Island End River Flood Resilience Project

Chelsea/Everett, Massachusetts

Expanded Environmental Notification Form

February 15, 2023

submitted to
Executive Office of Energy and Environmental Affairs

submitted by **Cities of Chelsea and Everett**

prepared by **Fort Point Associates, Inc., A Tetra Tech Company**

in association with
Weston & Sampson, Inc
AECOM
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Dewberry
Mystic River Watershed Association
GreenRoots
Tetra Tech

Fort Point Associates, Inc.
Urban Planning Environmental Consulting Project Permitting
A TETRA TECH COMPANY

TABLE OF CONTENTS

EXPANDED ENVIRONMENTAL NOTIFICATION FORM

PROJECT NARRATIVE

LIST OF TABLES

LIST OF FIGURES

APPENDICES

EXPANDED ENVIRONMENTAL NOTIFICATION FORM

Commonwealth of Massachusetts

Executive Office of Energy and Environmental Affairs
Massachusetts Environmental Policy Act (MEPA) Office

Environmental Notification Form

For Office Use Only

EEA#: _____

MEPA Analyst: _____

The information requested on this form must be completed in order to submit a document electronically for review under the Massachusetts Environmental Policy Act, 301 CMR 11.00.

Project Name: **Island End River Flood Resilience Project**		
Street Address: Beacham Street at Market Street		
Municipality: **Chelsea and Everett**	Watershed: **Mystic River**	
Universal Transverse Mercator Coordinates: **19T 331313E 4695530N**	Latitude: 42 23' 38" Longitude:-71 02' 58"	
Estimated commencement date: Fall 2024	Estimated completion date: Fall 2027	
Project Type: Resiliency	Status of project design: 50%complete	
Proponent: **City of Chelsea – Department of Housing & Community Development**		
Street Address: 500 Broadway, Chelsea, MA		
Municipality: **Chelsea and Everett**	State: **MA**	Zip Code:
Name of Contact Person: Katie Moniz		
Firm/Agency: **Fort Point Associates, Inc.**	Street Address: **31 State Street, 3rd Flr**	
Municipality: **Boston**	State: **MA**	Zip Code: **02109**
Phone: **(617) 279-4388**	Fax:	E-mail: **kmoniz@fpa-inc.com**

Does this project meet or exceed a mandatory EIR threshold (see 301 CMR 11.03)?
☐Yes ☒No

If this is an Expanded Environmental Notification Form (ENF) (see 301 CMR 11.05(7)) or a Notice of Project Change (NPC), are you requesting:

a Single EIR? (see 301 CMR 11.06(8))	☒Yes ☐No
a Rollover EIR? (see 301 CMR 11.06(13))	☐Yes ☒No
a Special Review Procedure? (see 301CMR 11.09)	☐Yes ☒No
a Waiver of mandatory EIR? (see 301 CMR 11.11)	☐Yes ☒No
a Phase I Waiver? (see 301 CMR 11.11)	☐Yes ☒No

(Note: Greenhouse Gas Emissions analysis must be included in the Expanded ENF.)

Which MEPA review threshold(s) does the project meet or exceed (see 301 CMR 11.03)?

301 CMR 11.03(3)(b)1.a. Alteration of a coastal bank
301 CMR 11.03(3)(b)1.c. Alteration of 1,000 or more sf of salt marsh or outstanding resource waters
301 CMR 11.03(3)(b)1.d. Alteration of 5,000 or more sf of bordering or isolated vegetated wetland
301 CMR 11.03(3)(b)1.f Alteration of one half or more acres of any other wetlands.

301 CMR 11.03(3)(b)6. Construction, reconstruction, or Expansion of an existing solid fill structure of 1,000 or more sf base area or of a pile-supported structure of 2,000 or more sf base area

Which State Agency Permits will the project require? **Chapter 91 License, 401 Water Quality Certification, Massachusetts Historical Commission Determination of No Adverse Effect, Massachusetts Coastal Zone Management Federal Consistency Review**

Identify any financial assistance or land transfer from an Agency of the Commonwealth, including the Agency name and the amount of funding or land area in acres:_ **Municipal Vulnerability Preparedness (MVP) and Coastal Zone Management (CZM) design funding of approximately $2 million since 2016**

Summary of Project Size & Environmental Impacts	**Existing**	**Change**	**Total**
LAND			
Total site acreage	9.54		
New acres of land altered		+1.04	
Acres of impervious area	5.58	-0.45	5.13
Square feet of new bordering vegetated wetlands alteration		14,742	
Square feet of new other wetland alteration		384,524	
Acres of new non-water dependent use of tidelands or waterways		0 Water Dependent	
STRUCTURES			
Gross square footage	8,946	+15,883	24,829
Number of housing units	0	0	0
Maximum height (feet)	11.9	+3.1	15
TRANSPORTATION			
Vehicle trips per day	0	0	0
Parking spaces	24	-5	19
WASTEWATER			
Water Use (Gallons per day)	0	0	0
Water withdrawal (GPD)	0	0	0
Wastewater generation/treatment (GPD)	0	0	0
Length of water mains (miles)	0	0	0
Length of sewer mains (miles)	0	0	0

Has this project been filed with MEPA before?
☐ Yes (EEA #_____) ☒No

Has any project on this site been filed with MEPA before?
☒ Yes (EEA # 16363 (withdrawn)_____) ☐No

GENERAL PROJECT INFORMATION –

PROJECT DESCRIPTION:

Describe the existing conditions and land uses on the project site:

The Island End River ("IER") is a tributary to the Mystic River and is tidally influenced. The IER is abutted by Everett on its western bank and Chelsea on its eastern bank. The surrounding area is heavily developed with high amounts of impervious surfaces and undersized stormwater infrastructure. The area is home to critical infrastructure including the New England Produce Center, the regional FBI headquarters, Massachusetts General Hospital, the City of Chelsea's Carter Street Pump Station, Williams Middle School, and Chelsea High School.

Historically, the IER region has experienced consistent flooding during relatively minor precipitation events, while experiencing significant coastal flooding during recent storm surge events and king tides. This is largely because the IER floodplain, anchored by the Beacham Street roadway corridor, was gradually filled for development on top of former tidal flats and marshes in the late 1800s, through the mid-1900s. More than 500 acres in Chelsea and Everett are inherently vulnerable to flooding because of the area's topography and hydrology, specifically the replacement of flood storage area with impervious surfaces and the culverted IER. The Project Site is located in two FEMA Flood Zones: 1) AE elevation ("El.") 10 NAVD88, Flood Insurance Rate Map ("FIRM") No. 25017C0443E, dated June 4, 2010, and 2) AE El. 10 NAVD88, FIRM No. 25025C0018J, dated March 16, 2016.

In March 2019 and again in May 2022, the presence of wetland resources, including salt marsh, bordering vegetated wetlands, coastal bank, and other resource areas, were delineated along the IER. The wetland resource areas in the Project Site are highly degraded due to adjacent dense development patterns and industrial uses. The banks of the IER are highly eroded and feature pieces of brick, stone, asphalt, and dumped debris. The IER's mean tidal elevations range between El. 4.3 and -5.16 feet NAVD88. There is a 6-foot deep by 75 to 100-foot wide U.S. Army Corps of Engineers Federal Navigation Project ("FNP") located south of the Project Site in the IER. The Everett shoreline of the Project Site is within part of the Mystic River Designated Port Area ("DPA"). See attached EENF Chapter 1, Section 1.3 for additional details.

Describe the proposed project and its programmatic and physical elements:

The Cities of Chelsea and Everett (the "Proponents") propose to construct a coastal flood barrier, Storm Surge Control Facility, and related amenities at IER in the Cities of Chelsea and Everett (the "Project Site"). The approximately 5.6-acre Project Site is currently comprised of a mix of commercial and industrial uses and supporting roadway and utility infrastructure. The proposed IER Flood Resilience Project (the "Project") will construct an approximately 4,640 linear-foot ("lf") flood barrier, an approximately 2,900 square-foot underground Storm Surge Control Facility, approximately 50,000 square feet of nature-based solutions along the riverfront, and associated wetland and public access improvements along the IER.

The Project includes the following critical flood resilience elements:

Flood Provisions East – Flood barrier along the Chelsea banks of the IER, which provides public amenities and improved pedestrian waterfront access, in the form of an

elevated boardwalk and vegetated berm sections.

<u>Storm Surge Control Facility</u> - This structure will be constructed at the outlet of the existing Market Street culvert to prevent inland flood damage during coastal storm events. The control gates will normally be open to allow for tidal flow into culverted and daylighted sections of the IER. Additionally, control measures will be installed on the Beacham Street drainage system to prevent backflow into the existing stormwater drainage system.

<u>Flood Provisions West</u> - Flood barrier along the Everett banks of the IER, which is situated in a DPA, in the form of vertical freestanding concrete wall and flood gates to protect working port businesses from coastal inundation.

<u>Nature-based Solutions</u> – Existing degraded riverfront slopes will be reimagined using a combination of native vegetation along upper bank and perforated concrete planters, lined with hardwood, and planted with bagged salt marsh grasses downslope. The planters will be dressed with natural stone joints and tiered for low and high marsh conditions in and behind the planters, making installation modular, scalable, and minimally invasive to install during low tide conditions. This design is also adaptive – as sea level rises the planters become support for filter feeding barnacles and shellfish.

<u>Wetlands Enhancements</u> - The Project will improve the health of the remaining salt marsh portion of the IER by removing invasive phragmites, replanting with and maintaining native species, and removal of significant deposits of existing trash and debris in this resource area. Additionally, it will address issues of erosion and sparse vegetation on coastal bank resource areas around IER through robust native planting program and slope stabilization efforts.

The Project will not interfere with the function or purpose of the DPA. Instead, the Project aims to protect the economic assets within Chelsea and Everett. The Project is critical for the flood protection of the IER floodplain and surrounding low-lying areas in Chelsea and Everett, which include the residences of environmental justice communities, significant transportation (rail and roadway) infrastructure, health care facilities, a grocery store serving much of the community, and a public high school, that will become part of the projected IER floodplain by 2070. Additionally, the Project will enhance natural resource areas, improve public access to the IER, and make meaningful connections to the Island End River Park. Regional collaboration between the municipalities of the Mystic River watershed, nonprofit organizations, and other partners, has been key to developing this flood protection initiative through extensive stakeholder input and community engagement. See attached EENF Chapter 1, Section 1.4 for additional details.

NOTE*: The project description should summarize both the project's direct and indirect impacts (including construction period impacts) in terms of their magnitude, geographic extent, duration and frequency, and reversibility, as applicable. It should also discuss the infrastructure requirements of the project and the capacity of the municipal and/or regional infrastructure to sustain these requirements into the future.*

Describe the on-site project alternatives (and alternative off-site locations, if applicable), considered by the proponent, including at least one feasible alternative that is allowed under current zoning, and the reasons(s) that they were not selected as the preferred alternative:

The Proponents considered multiple alternatives in addition to the Project, which is the Preferred Alternative. For a description of these alternatives, see attached EENF

Chapter 1, Section 1.6.

Summarize the mitigation measures proposed to offset the impacts of the preferred alternative:

NOTE*: The purpose of the alternatives analysis is to consider what effect changing the parameters and/or siting of a project, or components thereof, will have on the environment, keeping in mind that the objective of the MEPA review process is to avoid or minimize damage to the environment to the greatest extent feasible. Examples of alternative projects include alternative site locations, alternative site uses, and alternative site configurations.*

See attached EENF Chapter 3, Section 3.4.3 for description of mitigation measures.

If the project is proposed to be constructed in phases, please describe each phase:

The Project will not be constructed in phases.

AREAS OF CRITICAL ENVIRONMENTAL CONCERN:
Is the project within or adjacent to an Area of Critical Environmental Concern?
☐Yes (Specify:)
☒No
if yes, does the ACEC have an approved Resource Management Plan? ___ Yes ___ No;
If yes, describe how the project complies with this plan.
_____
Will there be stormwater runoff or discharge to the designated ACEC? ___ Yes ___ No;
If yes, describe and assess the potential impacts of such stormwater runoff/discharge to the designated ACEC.
_____

RARE SPECIES:
Does the project site include Estimated and/or Priority Habitat of State-Listed Rare Species? (see http://www.mass.gov/dfwele/dfw/nhesp/regulatory_review/priority_habitat/priority_habitat_home.htm)
☐Yes (Specify_____) ☒No

HISTORICAL /ARCHAEOLOGICAL RESOURCES:
Does the project site include any structure, site or district listed in the State Register of Historic Place or the inventory of Historic and Archaeological Assets of the Commonwealth?
☒Yes (Specify_ **Naval Hospital – Boston Historic District**_____) ☐No
If yes, does the project involve any demolition or destruction of any listed or inventoried historic or archaeological resources? ☐Yes (Specify_____) ☒No

WATER RESOURCES:
Is there an Outstanding Resource Water (ORW) on or within a half-mile radius of the project site? ___Yes _**X**_No;
if yes, identify the ORW and its location. _____

(NOTE: Outstanding Resource Waters include Class A public water supplies, their tributaries, and bordering wetlands; active and inactive reservoirs approved by MassDEP; certain waters within Areas of Critical Environmental Concern, and certified vernal pools. Outstanding resource waters are listed in the Surface Water Quality Standards, 314 CMR 4.00.)

Are there any impaired water bodies on or within a half-mile radius of the project site? _**X**_Yes ___No; if yes, identify the water body and pollutant(s) causing the impairment:_____.

Mystic River (Segment ID MA71-03) ammonia, cause unknown (contaminants in fish and/or shellfish; sediment screening value (exceedance)), dissolved oxygen, fecal coliform, flocculant masses, odor, oil and grease, PCBs in fish tissue, petroleum hydrocarbons, scum/foam.

Is the project within a medium or high stress basin, as established by the Massachusetts Water Resources Commission? ___Yes **X**_No

STORMWATER MANAGEMENT:

Generally describe the project's stormwater impacts and measures that the project will take to comply with the standards found in MassDEP's Stormwater Management Regulations:_____

The Project will adhere to the stormwater standards established by the Massachusetts Department of Environmental Protection (the "Department" or "DEP"). See attached EENF Chapter 5, Section 5.4.3.

MASSACHUSETTS CONTINGENCY PLAN:

Has the project site been, or is it currently being, regulated under M.G.L.c.21E or the Massachusetts Contingency Plan? Yes **X** No ___ ; if yes, please describe the current status of the site (including Release Tracking Number (RTN), cleanup phase, and Response Action Outcome classification): **Historically, the Site and surrounding area were operated as a Manufactured Gas Plant (MGP). Ultimately, the MGP and related operations resulted in releases of oil and hazardous materials to the environment. Assessment, remediation and ongoing management of these releases under the MCP relates to two primary Disposal Sites – the Former Coal Tar Processing Facility (FCTPF) and the Oxbow Fill Site (Oxbow). The table below summarizes the various RTNs within the boundaries of FCTPF and Oxbow Sites as encompassed by the ENF Project Site. In addition, the presence of urban fill in the area has resulted in issuance of additional RTNs unrelated to the former MGP operations.**

Physical Property Address	Primary RTN	MCP Status	Primary Contamination	Notes	Release Notes
Oxbow Site (#145 and #155 Market Street)	3-18459	C2 RAO	Coal Tar / MGP Impacts	Oxbow Site - MGP Waste Disposal	MGP/Urban Fill
Market and Beacham Streets	3-16509	B2 RAO	Urban Fill	Urban Fill	Urban Fill
Market and Beacham Streets	3-22647	A1 RAO	Oil	Vehicle spill	15-30 Gallons Diesel
#40 Commercial Street	3-26801	A2 RAO	Urban Fill	Urban Fill	Urban Fill
#60 Commercial Street	3-26381	URAM / DPS	Urban Fill	Urban Fill, DPS for CN in GW	MGP/Urban Fill
#61 Commercial Street	3-18189	B2 RAO	Oil	Transformer Release	MGP/Urban Fill
#18 Rover Street	3-0308	Partial Class C RAO	Coal Tar / MGP Impacts	Northern Study Area	MGP/Urban Fill
#101 Commercial Street	3-3404	B2 RAO	Coal Tar / MGP Impacts	Urban Fill with MGP Waste	MGP/Urban Fill
Island End River (IER)	3-25557	Tier ID	Oil	Oil Floating in River	600 Gallons Diesel to IER

RAO – Response Action Outcome Statement
URAM – Utility Related Abatement Measure
DPS – Downgradient Property Status

Is there an Activity and Use Limitation (AUL) on any portion of the project site? Yes **X** No ___; if yes, describe which portion of the site and how the project will be consistent with the AUL: **The table below presents a summary of the properties where an AUL has been used as part of regulatory closure for each of the Disposal Sites listed above. Note that not all Sites have AULs. AUL requirements will generally be met through the development and implementation of soil (and groundwater) management and health and safety plans during the work. Additional AUL requirements for specific Sites will be met on a case-by-case basis.**

Everett Main Address	Current Use	FCTPF Bounds	Oxbow Site	Urban Fill	Coal Tar / MGP Impacts	AUL?
#145 Market Street (Chelsea)	Undeveloped	No	Yes	Yes	Yes	Yes
#155 Market Street	Condakes	Yes	Partial	Yes	Yes (LNAPL)	Yes
#95 Behen Street	IMT Wharf Property / SPS	Partial	No	Yes	Yes	Yes
#61 Commercial Street	Distrigas - Warehouse	No	No	Yes	No	Yes
#101 Commercial (AKA #156 Rover)	Distrigas - Visitor Center	No	No	Yes	Yes (Cyanide in GW)	Yes
#18 Rover Street	Distrigas - LNG Facility	No	No	Yes	Yes (Cyanide in GW)	Yes

LNAPL – Light, non-aqueous phase liquid

Are you aware of any Reportable Conditions at the property that have not yet been assigned an RTN?
Yes ___ No _**X**_ ; if yes, please describe:_____

SOLID AND HAZARDOUS WASTE:

If the project will generate solid waste during demolition or construction, describe alternatives considered for re-use, recycling, and disposal of, e.g., asphalt, brick, concrete, gypsum, metal, wood:

The Proponents will re-use existing materials to the greatest possible extent and will recycle and dispose of the remaining materials in accordance with local and state regulations. Reuse of materials will be subject to AUL requirements for maintaining clean cover and/or impermeable surfaces.

(NOTE: Asphalt pavement, brick, concrete and metal are banned from disposal at Massachusetts landfills and waste combustion facilities and wood is banned from disposal at Massachusetts landfills. See 310 CMR 19.017 for the complete list of banned materials.)

Will your project disturb asbestos containing materials? Yes ___ No _X__ ;
if yes, please consult state asbestos requirements at http://mass.gov/MassDEP/air/asbhom01.htm

Describe anti-idling and other measures to limit emissions from construction equipment:

The Proponents expect their contractors to have a strict no-idling policy and to use post-2007 diesel vehicles retrofit to the US Environmental Protection Agency's standards.

DESIGNATED WILD AND SCENIC RIVER:

Is this project site located wholly or partially within a defined river corridor of a federally designated Wild and Scenic River or a state designated Scenic River? Yes ___ No **X**_ ; if yes, specify name of river and designation:

If yes, does the project have the potential to impact any of the "outstandingly remarkable" resources of a federally Wild and Scenic River or the stated purpose of a state designated Scenic River? Yes ___ No ___ ; if yes, specify name of river and designation: _____; if yes, will the project will result in any impacts to any of the designated "outstandingly remarkable" resources of the Wild and Scenic River or the stated purposes of a Scenic River. Yes ___ No ___ ; if yes,describe the potential impacts to one or more of the "outstandingly remarkable" resources or stated purposes and mitigation measures proposed.

ATTACHMENTS:

1. List of all attachments to this document.
2. U.S.G.S. map (good quality color copy, 8-½ x 11 inches or larger, at a scale of 1:24,000) indicating the project location and boundaries.
3.. Plan, at an appropriate scale, of existing conditions on the project site and its immediate environs, showing all known structures, roadways and parking lots, railroad rights-of-way, wetlands and water bodies, wooded areas, farmland, steep slopes, public open spaces, and major utilities.
4 Plan, at an appropriate scale, depicting environmental constraints on or adjacent to the project site such as Priority and/or Estimated Habitat of state-listed rare species, Areas of Critical Environmental Concern, Chapter 91 jurisdictional areas, Article 97 lands, wetland resource area delineations, water supply protection areas, and historic resources and/or districts.
5. Plan, at an appropriate scale, of proposed conditions upon completion of project (if construction of the project is proposed to be phased, there should be a site plan showing conditions upon the completion of each phase).
6. List of all agencies and persons to whom the proponent circulated the ENF, in accordance with 301 CMR 11.16(2).
7. List of municipal and federal permits and reviews required by the project, as applicable.
8. Printout of output report from RMAT Climate Resilience Design Standards Tool, available here.
9. Printout from the EEA EJ Maps Viewer showing the project location relative to Environmental Justice (EJ) Populations located in whole or in part within a 1-mile and 5-mile radius of the project site.

LAND SECTION – all proponents must fill out this section

I. Thresholds / Permits

A. Does the project meet or exceed any review thresholds related to **land** (see 301 CMR 11.03(1) ___ Yes _**X**_ No; if yes, specify each threshold:

II. Impacts and Permits

A. Describe, in acres, the current and proposed character of the project site, as follows:

	Existing	Change	Total
Footprint of buildings	0	0	0
Internal roadways	1.82	-0.03	1.79
Parking and other paved areas	3.55	-0.69	2.86
Other altered areas	1.50	0.48	1.99
Undeveloped areas	2.66	0.11	2.76
Total: Project Site Acreage	9.54	-0.13	9.40

B. Has any part of the project site been in active agricultural use in the last five years? ___ Yes _**X**_ No; if yes, how many acres of land in agricultural use (with prime state or locally important agricultural soils) will be converted to nonagricultural use?

C. Is any part of the project site currently or proposed to be in active forestry use? ___ Yes _**X**_ No; if yes, please describe current and proposed forestry activities and indicate whether any part of the site is the subject of a forest management plan approved by the Department of Conservation and Recreation:

D. Does any part of the project involve conversion of land held for natural resources purposes in accordance with Article 97 of the Amendments to the Constitution of the Commonwealth to any purpose not in accordance with Article 97? ___ Yes _**X**_ No; if yes, describe:

E. Is any part of the project site currently subject to a conservation restriction, preservation restriction, agricultural preservation restriction or watershed preservation restriction? ___ Yes_**X**_ No; if yes, does the project involve the release or modification of such restriction? ___ Yes ___ No; if yes, describe:

F. Does the project require approval of a new urban redevelopment project or a fundamental change in an existing urban redevelopment project under M.G.L.c.121A? ___ Yes _**X**_ No; if yes, describe:

G. Does the project require approval of a new urban renewal plan or a major modification of an existing urban renewal plan under M.G.L.c.121B? Yes ___ No _**X**_; if yes, describe:

III. Consistency

A. Identify the current municipal comprehensive land use plan

While neither community has a recent municipal comprehensive land use plan, both Chelsea and Everett have completed numerous recent plans/studies of the Project Site and the wider community that included components related to the Project.

City of Chelsea Planning Studies/Plans:

Title: Beacham/Williams Street Corridor Study **Date: June 2018**
Title: Open Space & Recreational Plan Update 2017-2024 **Date June 2017**

City of Everett Planning Studies/Plans:

Title: Hazard Mitigation Plan Update 2022-2027 **Date March 2022**

1) economic development: **The Project will support economic development in**

accordance with the planning goals of the Proponents by protecting more than 11,000 existing jobs and $2.3 billion dollars in economic activity in the region from catastrophic flood risk.

2) adequacy of infrastructure: **The Project will protect existing infrastructure from flood damages and will enhance stormwater utility infrastructure in the area by providing surge control measures for the existing Market Street culvert and the Beacham Street drainage system.**
3) open space impacts: **The Project will enhance public access to the IER and will enhance degraded riverfront area with native plantings and erosion and sedimentation control measures.**
4) compatibility with adjacent land uses: **The neighboring parcels are also zoned for industrial or commercial use and the Project will protect these businesses, as well as inland residential sections of Environmental Justice Communities, from flood risk.**

B. Identify the current Regional Policy Plan of the applicable Regional Planning Agency (RPA)

RPA: Metropolitan Area Planning Council ("MAPC")

Title: Metro Common 2050 Date: September 2021

C. Describe the project's consistency with that plan with regard to:

1) economic development: **The Project will support economic development in accordance with the planning goals of the Proponents by protecting more than 11,000 existing jobs and $2.3 billion dollars in economic activity in the region from catastrophic flood risk.**
2) adequacy of infrastructure: **The Project will protect existing infrastructure from flood damages and will enhance stormwater utility infrastructure in the area by providing surge control measures for the existing Market Street culvert and the Beacham Street drainage system.**
3) open space impacts: **The Project will enhance public access to the IER and will enhance degraded riverfront area with native plantings and erosion and sedimentation control measures.**

The Project is consistent with the visions and policies defined in the MAPC's Metro Common 2050 released in September 2021. The Project will realize several of the plan's goals related to livability, mobility, healthy environments, a climate resilient region, economic security, and economic prosperity. These include strengthening flood resilience, supporting economic vitality, strengthening connections, and expanding pedestrian networks. The Project will catalyze economic development in the City of Everett, City of Chelsea, and the region, improve and expand existing infrastructure at the Project Site, and enhance existing recreational areas.

RARE SPECIES SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **rare species or habitat** (see 301 CMR 11.03(2))? ___ Yes _**X**_ No; if yes, specify, in quantitative terms:

(NOTE: If you are uncertain, it is recommended that you consult with the Natural Heritage and Endangered Species Program (NHESP) prior to submitting the ENF.)

B. Does the project require any state permits related to **rare species or habitat**? ___ Yes _**X**_ No

C. Does the project site fall within mapped rare species habitat (Priority or Estimated Habitat?) in the current Massachusetts Natural Heritage Atlas (attach relevant page)? ___ Yes _**X**_ No.

D. If you answered "No" to all questions A, B and C, proceed to the **Wetlands, Waterways, and Tidelands Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Rare Species section below.

II. Impacts and Permits

A. Does the project site fall within Priority or Estimated Habitat in the current Massachusetts Natural Heritage Atlas (attach relevant page)? ___ Yes __ No. If yes,

1. Have you consulted with the Division of Fisheries and Wildlife Natural Heritage and Endangered Species Program (NHESP)? ___Yes ___No; if yes, have you received a determination as to whether the project will result in the "take" of a rare species? ___ Yes ___ No; if yes, attach the letter of determination to this submission.

2. Will the project "take" an endangered, threatened, and/or species of special concern in accordance with M.G.L. c.131A (see also 321 CMR 10.04)? ___ Yes ___ No; if yes, provide a summary of proposed measures to minimize and mitigate rare species impacts

3. Which rare species are known to occur within the Priority or Estimated Habitat?

4. Has the site been surveyed for rare species in accordance with the Massachusetts Endangered Species Act? ___ Yes ___ No

4. If your project is within Estimated Habitat, have you filed a Notice of Intent or received an Order of Conditions for this project? ___ Yes ___ No; if yes, did you send a copy of the Notice of Intent to the Natural Heritage and Endangered Species Program, in accordance with the Wetlands Protection Act regulations? ___ Yes ___ No

B. Will the project "take" an endangered, threatened, and/or species of special concern in accordance with M.G.L. c.131A (see also 321 CMR 10.04)? ___ Yes ___ No; if yes, provide a summary of proposed measures to minimize and mitigate impacts to significant habitat:

WETLANDS, WATERWAYS, AND TIDELANDS SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **wetlands, waterways, and tidelands** (see 301 CMR 11.03(3))? _**X**_ Yes ___ No; if yes, specify, in quantitative terms:

301 CMR 11.03(3)(b)1.a. Alteration of a coastal bank: 967 linear feet
301 CMR 11.03(3)(b)1.c. Alteration of 1,000 or more sf of salt marsh or outstanding resource waters: 22,812 sf Salt Marsh
301 CMR 11.03(3)(b)1.d. Alteration of 5,000 or more sf of bordering or isolated vegetated wetland: 7,374 sf BVW
301 CMR 11.03(3)(b)1.f Alteration on one half or more acres of other wetlands: 346,510 sf LSCSF
301 CMR 11.03(3)(b)6. Construction, reconstruction, or Expansion of an existing solid fill structure of 1,000 or more sf base area or of a pile-supported structure of 2,000 or more sf base area

B. Does the project require any state permits (or a local Order of Conditions) related to **wetlands, waterways, or tidelands**? _**X**_ Yes ___ No; if yes, specify which permit: **Local Order of Conditions (both Chelsea and Everett), DEP Chapter 91 License, 401 Water Quality Certification, Massachusetts Historical Commission Determination of No Adverse Effect**

C. If you answered "No" to both questions A and B, proceed to the **Water Supply Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Wetlands, Waterways, and Tidelands Section below.

II. Wetlands Impacts and Permits

A. Does the project require a new or amended Order of Conditions under the Wetlands Protection Act (M.G.L. c.131A)? _**X**_ Yes ___ No; if yes, has a Notice of Intent been filed? ___ Yes _**X**_ No; if yes, list the date and MassDEP file number: __**N/A**__; if yes, has a local Order of Conditions been issued? ___ Yes ___ No; Was the Order of Conditions appealed? ___ Yes ___ No. Will the project require a Variance from the Wetlands regulations? ___ Yes _**X**__ No.

B. Describe any proposed permanent or temporary impacts to wetland resource areas located on the project site: **Temporary impacts to wetland resource areas include clearing and grubbing existing vegetation, removal of existing site features such as boardwalk and fencing, and excavation for freestanding wall footings and sheet pile wall within the 25' Riverfront Area and 100' coastal buffer zone. Additional temporary impacts include clearing and maintenance of salt marsh trash and debris. Permanent impacts include construction of a freestanding and bulkhead walls along coastal bank and within the 25' Riverfront Area, a pile-supported wooden boardwalk, a concrete sidewalk, and other additional site amenities at Island End Park and the vicinity within the 100' coastal buffer zone. The proposed work in BVW includes an area of 5,718 SF of temporary impacts including proposed Spartina Alterniflora plugs and native salt tolerant seed mix plantings. The Project will replicate the 1,650 SF of BVW lost with a 2,674 SF area adjacent to the Island End Park and #359 Beacham Street property.**

C. Estimate the extent and type of impact that the project will have on wetland resources, and indicate whether the impacts are temporary or permanent:

Coastal Wetlands	Area (square feet) or Length (linear feet)	Temporary or Permanent Impact?
Land Under the Ocean	2,997 648	Permanent Temporary
Designated Port Areas	4,902 12,585	Permanent Temporary
Coastal Beaches	8,502 3,055	Permanent Temporary
Coastal Dunes	0	N/A
Barrier Beaches	0	N/A
Coastal Banks	759 208	Permanent Temporary
Rocky Intertidal Shores	0	N/A
Salt Marshes	22,812	Temporary
Land Under Salt Ponds	0	N/A
Land Containing Shellfish	1,357 252	Permanent Temporary
Fish Runs	0	N/A
Land Subject to Coastal Storm Flowage	211,496 125,014	Permanent Temporary
Inland Wetlands		
Bank (lf)	57	Permanent
Bordering Vegetated Wetlands	1,656 5,718	Permanent Temporary
Isolated Vegetated Wetlands	0	N/A
Land under Water	0	N/A
Isolated Land Subject to Flooding	0	N/A
Bordering Land Subject to Flooding	0	N/A
Riverfront Area	15,481 7,226	Permanent Temporary

D. Is any part of the project:

1. proposed as a **limited project**? ___ Yes _**X**__ No; if yes, what is the area (in sf)?____
2. the construction or alteration of a **dam**? ___ Yes _**X**_ No; if yes, describe:
3. fill or structure in a **velocity zone** or **regulatory floodway**? ___ Yes _**X**_ No
4. dredging or disposal of dredged material? _**X**_ Yes ___ No; if yes, describe the volume of dredged material and the proposed disposal site: 1438 cubic yards, disposal site to be determined. Past sampling results and discussion of dredging considerations is included in

5. a discharge to an **Outstanding Resource Water (ORW)** or an **Area of Critical Environmental Concern (ACEC)**? ___ Yes _**X**_ No
6. subject to a wetlands restriction order? ___ Yes _**X**_ No; if yes, identify the area (in sf):
7. located in buffer zones? _**X**_Yes ___No; if yes, how much (in sf) **48,574 sf (permanent) and 27,680 sf (temporary). Work located within the 100' buffer zone is associated with the coastal bank.**

E. Will the project:
1. be subject to a local wetlands ordinance or bylaw? _**X**_ Yes ___ No
2. alter any federally-protected wetlands not regulated under state law? ___ Yes _**X**_ No; if yes, what is the area (sf)?

III. Waterways and Tidelands Impacts and Permits

A. Does the project site contain waterways or tidelands (including filled former tidelands) that are subject to the Waterways Act, M.G.L.c.91? _**X**_ Yes __ No; if yes, is there a current Chapter 91 License or Permit affecting the project site? _**X**__ Yes __ No; if yes, list the date and license or permit number and provide a copy of the historic map used to determine extent of filled tidelands: **See the attached EENF Chapter 2: Tidelands**

B. Does the project require a new or modified license or permit under M.G.L.c.91? _**X**_ Yes ___ No; if yes, how many acres of the project site subject to M.G.L.c.91 will be for non-water-dependent use? Current _**0**_ Change _**0**_ Total _**0**_
If yes, how many square feet of solid fill or pile-supported structures (in sf)? TBD

C. For non-water-dependent use projects, indicate the following:
Area of filled tidelands on the site:_____
Area of filled tidelands covered by buildings:_____
For portions of site on filled tidelands, list ground floor uses and area of each use:
_____
Does the project include new non-water-dependent uses located over flowed tidelands? Yes ___ No ___
Height of building on filled tidelands_____

Also show the following on a site plan: Mean High Water, Mean Low Water, Water-dependent Use Zone, location of uses within buildings on tidelands, and interior and exterior areas and facilities dedicated for public use, and historic high and historic low water marks.

D. Is the project located on landlocked tidelands? __ Yes _**X**_ No; if yes, describe the project's impact on the public's right to access, use and enjoy jurisdictional tidelands and describe measures the project will implement to avoid, minimize or mitigate any adverse impact:

E. Is the project located in an area where low groundwater levels have been identified by a municipality or by a state or federal agency as a threat to building foundations? ___Yes _**X**_ No; if yes, describe the project's impact on groundwater levels and describe measures the project will implement to avoid, minimize or mitigate any adverse impact:

F. Is the project non-water-dependent **and** located on landlocked tidelands **or** waterways or tidelands subject to the Waterways Act **and** subject to a mandatory EIR? ___ Yes _**X**_ No;
(NOTE: If yes, then the project will be subject to Public Benefit Review and Determination.)

G. Does the project include dredging? _**X**_ Yes ___ No; if yes, answer the following questions:

What type of dredging? Improvement _**X**_ Maintenance ___ Both ____
What is the proposed dredge volume, in cubic yards (cys) _____
1438 CY.
What is the proposed dredge footprint **14,464 sf** (square feet) **113 ft** length (ft) **128 ft** width (ft) **8 ft** depth (ft);
Will dredging impact the following resource areas?

Intertidal Yes_**X**_ No__; if yes, __
Outstanding Resource Waters Yes__ No_**X**_; if yes, ___ sq ft
Other resource area (i.e. shellfish beds, eel grass beds) Yes_ No **X**
If yes to any of the above, have you evaluated appropriate and practicable steps to: 1) avoidance; 2) if avoidance is not possible, minimization; 3) if either avoidance or minimize is not possible, mitigation?
Dredging will also occur within buffer to a coastal bank and land under ocean resource areas at the existing outfall structure. The existing outfall needs to be updated as part of the flood control improvements and strategy for this Project, and cannot be avoided, and has been redesigned to minimize impacts on the resource areas. The overall goal of the Project is to mitigate flooding due to storm surges, coastal flooding, and sea level rise.
If no to any of the above, what information or documentation was used to support this determination?

Provide a comprehensive analysis of practicable alternatives for improvement dredging in accordance with 314 CMR 9.07(1)(b). Physical and chemical data of the sediment shall be included in the comprehensive analysis. **See attached EENF Chapter 5, Infrastructure and Project Construction.**

Sediment Characterization

Existing gradation analysis results? _**X**_Yes ___No: if yes, provide results. **See Appendix H – 2005 Sediment Sampling Information.**
Existing chemical results for parameters listed in 314 CMR 9.07(2)(b)6? **X** Yes __No; if yes, provide results. **See Appendix H – 2005 Sediment Sampling Information.**

Do you have sufficient information to evaluate feasibility of the following management options for dredged sediment? **Yes.** If yes, check the appropriate option.

Beach Nourishment ___
Unconfined Ocean Disposal ___
Confined Disposal:
Confined Aquatic Disposal (CAD) ___
Confined Disposal Facility (CDF) - **Based upon prior dredging within IER, it is anticipated that similar CDF disposal strategy or use of other off-site controlled disposal area will be necessary. See Appendix H – 2005 Sediment Sampling Information.**
Landfill Reuse in accordance with COMM-97-001 ___
Shoreline Placement ___
Upland Material Reuse____
In-State landfill disposal____
Out-of-state landfill disposal ___
(NOTE: This information is required for a 401 Water Quality Certification.)

IV. Consistency:

A. Does the project have effects on the coastal resources or uses, and/or is the project located within the Coastal Zone? _**X**_ Yes ___ No; if yes, describe these effects and the projects consistency with the policies of the Office of Coastal Zone Management:
See attached EENF Chapter 2: Tidelands.

B. Is the project located within an area subject to a Municipal Harbor Plan? ___ Yes _**X**__ No; if

yes, identify the Municipal Harbor Plan and describe the project's consistency with that plan:

WATER SUPPLY SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **water supply** (see 301 CMR 11.03(4))? ___ Yes _**X**_ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **water supply**? ___ Yes _**X**_ No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Wastewater Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Water Supply Section below.

II. Impacts and Permits

A. Describe, in gallons per day (gpd), the volume and source of water use for existing and proposed activities at the project site:

	Existing	Change	Total
Municipal or regional water supply	_____	_____	_____
Withdrawal from groundwater	_____	_____	_____
Withdrawal from surface water	_____	_____	_____
Interbasin transfer	_____	_____	_____

(NOTE: Interbasin Transfer approval will be required if the basin and community where the proposed water supply source is located is different from the basin and community where the wastewater from the source will be discharged.)

B. If the source is a municipal or regional supply, has the municipality or region indicated that there is adequate capacity in the system to accommodate the project? ___ Yes ___ No

C. If the project involves a new or expanded withdrawal from a groundwater or surface water source, has a pumping test been conducted? ___ Yes ___ No; if yes, attach a map of the drilling sites and a summary of the alternatives considered and the results. _____

D. What is the currently permitted withdrawal at the proposed water supply source (in gallons per day)? _____Will the project require an increase in that withdrawal? ___Yes ___No; if yes, then how much of an increase (gpd)? _____

E. Does the project site currently contain a water supply well, a drinking water treatment facility, water main, or other water supply facility, or will the project involve construction of a new facility? ___ Yes ___No. If yes, describe existing and proposed water supply facilities at the project site:

	Permitted Flow	Existing Avg Daily Flow	Project Flow	Total
Capacity of water supply well(s) (gpd)	_____	_____	_____	_____
Capacity of water treatment plant (gpd)	_____	_____	_____	_____

F. If the project involves a new interbasin transfer of water, which basins are involved, what is the direction of the transfer, and is the interbasin transfer existing or proposed?

G. Does the project involve:

1. new water service by the Massachusetts Water Resources Authority or other agency of the Commonwealth to a municipality or water district? ___ Yes ___ No
2. a Watershed Protection Act variance? ___ Yes ___ No; if yes, how many acres of alteration?

3. a non-bridged stream crossing 1,000 or less feet upstream of a public surface drinking water supply for purpose of forest harvesting activities? ___ Yes ___ No

III. Consistency

Describe the project's consistency with water conservation plans or other plans to enhance water resources, quality, facilities and services:

WASTEWATER SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **wastewater** (see 301 CMR 11.03(5))? ___ Yes _**X**_ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **wastewater**? ___ Yes _**X**_ No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Transportation -- Traffic Generation Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Wastewater Section below.

II. Impacts and Permits

A. Describe the volume (in gallons per day) and type of disposal of wastewater generation for existing and proposed activities at the project site (calculate according to 310 CMR 15.00 for septic systems or 314 CMR 7.00 for sewer systems):

	Existing	Change	Total
Discharge of sanitary wastewater	_____	_____	_____
Discharge of industrial wastewater	_____	_____	_____
TOTAL	_____	_____	_____

	Existing	Change	Total
Discharge to groundwater	_____	_____	_____
Discharge to outstanding resource water	_____	_____	_____
Discharge to surface water	_____	_____	_____
Discharge to municipal or regional wastewater facility	_____	_____	_____
TOTAL	_____	_____	_____

B. Is the existing collection system at or near its capacity? ___ Yes ___ No; if yes, then describe the measures to be undertaken to accommodate the project's wastewater flows:

C. Is the existing wastewater disposal facility at or near its permitted capacity? ___ Yes___ No; if yes, then describe the measures to be undertaken to accommodate the project's wastewater flows:

D. Does the project site currently contain a wastewater treatment facility, sewer main, or other wastewater disposal facility, or will the project involve construction of a new facility? ___ Yes ___ No; if yes, describe as follows:

	Permitted	Existing Avg Daily Flow	Project Flow	Total
Wastewater treatment plant capacity (in gallons per day)	_____	_____	_____	_____

E. If the project requires an interbasin transfer of wastewater, which basins are involved, what is the direction of the transfer, and is the interbasin transfer existing or new?

(NOTE: Interbasin Transfer approval may be needed if the basin and community where wastewater will be discharged is different from the basin and community where the source of water supply is located.)

F. Does the project involve new sewer service by the Massachusetts Water Resources Authority (MWRA) or other Agency of the Commonwealth to a municipality or sewer district? ___ Yes ___ No

G. Is there an existing facility, or is a new facility proposed at the project site for the storage, treatment, processing, combustion or disposal of sewage sludge, sludge ash, grit, screenings, wastewater reuse (gray water) or other sewage residual materials? ___ Yes ___ No; if yes, what is the capacity (tons per day):

	Existing	Change	Total
Storage	_____	_____	_____
Treatment	_____	_____	_____
Processing	_____	_____	_____
Combustion	_____	_____	_____
Disposal	_____	_____	_____

H. Describe the water conservation measures to be undertaken by the project, and other wastewater mitigation, such as infiltration and inflow removal.

III. Consistency

A. Describe measures that the proponent will take to comply with applicable state, regional, and local plans and policies related to wastewater management:

B. If the project requires a sewer extension permit, is that extension included in a comprehensive wastewater management plan? ___ Yes ___ No; if yes, indicate the EEA number for the plan and whether the project site is within a sewer service area recommended or approved in that plan:

TRANSPORTATION SECTION (TRAFFIC GENERATION)

I. Thresholds / Permit

A. Will the project meet or exceed any review thresholds related to **traffic generation** (see 301 CMR 11.03(6))? ___ Yes _**X**_ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **state-controlled roadways**? ___ Yes _**X**_ No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Roadways and Other Transportation Facilities Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Traffic Generation Section below.

II. Traffic Impacts and Permits

A. Describe existing and proposed vehicular traffic generated by activities at the project site:

	Existing	Change	Total
Number of parking spaces	_____	_____	_____
Number of vehicle trips per day	_____	_____	_____
ITE Land Use Code(s):	_____	_____	_____

B. What is the estimated average daily traffic on roadways serving the site?

Roadway	Existing	Change	Total
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____

C. If applicable, describe proposed mitigation measures on state-controlled roadways that the project proponent will implement:

D. How will the project implement and/or promote the use of transit, pedestrian and bicycle facilities and services to provide access to and from the project site?

C. Is there a Transportation Management Association (TMA) that provides transportation demand management (TDM) services in the area of the project site? ____ Yes ____ No; if yes, describe if and how will the project will participate in the TMA:

D. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation facilities? ____ Yes ____ No; if yes, generally describe:

E. If the project will penetrate approach airspace of a nearby airport, has the proponent filed a Massachusetts Aeronautics Commission Airspace Review Form (780 CMR 111.7) and a Notice of Proposed Construction or Alteration with the Federal Aviation Administration (FAA) (CFR Title 14 Part 77.13, forms 7460-1 and 7460-2)?

III. Consistency

Describe measures that the proponent will take to comply with municipal, regional, state, and federal plans and policies related to traffic, transit, pedestrian and bicycle transportation facilities and services:

TRANSPORTATION SECTION (ROADWAYS AND OTHER TRANSPORTATION FACILITIES)

I. Thresholds

A. Will the project meet or exceed any review thresholds related to **roadways or other transportation facilities** (see 301 CMR 11.03(6))? ___ Yes _**X**_ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **roadways or other transportation facilities**? ___ Yes _**X**_ No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Energy Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Roadways Section below.

II. Transportation Facility Impacts

A. Describe existing and proposed transportation facilities in the immediate vicinity of the project site:

B. Will the project involve any

1. Alteration of bank or terrain (in linear feet)? _____
2. Cutting of living public shade trees (number)? _____
3. Elimination of stone wall (in linear feet)? _____

III. Consistency -- Describe the project's consistency with other federal, state, regional, and local plans and policies related to traffic, transit, pedestrian and bicycle transportation facilities and services, including consistency with the applicable regional transportation plan and the Transportation Improvements Plan (TIP), the State Bicycle Plan, and the State Pedestrian Plan:

ENERGY SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **energy** (see 301 CMR 11.03(7))? ___ Yes _**X**_ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **energy**? ___ Yes _**X**_ No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Air Quality Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Energy Section below.

II. Impacts and Permits

A. Describe existing and proposed energy generation and transmission facilities at the project site:

	Existing	Change	Total
Capacity of electric generating facility (megawatts)	_____	_____	_____
Length of fuel line (in miles)	_____	_____	_____
Length of transmission lines (in miles)	_____	_____	_____
Capacity of transmission lines (in kilovolts)	_____	_____	_____

B. If the project involves construction or expansion of an electric generating facility, what are:

1. the facility's current and proposed fuel source(s)?
2. the facility's current and proposed cooling source(s)?

C. If the project involves construction of an electrical transmission line, will it be located on a new, unused, or abandoned right of way? ___Yes ___No; if yes, please describe:

D. Describe the project's other impacts on energy facilities and services:

III. Consistency

Describe the project's consistency with state, municipal, regional, and federal plans and policies for enhancing energy facilities and services:

AIR QUALITY SECTION

I. Thresholds

A. Will the project meet or exceed any review thresholds related to **air quality** (see 301 CMR 11.03(8))? ___ Yes _**X**_ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **air quality**? ___ Yes _**X**_ No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Solid and Hazardous Waste Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Air Quality Section below.

II. Impacts and Permits

A. Does the project involve construction or modification of a major stationary source (see 310 CMR 7.00, Appendix A)? ___ Yes ___ No; if yes, describe existing and proposed emissions (in tons per day) of:

	Existing	Change	Total
Particulate matter	_____	_____	_____
Carbon monoxide	_____	_____	_____
Sulfur dioxide	_____	_____	_____
Volatile organic compounds	_____	_____	_____
Oxides of nitrogen	_____	_____	_____
Lead	_____	_____	_____
Any hazardous air pollutant	_____	_____	_____
Carbon dioxide	_____	_____	_____

B. Describe the project's other impacts on air resources and air quality, including noise impacts:

III. Consistency

A. Describe the project's consistency with the State Implementation Plan:

B. Describe measures that the proponent will take to comply with other federal, state, regional, and local plans and policies related to air resources and air quality:

SOLID AND HAZARDOUS WASTE SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **solid or hazardous waste** (see 301 CMR 11.03(9))? ___ Yes _**X**_ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **solid and hazardous waste**? ___ Yes _**X**_ No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Historical and Archaeological Resources Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Solid and Hazardous Waste Section below.

II. Impacts and Permits

A. Is there any current or proposed facility at the project site for the storage, treatment, processing, combustion or disposal of solid waste? ___ Yes ___ No; if yes, what is the volume (in tons per day) of the capacity:

	Existing	Change	Total
Storage	_____	_____	_____
Treatment, processing	_____	_____	_____
Combustion	_____	_____	_____
Disposal	_____	_____	_____

B. Is there any current or proposed facility at the project site for the storage, recycling, treatment or disposal of hazardous waste? ___ Yes ___ No; if yes, what is the volume (in tons or gallons per day) of the capacity:

	Existing	Change	Total
Storage	_____	_____	_____
Recycling	_____	_____	_____
Treatment	_____	_____	_____
Disposal	_____	_____	_____

C. If the project will generate solid waste (for example, during demolition or construction), describe alternatives considered for re-use, recycling, and disposal:

D. If the project involves demolition, do any buildings to be demolished contain asbestos? ___ Yes ___ No

E. Describe the project's other solid and hazardous waste impacts (including indirect impacts):

III. Consistency

Describe measures that the proponent will take to comply with the State Solid Waste Master Plan:

HISTORICAL AND ARCHAEOLOGICAL RESOURCES SECTION

I. Thresholds / Impacts

A. Have you consulted with the Massachusetts Historical Commission? ___ Yes _**X**_ No; if yes, attach correspondence.

For project sites involving lands under water, have you consulted with the Massachusetts Board of Underwater Archaeological Resources? ____Yes _**X**__ No; if yes, attach correspondence

B. Is any part of the project site a historic structure, or a structure within a historic district, in either case listed in the State Register of Historic Places or the Inventory of Historic and Archaeological Assets of the Commonwealth? _**X**_ Yes __ No; if yes, does the project involve the demolition of all or any exterior part of such historic structure? ___ Yes _**X**_ No; if yes, please describe:

See attached EENF Chapter 7: Historic Resources

C. Is any part of the project site an archaeological site listed in the State Register of Historic Places or the Inventory of Historic and Archaeological Assets of the Commonwealth? ___ Yes _**X**_ No; if yes, does the project involve the destruction of all or any part of such archaeological site? ___ Yes _ _ No; if yes, please describe:

D. If you answered "No" to all parts of both questions A, B and C, proceed to the **Attachments and Certifications** Sections. If you answered "Yes" to any part of either question A or question B, fill out the remainder of the Historical and Archaeological Resources Section below.

II. Impacts

Describe and assess the project's impacts, direct and indirect, on listed or inventoried historical and archaeological resources:

The Project will indirectly provide flood protection to the area, increase public access to the waterfront, and improve natural conditions of the IER in order to protect the existing businesses and roadways and access to them and the Naval Hospital Historic District.

III. Consistency

Describe measures that the proponent will take to comply with federal, state, regional, and local plans and policies related to preserving historical and archaeological resources:

The Proponents will continue to review impacts to historic and archaeological resources in the proximity of the Project Site as the design develops. The Proponents will engage the state and local historic commissions to ensure that the project complies with the preservation of these historic properties.

Four properties were identified near the Project Site and are associated with the Boston Naval Hospital Historic District, which is listed on the National Register. The Boston Naval Hospital Building 2 (Inventory Number CLS.586) located at 285 Commandants Way, is the closest property, at approximately 102 feet from the Project Site. The Project will not include any work on Commandants Way and as a result will have no impact on these historic properties.

CLIMATE CHANGE ADAPTATION AND RESILIENCY SECTION

This section of the Environmental Notification Form (ENF) solicits information and disclosures related to climate change adaptation and resiliency, in accordance with the MEPA Interim Protocol on Climate Change Adaptation and Resiliency (the "MEPA Interim Protocol"), effective October 1, 2021. The Interim Protocol builds on the analysis and recommendations of the 2018 Massachusetts Integrated State Hazard Mitigation and Climate Adaptation Plan (SHMCAP), and incorporates the efforts of the Resilient Massachusetts Action Team (RMAT), the inter-agency steering committee responsible for implementation, monitoring, and maintenance of the SHMCAP, including the "Climate Resilience Design Standards and Guidelines" project. The RMAT team recently released the RMAT Climate Resilience Design Standards Tool, which is available here.

The MEPA Interim Protocol is intended to gather project-level data in a standardized manner that will both inform the MEPA review process and assist the RMAT team in evaluating the accuracy and effectiveness of the RMAT Climate Resilience Design Standards Tool. Once this testing process is completed, the MEPA Office anticipates developing a formal Climate Change Adaptation and Resiliency Policy through a public stakeholder process. Questions about the RMAT Climate Resilience Design Standards Tool can be directed to rmat@mass.gov.

All Proponents must complete the following section, referencing as appropriate the results of the output report generated by the RMAT Climate Resilience Design Standards Tool and attached to the ENF. In completing this section, Proponents are encouraged, but not required at this time, to utilize the recommended design standards and associated Tier 1/2/3 methodologies outlined in the RMAT Climate Resilience Design Standards Tool to analyze the project design. However, Proponents are requested to respond to a respond to a user feedback survey on the RMAT website or to provide feedback to rmat@mass.gov, which will be used by the RMAT team to further refine the tool. Proponents are also encouraged to consult general guidance and best practices as described in the RMAT Climate Resilience Design Guidelines.

Climate Change Adaptation and Resiliency Strategies

I. Has the project taken measures to adapt to climate change for all of the climate parameters analyzed in the RMAT Climate Resilience Design Standards Tool (sea level rise/storm surge, extreme precipitation (urban or riverine flooding), extreme heat)? _**X**__Yes __ No

Note: Climate adaptation and resiliency strategies include actions that seek to reduce vulnerability to anticipated climate risks and improve resiliency for future climate conditions. Examples of climate adaptation and resiliency strategies include flood barriers, increased stormwater infiltration, living shorelines, elevated infrastructure, increased tree canopy, etc. Projects should address any planning priorities identified by the affected municipality through the Municipal Vulnerability Preparedness (MVP) program or other planning efforts, and should consider a flexible adaptive pathways approach, an adaptation best practice that encourages design strategies that adapt over time to respond to changing climate conditions. General guidance and best practices for designing for climate risk are described in the RMAT Climate Resilience Design Guidelines*.*

A. If no, explain why.

B. If yes, describe the measures the project will take, including identifying the planning horizon and climate data used in designing project components. If applicable, specify the return period and design storm used (e.g., 100-year, 24-hour storm).

See attached EENF Chapter 6: Flood Resiliency.

C. Is the project contributing to regional adaptation strategies? **X**_ Yes __ No; If yes, describe.

See attached EENF Chapter 6: Flood Resiliency.

II. Has the Proponent considered alternative locations for the project in light of climate change risks? _**X**_ Yes ___ No

A. If no, explain why.

B. If yes, describe alternatives considered.

The Proponents considered multiple alternatives in addition to the Project, which is the Preferred Alternative. For a description of these alternatives, see attached EENF Chapter 1, Section 1.6.

III. Is the project located in Land Subject to Coastal Storm Flowage (LSCSF) or Bordering Land Subject to Flooding (BLSF) as defined in the Wetlands Protection Act? _**X**__Yes ____No

If yes, describe how/whether proposed changes to the site's topography (including the addition of fill) will result in changes to floodwater flow paths and/or velocities that could impact adjacent properties or the functioning of the floodplain. General guidance on providing this analysis can be found in the CZM/MassDEP Coastal Wetlands Manual, available here.

See attached EENF Chapter 6: Flood Resiliency.

ENVIRONMENTAL JUSTICE SECTION

I. Identifying Characteristics of EJ Populations

A. If an Environmental Justice (EJ) population has been identified as located in whole or in part within 5 miles of the project site, describe the characteristics of each EJ populations as identified in the EJ Maps Viewer (i.e., the census block group identification number and EJ characteristics of "Minority," "Minority and Income," etc.). Provide a breakdown of those EJ populations within 1 mile of the project site, and those within 5 miles of the site.

See attached EENF Chapter 4: Environmental Justice.

B. Identify all languages identified in the "Languages Spoken in Massachusetts" tab of the EJ Maps Viewer as spoken by 5 percent or more of the EJ population who also identify as not speaking English "very well." The languages should be identified for each census tract located in whole or in part within 1 mile and 5 miles of the project site, regardless of whether such census tract contains any designated EJ populations.

See attached EENF Chapter 4: Environmental Justice.

C. If the list of languages identified under Section I.B. has been modified with approval of the EEA EJ Director, provide a list of approved languages that the project will use to provide public involvement opportunities during the course of MEPA review. If the list has been expanded by the Proponent (without input from the EEA EJ Director), provide a list of the additional languages that will be used to provide public involvement opportunities during the course of MEPA review as required by Part II of the MEPA Public Involvement Protocol for Environmental Justice Populations ("MEPA EJ Public Involvement Protocol"). If the project is exempt from Part II of the protocol, please specify.

See attached EENF Chapter 4: Environmental Justice.

II. Potential Effects on EJ Populations

A. If an EJ population has been identified using the EJ Maps Viewer within 1 mile of the project site, describe the likely effects of the project (both adverse and beneficial) on the identified EJ population(s).

See attached EENF Chapter 4: Environmental Justice.

B. If an EJ population has been identified using the EJ Maps Viewer within 5 miles of the project site, will the project: (i) meet or exceed MEPA review thresholds under 301 CMR 11.03(8)(a)-(b) __ Yes _**X**_ No; or (ii) generate150 or more new average daily trips (adt) of diesel vehicle traffic, excluding public transit trips, over a duration of 1 year or more. ___ Yes _**X**__ No

C. If you answered "Yes" to either question in Section II.B., describe the likely effects of the project (both adverse and beneficial) on the identified EJ population(s).

III. Public Involvement Activities

A. Provide a description of activities conducted prior to filing to promote public involvement by EJ populations, in accordance with Part II of the MEPA EJ Public Involvement Protocol. In particular:

1. If advance notification was provided under Part II.A., attach a copy of the Environmental Justice Screening Form and provide list of CBOs/tribes contacted (with dates). Copies of email correspondence can be attached in lieu of a separate list.

2. State how CBOs and tribes were informed of ways to request a community meeting, and if any meeting was requested. If public meetings were held, describe any issues of concern that were raised at such meetings, and any steps taken (including modifications to the project design) to address such concerns.

3. If the project is exempt from Part II of the protocol, please specify.

See attached EENF Chapter 4: Environmental Justice.

B. Provide below (or attach) a distribution list (if different from the list in Section III.A. above) of CBOs and tribes, or other individuals or entities the Proponent intends to maintain for the notice of the MEPA Site Visit and circulation of other materials and notices during the course of MEPA review.

See attached distribution list in Appendix A.

C. Describe (or submit as a separate document) the Proponent's plan to maintain the same level of community engagement throughout the MEPA review process, as conducted prior to filing.

See attached EENF Chapter 4: Environmental Justice.

CERTIFICATIONS:

1. The Public Notice of Environmental Review has been/will be published in the following newspapers in accordance with 301 CMR 11.15(1):

   (Name) Everett Independent (Date) February 15, 2023
   (Name) Chelsea Record (Date) February 16, 2023
   (Name) El Planeta (Date) February 17, 2023

2. This form has been circulated to Agencies and Persons in accordance with 301 CMR 11.16(2).

Signatures:

2/14/2023	2/14/2023
Date Signature of Responsible Officer or Proponent	Date Signature of person preparing ENF (if different from above)
Alexander Train	Katie Moniz
Name (print or type)	Name (print or type)
City of Chelsea	Fort Point Associates, a Tetra Tech Company
Firm/Agency	Firm/Agency
500 Broadway	31 State Street, 3rd Floor
Street	Street
Chelsea/MA/02150	Boston/MA/02109
Municipality/State/Zip	Municipality/State/Zip
617-466-4192	617-279-4388
Phone	Phone

CERTIFICATIONS:

1. The Public Notice of Environmental Review has been/will be published in the following newspapers in accordance with 301 CMR 11.15(1):

   (Name) Everett Independent (Date) February 15, 2023
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2. This form has been circulated to Agencies and Persons in accordance with 301 CMR 11.16(2).

Signatures:

2/14/2023	2/14/2023
Date Signature of Responsible Officer or Proponent	Date Signature of person preparing ENF (if different from above)
Erik Swanson	Katie Moniz
Name (print or type)	Name (print or type)
City of Everett	Fort Point Associates, a Tetra Tech Company
Firm/Agency	Firm/Agency
484 Broadway	31 State Street, 3rd Floor
Street	Street
Everett/MA/02149	Boston/MA/02109
Municipality/State/Zip	Municipality/State/Zip
617-389-2100	617-279-4388
Phone	Phone

Chapter 1

PROJECT SUMMARY

CHAPTER 1: PROJECT SUMMARY

1.1 INTRODUCTION

The Cities of Chelsea and Everett (the "Proponents") propose to construct a coastal storm surge barrier, storm surge control facility, nature-based solutions along the riverfront, and related amenities at the Island End River ("IER") in the Cities of Chelsea and Everett (the "Project Site"). The approximately 9.5-acre Project Site is currently composed of a mix of commercial and industrial uses and supporting roadway and utility infrastructure. The existing banks of the river are highly degraded by legacy industrial uses and are comprised of hardened slope stabilization measures and littered with debris. The proposed IER Flood Resilience Project (the "Project") will construct an approximately 4,640 linear-foot ("lf") storm surge barrier, an approximately 2,900 square-foot ("sf") underground storm surge control facility, approximately 50,000 square feet of nature-based solutions along the riverfront, and associated wetland and public access improvements along the IER.

The Project includes the following critical flood resilience elements:

Resilience Provisions East – This project element consists of a storm surge barrier along the Chelsea banks of the IER. Additionally, the project will provide public amenities such as a resilient riverwalk, which has been designed to increase community access to the waterfront in the form of an elevated boardwalk and vegetated berm sections. The Island End Park is a mix of urban wild and manicured greenspace and provides the community with limited waterfront access. The park will be rehabilitated as part of the Project. This element protects not only critical regional infrastructure in Chelsea but will also safeguard several residences within neighborhoods comprised of environmental justice ("EJ") or underserved populations.

Storm Surge Control Facility – This structure will be constructed at the outlet to the IER of the existing Market Street culvert to prevent inland flood damage during coastal storm events. The catchment area for this outlet is approximately 200 acres within which the population has been determined to be EJ or underserved. The control gates will normally be open to allow for tidal flow into culverted and daylighted sections of the IER. Additionally, control measures will be installed on the Beacham Street drainage system to prevent backflow into the existing stormwater drainage system.

Resilience Provisions West – This project element consists of a storm surge barrier along the Everett banks of the IER, which is situated in a Designated Port Area ("DPA"), in the form of vertical freestanding concrete wall and flood gates to protect working port businesses from coastal inundation. This element protects not only the DPA but other critically important infrastructure including critical transportation corridors and homes for more than 6,000 residents comprised of EJ or underserved populations.

Nature-based Solutions – Existing degraded riverfront slopes will be reimagined using a combination of native vegetation along upper bank and perforated concrete planters, lined with hardwood, and planted with bagged salt marsh grasses downslope. The planters will be dressed with natural stone joints and tiered for low and high marsh conditions in and behind the planters, making installation modular, scalable, and minimally invasive to install during low tide conditions. This design is also adaptive – as sea level rises the planters become support for filter feeding barnacles and shellfish.

Wetlands Enhancements – The Project will improve the health of the remaining salt marsh portion of the IER by removing invasive Phragmites (*Phragmites australis*), replanting with and maintaining native species, and removing significant deposits of existing trash and debris in this resource area. Additionally, it will address issues of erosion and sparse vegetation on coastal bank resource areas around the IER through robust native planting program and slope stabilization efforts.

The Project is critical for the flood protection of the IER district and surrounding low-lying areas in Chelsea and Everett, which include the residences of under-served EJ communities, significant transportation (rail and roadway) infrastructure, health care facilities, a grocery store serving much of the community, and a public high school. These significant assets are all projected to be within the100-year floodplain by 2070. Additionally, the Project will enhance natural resource areas, improve public access to the IER, and substantially improve Island End River Park. Regional collaboration between the municipalities of the Mystic River watershed, nonprofit organizations, and other partners has been key to developing this flood protection initiative through extensive stakeholder input and community engagement.

1.2 PROJECT BACKGROUND

Chelsea and Everett have been collaborating on this project for over six years. Prior work in Chelsea under a Coastal Zone Management ("CZM") Coastal Resilience grant in Fiscal Year 2019 ("FY19") and a Massachusetts Executive Office of Energy & Environmental Affairs ("EEA") Municipal Vulnerability Preparedness ("MVP") Action Grant in FY20-21 enabled the identification of coastal flood risks and cost-effective solutions and work with private businesses to design and site the inland storm surge barrier. Engineering plans for the Chelsea portion were completed and the project Environmental Notification Form ("ENF") for this section was submitted in April 2021. The City of Chelsea subsequently rescinded the ENF to allow time for collaboration with the City of Everett and the development of the full regional flood resilience effort that now constitutes the Project. Much of the current FY22 MVP grant has involved furthering the design for the Everett portion of the storm surge barrier for this submittal. The Cities of Chelsea and Everett have also submitted an approximately $50 million grant proposal to the Federal Emergency Management Agency's ("FEMA's") Building Resilient Infrastructure and Communities ("BRIC") program and have worked to secure match funds through a state bond bill approved by the Massachusetts state legislature.

1.3 EXISTING CONDITIONS

The IER is a tributary to the Mystic River and is tidally influenced. The IER is abutted by Everett on its western bank and Chelsea on its eastern bank. The IER has a Federal Navigation Channel that consists of a six-foot-deep, 2,500-foot-long channel extending from the Mystic River, up Island End River, to the Admirals Hill Marina in Chelsea. The channel is 90 feet wide at its lower end and 100 feet wide at its upper end. The surrounding area is heavily developed with high amounts of impervious surfaces and undersized stormwater infrastructure. The area is home to critical infrastructure including the New England Produce Center, which provides fresh produce to communities throughout New England, the regional FBI headquarters, Massachusetts General Hospital, the City of Chelsea's Carter Street Pump Station, Williams Middle School, and Chelsea High School. The Project Site itself contains facilities ranging in uses from industrial, such as cold storage and liquified natural gas distribution, to recreational, such as a public park. See Figure 1-1, Project Locus Map and Figure 1-2, Project Aerial Map.

Historically, the IER region has experienced consistent flooding during relatively minor precipitation events, while experiencing significant coastal flooding during recent storm surge events and king tides. This is largely because the original course of the IER and its floodplain, anchored by the Beacham Street roadway corridor, was gradually filled for development on top of former tidal flats and marshes in the late 1800s, through the mid-1900s. More than 500 acres in Chelsea and Everett are inherently vulnerable to flooding because of the area's topography and hydrology, specifically the replacement of flood storage area with impervious surfaces and the culverted IER. IER is culverted through the Market Street Culvert, that extends approximately 1,240 feet north to a larger portion that has been recently daylighted to accommodate tidal action upstream of the outfall. Riverfront slopes are hardened using stone rip rap of varying sizes, as well as areas of other structural debris. Survey of the existing culvert outfalls identified stone rip rap conditions continuing down to the bottom of the river. Only the center of the channel at the outfalls and approximately 10 feet around them is loose soil and debris material, which likely creates sedimentation and other water quality issues within IER waters today. See Figures 1-3 through 1-14 for existing conditions photographs of the Project Site.

The FEMA has mapped the 100-year and 500-year coastal flooding events in their Flood Insurance Rate Maps ("FIRM"). Though the FIRM map panel representing this portion of Everett shows only moderate flooding, the adjacent mapping for Chelsea shows significantly larger flooding extents. This inconsistency in the mapping is due to the FIRM representing Chelsea being re-mapped on March 15, 2016, as part of updates to Massachusetts Suffolk County FIRMs, as opposed to Everett's June 3, 2010, effective date for Massachusetts Middlesex County FIRMs (revised Middlesex County maps have been pending final issuance since 2020). The Chelsea FIRM is representative of the flooding that can be expected in this area up to Elevation ("El.") 10 NAVD88 from the current 100-year flood event. See Figure 1-15, FEMA FIRM Flood Map. The Project is located in two FEMA Flood Zones: 1) AE El. 10

NAVD88, FIRM No. 25017C0443E, dated June 4, 2010, and 2) AE El. 10 NAVD88, FIRM No. 25025C0018J, dated March 16, 2016.

In March 2019 and again in May 2022, the presence of wetland resources was delineated along the IER. The delineation was conducted under the direction of a nationally certified Professional Wetlands Scientist ("PWS"). Wetland resource areas including salt marsh and mean high water of a river were identified and flagged in the field using pink flagging by a Weston & Sampson employee who is trained in the wetland delineation process using the Massachusetts Department of Environmental Protection ("MassDEP") and the US Army Corps of Engineers ("USACE") methodology. The wetland resource areas in the Project Site are highly degraded due to adjacent dense development patterns and industrial uses. The banks of the IER are highly eroded and feature pieces of brick, stone, asphalt, and dumped debris. In Spring 2021, the Proponents organized a spring cleanup volunteer effort to remove demolition debris, old tires, and other trash along the banks of the IER. See Chapter 3, Wetlands and Figure 3-1, Wetlands Resource Map. The mean tidal elevations range within the IER between El. 4.3 and -5.16 feet NAVD88.

Island End Park is a small municipal park adjacent to IER which contains a gazebo, walking paths, and a connection to a wooden boardwalk surrounding a small pocket of existing salt marsh. Although this small park has the potential to be a real asset to the community, it is often not enjoyed by the public because there is no direct access from the main road (Beacham Street) and there is very little public parking available. Additionally, the views from the boardwalk are largely blocked by a stand of common reed (*Phragmites australis*) which reduces the public appeal.

The MassDEP identifies more than 30 sites within the IER floodplain at which a release of oil and/or hazardous material ("OHM") to the environment has occurred. These sites are tracked by MassDEP and regulated under the Massachusetts Contingency Plan ("MCP") due to elevated concentrations of OHM detected primarily in soil and/or groundwater. In addition to reported releases, the long history of commercial and industrial development in the area means that urban fills and soil contamination will be found throughout the Project Site. These contaminants are a risk to migrate during a flood event which exacerbates community health and safety concerns in the region. The majority of these sites have achieved regulatory closure under the MCP through the use of surface caps/covers and associated deed restrictions such as Activity and Use Limitations ("AULs").

The Massachusetts Office of Coastal Zone Management ("CZM") manages and provides technical assistance for the Port and Harbor Planning Program, which promotes the completion of a municipal harbor plan for areas within the jurisdiction of the Public Waterfront Act (known as "Chapter 91"). CZM also works with the MassDEP, which is responsible for permitting uses, fill, and structures in DPAs that were established by the Commonwealth. DPAs were designed to protect water-dependent industrial uses that need to be near the ocean for physical or operational reasons. Other uses are prohibited except for

"compatible public access and certain industrial, commercial, and transportation activities that can occur on an interim basis without significant detriment to the capacity of DPAs to accommodate water-dependent industrial use in the future (301 CMR 25.00)." The Everett shoreline of the Project Site is part of the Mystic River DPA, and the Project will not interfere with the function or purpose of the DPA. Instead, the Project aims to protect the economic assets within Chelsea and Everett.

1.4 PROJECT DESCRIPTION

The Project includes four flood resilience elements, including the publicly accessible Resilience Provisions East, the efficient Resilience Provisions West within the Mystic River DPA, the essential Storm Surge Control Facility protecting existing storm drainage infrastructure, and an investment in improving coastal wetland resource areas. The entire Project will include approximately 4,640 lf of protective flood barrier system, an approximately 2,900 sf underground surge control structure, approximately 50,000 square feet of nature-based solutions along the riverfront, approximately 22,818 sf of wetland enhancements, and public amenities. Each of these elements is detailed below.

Resilience Provisions East ("RPE")

The goal of the RPE segment of the Project is to prevent overland storm surge flooding to the low lying areas of the region, in coordination with the Resilience Provisions West segment of the Project. Additionally, this segment will provide an opportunity for the community to engage with the natural coastal resources that the IER has to offer through accessible connected waterfront pathways. The alignment of flood protection measures along the RPE portion of the Project includes a coastal free-standing flood wall, hybrid vegetated berm, and paved berm sections near Justin Drive.

The RPE barrier alignment is a coastal free-standing storm surge barrier with deep foundation elements connecting from higher grade at Justin Drive to the Resilience Provisions West storm surge barrier at the Everett/Chelsea municipal boundary to the west, through the Mystic River DPA along Market Street. Market Street is a heavily trafficked public roadway, serviced by large freight vehicles that require maintaining the width of the existing private right-of-way for vehicle passage. From the edge of the right of way, a ten-foot buffer is maintained between the barrier alignment and the edge of pavement. In this space, a guard rail provides protection from the physical impact of turning freight vehicles, and a sloped grassed banking provides a safe corridor for inspection and walking passage at the face of the barrier. The toe slope of the barrier in this buffer will taper from approximate surface grade elevation 9.0' to elevation 11.0' to provide opportunity for viewing over the barrier. Barrier construction will be driven sheet pile with a form finished architectural concrete cap on each land and waterward exposed facets. Adjacent riverfront plantings and surface treatments are described below in the Nature-based Solutions and Wetlands Enhancements section of this document.

At #357 Beacham Street (existing bank), the storm surge barrier inflects around the top of the Island End River and crosses the location of the proposed Storm Surge Control Facility. At this location, a coastal pedestrian walkway is proposed to begin on the landward side of the barrier. This currently unavailable walkway is a keystone piece in the community's plan for expanding community access to waterfront resources. It will be a visible and inviting entryway to the existing Island End Park, linking the public sidewalk at Beacham Street to waterfront pedestrian network on private property and the DCR's Mary C. O'Malley State Park. The park entryway location is especially advantageous as Beacham Street was recently reconstructed with a 10-foot multi-modal shared use path intended to connect recreational users from Lower Broadway in Everett to Chelsea. At its start near Beacham Street, the new waterfront walkway will include sign advertising entrance, mounted on the architecturally finished barrier, with landscaped plantings and ornamental lighting. The walkway will be 8-feet wide and constructed at-grade beside the storm surge barrier until the barrier deflects with the river. The walkway will ramp-up to elevation 11.0' so that it presents to pedestrians with 3-feet reveal beside them and offers a viewshed of the river and wetlands. The location of barrier is confined by existing development at #357 Beacham Street (existing bank), which requires egress from Market Street to support its land use and emergency vehicle access. The storm surge barrier, walkway, and Storm Surge Control Facility features are sited to support existing large commercial truck vehicle maneuvers in Market Street onto Beacham Street, private property egress at #357 Beacham Street off Market Street, accessible walkway design considerations, and abutting wetlands. The existing snow storage, parking, and trash management space along Market Street is maintained to support usability/viability of the site for existing commercial enterprise.

Near the property limit of #357 Beacham Street (existing bank) and #359 Beacham Street (existing boat yard), the walkway ramps up to elevation 14.0' to provide for passage over the barrier and into the existing Island End River Park. This elevated point will provide a viewing area of the IER and the Boston skyline. The walk then expands to 10-foot wide and will be bounded by railing. A tapered grass slope with plantings transitions the elevated walkway to existing grades on the landward side. The planted slopes will improve functionality of this space by adding shade, a recreational space, and a pet-friendly space. The barrier will function as a sheet pile core supporting the walkway and seepage barrier. All exposed landward and waterward faces will be finished with an architectural form finished concrete cap.

The RPE alignment continues behind the #359 Beacham Street property, which abuts existing bordering vegetated wetland ("BVW") and salt marsh resource areas. The pedestrian walk remains on the landward side of the barrier, adjacent to the storm surge barrier, at an elevation of 3' above existing grade. The path will have a tapered slope to transition to existing grade and integrate with abutting land. Ornamental lighting, benches, and similar amenities will make this a feature space for enjoying vistas of IER and wetlands areas. The existing wood boardwalk will be removed from the BVW area, 16-feet of the paved boat yard lot will be stripped, and wetlands improvements will be performed, as described in the Nature-based

Solutions and Wetlands Enhancements section of this document. The waterward barrier has a tapered toe slope to support future scour protection and access for inspection and tide-borne trash cleanup.

At the #100 Justin Drive property, the walkway and storm surge barrier tighten in profile to meet functional demands of vehicle mobility increase. This industrial and distribution facility has three loading bays in the rear with easements to guarantee space for vehicle turning required to back-into the three loading bays in the rear. The location of barrier and walk features will accommodate the function of these loading bays and truck turning as noted by the owner in this area. Continuing along the coast, easements exist between the 100 Justin Drive facility and the waterway to provide for vehicular passage in Justin Drive, notably around hauled boats between the marina and boat yard. This obligates maintaining a safe and clear distance between the existing building and the barrier walk system.

The RPE alignment ends in Justin Drive with the private drive ramped to design elevation 14.0 and tieback into naturally elevated grades upgradient toward Commandants Way and the Admiral's Hill neighborhood. The walkway will grade down to being flush with existing grade in the berm and connect with abutting sections of waterfront community walkways on private properties. The berm will include a sheet pile seepage barrier for continuity with the remainder of the barrier system. The existing boat lift and marina functions will be uninhibited by the Project. See Table 1-1: IER Resilience Provisions East –Storm Surge Barrier Design Elements for quantities associated with this scope of work.

Table 1-1: IER Resilience Provisions East –Storm Surge Barrier Design Elements

Project Element	Quantity	Unit
Storm Surge Barrier – Free-Standing Flood Wall	115	Linear Feet
Resilient Riverwalk – Elevated Pedestrian Boardwalk	940	Linear Feet

Before work begins, sedimentation and erosion control devices will be placed at the site to minimize sediment migration into the neighboring wetland resource areas. These measures will include compost filter tubes located between the work area and the wetland resources. The first stage of work will involve clearing the Project Site, including the removal of the existing boardwalk structure and associated lighting and electrical conduit, removal of existing chain link fence, guardrail, boulders and concrete, and collection of trash and debris. Once the Project Site is cleared, equipment will be utilized to drive the sheet pile into the ground, extending to a depth of approximately 45 feet below grade. All equipment utilized for this Project will be kept out of the wetland resource areas and will approach the work area from the upland. Once the sheet pile wall is complete, grading, drainage, and utilities located behind will be added. Following the grading, the structural details including retaining walls, form finished architectural concrete cap, concrete walkways, and new public amenities will be added. Final details including veneer finishes, paving, planting, and seating/shade

installations will be completed. Sediment and erosion control measures will remain in place until the site is stabilized.

Storm Surge Control Facility ("SSCF")

The goal of the SSCF segment of the Project is to prevent dangerous and damaging coastal flooding from the IER via the existing storm drainage network during extreme coastal events. The structure will allow regular tidal flushing of brackish water from the IER via the Market Street culvert to the upstream open channel, in the same way as the existing Market Street culvert system. During extreme coastal events, gates will be closed when water reaches El. 7.0 to prevent flow backwards through the storm drain infrastructure. This backwater elevation of this flow has been demonstrated to cause damage to local and regional commerce and industry, as well as municipal and private utility services, community support infrastructure, and residences. The structure is needed as a critical piece of the Project to allow inland environments to continue benefitting from the daily tidal flows from the IER while also preventing extreme coastal surge from bypassing the storm surge barrier provisions and causing inland damage to critical infrastructure and the homes of EJ or underserved populations.

Peak flow from the Market Street culvert tributary area is estimated to be 350,000 gallons per minute ("gpm"), or approximately 940 cubic feet per second ("cfs"). See Figure 1-18, Storm Surge Control Facility Watershed Map for the drainage tributary area to the Market Street Culvert. Where accessible to vehicular traffic, the structure will be designed for AASHTO HL-93 wheel load of 16 kips plus 30% impact at a minimum. In other locations the design will be suitable for anticipated maintenance operations, snow, equipment, hydrostatic loads, earth loads, and other Project elements. The SSCF will be supported on a deep pile foundation.

The SSCF will permit bi-directional flow during normal operation by use of combination flap gate valves that are normally in the 'Open' position. It will connect to the inland existing Market Street culvert via a short culvert section and transition structure. The SSCF will connect to the IER via a short culvert section and wingwall structure. In addition to the valves, the SSCF is proposed to contain an inland bar rack and rock traps on both sides of the gates to facilitate maintenance. Roll-up gates are proposed for isolation of the inland and riverside culverts. Each gate has the ability to be isolated for maintenance using stop logs. The gate actuators will be located aboveground and above the design flood elevation of El 14 NAVD88. Providing some view shielding through plantings or other means will be investigated as part of final design. Access will be provided from the surface via hatches and maintenance holes. On the waterside of the structure, maintenance access will be required to be bolted to withstand the hydraulic head of the high water. The structure and access points inland of the gates will be located at approximately existing grade. The actuators are proposed to maintain a charge in the event of a power failure so they could still operate on a limited basis without a permanently installed generator. The footprint of the structure is approximately 41 feet wide by 70 feet long.

The SSCF is sized to accommodate peak flows from the Market Street culvert. The existing 15′-6″ by 9′-5″ arch culvert section will ultimately be replaced by a 16′ by 12′ box culvert in an ongoing future project. As part of this Project the SSCF will be connected to a 16′ by 12′ box culvert that transitions to the existing culvert. The existing Beacham Street 8′-6″ by 6′-1″ arch section culvert and local drainage will be rerouted to facilitate construction of the SSCF on the Market Street culvert. See Table 1-2: IER Storm Surge Control Facility Elements for a summary of Surge Control Structure project elements.

Table 1-2: IER Storm Surge Control Facility Elements

Project Element	Quantity	Unit
Storm Surge Control Facility Footprint	2,900	sf
Outfall Protection Area – Outlet Gate to Riprap	4,500	sf
Above-Ground Infrastructure – Gate Actuators	3	Units

Localized drainage system at the intersection of Beacham and Market Streets will be routed through the Beacham Street outfall. The Beacham Street outfall will be rebuilt adjacent to the Market Street culvert outfall along with a headwall and rip rap system to stabilize this embankment and address existing erosion patterns from this tidally influenced drainage system. The Beacham Street outfall will incorporate a flap gate valve or duckbill gate to prevent brackish flow into the existing drainage system. Unlike the Market Street culvert, the Beacham Street drainage system has no daylighted stream section that could potentially benefit from daily tidal exchange.

The proposed design also considers the possibility of connection to a future stormwater pump station that would provide additional capacity and the capability to drain the stormwater system during high tidal or storm events, when needed. Since the need for and details of this potential pump station has not been determined, no permanent facilities are included in the design. Instead, knock out panels that would facilitate a future connection have been included in the SSCF.

It is anticipated that the construction of the SSCF will occur in two phases. During both phases, typical site erosion and sedimentation devices, such as perimeter straw wattles around the work area and silt sacks in all existing catch basins will be employed. The first phase of construction will relocate the Beacham Street drainage system and local drainage and establish approximately half of the ultimate outfall structure (i.e. headwall, wingwall and slab, and riprap energy dissipation). A permanent connection between the Beacham Street drainage system and Market Street culvert is also proposed to be constructed in Phase 1. This connection will reduce the need for bypass pumping during Phase 2 of the construction as the Market Street flows will be redirected into the new Beacham Street culvert. The connection is proposed to be above the invert of the Market Street culvert to allow brackish water to be primarily directed toward the open channel section. The connection will also facilitate future maintenance of either the SSCF or the Beacham Street drainage system outfall.

A temporary stormwater pump station is proposed to bypass flow during Phase 1 construction. A dry worksite will be established through use of a cofferdam in the river and a suitable shoring and dewatering system.

Phase 2 focuses on construction of the SSCF and outfall. The Market Street culvert will be plugged downstream of the Beacham Street drainage system to allow flow to bypass the construction area and continue to flow by gravity to the IER. The temporary stormwater pump station will only be used during periods of flow that exceed the capacity of the Beacham Street culvert. The remaining portion of the outfall structure and riverside culvert will be constructed. The SSCF will be formed, and concrete poured. After a curing period, the mechanical and electrical/instrumentation equipment can be installed, and the construction area restored. Similar to Phase 1, a dry worksite will be established through use of a cofferdam in the river and a suitable shoring and dewatering system.

Access from Market Street to the #357 Beacham Street (existing bank) parking lot will be limited during construction. A further portion of the parking lot will be used for staging, bypass pumping operations, and construction access to the east. Traffic control and construction timing will need to be carefully planned to minimize disruption to commercial and non-commercial traffic on Market Street and Beacham Street. Some relocation of Market Street may be required to avoid unnecessary loading on the SSCF as well as facilitate future, safe access for maintenance.

The SSCF will require regular inspection and maintenance. The table below summarizes the primary maintenance activities. In addition to the activities listed in the table, the Cities should expect to replace electrical and mechanical equipment at least once during the first 50 years of operation of the SSCF. Concrete spall repair within the structure should also be anticipated once during the first 50 years of operation. See Table 1-3: IER Storm Surge Control Facility Inspection and Maintenance Schedule for a summary of Storm Surge Control Facility inspection and maintenance programming.

Table 1-3: IER Storm Surge Control Facility Inspection and Maintenance Schedule

Task	# of Staff	Equipment	Events per Year
Regular Inspection	2	Tool Truck	12[1]
Bar Rack Cleaning	2	Tool Truck, Rake	12[1]
Rock Trap Cleaning	3	Tool Truck, Vactor Truck	12[1]
Gate & Actuator Maintenance	2	Tool Truck	2
Electrical Maintenance	2	Tool Truck	2
Comprehensive Inspection	4	Tool Truck, Crane	1

Notes: [1] Inspection and cleaning should occur post storm event and as needed to keep grates clear and facility operational.

Resilience Provisions West ("RPW")

The goal of the RPW segment of the Project is to prevent overland storm surge flooding, in coordination with the RPE segment of the Project, to the low-lying areas of Chelsea and Everett, while respecting the operations of the working waterfront businesses in the DPA. The RPW segment of the Project includes concrete storm surge barrier walls and storm surge barrier gates along the IER, turning inland at #60 Commercial Street (existing cold storage facility) to travel north where the barrier ties into higher topographic grades. The majority of storm surge barrier gates will be passive flip-up gates, floating up as flood waters rise to seal against the barrier. The active flood gates will be automated by the City of Everett Department of Public Works, with communication of gate closure upon forecasted extreme weather events. This will be coordinated with the District's stakeholders directly to make preparations. Starting at the Everett/Chelsea municipal and the Middlesex/Suffolk County boundary to the west, the RPW storm surge barrier alignment continues the coastal free-standing flood wall with deep foundation elements running roughly parallel to the IER towards the #155 Market Street (existing commercial produce sector business) existing loading dock area. The storm surge barrier then turns south to follow the perimeter of the existing loading dock to the entrance of an existing parking lot that splits the #155 Market Street property and the #95 Behen property. A 7′ high flip-up gate is proposed at the north entrance to the parking to provide continued access to the parking lot and can be closed during storms and flooding to maintain a continuous barrier to protect the existing properties. The foundation and pile design of the flip-up gate will match the foundation system of the adjacent free-standing storm surge barrier wall. The south entrance to the parking lot is proposed to have a 51″ high, 40′ wide sliding gate, with a foundation and pile design to match the free-standing storm surge barrier wall adjacent on each side. The alignment of the barrier wall here bisects the #95 Behen Street site (existing marine construction facility). The storm surge barrier wall runs on the north side of the existing parking lot to avoid conflicting with an existing Contained Disposal Facility ("CDF") consisting of sealed steel sheets that contains polycyclic aromatic hydrocarbons ("PAH")-contaminated material dredged from the IER in the mid-2000s.

The RPW storm surge barrier alignment then runs south, parallel to the existing railroad tracks along the #60 Commercial Street (existing cold storage facility) loading dock and wharf, where it turns northwest to cross the railroad tracks. A 6′ high, 30′ wide sliding flood gate is proposed on the north side of 60 Commercial Street to allow for access to the existing concrete wharf on the east side of the storm surge barrier alignment. This gate will remain open during regular operations and will close to be flush with the storm surge barrier during storms and coastal flooding. A 6′ high, 12′ wide automated swing flood gate is proposed at the railroad crossing to allow for trains to continue daily operations. This automated flood gate will remain closed when not needed for train passage to provide a continuous barrier to protect the existing properties from rising tides and flooding from storm surge. The control of this gate will be coordinated with the IER outlet control structure. The flood barrier alignment continues then northwest, parallel to the #60 Commercial Street (existing cold storage facility) property line and building, crossing Commercial Street into the #61 Commercial Street

(existing Liquified Natural Gas ("LNG") warehouse facility) property. A 2.5′ high sliding flood gate is proposed across Commercial Street. The sliding gate will remain open as to not interfere with daily traffic down Commercial Street but will be closed during storms and coastal flooding. A 3.5′ high flip-up gate is proposed at the driveway on the northwest corner of 61 Commercial Street. This gate will remain open to allow for regular access to this driveway and will be closed during storm events to protect against flooding.

The alignment parallels the Commercial Street southwest property line and then turns southwest, parallel to an existing concrete retaining wall until it reaches an existing high ridge on the #101 Commercial Street (existing LNG visitor center facility) site where the storm surge barrier terminates at higher ground.

RPW storm surge barrier alignment will provide flood protection from historic and future increases in sea level rise and coastal storm surge to the critical facilities inland of the alignment. The footing of the storm surge barrier wall will taper from approximately elevation 6.5′ to elevation 10′, to taper the aesthetic impact of the free-standing wall and to maintain a top-of-wall elevation of 14′ to 15′. Barrier construction will be driven sheet pile with a form finished architectural concrete cap on each land and waterward exposed facets. Living shoreline plantings and surface treatments are described in the Nature-based Solutions and Wetlands Enhancements section of this document. Table 1-3 summarizes the extent and nature of storm surge barrier design elements.

Construction of the RPW alignment will take place in a permanent easement that follows the alignment of the storm surge barrier and ranges in width from 15′ to 25′ plus a temporary work area that expands into the north east corner of #155 Market Street, into portions of the loading dock and into #95 Behen Street. The temporary work area from here matches the boundary of the permanent easement. The permanent easement and temporary work area balance interests to protect and enhance the wetlands resources and resilience, while maintaining capacity for the private properties to continue their commercial business. See Table 1-4: IER Resilience Provisions West – Storm Surge Barrier Design Elements for a summary of RPW project elements.

Table 1-4: IER Resilience Provisions West – Storm Surge Barrier Design Elements

Project Element	Quantity	Unit
Inland Free-Standing Concrete Storm Surge Barrier	3583	Linear Feet
Passive Storm Surge Barrier – 1 Roadway Crossing	40	Linear Feet
Automated Storm Surge Barrier – 1 Rail Crossing	12	Linear Feet
Passive Storm Surge Barriers – 4 Driveway Crossings	100	Linear Feet

Before work begins, sedimentation and erosion control devices will be placed at the site to minimize sediment migration into the neighboring wetland resource areas. These measures will include compost filter tubes located between the work area and the wetland resources. The first stage of work will involve clearing the site including the removal of the existing rip

rap and debris, removal of existing chain link fences and guardrails, and collection of trash and debris. Once the Project Site is cleared, equipment will be utilized to drive deep foundation sheet pile and a seepage wall into the ground extending to a depth of approximately 15 feet below grade. All equipment utilized for the Project will be kept out of the wetland resource areas and will approach the work area from the upland area. Once the foundation work is complete, grading, drainage, and utilities located behind the storm surge barrier alignment will be constructed. Following this installation, the concrete wall and structural details including retaining walls, and the form finished architectural concrete cap will be added. Final details including, paving, planting, and other finishes will complete the Project and will be completed approximately 3 months from the completion of the storm surge barrier. Sediment and erosion control measures will remain in place until the work area is stabilized. Management, handling and reuse/disposal of soils and groundwater disturbed and/or displaced by construction will be managed pursuant to MCP and site-specific AUL requirements.

Construction will begin on the east, at the tie-in with RPE storm surge barrier and will continue southwest. Access to #155 Market Street will be impacted during construction, causing entrance on the east side to be inaccessible. The loading dock in the back of #155 Market Street will also be inaccessible during construction of the east portion of the storm surge barrier. The storm surge barrier wall will be constructed at #155 Market Street first, in order to reconstruct the entrances and loading docks, and allow those to be opened back up for operational use. This phase of the construction will require the parking lot on the south to be accessed only using the entrance from #95 Behen Street.

Once the storm surge barrier at #155 Market Street is completed, the north parking lot will be reopened, and the south entrance will be closed for the next phase of construction. Construction will then move south to #95 Behen Street and along the train tracks. Construction along the tracks will be completed up to the railroad crossing, to maintain access along the tracks for as long as possible. Once construction has reached the crossing, the tracks will be closed to install the swing gate, new tracks, and adjacent walls. The tracks will reopen after the gate has been installed and confirmed to be operational.

Construction will then continue northwest along 60 Commercial Street. This construction will take place along a concrete driveway, and measures will be taken to ensure that traffic along this driveway is minimally impacted by the construction equipment. This phase of construction will extend to Commercial Street. Once complete, Commercial Street will be closed off to complete the installation of the sliding gate and pavement. When the gate is installed, adjacent barrier walls are constructed, and pavement has cured, Commercial Street will be re-open, and construction will continue north west. Construction of the remaining portion of the storm surge barrier will be the final phase of construction the RPW barrier.

The storm surge barrier will require regular inspection and maintenance. Inspections of the storm surge barrier wall should take place monthly and after each storm event. Inspections

should be done as needed to keep all gates clear and facilities operational. Debris should be cleared from gates and from the footing of the wall to ensure the facilities function properly and do not have any faults, cracking, or vulnerabilities. Electrical facilities for the storm surge barrier gates should be inspected every six months, or twice per year. A comprehensive inspection should take place annually.

Nature-based Solutions ("NbS")

Dense historic development patterns surrounding the IER and a lack of investment in the health of plantings along the riverfront have left limited vegetation in the riverfront area. The riverbanks are dominated by invasive species, Phragmites and Ailanthus, with patches of native Ruderal and Urban stress tolerant species. The steep bank areas are subject to erosion and the intertidal area of IER have been channelized and armored, limiting the opportunity for shellfish or vegetation. Portions of the riverfront are significantly hardened by installation of stone rip rap and other structural stabilizing materials that offer no habitat value and are littered with other debris.

The Project will invest in a robust long-term planting program to stabilize the banks of the IER and create habitat along the river. The proposed banks will be a hybrid environment of natural stone, visually and functionally mimicking a rocky tidal river bank with pockets of marsh grass and marine plants tiered for low and high marsh and marginal riparian conditions. This combination will reduce erosion and create more space for vegetation without extending into the navigable channel. Planted areas will include structured gaps for monitoring and maintenance access on foot. The terrace and cap system creates a barrier between surface plantings and unclassified substrate, allowing the area to become more suitable for public access and research. Additionally upland plantings include a combination of phytoremediator plants and cooperative fungi to slowly restore soil health beyond the intertidal areas.

Existing degraded riverfront slopes will be rebuilt and terraced using a combination of native coastal vegetation and stone along the upper bank with two lower layers combining existing stone and perforated concrete planters, lined with hardwood, and planted with bagged salt marsh grasses. Planters and stone will form low modular retaining walls, allowing wider plantings behind and above them. The planters will be set so their tops are at and slightly above the current mean high water ("MHW") line and variously tiered above this elevation for succession as sea level rises. Compared to traditional stone terrace stabilization only, this design provides 35% more area for vegetation. These planters will be clustered acting as retaining walls to support the planting soil in and behind them. Planters are variously rotated to increase channel roughness which dissipates flow kinetics of floodwaters. This configuration and the perforated surface structure maximize surface area for shellfish habitat. The hybrid system of planters and stone provide twice the surface area for shellfish adhesion per linear foot of shore compared to that that provided by traditional stone slopes or existing riprap slope. This replaces unvegetated existing armored slopes, which will allow a tighter footprint than typical stone terraced systems, avoiding the direct path of storm flow, and

maintaining clearance in navigable waters. NbS will also be installed in accordance with the requirements of the adjacent areas with AULs through increased slope stability and reduced scour/erosion. See Appendix B: Project Plans, Sheets NBS-L-101 and NBS-L-102 for details regarding coastal planters and shoreline installation.

This modular system allows for two modes of resilient succession. First, as sea levels exceed healthy salt marsh elevations, the rigid structures will provide alternative habitat for eelgrass and filter feeding barnacles and shellfish. Second, practical structures can be extended with fitted modules and dressed with sand to allow salt marsh to periodically match the natural conditions as sea level rises. When storm surge levels approach the projected threshold, successive layers of structured bank can be added toward the storm surge barrier to allow a natural migration process to continue.

The modular installation is scalable and minimally invasive. It can be installed by sections during low tide conditions and does not require diversion measures. It can be scaled to phased budgets and expanded at need with structured gaps for monitoring and maintenance access on foot. The terrace and cap system creates a barrier between surface plantings and unclassified substrate, allowing the area to become more suitable for public access and research. Additionally upland plantings include a combination of phytoremediator plants and cooperative fungi to slowly restore soil health beyond the intertidal areas. See Appendix B: Project Plans, Sheet NBS-L-101 for notes regarding installation and maintenance of NbS elements.

Initial preparation of select seaward elements of the NbS can begin prior to or in conjunction with construction of the storm surge barrier. This will provide a degree of protection to the barrier in progress and increased buffer between the wall excavations and IER during the storm surge barrier construction. After the storm surge barrier and SSCF are complete, remaining banks can be built out and riverfront area soils can be completed and planted. These coastal planters can be installed quickly between tides with minimal surface disruption and no removal of stone cap and little if any disruption/disposal of substrate. The planters will be readily available prefabricated drywell storm drain modules inverted for use as planters lined with black locust or white oak to contain coarse sand planting media and allow time for the combination of root growth to stabilize soils and shellfish to colonize the perforations while allowing gas exchange and infiltration to function normally. As a modular system, the installation can be phased to fit schedules and budgets without precluding future work or requiring overages for unforeseen obstacles.

This process will include monthly management and maintenance with annual plantings for the first 3 years, after which management cycles will slow to annual community events for maintenance education and species management. During plant establishment, maintenance includes removal of litter, monitoring for invasive species and hand pruning where necessary, maintenance of temporary irrigation, installation of interpretive markers, habitat features and access deterrents. Maintenance after the establishment period includes tracking of sea level

effects on marsh planters to predict expansion cycles and supplemental seeding and planting substitutions as needed, with reduced frequency and intensity of efforts or demobilization of establishment activities. As part of the adaptive management planting program, the Proponents will maintain invasive species control, irrigation, waste removal, habitat feature management, and soil monitoring. The Proponents will also enlist professional ecologists to monitor and implement maintenance programs seasonally.

The NbS portion of the Project will address issues of erosion and sparse low habitat value vegetation on the coastal bank and riverfront through structured plantings of native plantings implemented successionally through a community-driven adaptive management program. Adaptive management is a strategy that many local cities are engaging in as an alternative to typical management. This year, the City of Everett Mayor's Youth Employment Interns will receive the Massachusetts Association of Conservation Commissions (MACC) Youth Service Award for their involvement in these programs. The strategic goal is to supplant the unsustainable 'set it and forget it' model of urban land management with community-led stewardship of natural resources like the IER riverfront. The use of coastal planters with controlled soil mix allows the community to physically plant and interact with this space despite the degraded urban conditions present in the native soils below. This community objective would not be met through the implementation of a more traditional at-grade living shoreline installation.

This process is already in progress at multiple riparian wetlands in the City of Everett. This program focuses on low impact vegetative and soil enhancements including high forage plantings, phytoremediation, and habitat feature builds. The program is implemented by a combination of City of Everett municipal staff, community stakeholder groups, and professional design and ecology consultants with direct oversight by the Everett Conservation Commission. For this project, initial NbS construction and planting will be performed by the General Contractor and City public works staff. Then organizations, such as the City of Everett Mayor's Youth Employment Intern program and regional stakeholder groups like Mystic River Watershed Association (MyRWA) and GreenRoots, will be trained by ecologists empowering them to understand and lead the process, to develop institutional knowledge of programming, and to perform planting, nest-building, plant management, and other activities. These organizations then plan events for community volunteers, including school groups, nonprofits, and volunteers from local businesses, to perform this work as environmental stewardship opportunities.

Wetlands Enhancements

The existing salt marsh and adjacent BVW areas contain a thick wall of invasive species (Phragmites) and bare spots plagued by trash and debris further into the marsh. Wetlands enhancements are summarized below with further detailed design considerations.

There are two locations within the delineated salt marsh where vegetation is not present even though the substrate is suitable for vegetation. The Project proposes to restore these areas with salt tolerant plantings. It was important in this design that native species that were already growing at the Project Site be used. Salt marsh inundation levels cause distinct vegetation bands due to the sensitivity of plants to the length of inundation. Low marsh extends from mean sea level to the mean highwater mark and is dominated by smooth cordgrass (*Spartina alterniflora*). Revegetating areas will entail the placement of Spartina plugs on top of existing exposed wetland substrate (peat) above El. 2.0 NAVD88, which is over two feet above the mid-tide line (El. -0.42 NAVD88).

The Project proposes to extend wetlands enhancements into filled land above delineated extent of existing salt marsh and bordering vegetated wetlands in the rear of the #359 Beacham Street (existing boat yard) property. The scope of improvements in this area will be to remove the existing wooden boardwalk, existing hot mix asphalt pavement parking lot, and urban fill substrate to a point where native wetlands substrate is identified and then backfill with appropriate wetlands substrate soils and plant with suitable plants and seed mixtures at grade. The scope will seek to build approximately 800 square feet of salt marsh constructed in elevations up to 6.5′ NAVD88, and approximately 1,640 square feet of bordering vegetated wetland ranging from elevation 6.5′ to 7.5′ NAVD88. The work will seek to offset approximately 1,650 square feet of impacted wetlands resulting from removal of existing wooden boardwalk and construction of the Project. The impacted area contains degraded bordering vegetated wetlands beneath, and inland, of the existing wood boardwalk adjacent to the rear of the #359 Beacham Street (existing boat yard) property. The Proponents are committed to maintaining the space following construction and see it as an opportunity for ecological improvements, aesthetic betterment paired to new community green space in the project area, and that it may provide a limited space for wetlands migration with future sea level rise.

1.5 SUSTAINABILITY

The Proponents are committed to designing and constructing the Project in an environmentally sustainable manner. Accordingly, the following mitigation measures will be pursued to reduce the environmental impacts associated with the Project. The site design and resiliency measures include:

1.5.1 SITE DESIGN AND RESILIENCY

- Incorporation of state-recommended Resilient Massachusetts Action Team ("RMAT") design criteria in the design of flood resilience measures to account for future sea level rise, setting Design Flood Elevation ("DFE") more than four feet above the current 100-year base flood elevation ("BFE") of El. 10 NAVD88;
- Protection of industrial sites that store hazardous chemicals and fuels that could pose a risk to the Mystic River watershed in the event of coastal storm;

- Planting of native species, including 19 new shade trees, and reducing impervious surfaces throughout Project Site to address urban heat island effect in Chelsea and Everett;
- Incorporation of nature-based solutions along degraded riverfront area to reimagine IER as an adaptive habitat for birds, pollinators, and shellfish over time;
- Enhancing existing degraded salt marsh area by removing a thick wall of invasive species (Phragmites) and replanting bare spots further into the marsh with native species;
- Proposing salt marsh improvements that will improve habitat and awareness of the salt marsh resource area from adjacent publicly accessible areas; and
- Utilizing efficient design and construction practices to minimize Project Site area to the maximum extent practicable and avoid unnecessary impacts to coastal resources and buffer zones along the IER.

1.5.2 STORMWATER

- Reduction of impervious surfaces within the Project Site to increase groundwater recharge and minimize stormwater runoff;
- Planting of coastal bank areas to stabilize these sloped areas and address existing patterns of erosion and sedimentation into the IER;
- Inspection and maintenance of existing public and private storm drainage systems that outlet into the IER; and
- Install and/or repair backwater prevention devices on existing storm drain outlets into the IER to prevent saltwater intrusion and storm surge into drainage systems that can erode utility infrastructure and disturb collected sediments and greases/oils within catch basin sump collection systems.

1.5.3 TRANSPORTATION

- Creation of a connection to new bicycle transportation infrastructure along the Beacham Street roadway corridor;
- Incorporation of bicycle parking amenities at Island End Park; and
- Commitment by the Cities of Chelsea and Everett to increase awareness and enforcement of "No Idling" regulations to minimize commercial vehicle emissions that contribute to global warming and climate change. Measures will include posting additional signage along roadways adjacent to the Project Site and increasing enforcement actions by local law enforcement where appropriate.

1.6 ALTERNATIVES ANALYSIS

The Proponents evaluated three alternatives for the Project: 1) A No Build Alternative (of entire Project); 2) an Alternate Design Alternative (of each element of the Project); and 3) the Preferred Alternative (the Project). Within the Alternate Design Alternative, the Proponents

analyzed alternate concepts between the RPE, RPW, and SSCF design projects. RPE and RPW were both evaluated as a storm surge barrier positioned more prominently on the coastline. While the Proponents evaluated an inland flood barrier system positioned within the public rights-of-way of Beacham, Market, and Behen Streets, an inland solution was infeasible due to narrow rights-of-way and heavy tractor trailer traffic within these roadways that would jeopardize the system. Additionally, inland flood protection systems would leave more than 15 waterfront properties extremely vulnerable to coastal storms and potentially subject to additional wave impacts, and therefore they were not pursued. These three alternatives are described and evaluated below. See Table 1-5, Project Alternatives for a comparison of these alternatives, and see Figure 1-23, Project Alternative 2 Alignment.

1.6.1 NO BUILD ALTERNATIVE 1

The No Build Alternative would not address the ongoing flooding issues that plague the Project Site and the surrounding communities of Chelsea and Everett. The Cities of Chelsea and Everett have consistently struggled to manage flooding in the IER floodplain. Flooding has resulted in business closures, road shutdowns, property damage, and stranded motorists. These events typically begin with seasonally high tides and heavy rainstorms and persist until tides recede. Members of the community are familiar with closures of major arterial roadways such as Vale Street, Beacham Street, and Second Street during storms and high tide events. It is not uncommon during these events to see vehicles abandoned by their drivers in flooded public roadways, or the local Fire Department supporting emergency rescue from these vehicles. Businesses such as New England Produce Center, one of the largest employers in Chelsea and a regionally critical fresh food distribution center, regularly sees their ability to perform business curtailed by or at risk of flooding.

In recent years, the flood events and severity have increased. Flood risk modeling completed through the Massachusetts Coastal Flood Risk Model ("MC-FRM") indicates the current IER floodplain and surrounding area is at great risk for coastal flooding not just during current extreme flood events, but also during more regular coastal flooding events in the future due to projected climate change induced sea level rise, aided by the natural land subsidence of the region. While much of the area can be expected to flood now during the 10- and 100-year flood events, in 2050 the same flooding extent can be expected in the 1-year coastal flood. In 2070, those same areas will experience even deeper flooding during 1-year coastal floods, and 10- and 100-year flood events will penetrate further into the cities with deep, damaging floodwaters. The MC-FRM highlighted the increasing urgency to address growing flood risk in this area with catastrophic flood depths associated with the projected 100-year flood event in 2070.The future state impacts of projected flooding would be devastating to regional food security (production, storage, distribution), regional transportation infrastructure, local public schools, community health and safety, and economic vitality.

The No Build Alternative would yield no improvement to the environmental or economic conditions of the Project Site. The shoreline would remain in its eroded condition, full of trash and other debris, and would not be stabilized by native plantings and improved natural habitat along the banks of the IER. The existing Market Street culvert and Beacham Street drainage outfalls would remain as they currently exist today, with no ability to control dangerous extreme high tides and storm surge into Chelsea and Everett communities. Although there would be no additional impacts to wetlands under this alternative, in their current state, the wetlands are degraded and provide few substantial environmental benefits.

1.6.2 ALTERNATIVE DESIGN ALTERNATIVE 2

The Proponents considered an Alternative for each element of the Project. These Alternatives were considered separately as the coastal storm surge barrier element would fundamentally need to operate independently of any SSCF in this alternative and the widespread regional benefits of the Project would not be realized. Additionally, the inland alternative such as a freestanding concrete flood wall within public right-of-way areas along Market and Beacham Streets was considered, however more than a dozen coastal properties would face devastating coastal flood risk in this scenario.

1.6.2.1 RESILIENCE PROVISIONS EAST ALTERNATIVE – PREVIOUSLY FILED 2021 ENVIRONMENTAL NOTIFICATION FORM (ENF) DESIGN

The City of Chelsea originally proposed with a hybrid flood barrier design approach to fulfill the program requirements in this densely developed area. Listed from west (City Limit) to east (Admirals Hill), the following components comprised the original hybrid coastal flood protection system:

- Market Street (City Limit/County Line): Wall facing water with tapered half-berm sloping to existing grade on the inland side.
- Behind #357 Beacham Street (existing bank) property: Wall with a limited sloped planting bed at the base.
- Behind #359 Beacham Street (existing boat yard) property: Wall facing water with half-berm sloping to existing grade.
- #100 Justin Drive (existing industrial manufacturing facility): A wall is proposed to maintain the Justin Drive access road, which is maintained with a 30-foot offset from existing building. On the waterward side of the wall exists wetlands resource areas.
- #305 Commandant's Way (existing marina): Tieback of the waterfront measure to elevated land at Admirals Hill is

achieved through a ramped berm crossing Justin Drive and concluding in the abutting hillside.

Alignment of the barrier, berm, and walk provisions were determined based on a balancing of the interests of creating new continuous path of travel at waterfront; creation of new open space with views of waterfront; incorporation of green features; preventing any new take of existing wetlands; and respecting existing business operations in the area. The design team targeted setting the wall in the bank of the waterway at El. 8.0 NAVD88 where practical, but sometimes topography and site constraints required the barrier set in lower elevation earth. The steep banks of the river near the culvert outfall were to be armored with new rip rap (existing boulder/concrete armoring is in poor condition) to support safe trash clean-up and prevention of scour of the bank.

The boardwalk was proposed on the waterward side of the barrier abutting Market Street to provide space for an accessible ramp at the west end of the Island End Park. All work, both landside and waterside of the barrier, was proposed to be cast-in-place or precast concrete with weather-resistant properties and elevated to El. 14.0 NAVD88. The existing boardwalk from the marina to Island End Park would be demolished and vacated from the wetlands behind #359 Beacham Street (existing boat yard) property. At Justin Drive, the walk switched back to the waterside of the barrier into an alignment like the existing boardwalk to be removed.

1.6.2.2 STORM SURGE CONTROL FACILITY ALTERNATIVE

The Proponents considered multiple alternatives to the SSCF element of the Project. These alternatives were built upon more than a decade worth of evaluation of the damaged Market Street culvert and prior engagement with federal and state agencies. These alternatives are best summarized as the creation of upstream flood storage to absorb the effects of extreme high tides and storm surge and the use of passive control measures, such as non-mechanical flap gates, on the Market Street culvert and the Beacham Street drainage system outfalls. The intent of the passive flow control options was to prevent tidal ocean water from entering the Beacham Street drainage system and the Market Street stormwater culverts. This design would prevent inland flooding via the storm drain system during storm surge events as well as keep the culverts emptier than if bi-directional flow is allowed. Emptier culverts provide more storage volume for rainwater that would otherwise cause localized surface flooding, potentially impacting many structures. Federal and state regulatory agencies have commented that flow through the Market Street

culvert must be bi-directional, so that water from the IER can flow to inland resources at the open channel adjacent to the rail tracks. Therefore, the passive flow control alternative was dismissed as nonviable.

Upstream flood storage improvements were considered instead of the proposed SSCF. An initial upstream storage alternative considered widening the existing channel to attenuate flood flow in the open channel upstream of the Market Street culvert. This alternative is infeasible for several reasons, namely a constrained footprint for expansion and limited downstream benefits.

- There is no room to expand the existing upstream open channel on the former Boston Market Terminal site due to the proximity of the existing rail lines, a new last-mile distribution facility, and other developed areas, such as the neighboring Middlesex Gases facility.

- This location would only store excess rainwater from the upstream reaches of the drainage area tributary to the Market Street culvert and would not address flooding in the tributary area between the open channel and the IER cause by storm surge and the associated backflow. Flow control measures would need to be added to all tributary stormwater infrastructure connections to the Market Street culvert downstream of the open channel. These measures would mitigate flooding impacts on businesses and critical infrastructure in the areas between the IER and the upstream culvert. Without the measures, the high water levels would surcharge catch basins and manholes and cause flooding. The inspection and maintenance needed for numerous storm surge control measures would be an infeasible task for the Proponents and is likely to result in failure of multiple locations over time.

In-ground storage was not an option due to the space required for storage volumes estimated to exceed seven million gallons. It would also be prohibitively costly to construct and operate such storage structure(s).

1.6.2.3 RESILIENCE PROVISIONS WEST ALTERNATIVE

The City of Everett originally proceeded with a water's edge flood barrier design approach to fulfill the program requirements in this densely developed area. Listed from east (City Limit) to west (#101 Commercial Street (existing LNG facility visitors center), the following components

comprised the original waterfront coastal flood protection system considered

- Market Street (City Limit/County Line): Freestanding concrete flood wall running parallel to water with existing grade of approximate El. 9.0 NAVD88 on landward side and existing slope of IER coastal bank on waterside of barrier.
- Behind #155 Market Street (existing commercial produce sector business) property: Installation of a sheet pile wall in the IER seaward of existing bulkhead.
- Behind #95 Behen Street (existing marine construction facility) property: Installation of a sheet pile wall in the IER seaward of existing bulkhead.
- Behind #60 Commercial Street (existing cold storage facility) property: Installation of a sheet pile wall in the IER seaward of existing pier. Turning due north to parallel existing building as a free-standing concrete flood wall. Crossing private rail track with swing-style flood gate.
- Across Commercial Street: A passive flip-up style flood gate for roadway crossing.
- Between #61 Commercial Street (existing LNG facility warehouse) and #101 Commercial Street (existing LNG facility visitors center): A free-standing concrete flood wall between existing buildings with a passive flip-up style flood gate to maintain driveway access. Flood wall terminates at higher ground on #101 Commercial Street (existing LNG facility visitors center) property.

This Alternate Design to RPW provided a potentially significant cost and time saving option to inland wall construction in highly active waterfront sites and eliminated the need for additional access gates. Additionally, it allowed the Proponents to avoid the management of contaminated soils on multiple sites under AULs. However, this waterfront alternative did limit use of waterfront in the Mystic River DPA and increase impacts to Land Under Ocean in the IER.

1.6.3 PREFERRED ALTERNATIVE 3 (THE "PROJECT")

The Project described in Section 1.4, Project Description of this document is the Preferred Alternative. It will provide the greatest public benefit while being economically feasible for the Proponents to construct based upon limited municipally controlled land area near the IER and the extremely high cost of acquiring privately-

owned land in Chelsea and Everett. Private properties owners agree that the Project will provide flood protection to their waterfront sites in return for temporary and permanent easements to construct and maintain the Project. The Proponents have worked with these key stakeholders to review dozens of potential flood protection system alignments prior to arriving at the Project's proposed storm surge barrier system alignment. The linear Project Site will place proposed storm surge barrier elements at the center of proposed easements to allow for long-term operation and maintenance of this flood protection system. The Preferred Alternative will produce approximately 1,000 construction jobs.

The Project will permanently alter portions of the majority of the 25-foot Riverfront Area, Land Subject to Coastal Storm Flowage, and 100-foot Buffer Zone to Coastal Bank (all of which are regulated under 310 CMR 10.00). To mitigate these impacts, the Project will restore the conditions of the existing shoreline through the implementation of a robust native planting program and enhancement of 22,818 sf existing salt marsh and removal of invasive species within BVW. The Project will permanently improve portions of the Coastal Bank and its Buffer Zone, and the Riverfront Area to minimize existing erosion and sedimentation issues along the IER through the removal of existing impervious surfaces, removal of trash and debris, and steep slope stabilization practices. The Resilient Riverwalk, a proposed boardwalk with overlook areas, will be constructed along the shoreline to facilitate public enjoyment of the riverfront. The public access to these spaces is currently limited by accessible pedestrian access points, limited visibility due to high growth of invasive species along the existing salt marsh, and lack of public education and awareness of these resource areas.

1.6.4 SUMMARY

Table 1-5: Project Alternatives

Item	No Build Alternative 1	Alternate Design Alternative 2				Preferred Alternative 3 - the Project
		Alternate Design– Resilience Provisions East	Alternate Design– Storm Surge Control – Flood Storage Upstream[a]	Alternate Design– Resilience Provisions West	Alternate Designs– Total	
Project Site (acres)	2.16	2.16	2	3.14	7.3	9.54
Impervious Area (acres)	4.25	1.50	0.25	2.66	4.41	5.58
Barrier Length (lf)	0	970	0	1,700	2,670	4,640
Alteration of BVW (sf)	0	0	0	0	0	1,656
Creation of BVW (sf)	0	0	0	0	0	1,641
Alteration of Salt Marsh (sf)	0	0	0	0	0	0
Creation of Salt Marsh (sf)	0	0	0	0	0	800
Wetlands Impacts (sf - temporary)	0	100,431	80,000	24,000	204,431	135,054
Wetlands Impacts (sf - permanent)	0	30,475	20,000	110,737	161,212	211,456
Dredge/Fill (cubic yards)	0	1,308	0	0	1,308	1,438

Note: [a] Impacts associated with upstream flood storage area are estimated based upon a recent H&H Study completed for City of Chelsea that indicates that more than 7 million gallons of flood storage may be needed by 2050 to prepare for significant storm events.

1.7 PUBLIC AND COMMUNITY BENEFITS

The Project's benefits include, but are not limited to:

- Enhancement of the coastline protection with a new 4,640 lf coastal and inland storm surge barrier alignment designed to range in height of four feet or more over the current BFE to protect the area's industrial, commercial, and community uses;
- Improvement of the waterfront of the Project Site through rehabilitation of the eroded shoreline and the use of adaptive nature-based solutions;
- Investment in existing Island End Park, including educational signage in multiple languages spoken in the community, new benches and other site furnishings, landscape plantings, and other amenities;
- Improvement of waterfront public access through the construction of the Resilient Riverwalk - an approximately 940-foot long, 10-foot wide elevated boardwalk;
- Construction of accessible pedestrian sidewalk amenities to Beacham Street;
- Protection of approximately 11,000 jobs, critical transportation corridors, key assets such as Mass General Hospital Chelsea, Williams Middle School, Chelsea High School, Excel Academy, and a regional FBI Headquarters, and homes occupied by EJ communities within the Cities of Everett and Chelsea;
- Creation of between 670-1,000 construction jobs over the projected 36 months of construction for the Project;
- Establishment of the Community Advisory Group, composed of more than six community-driven individuals, to provide input on the public benefits of the Project; and
- Formation of the Stakeholder Working Group, composed of over 20 representatives from private sector industrial businesses in Chelsea and Everett, to contribute feedback on the Project.

1.8 ENVIRONMENTAL JUSTICE POPULATIONS

The Project Site is in proximity to neighborhoods defined as EJ Populations based on the EEA 2020 EJ Map Viewer, which is derived on 2020 Census Block Groups. Within a 5-mile radius of the Project Site, there are 511 census block group that trigger seven EJ criteria, which include: Minority; Income; English Isolation; Income and Minority; Minority and English Isolation; Income and English Isolation; and Minority, Income, and English Isolation. Within a 1-mile radius, there are 46 census block group that trigger five EJ criteria, which include

Minority; English Isolation; Income and Minority; Minority and English Isolation; and Minority, Income, and English Isolation.

The Project is located along the IER in an area characterized by a mix of industrial uses including postal services, a boat yard, produce distribution, liquified natural gas, coal storage facilities, marine construction facilities, a bank, and other commercial/industrial uses. The environmental risks faced by residents, users, visitors, and others that pass through the Project Site located in Chelsea and Everett at the IER are neither limited to flooding nor concentrated solely among waterfront industrial properties. The IER's adjacent neighborhoods experience many of the public health and environmental impacts that come with living in proximity to heavy industrial operations, while lacking in waterfront access and open space.

Flood protection measures will protect over 500 acres of densely developed urban neighborhoods in Chelsea and Everett. The Project will result in considerable long-term net benefits to EJ Populations. The Project is anticipated to provide several economic and environmental benefits. Environmental benefits of the Project include an improved public realm, enhanced pedestrian safety conditions, and ecological improvements such as improved water quality and flood protection. The Project will provide additional community benefits including new sidewalks with shade trees, scenic overlooks, and bike racks and benches, and include a 1/5-mile riverfront park to access the waterfront and provide expanded public open space. This landscaping will contribute to a reduction in the overall impervious surface area and urban heat island effect on the Project Site. See Chapter 4 for further details how the Project affects EJ Populations.

1.9 COMMUNITY AND AGENCY OUTREACH

Since 2016, the Proponents have tireless worked to gather input from community and agency groups to refine the Project. The Proponents have held numerous meetings and public engagements since the start of the Project. Significant meetings and events held over the last 24 months are described in Table 1-6, Community and Agency Outreach.

Table 1-6: Community and Agency Outreach

Date	Participant(s)	Description
September 26, 2020	GreenRoots staff and community members	IER Fall Clean Up Event
October 21, 2020	Cities of Chelsea and Everett staff and community members	Virtual Project Open House
November 5, 2020	Cities of Chelsea and Everett staff and community members	Public Informational Meeting at IER Park
May 22, 2021	GreenRoots staff and community members	IER Spring Clean Up Event

Date	Participant(s)	Description
September 1, 2021	City of Everett, Project Team, and EEA MVP staff	FY22 MVP Action Grant Kickoff Meeting with EEA
September 8, 2021	Project Team and Stakeholder Working Group ("SWG") members	SWG Meeting #1 – Kickoff Meeting (Virtual)
October 7, 2021	Project Team and EEA, Massachusetts Emergency Management Agency ("MEMA"), and CZM staff	Discuss FEMA BRIC Funding Opportunities
October 20, 2021	Project Team and SWG members	SWG Meeting #2 – Site Walk
October 28, 2021	Project Team, MEMA and CZM staff, and MEMA Technical Assistance Consultants	Discuss FEMA BRIC Grant Application Scope & Benefit-Cost Analysis ("BCA") Approach
November 3, 2021	Mystic River Watershed Association ("MyRWA") staff and legislative partners	State Legislators Mystic and IER Boat Tour #1
November 5, 2021	MyRWA staff and legislative partners	State Legislators Mystic and IER Boat Tour #2
November 15, 2021	Project Team, MEMA and CZM staff, and MEMA Technical Assistance Consultants	Discuss FEMA BRIC Grant Application Scope & BCA Approach Follow Up
November 18, 2021	Project Team and SWG members	SWG Meeting #3 (Virtual)
November 29, 2021	Project Team, MEMA and CZM staff, and MEMA Technical Assistance Consultants	Review Session - FEMA BRIC Grant Application
January 20, 2022	Project Team and SWG members	SWG Meeting #4 (Virtual)
April 7, 2022	GreenRoots staff and Community Advisory Group ("CAG") members	CAG Meeting #1 – Kickoff Meeting (Virtual)
April 14, 2022	Project Team and SWG members	SWG Meeting #5 – Site Walk
April 23, 2022	Project Team, GreenRoots, MyRWA, Community	Island End River Cleanup Event on Earth Day
May 5, 2022	GreenRoots staff and CAG members	CAG Meeting #2 – Site Walk
May 18, 2022	GreenRoots staff and CAG members	CAG Meeting #3 (Virtual)
June 9, 2022	Multiple Agencies – CZM, US Environmental Protection Agency, MassDEP, Massachusetts Environmental Protection Act ("MEPA") Office, USACE, and others	Pre-Filing Site Meeting (Virtual) with Agencies
June 15, 2022	GreenRoots staff and CAG members plus Youth Eco Ambassadors	CAG Meeting #4 – Mystic and IER Boat Tour
June 16, 2022	Everett Conservation Commission	Informational Presentation

Date	Participant(s)	Description
June 21, 2022	Project Team and SWG members	SWG Meeting #6 (Virtual)
June 23, 2022	Multiple Agencies – CZM, EPA, MassDEP, MEPA Office, USACE, and others	Pre-Filing Site Walk with Agencies

This document reflects requests by the agencies for details and clarifications of resource areas and Project plans. Additional details will be provided during the permitting process.

1.10 SUMMARY OF REQUIRED PERMITS AND APPROVALS

The following table lists the anticipated approvals for the Project.

Table 1-7, Anticipated Project Approvals

Agency	Approval
Local	
City of Everett	• Utility Connection Permits
Everett Conservation Commission	• Order of Conditions (Wetlands Protection Act)
City of Chelsea	• Utility Connection Permits
Chelsea Conservation Commission	• Order of Conditions (Wetlands Protection Act)
State	
Executive Office of Energy and Environmental Affairs	• Secretary's MEPA Certificate
Massachusetts Department of Environmental Protection	• Chapter 91 License • 401 Water Quality Certification
Massachusetts Historical Commission	• Determination of No Adverse Impact
Federal	
Army Corps of Engineers	• Pre-Construction Notification
Environmental Protection Agency	• NPDES Construction General Permit & Remediation General Permit

1.11 PROJECT TEAM

The following table lists the members of the Project Team.

Table 1-8: Project Team List

Team Member	Contact Information
Proponents	City of Chelsea – Department of Housing and Community Development 500 Broadway Chelsea, MA 02150 Contact: Alexander Train, AICP atrain@chelseama.gov (617) 466-4192 City of Everett – Department of Public Works (DPW) – Engineering 484 Broadway Everett, MA 02149 Contact: Erik Swanson, P.E. Erik.Swanson@ci.everett.ma.us (617) 394-2251
Planning/Permitting	Fort Point Associates, A Tetra Tech Company 31 State Street, 3rd Floor Boston, MA 02109 Contact: Katie Moniz, P.E., AICP, CFM kmoniz@fpa-inc.com (617) 279-4388

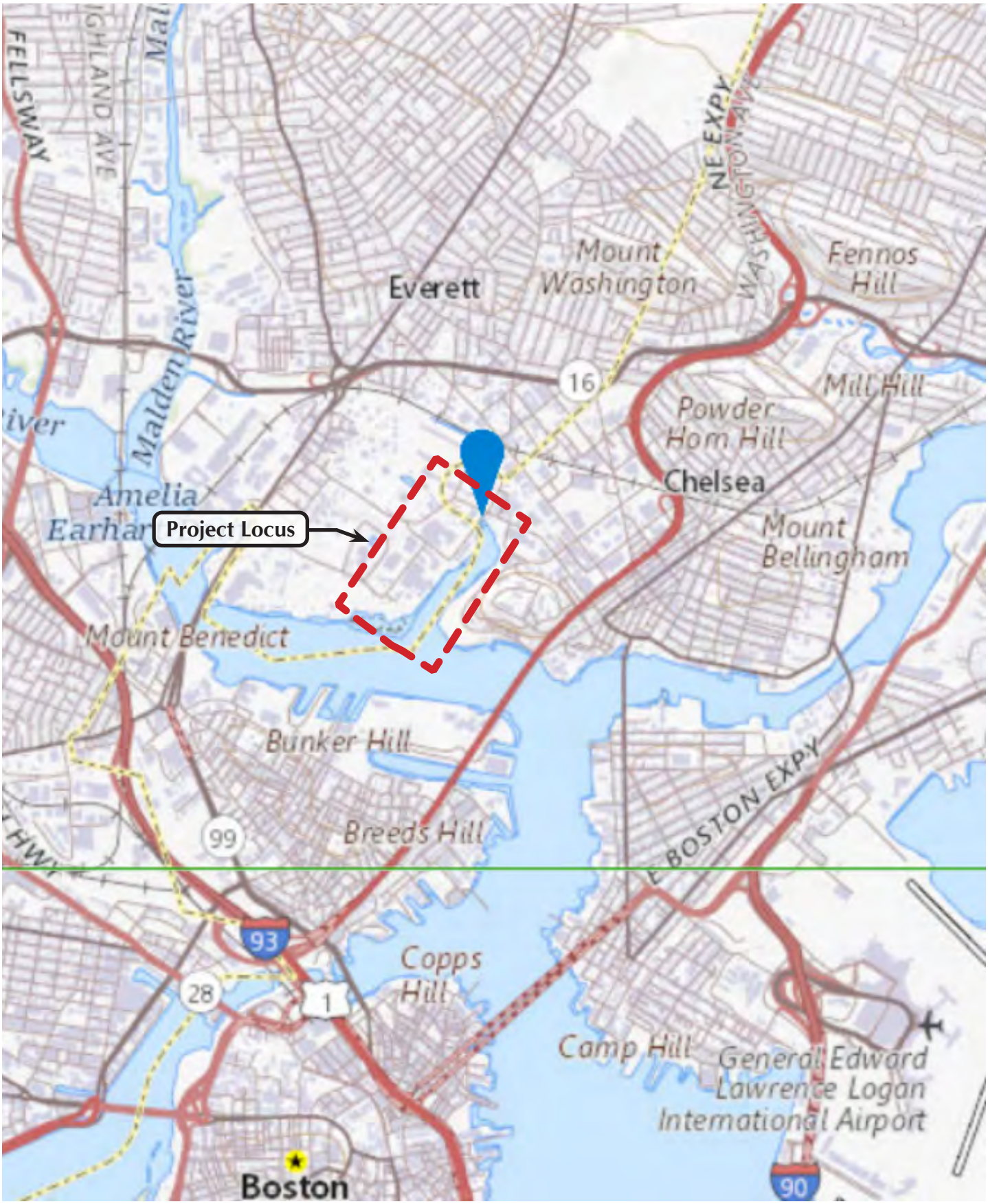
Team Member	Contact Information
Civil & Structural Engineering Design	AECOM 250 Apollo Drive Chelmsford, MA 01824 Contact: Tim Harrison, P.E. Tim.harrison@aecom.com (978) 905-2100 Tetra Tech (Civil) 498 7th Avenue, 15th Floor New York, NY 10018 Contact: Jake Oldenburger, P.E., CFM, ENV SP Jake.Oldenburger@tetratech.com (646) 576-4023 Tetra Tech (Structural) 1901 South Congress Avenue, Suite 200 Boynton Beach, FL 33426 Contact: Saied Saiedi, P.E. Saied.Saiedi@tetratech.com (561) 735-0482 Weston & Sampson 55 Walkers Brook Drive, Suite 100 Reading, MA 01867 Contact: Tim Corrigan, P.E. corrigant@wseinc.com (978) 573-4184

Team Member	Contact Information
Land Surveying	Beals and Thomas 144 Turnpike Road Southborough, MA 01772 Contact: Mark Benson mbenson@bealsandthomas.com (508) 366-0560 x4821 LandTech 515 Groton Road Westford, MA 01886 Contact: Chris Lorrain clorrain@landtech.com (978) 692-6100
Geotechnical Engineering	Tetra Tech 960 North Hamilton Road, Suite 104 Gahanna, OH 43230 Contact: Pete Nix Pete.Nix@tetratech.com (614) 289-0112 Northeast Geotechnical 66 Old Danielson Pike Foster, RI 02825 Contact: James Handanyan jhandanyan@northeastgeotechnical.com (508) 598-3510 x711 Weston & Sampson 55 Walkers Brook Drive, Suite 100 Reading, MA 01867 Contact: Tim Corrigan, P.E. corrigant@wseinc.com (978) 573-4184

Team Member	Contact Information
Community Outreach	GreenRoots 227 Marginal Street, Suite 1 Chelsea, MA 02150 Contact: John Walkey JohnW@GreenRootsChelsea.org (617) 466-3076 Mystic River Watershed Association 20 Academy Street, Suite 306 Arlington, MA 02476-6401 Contact: Julie Wormser julie.wormser@mysticriver.org (781) 316-3438
Coastal Modeling	Woods Hole Group 107 Water House Road Bourne, MA 02532 Contact: Kirk Bosma kbosma@woodsholegroup.com (508) 495-6228
Stormwater Modeling	Dewberry 99 Summer Street, Suite 700 Boston, Massachusetts 02110-1200 Contact: David Bedoya dbedoya@dewberry.com (617) 695-3400
Wetlands Science	Weston & Sampson 55 Walkers Brook Drive, Suite 100 Reading, MA 01867 Contact: Devin Herrick herrickd@wseinc.com (978) 977-0110 x2332

Team Member	Contact Information
Licensed Site Professional Services	Tetra Tech Marlborough Technology Park 100 Nickerson Road Marlborough, MA 01752 Contact: Bill Phelps william.phelps@tetratech.com (508) 786-2389 Weston & Sampson 55 Walkers Brook Drive, Suite 100 Reading, MA 01867 Contact: Prasanta Bhunia, L.S.P. bhuniap@wseinc.com (978) 573-4006
Property Appraisals	Eric Reenstierna Associates, LLC 24 Thorndike Street Cambridge, MA 02141 Contact: Eric Reenstierna ericreen@tiac.net (617) 577-0096

Team Member	Contact Information
Legal Services	Blatman, Bobrowski, Haverty & Silverstein, LLC 9 Damonmill Square, Suite 4A4 Concord, MA 01742 Contact: Jonathan Silverstein Jms@BBSHlaw.net (978) 931-2226 City of Chelsea City Solicitor 500 Broadway Chelsea, MA 02150 Contact: Cheryl Watson Fisher cfisher@chelseama.gov (617) 466-4150 City of Everett City Solicitor 484 Broadway, Room 21 Everett, MA 02149 Contact: Colleen Mejia colleen.mejia@ci.everett.ma.us (617) 394-2284
Landscape Architecture	BSC Group 803 Summer Street Boston, MA 02127 Contact: Casey-Lee Bastien cbastien@bscgroup.com (617) 896-4300



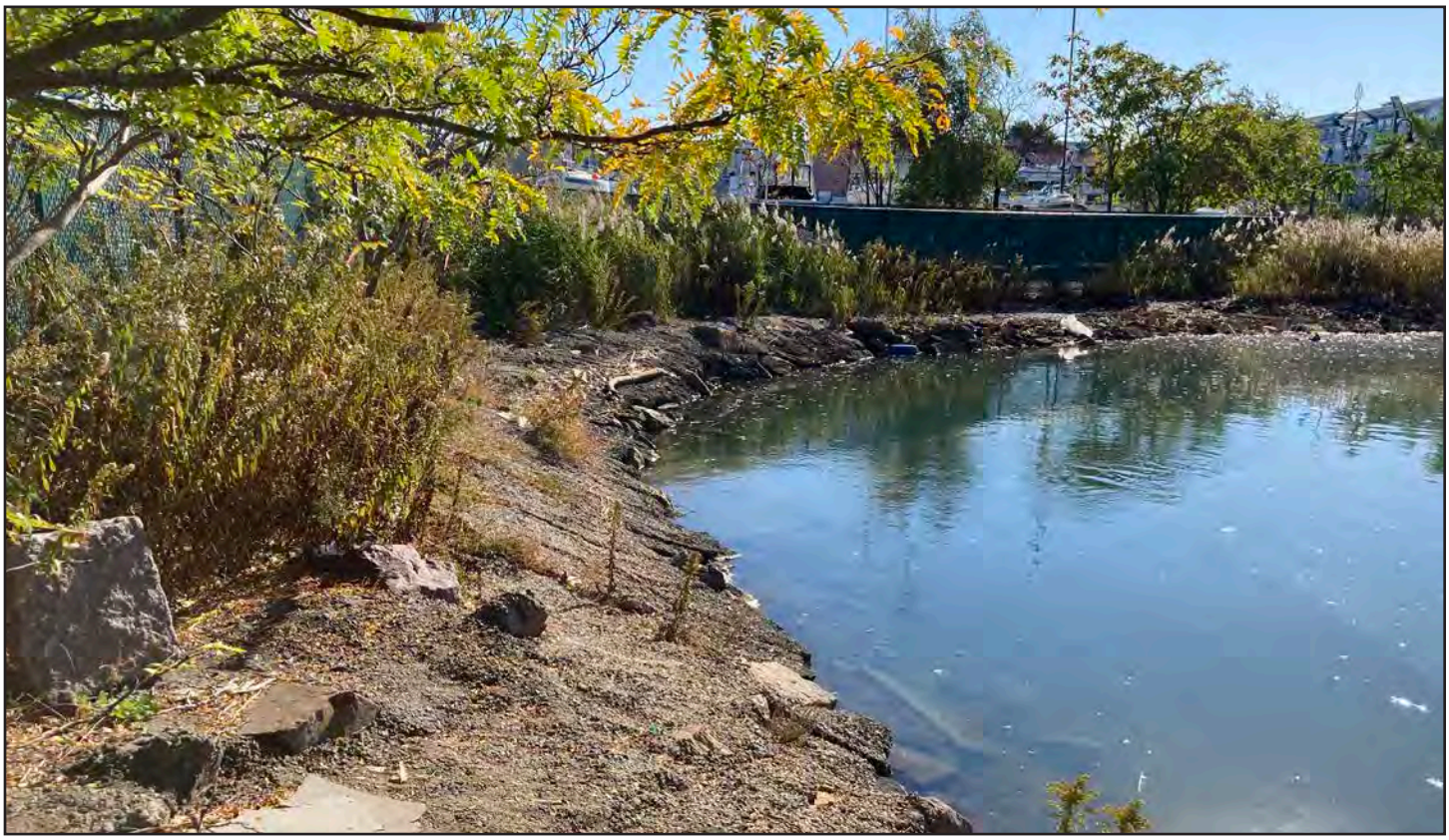
Chelsea, MA
Everett, MA

Figure 1-1
Project Locus Map
Source: Fort Point Associates, Inc., 2022

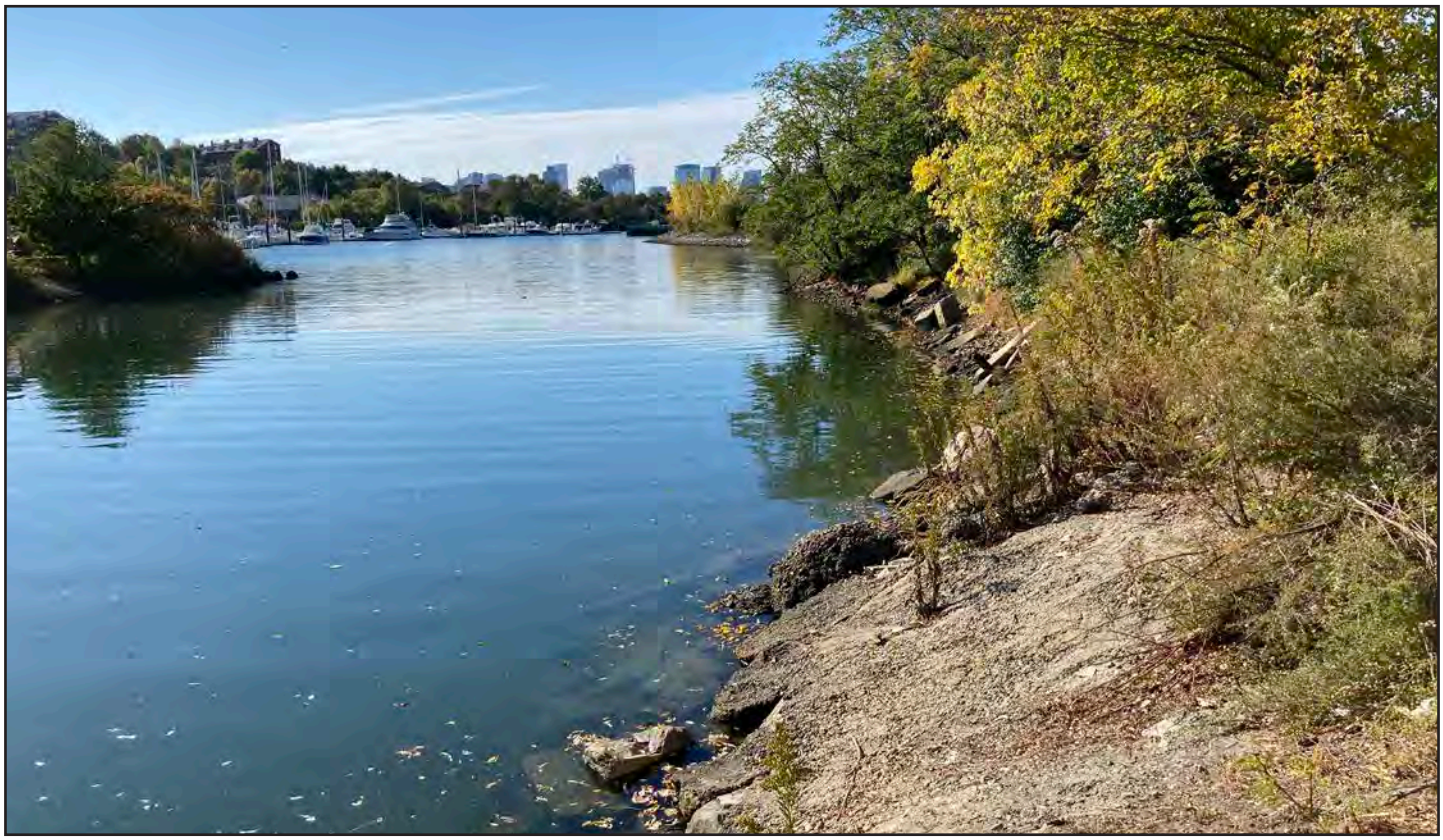
Chelsea, MA
Everett, MA

Figure 1-2
Project Aerial Map
Source: Fort Point Associates, Inc., 2023

Figure 1-3
Existing Conditions Photograph Key
Source: Fort Point Associates, Inc., 2023



Photograph 1: View of the Island End River behind #359 Beacham Street property and Market Street culvert



Photograph 2: View looking up Island End River, facing south towards Mystic River

Photograph 3: View of the IER shoreline from #155 Market Street, facing north towards Chelsea/Everett border

Photograph 4: View of the Island End River facing south along #155 Market Street and shoreline

Photograph 5: View of the #155 Market Street facing west along ramp up to dock and upper parking area

Photograph 6: View of the #155 Market Street upper and lower parking areas facing south

Photograph 7: View of PW Marks and SPS New England property line facing south from SPS New England facility

Photograph 8: View of the SPS New England facility facing north along SPS New England western property line

Photograph 9: View of the SPS New England facility facing south towards the southern edge of dock

Photograph 10: View of the railroad and SPS New England facility facing north from Lineage Logistics facility

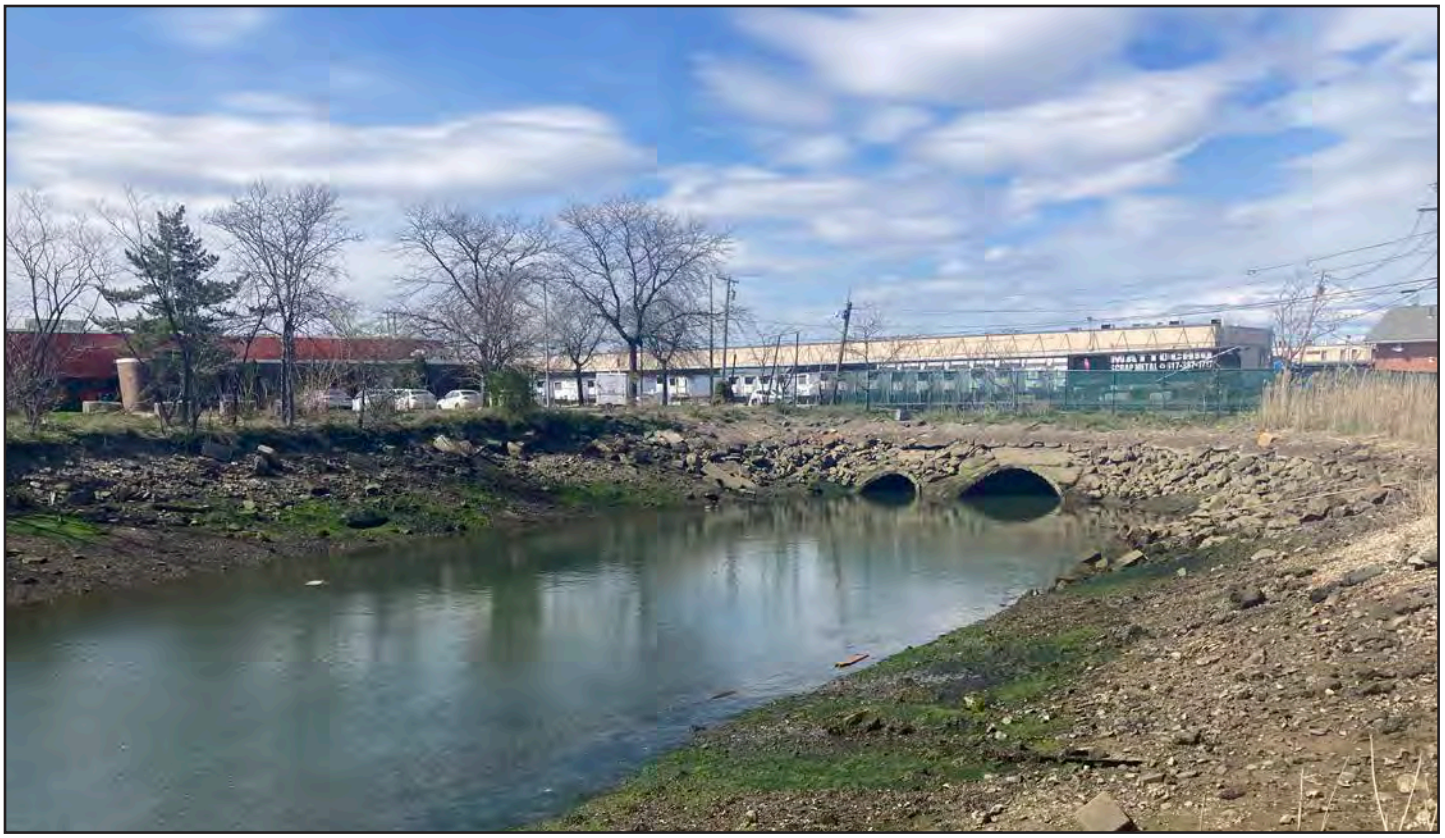
Photograph 11: View looking southwest towards the southeast corner of the Lineage Logistics building

Photograph 12: View looking west between Lineage Logistics and Quebec Ciment, towards Commercial Street

Photograph 13: View looking east towards Island End River, between Lineage Logistics and Quebec Ciment

Photograph 14: View looking southwest from Commercial Street towards Constellation Energy

Photograph 15: View looking east along existing boardwalk towards Signature Breads



Photograph 16: View looking northwest towards Beacham Street from Island End Park

Photograph 17: View looking southeast towards Island End River and Admiral's Hill Marina from Island End Park

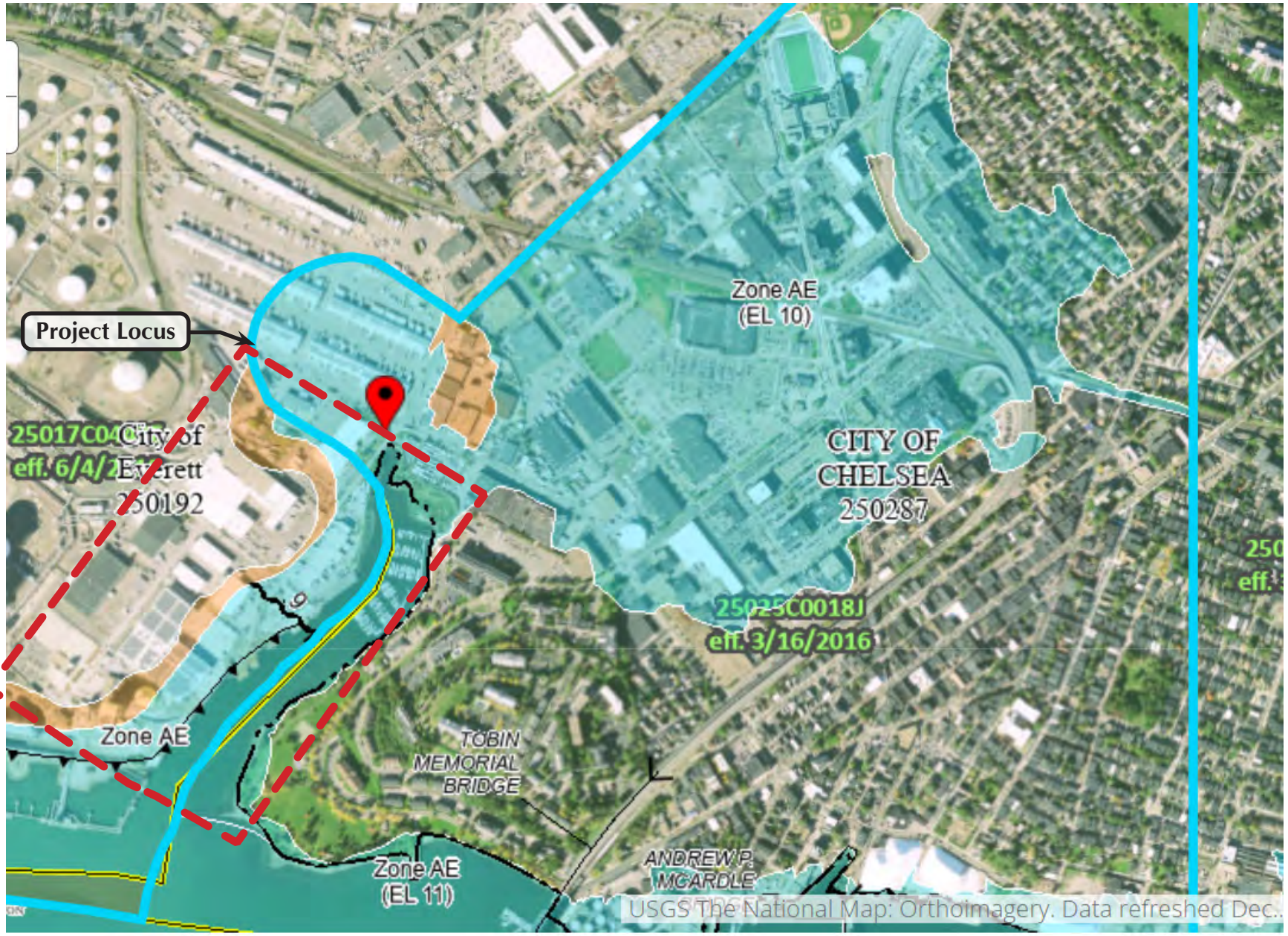
Photograph 18: View looking south towards Admiral's Hill Marina from salt marsh

Photograph 19: View looking north towards Beacham Street from Admiral's Hill Marina parking lot

Photograph 20: View looking south from Signature Bread property towards Admiral's Hill Marina

Photograph 21: View looking east towards Island End River from salt marsh

Photograph 22: View looking west towards Island End Park gazebo



Chelsea, MA
Everett, MA

Figure 1-15
FEMA Firm Flood Map
Source: FEMA, 2022

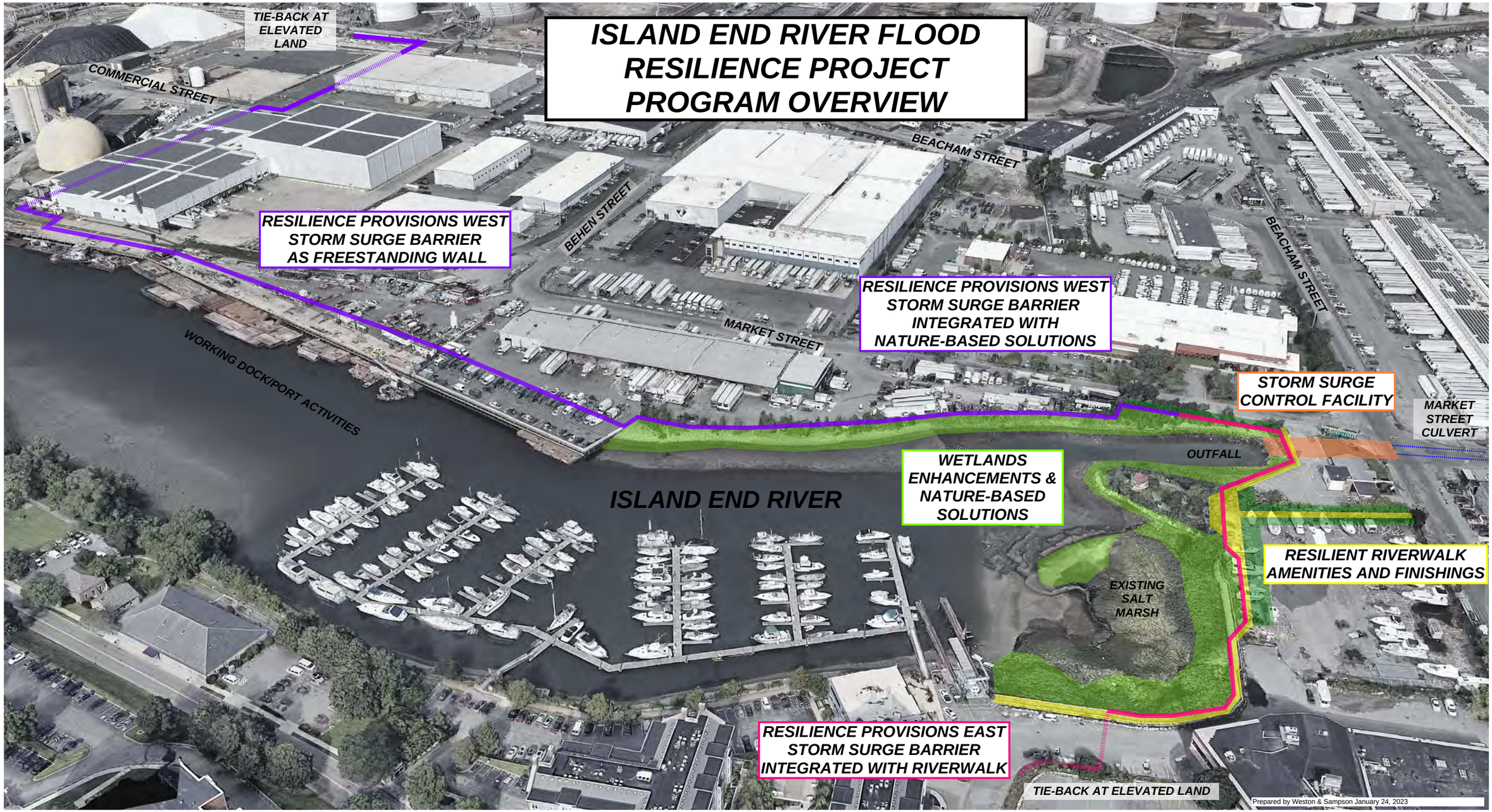
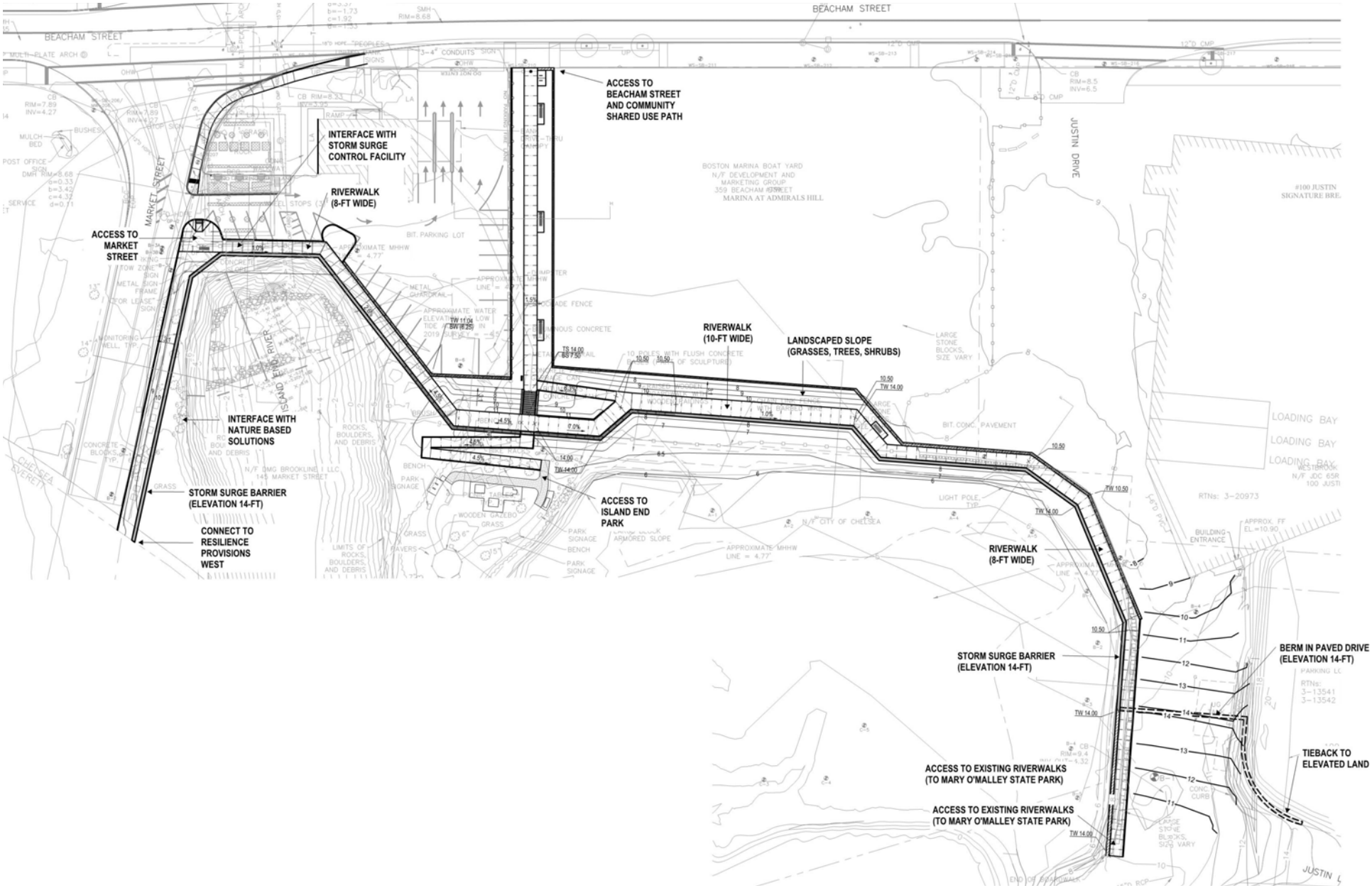
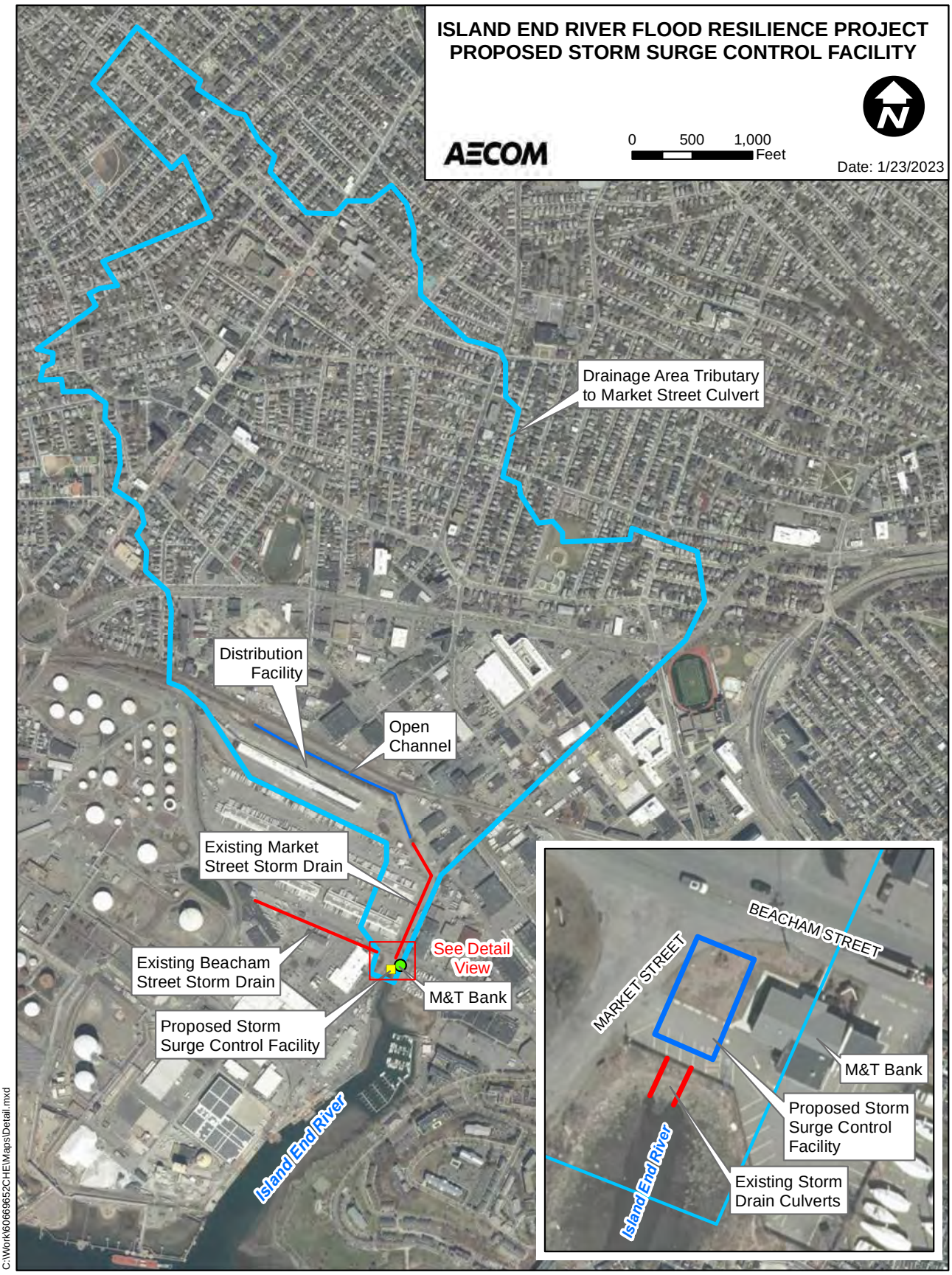


Figure 1-16
IER Flood Resilience Project Annotated Exhibit
Source: Weston & Sampson, Inc., 2023



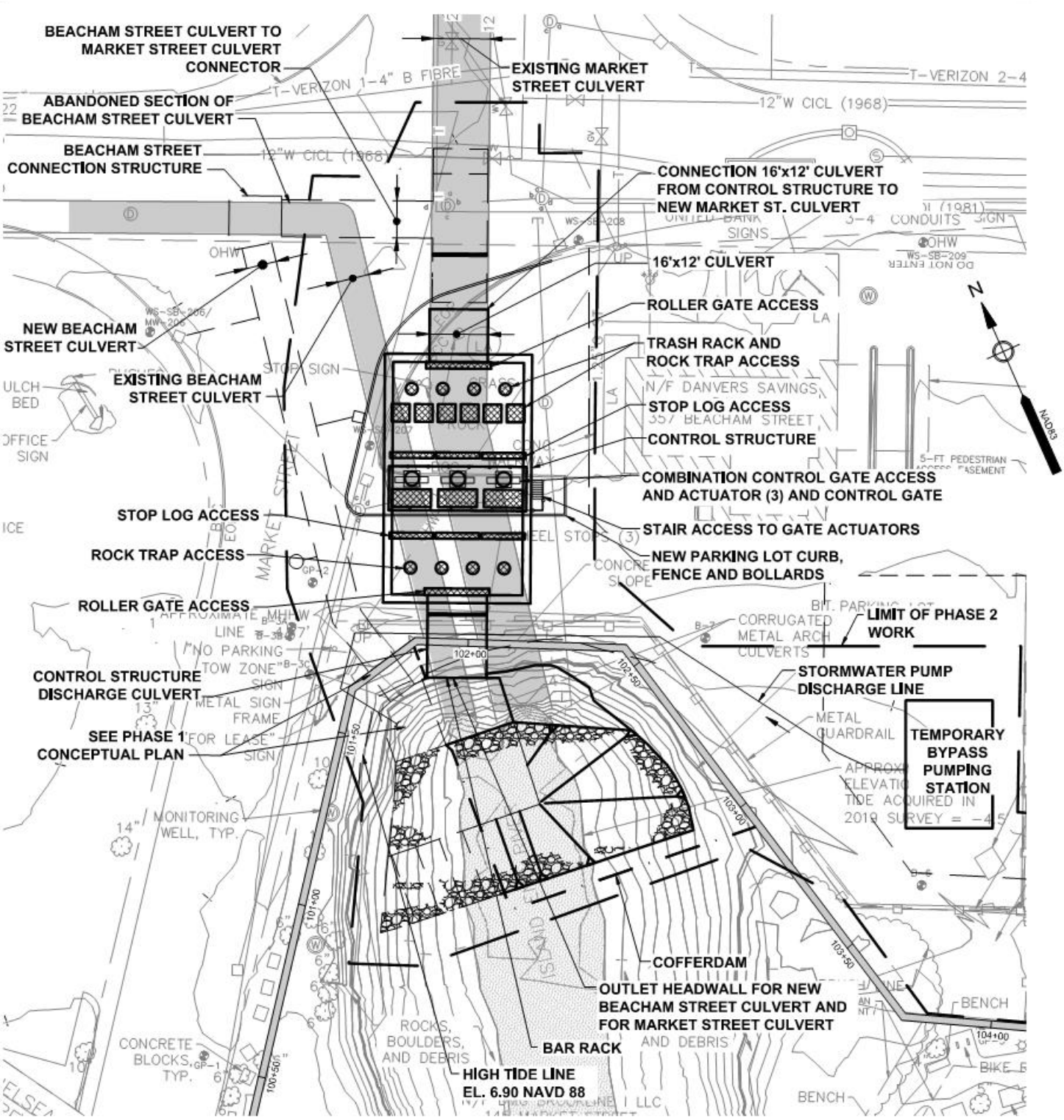
Chelsea, MA
Everett, MA

Figure 1-17
Resilience Provisions East Exhibit
Source: Weston & Sampson, Inc., 2022



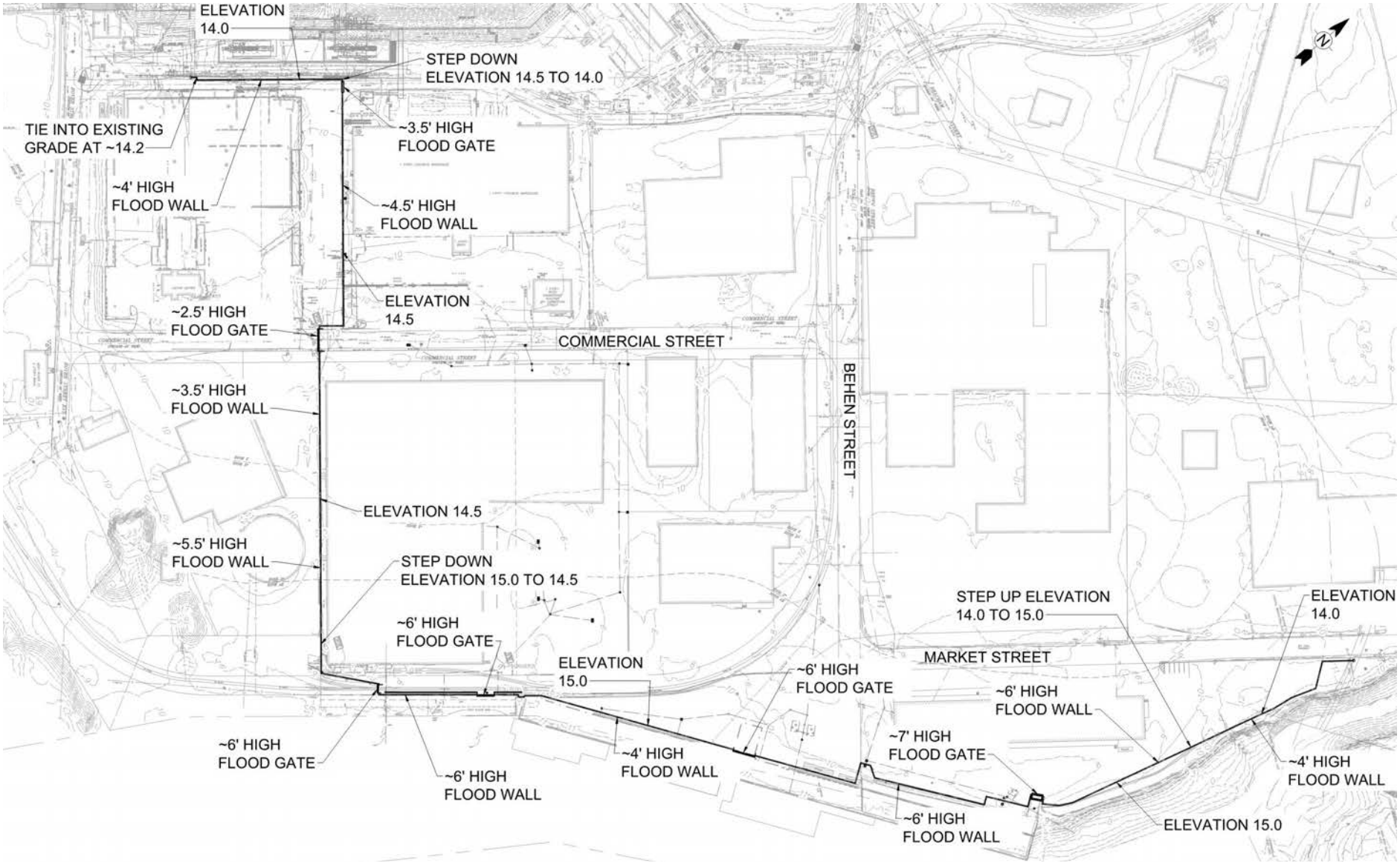
Chelsea, MA
Everett, MA

Figure 1-18
Storm Surge Control Facility Watershed Map
Source: AECOM, 2022



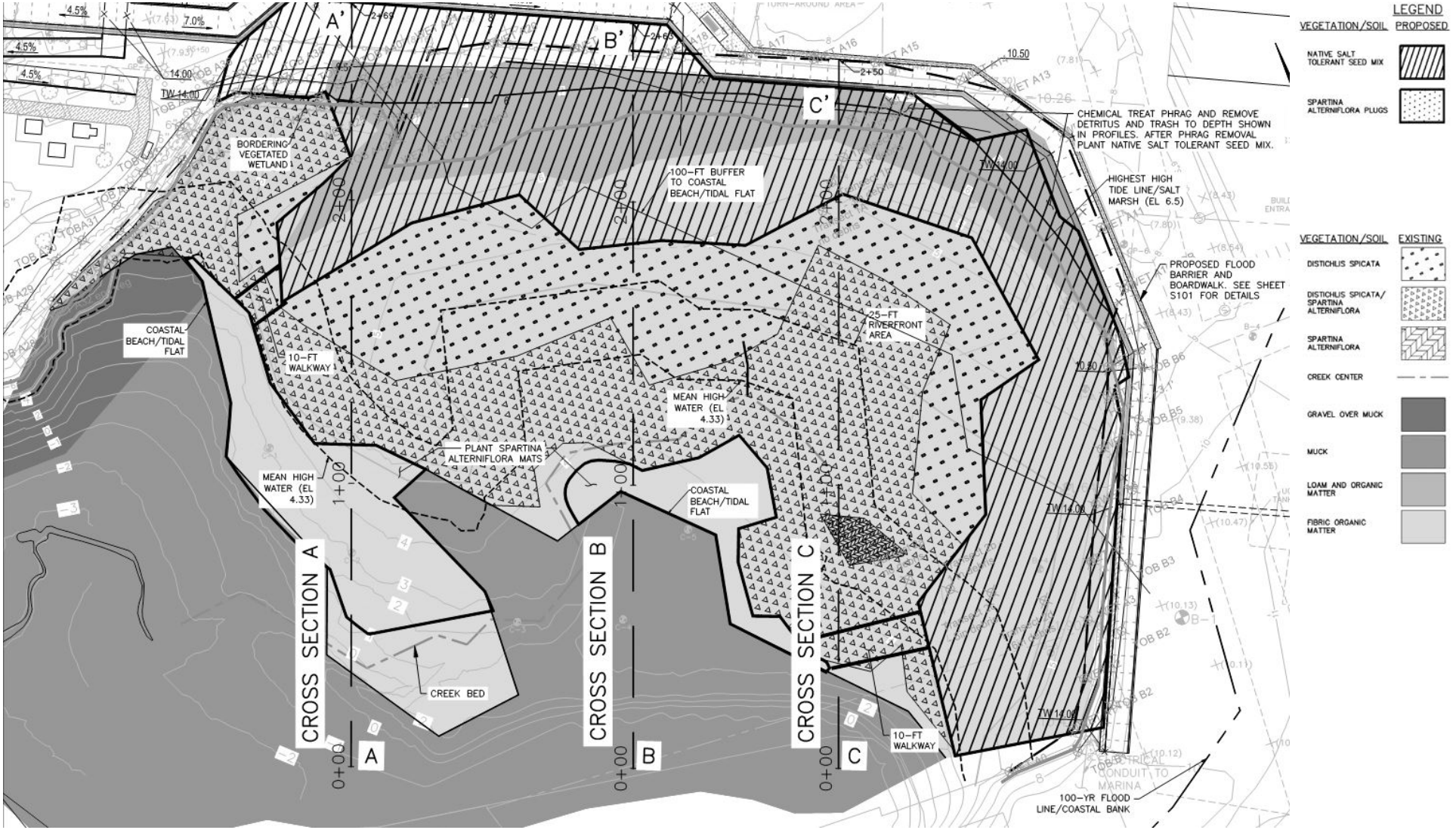
Chelsea, MA
Everett, MA

Figure 1-19
Storm Surge Control Facility Exhibit
Source: AECOM, 2023



Chelsea, MA
Everett, MA

Figure 1-20
Resilience Provisions West Exhibit
Source: Fort Point Associates, Inc., 2023



Chelsea, MA
Everett, MA

Figure 1-21
Wetlands Enhancements Exhibit
Source: Weston & Sampson, Inc., 2023

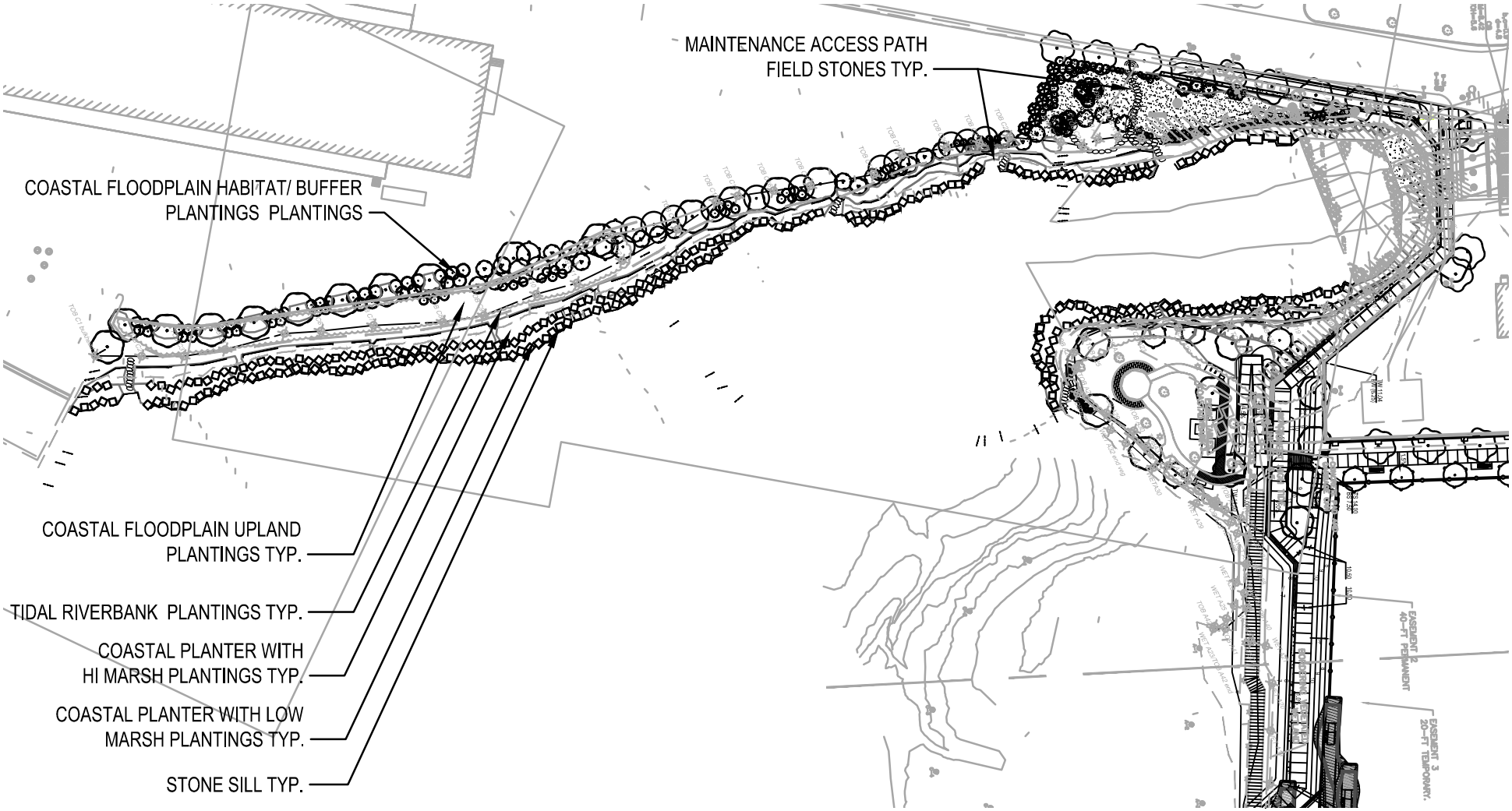


Figure 1-22
Nature-based Solutions Exhibit
Source: BSC Group, 2023

Chelsea, MA
Everett, MA

Figure 1-25
Project Alternative 2 Alignment
Source: Fort Point Associates, Inc., 2023

Figure 1-24
IER Flood Resilience Project Exhibit
Source: Weston & Sampson, Inc., 2023

Chelsea, MA
Everett, MA

Figure 1-25
IER Area within Projected 2070 Floodplain
Source: Weston & Sampson, Inc., 2021

Chapter 2

TIDELANDS

CHAPTER 2: TIDELANDS

2.1 INTRODUCTION

The Cities of Chelsea and Everett (the "Proponents") propose to construct a coastal flood barrier, Storm Surge Control Facility, and related amenities at Island End River ("IER") in the Cities of Chelsea and Everett (the "Project Site"). The approximately 9.5-acre Project Site is currently comprised of a mix of commercial and industrial uses and supporting roadway and utility infrastructure. The proposed Island End River Flood Resilience Project (the "Project") will construct an approximately 4,640 linear-foot (lf) storm surge barrier, an approximately 2,900 square-foot underground Storm Surge Control Facility, approximately 50,000 square feet of nature-based solutions along the riverfront, and associated wetland and public access improvements. This chapter describes Chapter 91 jurisdiction and compliance of the portion of the Project Site that is within Chapter 91 jurisdiction.

2.2 CHAPTER 91 JURISDICTION

The Project Site consists of filled (formerly flowed) tidelands and flowed tidelands on private and Commonwealth tidelands. See Figure 2-1, Chapter 91 Jurisdiction Map. The Chapter 91 presumptive line is based on MassGIS data and the high water mark from three historic survey plans. The historic high water mark reflects the most landward high water marks of the U.S. Coast Survey, 1847 (T-233), the U.S. Coast and Geodetic Survey, 1894 (T-2190), and the Harbor and Land Commissioner's Office Survey, 1908. See Figure 2-2: Historic Chapter 91 Jurisdiction (1847); Figure 2-3: Historic Chapter 91 Jurisdiction (1894); and Figure 2-4: Chapter 91 Jurisdiction (1908). The Project Site runs through the former IER in the vicinity of Market Street and contains areas seaward of the historic low water mark as shown on the 1894 survey, and therefore meets DEP's definition of Commonwealth tidelands. The mean high water (MHW) is 4.33' (NAVD88) and the mean low water (MLW) is -5.16'.

2.2.1 HISTORIC LICENSES

State authorizations for fill and structures within Chapter 91 jurisdiction were researched using a database from the Massachusetts Department of Environmental Protection (the "DEP"), and the on-line web sites at the Middlesex South Registry of Deeds and the Suffolk Registry of Deeds. Authorizations were found for the existing structures including pile supported piers and deck, filling, dredging, stormwater structures in Chelsea and Everett. Authorizations for structures and fill were issued between 1897 and 2008 by the Harbor and Land Commissioner's Office (the "HLC"), the Massachusetts Department of Public Works (the "DPW"), and the DEP. See Table 2-1, Historic Authorizations within the Project Site. These licenses authorized the

property owner to maintain, repair, dredge, construct walls, foundations, and piers, and railways, and fill in and over the tideland of the IER.

Table 2-1, Historic Authorizations within the Project Site

License No.	Date Issued	Authorization
2083	December 10,1897	HLC
2250	January 19, 1899	HLC
434	May 29, 1924	DPW
1908	October 28, 1937	DPW
2990	May 7, 1992	DEP
3037	June 26, 1992	DEP
11280	March 10, 2006	DEP
12100	April 1, 2008	DEP

Source: DEP Waterways, 2022.

2.3 COMPLIANCE WITH CHAPTER 91 REGULATIONS

This section describes the Project's compliance with the following applicable standards of the Chapter 91 Regulations.

2.3.1 APPLICABLE CHAPTER 91 STANDARDS

310 CMR 9.11(3)(c)2 – Statement Regarding Proper Public Purpose, Public Rights, CZM Consistency, and Conformity to Municipal Harbor Plan

Pursuant to 310 CMR 9.31(2), the Project serves a proper public purpose because it is a water-dependent use project as described below. The Project is not detrimental to or does impact the rights, access, or use of the tidelands by the public. The Project Site is not within the planning area of a municipal harbor plan (MHP) and therefore, compliance with an MHP is not applicable.

310 CMR 9.12 – Water-Dependent Use

A project is considered a water-dependent use if it meets the use standards under 310 CMR 9.12(2)(a) that allow for pedestrian facilities that promote use and enjoyment of the water by the public and are located near the water's edge, and for shore protection structures and associated fill, which are necessary either to protect an existing structure from natural erosion or accretion or to protect, construct, or expand a water-dependent use. The Project complies with these standards by providing pedestrian facilities that promote use and enjoyment of the water, dredging to support wetland

improvements, installation of native vegetation and perforated concrete planters, and replacement of stormwater structures, flood and shore protection structures, and stormwater structures.

310 CMR 9.31(2) – Proper Public Purpose

The standards at 310 CMR 9.31(2)(a) state that no license shall be issued by the Department unless the project serves a proper public purpose which provides greater benefit than detriment to the rights of the public in said lands in accordance with the provisions of this standard. Pursuant to the standard at 310 CMR 9.31(2)(a), the project is presumed to provide a proper public purpose if it is a water-dependent use project. Therefore, the Project meets this standard because it is a water-dependent use project.

310 CMR 9.32 - Categorical Restrictions on Fill and Structures

The project is eligible for a license if it is restricted to fill and structures which accommodate specific uses depending on its location within and outside of a Designated Port Area (DPA). Approximately four fifths of the Project Site is within the DPA, most of which is in Everett, and approximately one-fifth of the Project Site is outside of the DPA, most of which is in Chelsea (see Figure 2-1). As described below, the Project complies with the applicable standards pursuant to 310 CMR 9.32(1)(a) and (b) regarding fill and structures outside of and within DPA portions of the Project Site.

Project Outside of DPA

The Project will comply with the standards that allow fill or structures for any use on previously filled tidelands; and fill or structures for water-dependent uses located below the MHW mark and take reasonable measures to minimize the amount of fill by relocating the use to a position above the high water mark.

Project Within the DPA

The Project will comply with the standards that allow fill or structures for any water dependent industrial use provided that parking is not located within the water-dependent use zone; and supporting DPA uses may not exceed 25% of the Project Site.

The proposed flood protection system will run through previously filled tidelands, flowed tidelands, and upland areas. Its design has been minimized to the extent practicable and still meet the goals to protect inland structures and uses from coastal storms and flooding.

The Storm Surge Control Facility will replace the existing outfall located in filled and flowed tidelands at the northern end of the IER. The Project had several alternative designs, some of which had a much larger portion of the structure within flowed tidelands but were not chosen due to the extensive impacts to wetland resource areas. The Project (the "Preferred Alternative") complies with the requirements to take reasonable measures to minimize the amount of fill below the high water mark.

The proposed public access walkway will replace an existing walkway on filled tidelands and will not be within flowed tidelands. Although a portion of the walkway will be pile supported, it will be located landward of the high water mark.

The DEP may license fill provided that reasonable measures are taken to avoid, minimize, and mitigate encroachment in a waterway. In compliance with these standards at 310 CMR 9.32(2), the Project will stabilize the shoreline by planting native vegetation along upper bank, and installing perforated concrete planters near the MHW along the bank and new drainage structures within the Site.

310 CMR 9.33(1) - Environmental Protection Standards

The Project will comply with applicable environmental regulatory programs of the Commonwealth, including the Massachusetts Wetlands Protection Act and DEP stormwater standards. The Applicant will submit Notices of Intent (NOI) to the Conservation Commissions in Chelsea and Everett. Along with the Chapter 91 License/Permit application, the Proponents will submit a 401 Water Quality Certification application to DEP. The Proponents will file a Coastal Zone Management (CZM) Federal Consistency Review with the Massachusetts Office of Coastal Zone Management (MCZM).

310 CMR 9.34 – Conformance with Municipal Zoning and Harbor Plans

The Site is located on private and Commonwealth filled and flowed tidelands and therefore the Project must conform to the standards of 310 CMR 9.34(1) regarding

compliance with applicable zoning ordinances. The Project will comply with the Chelsea and Everett zoning ordinances.

The Project Site is not located within the Everett Central Waterfront MHP (the "ECWMHP"). The City of Chelsea is currently developing a municipal harbor plan for Chelsea Creek, which is outside of the Project Site, and therefore the Project is not subject to the standards for compliance with an MHP.

310 CMR 9.35 – Standards to Preserve Water-Related Public Rights

The Project conforms to the Standards to Preserve Water-Related Public Rights at 310 CMR 9.35. In accordance with this standard, the project must preserve any rights held by the Commonwealth in trust for the public to use tidelands along with any public rights for access that are associated with such use. In compliance with this general standard, the Project meets the applicable standards for access to waterways and tidelands set forth in 310 CMR 9.35(2) through (4).

Pursuant to 310 CMR 9.35(2), the Project does not interfere with public rights of navigation. The existing culverts and outfall in the north side of the IER end along the coastal bank, which is adjacent to navigable waters. The proposed outfall and Storm Surge Control Facility will replace these two structures and dredge within a similar location along the coastal bank and adjacent subtidal waters and will not interfere with the public rights of navigation.

The Project will not extend beyond the length required to achieve safe berthing, generate water-borne traffic that would interfere with other existing or future water-borne traffic, adversely affect the depth or width of an existing channel, or impair in any other substantial manner the ability of the public to pass freely upon the waterways and to engage in transport or loading/unloading activities.

Pursuant to 310 CMR 9.35(3)(a), the Project does not interfere with public rights to access the site for the purposes of fishing, fowling, and navigation, and does not pose an obstacle to the public's ability to pursue such activities.

Pursuant to 310 CMR 9.35(3)(b), the Project does not interfere with public rights to walk or otherwise pass freely on Commonwealth tidelands.

In compliance with 310 CMR 9.35, the Project will not significantly interfere with public rights to walk or pass freely on private tidelands for purposes of fishing, fowling, or navigation. The Project will substantially improve public access along the northern section of the Project Site with a new ramp and elevated boardwalk to and along the wetland areas. There will also be several breaks along the western side of the IER within the DPA, which will allow pedestrian and vehicular access to the edge of the water. The water will be accessible to the public 24 hours per day, 7 days per

week unless there are emergency or construction activities that warrant its temporary closure or restricted access.

310 CMR 9.36 – Standards to Protect Water-Dependent Uses

The Project conforms to the Standards to Protect Water-Dependent Uses of 310 CMR 9.36. In accordance with 310 CMR 9.36, a project must preserve the availability and suitability of tidelands that are in use for water-dependent purposes, or which are reserved primarily as a location for maritime industry or other specific types of water-dependent uses. The Project meets the applicable specific provisions of these standards as described below.

In compliance with 310 CMR 9.36(1), the Project will be preserving the availability for water-dependent uses by constructing a flood barrier that has several access points at critical locations and allows access to water-dependent industrial and public properties. Public access is enhanced at Island End Park with a boardwalk and ramp system, and a connecting walkway from Beacham Street that allows direct access to the water and wetland system. There are several flood gate installations along the eastern and western portions of the flood barrier that allow continuation of railway, vehicular, and pedestrian access to water-dependent and industrial properties.

In compliance with 310 CMR 9.36(2), the Project will not limit existing or future water-dependent uses on the project site or access to abutting littoral or riparian property owner's right to approach their properties. Landside access will be provided through strategically-located access points along the flood barrier.

In compliance with 310 CMR 9.36(3), the Project will not significantly disrupt any water-dependent use in operation within proximate vicinity of the Project Site. No new structures, except for the new outlets, will be constructed within the navigable waterways.

In compliance with 310 CMR 9.36(4), the Project will not displace any water-dependent uses in operation that have occurred on the site for the previous five years. Vessels will still have the same accessibility to existing docks and berths at the waterfront properties along the western side of the IER. Landside access to these docks will be through strategically located breaks in the flood barrier. Access to them may be limited during extreme storm events when the flood gates are in use.

In compliance with 310 CMR 9.36(5), the Project will not include fill or structures for nonwater-dependent, non-industrial uses that preempt water-dependent industrial use.

310 CMR 9.37 - Engineering and Construction Standard

The Project will comply with the standards of 310 CMR 9.37. In compliance with 310 CMR 9.37(1), a Registered Professional Engineer will certify and will comply with all applicable safety regulations. The Project will not restrict the ability to dredge any channels. In compliance with 310 CMR 9.37(3), the proposed flood barrier will be located landward of the existing MHW. The Storm Surge Control Facility, which is replacing the existing culvert, must be located below the MHW to function properly and be compatible with existing shoreline structures in terms of design, size, function, and materials.

310 CMR 9.40 – Standards for Dredging and Dredged Material

The Project will comply with the standards at 310 CMR 9.40. This section of the Chapter 91 regulations requires dredging projects to meet specific requirements for resource protection, operational requirements for dredging and dredged materials disposal, and notification of dredging and disposal activities.

Dredging activities will be timed to minimize impacts on the tidal flats and downgradient resources areas. Approximately 1,438 cubic yards of material will be dredged from the northern portion of the Project Site at the existing culverts and shorelines to install new storm surge control measures, outfalls, and planters. The coastal bank will be stabilized with appropriate riprap material to match the existing grade at this location.

The Project will comply with specific applicable provisions of Chapter 91 regulations, 310 CMR 9.40, as follows:

- The Project will not dredge any channels or mooring basins to a mean low water depth greater than 20 feet;
- No dredging will occur during any period designated by the Division of Marine Fisheries (DMF) for the protection of anadromous/catadromous fish runs, unless otherwise approved in writing by the DMF. Additionally, the Project will comply with DMF's Time-of-Year (TOY) restrictions prohibiting silt producing in-water work that would impact winter flounder spawning grounds from March 15th to June 30th and or for shellfishing, which could extend to approximately September 15th.
- The dredge area has been designed to reasonably accommodate the navigational requirements of the Project and provide adequate water circulation;

- The regulations require that the extent of the dredge footprint shall be a sufficient distance for the edge of the adjacent marshes to avoid slumping. The edge of the proposed dredge area is more than 250 feet from the nearest marsh, and therefore will avoid slumping;

- The dredged area will not be connected to or be any deeper than the nearby channel in the IER;

- The Applicant will notify the DEP about the start and completion of the dredging operation; and

- All dredged material will be pre-characterized and disposed of at a Confined Disposal Facility ("CDF") or an upland landfill in accordance with the regulations of the Massachusetts Contingency Plan. See Appendix H, 2005 Sediment Sampling Information for additional context on the anticipated composition of dredged sediments based upon legacy industrial uses along the river.

2.4 CONSISTENCY WITH COASTAL ZONE MANAGEMENT POLICIES

The Project is required to be consistent with the Massachusetts Office of Coastal Zone Management ("MCZM") Program Policies in accordance with the standards of 310 CMR 9.54. The Department shall presume that the standard is met if the Project Site is covered by a municipal harbor plan.

The Project Site is located outside the planning areas of the Chelsea Municipal Harbor Plan and the Everett Central Waterfront Municipal Harbor Plan. Therefore, the Project must demonstrate consistency with the applicable MCZM Program Polices as described below.

2.4.1 WATER QUALITY

Water Quality Policy #2

Ensure the implementation of nonpoint source pollution controls to promote the attainment of water quality standards and protect designated uses and other interests.

The Project will allow water to maintain existing drainage patterns through minor stormwater infrastructure and grading modifications that may be needed to prevent ponding behind the flood barrier. There will be no new untreated stormwater point discharges associated with the Project.

Best Management Practices during construction will be implemented to ensure that erosion and sedimentation are minimized. As deemed necessary, erosion and

sedimentation controls, such as straw bales, siltation fences, and turbidity curtains will also be used during construction.

2.4.2 HABITAT

Habitat Policy #1

Protect coastal, estuarine, and marine habitats—including salt marshes, shellfish beds, submerged aquatic vegetation, dunes, beaches, barrier beaches, banks, salt ponds, eelgrass beds, tidal flats, rocky shores, bays, sounds, and other ocean habitats—and coastal freshwater streams, ponds, and wetlands to preserve critical wildlife habitat and other important functions and services including nutrient and sediment attenuation, wave and storm damage protection, and landform movement and processes.

The Project includes structures that will affect coastal bank, land under ocean, and Coastal Beach resource areas in the IER. Best management practices (BMPs) will be implemented during construction of both the landside and waterside structures to minimize any potential impacts to the resources of the IER. The existing salt marsh will be enhanced with additional plantings of salt marsh plant species, and the invasive species will be controlled to minimize their growth. Vegetation will be planted on the existing degraded IER shoreline with native vegetation, perforated concrete planters, and bagged salt marsh grasses. These plantings will bolster environments for filter feeding barnacles and shellfish when sea level rises as well. To the extent practicable, the dredging operations will minimize turbidity and impacts to nearby habitats with the use of appropriate BMPs, such as turbidity curtains, and TOY restrictions. Furthermore, the existing site, which does not treat any of the stormwater runoff will have a new stormwater drainage system that will improve the water quality and habitats of the downgradient wetland resources.

Habitat Policy #2

Advance the restoration of degraded or former habitats in coastal and marine areas.

The northern portion of the Site is located next to a salt marsh, which will be enhanced with additional salt marsh plantings and removal of trash and debris. Improvements to the existing drainage system near the salt marsh will reduce fresh water intrusion to minimize growth of phragmites and help improve the downgradient habitats and overall viability of the area.

2.4.3 COASTAL HAZARDS

Coastal Hazard Policy #1

Preserve, protect, restore, and enhance the beneficial functions of storm damage prevention and flood control provided by natural coastal landforms, such as dunes, beaches, barrier beaches, coastal banks, land subject to coastal storm flow, salt marshes, and land under the ocean.

Coastal Hazard Policy #2

Ensure that construction in water bodies and contiguous land areas will minimize interference with water circulation and sediment transport. Flood or erosion control projects must demonstrate no significant adverse effects on the project site or adjacent or downcoast areas.

The Project has been designed to minimize interference with water circulation and sediment transport. To the extent possible, the flood barrier has been moved away from the water's edge to the extent practicable, much of which is constrained by commerce along existing rights-of-ways in the heavily industrialized area. Coastal banks will have native vegetation along upper bank and perforated concrete planters added to the upper portions and bagged salt marsh grasses downslope to help stabilize them and create a natural buffer between the industrial hardscape and the downgradient wetland resource areas.

2.4.4 PUBLIC ACCESS

Public Access Policy #1

Ensure that development (both water-dependent or nonwater-dependent) of coastal sites subject to state waterways regulation will promote general public enjoyment of the water's edge, to an extent commensurate with the Commonwealth's interests in flowed and filled tidelands under the Public Trust Doctrine.

This water-dependent use flood resiliency project enhances public access and use of the tidelands. A new pathway, accessible ramp system, and elevated boardwalk will improve access to and along Island End Park, which is located in the north end of the IER. The nature-based solutions, landscaping, benches, and other amenities will create a more inviting waterfront destination.

2.4.5 GROWTH MANAGEMENT

Growth Management Principle #3

Encourage the revitalization and enhancement of existing development centers in the coastal zone through technical assistance and financial support for residential, commercial, and industrial development.

The Project, which is funded through local, state, and federal funding sources, is in a critical industrial center within the coastal zone that supports the region. The Project will protect approximately 500 acres of densely developed industrial and commercial businesses, public institutions, and residences from long-term flooding in the environmental justice (EJ) communities of Chelsea and Everett.

2.4.6 PORTS AND HARBORS

Ports and Harbors Policy #1

Ensure that dredging and disposal of dredged material minimize adverse effects on water quality, physical processes, marine productivity, and public health and take full advantage of opportunities for beneficial reuse.

Dredging will be conducted to support replacement of the existing culverts and installation of native vegetation, perforated concrete planters, and salt marsh grasses at the northern end of the IER. Dredging disposal options are currently being evaluated will be determined after the dredged material is tested and coordination with key stakeholders is completed. Dredging operations will be conducted in accordance with local, state, and federal regulations to ensure that it minimizes impacts to the environmental resources as well as the public's health. Best Management Practices will be utilized to minimize impacts to the water quality and fish and benthic habitat, including observation of the TOY restriction period. Dredging will occur from the land side using excavators to prevent impact from barges bottoming out on the substrate below and to minimize any deposition of dredged material into the water. Turbidity curtains will be used to the extent practicable to minimize turbidity and impacts to nearby habitats.

Ports and Harbors Policy #4

For development on tidelands and other coastal waterways, preserve and enhance the immediate waterfront for vessel-related activities that require sufficient space and suitable facilities along the water's edge for operational purposes.

There are active vessel and dock side industrial uses along the western portion of the IER. The flood barrier was located inland from these docks and piers to preserve water-dependent industrial uses.

Ports and Harbors Policy #5

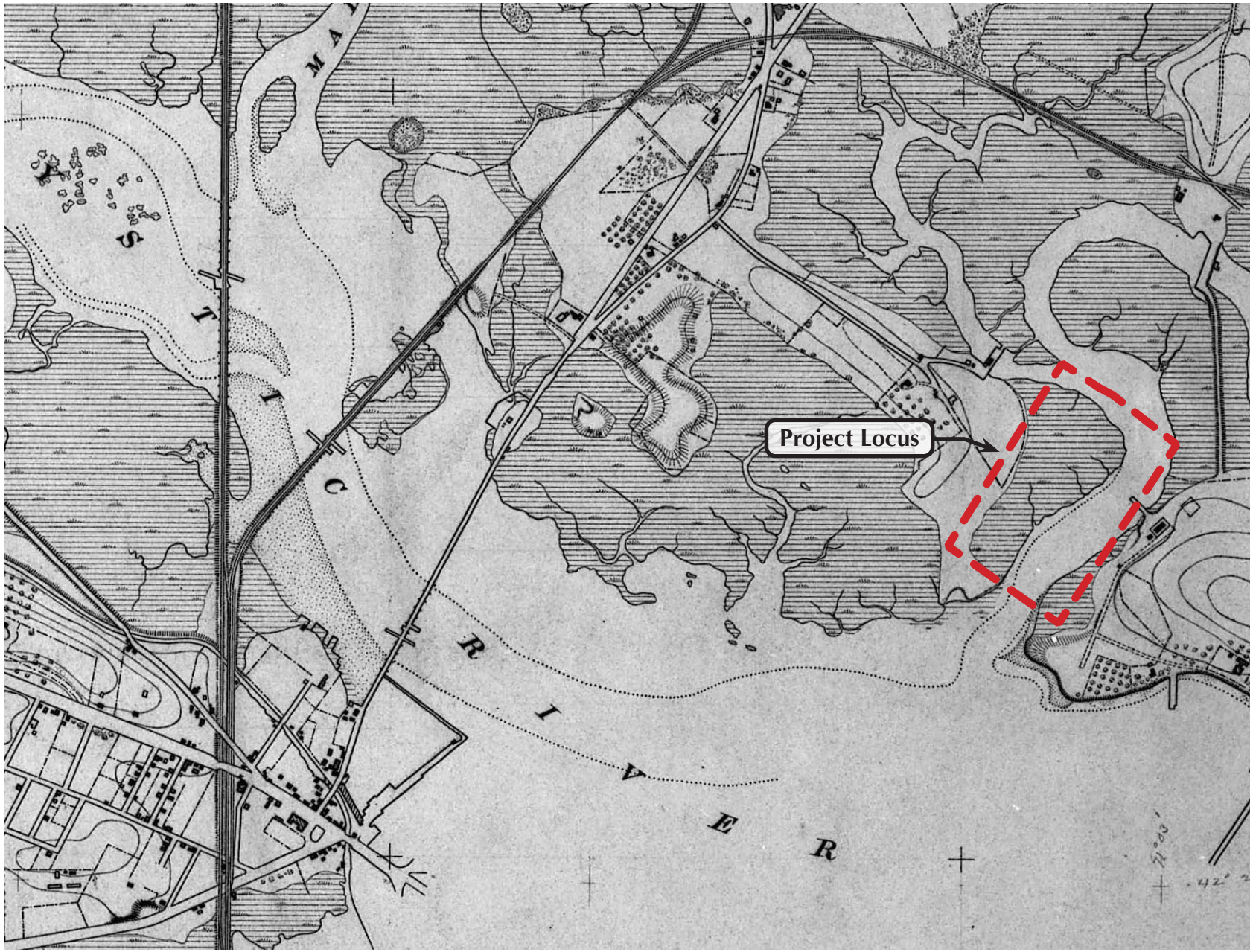
Encourage, through technical and financial assistance, expansion of water dependent uses in Designated Port Areas and developed harbors, re-development of urban waterfronts, and expansion of physical and visual access.

The Project is supported by several federal, state, and local funding sources and technical assistance, which will protect existing and future water-dependent uses within a DPA and developed harbor from flooding due to sea level rise and coastal storms.

The Project will improve pedestrian and visual access with a new public walkway, connections to several streets, nature-based solutions, and wetland enhancements. This public area will also be enhanced with trees, landscaping, and benches.

Chelsea, MA
Everett, MA

Figure 2-1
Chapter 91 Jurisdiction Map
Source: Fort Point Associates, Inc., 2022

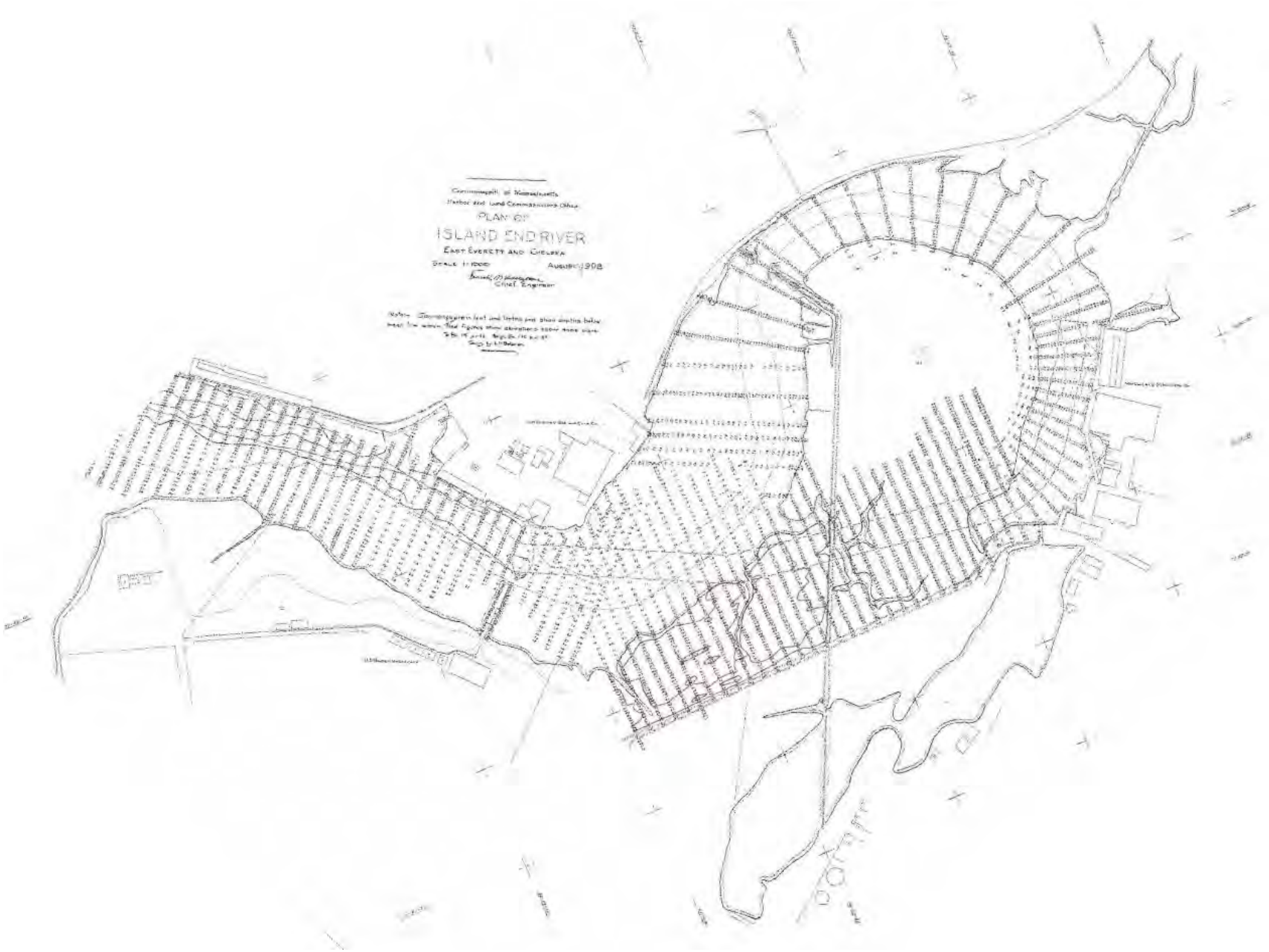


Chelsea, MA
Everett, MA

Figure 2-2
Historic Chapter 91 Jurisdiction (1847)
Source: U.S. Coast Survey, 1847

Chelsea, MA
Everett, MA

Figure 2-3
Historic Chapter 91 Jurisdiction (1894)
Source: U.S. Coast and Geodetic Survey, 1894



Chelsea, MA
Everett, MA

Figure 2-4
Historic Chapter 91 Jurisdiction (1908)
Source: U.S. Coast Survey, 1908

Chapter 3

WETLANDS

CHAPTER 3: WETLANDS

3.1 INTRODUCTION

The Cities of Chelsea and Everett (the "Proponents") propose to construct a coastal flood barrier, Storm Surge Control Facility, and related amenities at Island End River ("IER") in the Cities of Chelsea and Everett (the "Project Site"). The approximately 9.5-acre Project Site is currently comprised of a mix of commercial and industrial uses and supporting roadway and utility infrastructure. The proposed Island End River Flood Resilience Project (the "Project") will construct an approximately 4,640 linear-foot (lf) flood barrier, an approximately 2,900 square-foot underground Storm Surge Control Facility, approximately 50,000 square feet of nature-based solutions consisting of native vegetation planting, perforated concrete planters, and salt marsh grasses, and associated wetland and public access improvements along the riverfront. This chapter describes Massachusetts Wetlands Protection Act (WPA) jurisdiction and compliance of the portion of the Project Site that is within WPA jurisdiction.

The Project Site is located within and adjacent to tidal portions of the Island End River ("IER"), which connects to the Mystic River approximately 0.5 miles downstream. The wetland resource areas on the Project Site that are regulated under the WPA and local laws and programs include: Land Subject to Coastal Storm Flowage (LSCSF), Land Under Ocean (LUO), Coastal Bank, Tidal Flat, Salt Marsh, Bordering Vegetated Wetlands (BVW), Designated Port Area (DPA), and Riverfront Area. The boundaries of these resource areas are described below. The Project Site also includes a regulated 100-foot Buffer Zone, which, while not a resource area, is protected under the WPA. The Mean High Water line (MHW) is located at El 4.3 (NAVD88).

The Project will be making substantial improvements to the existing vegetated wetlands along the shoreline. It will be revitalizing a large area of wetlands resource areas with new native plantings, stabilizing dilapidating shoreline to prevent erosion and sedimentation, and restoring up to a half-acre of coastal beach and up to a third acre of riverfront area with other habitat enhancements. These and other improvements and impacts to wetland resource areas are discussed in the following sections.

3.2 PROJECT DESCRIPTION

The Project addresses flood resilience through the construction of a storm surge protection system that involves impacts within multiple resource areas adjacent to the IER. The Project's four major components consist of: 1) Resilience Provisions East, 2) Resilience Provisions West, 3) Storm Surge Control Facility, and 4) Wetlands Enhancements and Nature-based Solutions. These components are all adjacent to wetland resource areas along the IER, but

the Wetlands Enhancements scope of work, which is detailed below, most directly benefits the resource areas.

3.2.1 WETLANDS ENHANCEMENTS

The Wetlands Enhancements component of the Project is located between the Island End Park and Admiral's Hill Marina within the City of Chelsea. See Figure 3-1, Wetland Resource Map. The existing Salt Marsh contains phragmites and bare spots with a peat substrate that shows evidence of prior vegetation growth further into the marsh. This area currently provides low-value habitat and minimizes public enjoyment of this natural resource area.

Wetlands enhancements are being proposed to improve habitat and public enjoyment of the Salt Marsh and surrounding wetlands. The Project design focuses on removing and managing phragmites, lowering salinity tolerance levels for proposed plantings, and planting smooth cordgrass (*Spartina alterniflora*). During construction, all work related to these wetland enhancements will occur during low water conditions when water will not be present in the work area. Erosion control measures in the form of a silt curtain will be installed prior to any work on site.

The proposed phragmites management program includes the mowing of phragmites, herbicide treatment, and debris and detritus removal. Several weeks after these steps and once new sprouts are approximately two (2) feet in height, a herbicide will be applied locally in accordance with a state-authorized herbicide permit. Precautions will be taken to avoid chemical runoff or drift and impacts to pollinators and other nontarget species.

After the herbicide has taken affect (3 – 4 weeks after application), the accumulated plant material, detritus, and debris will be removed down to the soil surface. Once the soil surface is exposed the area will be seeded with a native salt-tolerant seed mix. Smooth cordgrass (*Spartina alterniflora*) will be planted in the low marsh areas. It will be conditioned by the supplier to thrive in the existing salinity level to maximize success of the replanted species. The planting season for smooth cordgrass within the enhancements area will extend from only after the last frost in the spring through mid-May, and from September 15 until November 30 in the fall. Extended or out-of-season planting requirements would include application of antitranspirant and extra water as needed. After the initial planting season, the marsh and wetlands areas will be monitored at a minimum of two times per year (spring and fall) for a minimum of two years by an ecologist consultant. The Project Site will be visited twice per year for two years for additional spot herbicide application on new phragmites sprouts to ensure successful eradication.

As described in Appendix C, Wetland Delineation Report, the area of BVW located along the shoreline area in Chelsea is dominated by the invasive Common Reed

(*Phragmites australis*), which tolerates brackish water, thrives in disturbed areas, and is in mainly urban fill and influenced by coastal flooding. Within Resilience Provisions East, the proposed elevated boardwalk must permanently impact the existing BVW due to spatial constraints at the adjacent properties and to provide the community benefit it currently serves. In compliance with the WPA regulations, the magnitude of removing this small 1,656 SF area of BVW permanently impacted from the riverwalk construction is to be replaced at least at a 1:1 ratio in another location on-site. The marginally functional BVW being replaced by another habitat that is beneficial to the interests of the habitats found direct along tidal shorelines, i.e., Salt Marsh, can provide a multitude of fisheries and wildlife benefits to the existing Salt Marsh in the Project Site, as well as within the IER. A replicated BVW will also provide additional storm damage protection and erosion control to the Project. Furthermore, the Proponents will be enhancing approximately 1,656 SF of BVW with approximately 2,441 SF of BVW, which is more than the 1:1 ratio required for the size of the BVW to be replaced and located next to the existing BVW on the northwest section of the existing riverwalk.

See Appendix C, Wetlands Delineation Report and Wetland Resource Area Impacts Exhibits.

3.3 WETLAND RESOURCES

The Project Site contains eight resource areas regulated under the WPA at 310 CMR 10.00. The current conditions of these resource areas, as well as the 100-Foot Buffer Zones as applicable, are described in the following sections. See Figure 3-1, Wetland Resources.

3.3.1 LAND SUBJECT TO COASTAL STORM FLOWAGE

LSCSF is "land subject to any inundation caused by coastal storms up to and including that caused by the 100-year storm, surge of record, or storm of record, whichever is greater" (310 CMR 10.04). The 100-year flood elevation is identified on the Flood Insurance Rate Maps (FIRM) produced by the Federal Emergency Management Agency (FEMA).

3.3.2 LAND UNDER OCEAN

LUO is "land extending from the mean low water line seaward to the boundary of the municipality's jurisdiction and includes land under estuaries" as defined in 310 CMR 10.25(2).

3.3.3 COASTAL BANK

Coastal Bank is defined at 310 CMR 10.30(2) as "the seaward face or side of any elevated landform, other than a coastal dune, which lies at the landward edge of a coastal beach, land subject to tidal action or other wetland."

3.3.4 TIDAL FLAT

A Tidal Flat, which is included in the Coastal Beach resource area, is "any nearly level part of a coastal beach which usually extends from the mean low water line landward to the more steeply sloping face of the coastal beach or which may be separated from the beach by land under the ocean" (310 CMR 10.27).

3.3.5 SALT MARSH

Salt Marsh is defined as "a coastal wetland that extends landward up to the highest high tide line; that is, the highest spring tides of the year" (310 CMR 10.32). Salt Marsh is characterized by plants that are well adapted to or prefer living in saline soils. A Salt Marsh may contain tidal creeks, ditches, and pools.

3.3.6 BORDERING VEGETATED WETLANDS

BVW are defined as "freshwater wetlands which border on creeks, rivers, streams, ponds and lakes" and can include wet meadows, marshes, swamps and bogs (310 CMR 10.55).

3.3.7 DESIGNATED PORT AREA

Per 310 CMR 10.26, the DPA are areas designated in 301 CMR 25.00 and are portions of developed harbors with land forms that have been greatly altered from their natural shape with coastal engineering structures that often have replaced natural protection for upland areas from storm drainage and flooding. Portions of the Project Site are located within the Mystic River DPA.

3.3.8 RIVERFRONT AREA

Per 310 CMR 10.58, the Riverfront Area is a protected zone paralleling the tidal Island End River. For the Chelsea and Everett waterfronts, this zone extends 25 feet inland in a perpendicular direction from the mean high water.

3.4 WETLAND IMPACTS, COMPLIANCE, AND MITIGATION

3.4.1 IMPACTS

Table 3-1, Wetland Resource Area Impacts

Resource Area	Impact Area (Total)	Impact (Temporary/Permanent)
Land Subject to Coastal Storm Flowage	346,510 SF	• 135,014 SF within land subject to inundation for a 100-year storm will be impacted temporarily within the Project Site. • 211,496 SF within land subject to inundation for a 100-year storm will be impacted permanently to construct the storm surge barrier, an elevated boardwalk, and material replacement.
Coastal Bank	967 LF	• 208 LF seaward of the coastal bank line will be temporarily impacted within the Project Site. • 759 LF seaward of the coastal bank line will be impacted to construct the storm surge barrier wall, Storm Surge Control Facility, and sheet pile supported riverwalk.
100-foot Buffer Zone	76,254 SF	• 27,680 SF will be temporarily impacted within limits of excavation to construct the storm surge barrier wall, Storm Surge Control Facility, and sheet pile-supported Resilient Riverwalk. This impacted area is encompassed by the Land Subject to Coastal Flowage area. • 48,574 SF will be permanently impacted within limits of excavation to construct the storm surge barrier wall, Storm Surge Control Facility, and sheet pile-supported Resilient Riverwalk. This impacted area is encompassed by the Land Subject to Coastal Flowage area.
25’ Riverfront Area	22,707 SF	• 7,226 SF will be temporarily impacted within sawcut and limits of excavation to construct the storm surge barrier wall, Storm Surge Control Facility, and sheet pile-supported Resilient Riverwalk. This area is largely within the bounds of the FIRM 1% annual chance flood limits. • 48,574 SF will be permanently impacted within sawcut and limits of excavation to

Resource Area	Impact Area (Total)	Impact (Temporary/Permanent)
		construct the storm surge barrier wall, Storm Surge Control Facility, and sheet pile-supported Resilient Riverwalk. This area is largely within the bounds of the FIRM 1% annual chance flood limits.
Tidal Flat/Coastal Beach	11,557 SF	• 3,055 SF will be impacted temporarily within Tidal Flats, part of the Coastal Beach resource area, to excavate and construct the Storm Surge Control Facility and perform Wetlands Enhancements. • 8,502 SF will be impacted permanently within Tidal Flats, part of the Coastal Beach resource area, due to construction of the Storm Surge Control Facility.
Land Containing Shellfish	1,609 SF	• 252 SF will be impacted temporarily within the Land Containing Shellfish to excavate and construct the Storm Surge Control Facility and perform Wetlands Enhancements. • 252 SF will be impacted permanently within the Land Containing Shellfish due to construction of the Storm Surge Control Facility. • While the MassGIS data layer indicates Land Containing Shellfish within the Project Site, this data layer was originally created in 1992 and represents the coastal conditions prior to the construction of a confined disposal facility (CDF) along #155 Market Street and #95 Behen Street, which was constructed after 2005. A shellfish survey was performed by BSC Group in 2022 confirming the de-minims impact to shellfish in the areas of temporary disturbance.
Bordering Vegetated Wetland	7,374 SF	• 5,718 SF of the BVW will be temporarily impacted for the excavation and construction of the sheet-pile-supported boardwalk, trash/debris removal, and plug plantings. • 1,656 SF of the BVW will be permanently impacted along the northeast corner of the Project Site. • 1,641 SF of BVW will be enhanced at the northwest portion of the existing boardwalk to compensate for permanent impacts to

Resource Area	Impact Area (Total)	Impact (Temporary/Permanent)
		existing BVW. Additionally, 800 SF of Salt Marsh will be created as part of these enhancements. Total enhancement area will be 2,441 SF.
Salt Marsh	22,812 SF	• 22,812 SF will be temporarily impacted within the Salt Marsh for the debris/detritus removal, chemical phragmites treatment, and various plug plantings as part of the Wetlands Enhancements. • The Project will not have any permanent impacts to the Salt Marsh. • The Project will create 800 SF of new Salt Marsh as part of the BVW replication work described above.
Designated Port Area	11,557 SF	• 4,902 SF will be impacted temporarily within the Land Under Ocean and Designated Port Area by the dredging and construction of the Storm Surge Control Facility outfall. • 1,438 cubic yards of dredge material will be removed and 12,585 SF will be impacted permanently within the Land Under Ocean and Designated Port Area to dredge and construct the Storm Surge Control Facility and adjacent nature-based solutions along the river.

3.4.2 COMPLIANCE WITH WPA PERFORMANCE STANDARDS

Land Subject to Coastal Storm Flowage

There are no regulatory performance standards for Land Subject to Coastal Storm Flowage under 310 CMR 10.00.

Coastal Bank

The Project will construct the storm surge barrier foundations, Storm Surge Control Facility, sheet pile wall, nature-based solutions, and supported riverwalk along the Coastal Bank of the Project Site. All materials will be replaced in-kind. Existing wetland vegetation, landscaping, and rip rap will be replaced with loam and seed and stabilized. This work will positively impact storm damage prevention and flood control and prevent sediment deposition within the coastal resource areas.

Table 3-2, Compliance with Performance Standards for Coastal Bank (310 CMR 10.30)

COASTAL BANK PERFORMANCE STANDARD	COMPLIANCE WITH PERFORMANCE STANDARD
310 CMR 10.30(6): Any project on such a coastal bank or within 100 feet landward of the top of such coastal bank shall have no adverse effects on the stability of the coastal bank.	967 LF of coastal bank will be impacted within limits of excavation to construct the proposed flood barrier including foundations, and material replacement. Installation of the flood barrier will not have adverse effects on the stability of the coastal bank. Existing wetland vegetation, landscaping, and rip rap will be replaced with loam and seed and stabilized.
310 CMR 10.30(7): Bulkheads, revetments, seawalls, groins or other coastal engineering structures may be permitted on such a coastal bank except when such bank is significant to storm damage prevention or flood control because it supplies sediment to Coastal Beaches, coastal dunes, and barrier beaches.	The impacted coastal bank is not significant to storm damage prevention or flood control. The Project seeks to prevent storm damage to the Project Site and surrounding area.
310 CMR 10.30 (8): Notwithstanding the provisions of 310 CMR 10.30(3) through (7), no project may be permitted with which will have an adverse effect on specified habitat sites of rare vertebrate of invertebrate species, as identified by procedures established under 310 CMR 10.37.	The Project will not have an adverse effect on specified habitat sites of rare vertebrate of invertebrate species.

Riverfront Area

Work activities and uses within areas of Chapter 91 jurisdiction are exempt from the performance standards for the Riverfront Area pursuant to 310 CMR 10.58(6)(i) because a license will be obtained. Work outside of Chapter 91 jurisdiction must still comply with the standards of the Riverfront Area.

Projects within previously developed Riverfront Areas may occur providing the proposed work improves existing conditions and meets specific criteria including Stormwater Management standards, limits of proposed work to degraded area only, restoration of the area with preference to begin at the Riverfront Area bound (closest to the water), and mitigation that results in no significant adverse impact.

Table 3-3, Compliance with Performance Standards for Riverfront Area (310 CMR 10.58)

RIVERFRONT AREA PERFORMANCE STANDARD	COMPLIANCE WITH PERFORMANCE STANDARD
310 CMR 10.58(4): General Performance Standard. Where the presumption set forth in 310 CMR 10.58(3) is not overcome, the applicant shall prove by a preponderance of the evidence that there are no practicable and substantially equivalent economic alternatives to the proposed project with less adverse effects on the interests identified in M.G.L. c.131 § 40 and that the work, including proposed mitigation, will have no significant adverse impact on the riverfront area to protect the interests identified in M.G.L. c. 131 § 40. In the event that the presumption is partially overcome, the issuing authority shall make a written determination setting forth its grounds in the Order of Conditions and the partial rebuttal shall be taken into account in the application of 310 CMR 10.58 (4)(d)1.a. and c.; the issuing authority shall impose conditions in the Order that contribute to the protection of interests for which the riverfront area is significant.	22,707 SF will be impacted within sawcut and limits of excavation to construct the storm surge barrier wall, Storm Surge Control Facility, and sheet pile supported boardwalk. This area is largely within the bounds of the FIRM 1% annual chance flood limits.
310 CMR 10.58(4)(a): Protection of Other Resource Areas. The work shall meet the performance standards for all other resource areas within the riverfront area, as identified in 310 CMR 10.30 (Coastal Bank), 10.32 (Salt Marsh), 10.55 (Bordering Vegetated Wetland), and 10.57 (Land Subject to Flooding). When work in the riverfront area is also within the buffer zone to another resource area, the performance standards for the riverfront area shall contribute to the protection of the interests of M.G.L. c. 131, § 40 in lieu of any additional requirements that might otherwise be imposed on work in the buffer zone within the riverfront area.	The Project meets the performance standards for all impacted resource areas.
310 CMR 10.58(4)(b): Protection of Rare Species. No project may be permitted within the riverfront area which will have any adverse effect on specified habitat sites of rare wetland or upland, vertebrate or invertebrate species, as identified by the procedures established under 310 CMR	There are no rare species within the disturbed area; therefore, none will be impacted by the Project.

RIVERFRONT AREA PERFORMANCE STANDARD	**COMPLIANCE WITH PERFORMANCE STANDARD**
10.59 or 10.37, or which will have any adverse effect on vernal pool habitat certified prior to the filing of the Notice of Intent	
310 CMR 10.58(4)(c): Practicable and Substantially Equivalent Economic Alternatives. There must be no practicable and substantially equivalent economic alternative to the proposed project with less adverse effects on the interests identified in M.G.L. c. 131 § 40.	All practicable and/or substantially economic equivalent projects require greater adverse effects on these interests.
310 CMR 10.58(5): Redevelopment within Previously Developed Riverfront Areas; Restoration and Mitigation. Work to redevelop previously developed riverfront areas shall conform to the following criteria:	
(a) At a minimum, proposed work shall result in an improvement over existing conditions of the capacity of the riverfront area to protect the interests identified in M.G.L. c. 131 § 40.	The Project results in an improvement of the capacity of the riverfront area through the installation of surge control measures, improvements to the salt marsh, and further protection and landscape enhancement of the shoreline.
(b) Stormwater management is provided according to standards established by the Department.	The Project results in a decrease of impervious area thereby reducing stormwater runoff. The Project meets the stormwater management standards established by the Department.
(c) Within 200 foot riverfront areas, proposed work shall not be located closer to the river than existing conditions or 100 feet, whichever is less, or not closer than existing conditions within 25 foot riverfront areas, except in accordance with 310 CMR 10.58(5)(f) or (g).	The Project is not located closer to the river than existing conditions or 25 feet.
(d) Proposed work, including expansion of existing structures, shall be located outside the riverfront area or toward the riverfront area boundary and away from the river, except in accordance with 310 CMR 10.58(5)(f) or (g).	The Project is located as close to the riverfront area boundary away from the river as practicable.

RIVERFRONT AREA PERFORMANCE STANDARD	COMPLIANCE WITH PERFORMANCE STANDARD
(e) The area of proposed work shall not exceed the amount of degraded area, provided that the proposed work may alter up to 10% if the degraded area is less than 10% of the riverfront area, except in accordance with 310 CMR 10.58(5)(f) or (g).	The Project does not exceed the amount of degraded area along the riverfront area.
(f) When an applicant proposes restoration on-site of degraded riverfront area, alteration may be allowed notwithstanding the criteria of 310 CMR 10.58(5)(c), (d), and (e) at a ratio in square feet of at least 1:1 of restored area to area of alteration not conforming to specific criteria.	The Project is proposing enhancements of a degraded riverfront area at a ratio in square feet of 1:1 of enhanced area to area of alteration.

Tidal Flat/Coastal Beach

The Project will require work within Tidal Flat, part of the Coastal Beach resource area, including the disturbance and excavation within the existing shoreline and the construction of a section of the elevated boardwalk, drainage outfalls, and shoreline stabilization and plantings.

Table 3-4, Compliance with Performance Standards for Coastal Beach (310 CMR 10.27)

COASTAL BEACH PERFORMANCE STANDARD	COMPLIANCE WITH PERFORMANCE STANDARD
310 CMR 10.27(3): Any project on a Coastal Beach, except any project permitted under 310 CMR 10.30(3)(a), shall not have an adverse effect by increasing erosion, decreasing the volume or changing the form of any such Coastal Beach or an adjacent or downdrift Coastal Beach.	The Project will not have any adverse effects on the Coastal Beach with the Project Site. The Project will improve erosion protection without altering the landform along the Coastal Beach.
310 CMR 10.27(4): Any groin, jetty, solid pier, or other such solid fill structure which will interfere with littoral drift, in addition to complying with 310 CMR 10.27(3), shall be constructed in accordance with 310 CMR 10.27 (a) through (c).	The Project does not propose any solid fill structure which will interfere with littoral drift within Coastal Beach. The proposed stormwater outfall structure will not affect the longshore transport of sediments.

COASTAL BEACH PERFORMANCE STANDARD	COMPLIANCE WITH PERFORMANCE STANDARD
310 CMR 10.27(5): Notwithstanding 310 CMR 10.27(3), beach nourishment with clean sediment of a grain size compatible with that on the existing beach may be permitted.	The Project does not include beach nourishment within the Coastal Beach.
310 CMR 10.27(6): In addition to complying with the requirements of 310 CMR 10.27(3) and 10.27(4), a project on a Tidal Flat shall if water-dependent be designed and constructed, using best available measures, so as to minimize adverse effects, and if non-water dependent, have no adverse effects, on marine fisheries and wildlife caused by:	
(a) Alterations to water circulation	The Project will not have any adverse effects on marine fisheries and wildlife caused by alterations to water circulation.
(b) Alterations in the distribution of sediment grain size	The Project will not have any adverse effects on marine fisheries and wildlife caused by alterations to distribution of sediment grain size.
(c) Changes in water quality, including, but not limited to, other than natural fluctuations in the levels of dissolved oxygen, temperature, or turbidity, or the addition of pollutants.	The Project will not have any adverse effects on marine fisheries and wildlife caused by changes to water quality. The Project will decrease the amount of impervious surface, increase the number of native plantings, and address issues of erosion and sedimentation on slopes of IER.
310 CMR 10.27(7): Notwithstanding the provisions of 310 CMR 10.27(3) through 10.27(6), no project may be permitted which will have any adverse effect on specified habitat sites or rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.37.	The Project will not have any adverse impact on specified habit sites or rare species.

Land Containing Shellfish

The Project proposes work consisting of 252 SF of temporary impacts and 1,357 SF of permanent impacts within the Land Containing Shellfish resource area for the

excavation and construction of the the Storm Surge Control Facility and Wetlands Enhancements, and Storm Surge Control Facility outfall, respectively. Proposed work including trash/debris removal, plug plantings, and seeding in adjacent areas will not affect Land Containing Shellfish. While the MassGIS data layer indicates Land Containing Shellfish within the Project Site, this data layer was originally created in 1992 and represents the coastal conditions prior to the construction of a confined disposal facility (CDF) along #155 Market Street and #95 Behen Street, which was constructed after 2005. A shellfish survey was performed by BSC Group in 2022 confirming the de-minims impact to shellfish in the areas of temporary disturbance.

Table 3-5, Compliance with Performance Standards for Land Containing Shellfish (310 CMR 10.34)

LAND CONTAINING SHELLFISH PERFORMANCE STANDARD	COMPLIANCE WITH PERFORMANCE STANDARD
310 CMR 10.34(4): Except as provided in 310 CMR 10.34(5), any project on land containing shellfish shall not adversely affect such land or marine fisheries by a change in the productivity of such land caused by:	
(a) alterations of water circulation;	The Project will not have any adverse effects on such land or marine fisheries caused by alterations to water circulation.
(b) alterations in relief elevation,	The Project will not have any adverse effects on such land or marine fisheries caused by alterations to relief elevation.
(c) the compacting of sediment by vehicular traffic,	The Project will not have any adverse effects on such land or marine fisheries caused by t compaction of sediment by vehicular traffic.
(d) alterations in the distribution of sediment grain size,	The Project will not have any adverse effects on such land or marine fisheries caused by alterations to distribution of sediment grain size.
(e) alterations in natural drainage from adjacent land, or	The Project will not have any adverse effects on such land or marine fisheries caused by alterations to natural drainage from adjacent land.
(f) changes in water quality, including, but not limited to, other than natural fluctuations in the levels of salinity, dissolved oxygen, nutrients, temperature or turbidity, or the addition of pollutants.	The Project will not have any adverse effects on such land or marine fisheries caused by alterations to water quality. The Project will decrease the amount of impervious surface, increase the number of native plantings, and address issues of erosion and sedimentation on slopes of IER.
310 CMR 10.34(5): Notwithstanding the provisions of 310 CMR 10.34(4), projects which temporarily have an adverse effect	The Project will not have any temporary or permanent adverse effects on shellfish productivity.

LAND CONTAINING SHELLFISH PERFORMANCE STANDARD	COMPLIANCE WITH PERFORMANCE STANDARD
on shellfish productivity but which do not permanently destroy the habitat may be permitted if the land containing shellfish can and will be returned substantially to its former productivity in less than one year from the commencement of work, unless an extension of the Order of Conditions is granted, in which case such restoration shall be completed within one year of such extension.	
310 CMR 10.34(6): In the case of land containing shellfish defined as significant in 310 CMR 10.34(3)(b) (i.e., those areas identified on the basis of maps and designations of the Shellfish Constable), except in Areas of Critical Environmental Concern, the issuing authority may, after consultation with the Shellfish Constable, permit the shellfish to be moved from such area under the guidelines of, and to a suitable location approved by, the Division of Marine Fisheries, in order to permit a proposed project on such land. Any such project shall not be commenced until after the moving and replanting of the shellfish have been commenced.	The Project does not have land containing shellfish defined as significant within the Project Site.
310 CMR 10.34(7): Notwithstanding 310 CMR 10.34(4) through (6), projects approved by the Division of Marine Fisheries that are specifically intended to increase the productivity of land containing shellfish may be permitted. Aquaculture projects approved by the appropriate local and state authority may also be permitted.	The Project will not have any temporary or permanent adverse effects on shellfish productivity.
310 CMR 10.34(8): Notwithstanding the provisions of 310 CMR 10.34(4) through (7), no project may be permitted which will have any adverse effect on specified habitat of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.37.	The Project will not have any temporary or permanent adverse effects on shellfish productivity.

Bordering Vegetated Wetland

The proposed work in BVW includes an area of 5,718 SF of temporary impacts including proposed *Spartina alterniflora* plugs and native salt tolerant seed mix

plantings. However, 1,656 SF of BVW may be replaced due to permanent impacts providing it meets specific criteria in consideration of the magnitude of the alteration and the significance of the project site to the interest of the WPA. The Project will enhance 1,656 SF of BVW lost with a 2,441 SF area adjacent to the Island End Park and #359 Beacham Street property. 1,641 SF of BVW is replicated and an additional 800 SF of Salt Marsh will be created as part of this replication.

Table 3-6, Compliance with Performance Standards for Bordering Vegetated Wetlands (310 CMR 10.55)

BORDERING VEGETATED WETLAND PERFORMANCE STANDARD	COMPLIANCE WITH PERFORMANCE STANDARD
310 CMR 10.55(4)(a): Where the presumption set forth in 310 CMR 10.55(3) is not overcome, any proposed work in a Bordering Vegetated Wetland shall not destroy or otherwise impair any portion of said area.	The Project will temporarily impact 5,718 SF area of BVW and permanent impacts of 1,656 SF to the placement of an elevated boardwalk due to site constraints related to an extended wetlands delineation.
310 CMR 10.55(4)(b): Notwithstanding the provisions of 310 CMR 10.55(4)(a), the issuing authority may issue an Order of Conditions permitting work which results in the loss of up to 5,000 square feet of Bordering Vegetated Wetland when said area is replaced in accordance with the following general conditions and any additional, specific conditions the issuing authority deems necessary to ensure that the replacement area will function in a manner similar to the area that will be lost.	The Project will enhance the 1,656 SF of BVW lost with a 2,441 SF area adjacent to the Island End Park and #359 Beacham Street property. 1,641 SF of BVW is improved and an additional 800 SF of Salt Marsh will be created as part of this replication.
310 CMR 10.55(4)(c): Notwithstanding the provisions of 310 CMR 10.55(4)(a), the issuing authority may issue an Order of Conditions permitting work which results in the loss of a portion of Bordering Vegetated Wetland when:	
1. said portion has a surface area less than 500 square feet;	The portion of the BVW is greater than 500 SF but will be improved on-site.
2. said portion extends in a distinct linear configuration ("finger-like") into adjacent uplands; and	The portion of the BVW does not extends in a linear configuration but will be replicated on-site.
3. in the judgment of the issuing authority it is not reasonable to scale down, redesign or otherwise change the proposed work so that it could be completed without loss of said wetland.	The site constraints limit the extent that the Project can be adjusted practicably for the function of the publicly accessible elevated boardwalk.

BORDERING VEGETATED WETLAND PERFORMANCE STANDARD	COMPLIANCE WITH PERFORMANCE STANDARD
(d) Notwithstanding the provisions of 310 CMR 10.55(4)(a),(b) and (c), no project may be permitted which will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.59.	The Project will not have any adverse impact on specified habit sites or rare species.
(e) Any proposed work shall not destroy or otherwise impair any portion of a Bordering Vegetated Wetland that is within an Area of Critical Environmental Concern designated by the Secretary of Energy and Environmental Affairs under M.G.L. c. 21A, § 2(7) and 301 CMR 12.00: Areas of Critical Environmental Concern. 310 CMR 10.55(4)(e):	
1. supersedes the provisions of 310 CMR 10.55(4)(b) and (c);	The Project is not located within an Area of Critical Environmental Concern.
2. shall not apply if the presumption set forth at 310 CMR 10.55(3) is overcome;	The Project is not located within an Area of Critical Environmental Concern.
3. shall not apply to work proposed under 310 CMR 10.53(3)(l); and	The Project is not located within an Area of Critical Environmental Concern.
4. shall not apply to maintenance of stormwater detention, retention, or sedimentation ponds, or to maintenance of stormwater energy dissipating structures, that have been constructed in accordance with a valid order of conditions.	The Project is not located within an Area of Critical Environmental Concern.

Salt Marsh

The proposed work in the salt marsh includes an area of 22,812 SF of proposed *Spartina alterniflora* plugs and native salt tolerant seed mix plantings.

Table 3-7, Compliance with Performance Standards for Salt Marsh (310 CMR 10.32)

SALT MARSH PERFORMANCE STANDARD	COMPLIANCE WITH PERFORMANCE STANDARD
310 CMR 10.32(3): A proposed project in a salt marsh, on lands within 100 feet of a salt marsh, or in a body of water adjacent to a salt marsh shall not destroy any portion of the salt marsh and shall not have an adverse effect on the productivity of the salt marsh. Alterations in growth, distribution	The Project will not destroy or otherwise impact any portion of the salt marsh. Proposed chemical treatment and plug plantings within the salt marsh will not have any adverse effects.

SALT MARSH PERFORMANCE STANDARD	COMPLIANCE WITH PERFORMANCE STANDARD
and composition of salt marsh vegetation shall be considered in evaluating adverse effects on productivity. 310 CMR 10.32(3) shall not be construed to prohibit the harvesting of salt hay.	
310 CMR 10.32(4): Notwithstanding the provisions of 310 CMR 10.32(3), a small project within a salt marsh, such as an elevated walkway or other structure which has no adverse effects other than blocking sunlight from the underlying vegetation for a portion of each day, may be permitted if such a project complies with all other applicable requirements of 310 CMR 10.21 through 10.37.	The Project will not have any adverse effects on the salt marsh
310 CMR 10.32(5): Notwithstanding the provisions of 310 CMR 10.32(3), a project which will restore or rehabilitate a salt marsh, or create a salt marsh, may be permitted in accordance with 310 CMR 10.11 through 10.14, 10.24(8), and/or 10.53(4).	The Project will improve a salt marsh within the Wetlands Enhancements component of the scope of work.
310 CMR 10.32(6): Notwithstanding the provisions of 310 CMR 10.32(3) through (5), no project may be permitted which will have any adverse effect on specified habitat sites of Rare Species, as identified by procedures established under 310 CMR 10.37.	There are no rare species within the disturbed area; therefore, none will be impacted by the Project.

Designated Port Area (DPA)

Dredging and constructing the Storm Surge Control Facility outfall will temporarily impact 4,902 SF and permanently impact 12,585 SF of the Land Under Ocean within the Designated Port Area. This impact area includes 1,438 cubic yards of material to be dredged, which will be disposed of at either a Confined Disposal Facility ("CDF") or an off-site landfill depending on final sediment sampling and analysis results. See Appendix H, 2005 Sediment Sampling Information for additional context on the anticipated composition of dredged sediments based upon legacy industrial uses along the river.

Table 3-8, Compliance with Performance Standards for Designated Port Area (310 CMR 10.32)

DESIGNATED PORT AREA PERFORMANCE STANDARD	COMPLIANCE WITH PERFORMANCE STANDARD
310 CMR 10.26(3): Projects shall be designed and constructed, using best practical measures, so as to minimize adverse effects on marine fisheries caused by changes in:	
(a) water circulation;	The Project will not alter water circulation.
(b) water quality, including, but not limited to, other than natural fluctuations in the levels of salinity, dissolved oxygen, nutrients, temperature or turbidity, or the addition of pollutants.	The Project will not alter water quality. The Project will decrease the amount of impervious surface, increase the number of native plantings, and address issues of erosion and sedimentation on slopes of IER.
310 CMR 10.26(4): Projects shall be designed and constructed, using the best practical measures, so as to minimize, adverse effects on storm damage prevention or flood control caused by changes in such land's ability to provide support for adjacent coastal banks or adjacent coastal engineering structures.	The Project will not have any adverse effects on storm damage protection or flood control but will improve existing flood protection through the storm surge barrier and Storm Surge Control Facility.

3.4.1 UPSTREAM RESOURCE AREAS

Upstream of the Project Site, a 400-foot long segment of the IER that was formerly a collapsed section of the Market Street culvert alignment has recently been daylighted as a riprap-armored channel with steep banks and newly planted vegetation by the City of Everett and the site property owner. This upstream project extended the open channel conditions at 34 Market Street running parallel to the existing commuter rail tracks and Second Avenue. This open channel is currently influenced by the tidal cycle through its unrestricted hydrologic connection with the IER through the Market Street culvert and historically struggled to maintain native vegetation due to the presence of invasive species, bank erosion, and significant trash and debris. The City of Everett is currently working on adaptive management strategies to establish healthy salt-tolerant vegetation and habitat in this location.

In the design of the Storm Surge Control Facility ("SSCF"), the Proponents seek to maintain this existing hydrologic connection and allow for uninterrupted tidal flows in typical present day conditions. Only when coastal storm event surge conditions exceed the current High Tide Line ("HTL") will the SSCF gates be triggered by a passive alarm system to provide temporary flood protection to the Cities of Chelsea and Everett. Once the coastal storm conditions have subsided to an IER water

elevation below Elevation 7.0 NAVD88, the gates will reopen to allow the unrestricted connection to the open channel.

Last year, the City of Everett turned to an adaptive management strategy for the upstream open channel due to difficulties with maintaining native vegetation in this harsh inland location surrounded by industrial uses after consultation with the U.S. Army Corps of Engineers ("USACE") New England district representatives. The ongoing open channel planting strategy incorporates nutrient-rich compost and hydrogel seeded filter bags, in addition to bare root shrubs and tidal grass plugs, with temporary saltwater irrigation system and shading measures to establish native plantings at upper and lower portions of the stabilized channel bank. The City's on-call ecology consultant who designed the adaptive management strategy for the open channel also designed the Project's Nature-based Solutions ("NbS"). The Proponents and the consultant will continue use of this hybrid shoreline stabilization strategy going forward to foster healthy vegetation and habitat in the IER corridor, while also dissipating flow velocities in a changing climate.

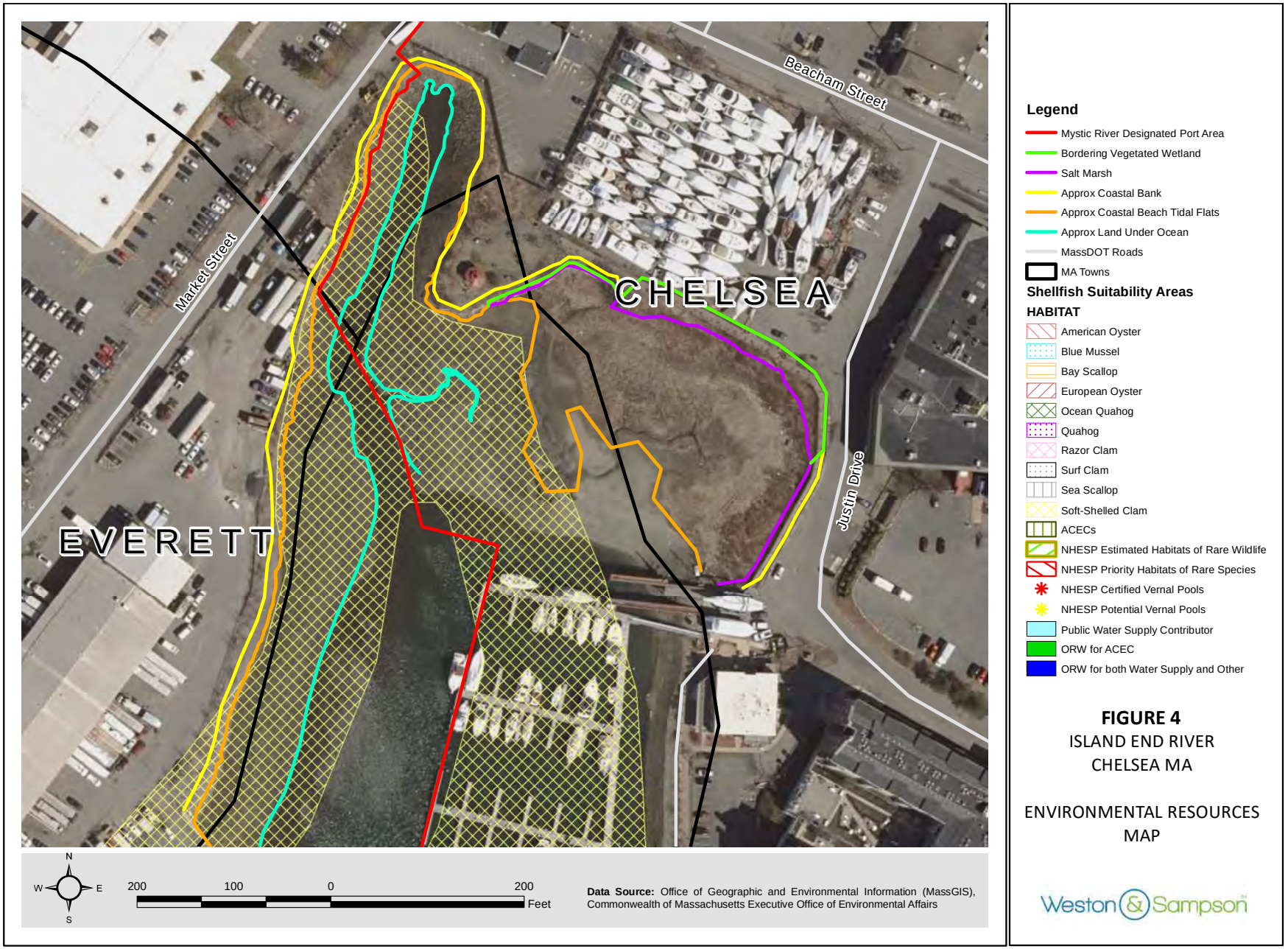
3.4.2 MITIGATION

To mitigate any Project–related construction impacts to wetland resources and buffers, the Project will enhance existing degraded salt marsh area by removing a large swath of invasive species (phragmites) and replant bare spots further into the marsh with native species. The proposed wetlands enhancements will also improve habitat and access to Island End Park and salt marsh, allowing for greater opportunity for community cleanup efforts to mitigate the accumulation of trash/debris. The existing shoreline will be stabilized through the planting of coastal bank areas and protect against erosion along the IER. In general, the project team has designed the Project efficiently to minimize Project Site area footprint, use minimally invasive construction methods, and avoid impacts to coastal resource areas and buffer zone areas to the maximum extent practicable.

Erosion and sedimentation control measures will also be installed prior to commencement of construction activities to protect the resource areas during construction. Construction materials, equipment, and fuel will be stored outside of resource areas and buffers to the maximum extent practicable. Mitigation measures such as erosion control, hay bales, and silt fences will be used to reduce sedimentation and alleviate any adverse impacts. Disturbed areas will be revegetated or covered with erosion control mats as needed. The Project proposes native plantings along IER shoreline to address long-term erosion and sedimentation issues in this waterbody.

The Project will also address resource area impacts by implementing sustainability and resiliency measures throughout the Project Site. The reduction of impervious

surfaces and planting of native species will help increase groundwater recharge, decrease the volume of stormwater runoff, and increase water quality within the resource areas. The Proponents will work to continue to educate the public (in their preferred language) about the benefits of sustainable development practices and long-term stewardship of the IER and nearby MyRWA. Ongoing collaboration with local nonprofit advocacy groups such as GreenRoots and MyRWA will support this public education and sustainable stewardship practices at IER.



Chelsea, MA
Everett, MA

Figure 3-1
Wetlands Resource Map
Source: Weston & Sampson, Inc., 2022

Chapter 4

ENVIRONMENTAL JUSTICE

CHAPTER 4: ENVIRONMENTAL JUSTICE

4.1 INTRODUCTION

The Cities of Chelsea and Everett (the "Proponents") propose to construct a coastal storm surge barrier, storm surge control facility, nature-based solutions along the riverfront, and related amenities at the Island End River ("IER") in the Cities of Chelsea and Everett (the "Project Site"). The approximately 9.5-acre Project Site is currently composed of a mix of commercial and industrial uses and supporting roadway and utility infrastructure. The existing banks of the river are highly degraded by legacy industrial uses and are comprised of hardened slope stabilization measures and littered with debris. The proposed IER Flood Resilience Project (the "Project") will construct an approximately 4,640 linear foot ("lf") storm surge barrier, an approximately 2,900 square foot ("sf") underground storm surge control facility, approximately 50,000 square feet of nature-based solutions along the riverfront, and associated wetland and public access improvements along the IER. This chapter describes Project compliance with MEPA Public Involvement Protocol for Environmental Justice Populations effective January 1, 2022.

The Project is located along the northern and western sides of IER in the cities of Chelsea and Everett. This area is characterized by a mix of commercial and industrial uses including federal postal services, boat yard and marina, produce distribution, liquified natural gas and cold storage facilities, marine construction yard and dock, financial banking, and other land uses. The Project will protect these industries and the adjacent low-lying neighborhoods from coastal flooding as well as other critical infrastructure located within the floodplain. Additionally, the Project will revitalize IER riverfront area with improved wetland resource areas, creation of nature-based solutions along the riverfront area, and enhanced public access.

The risks faced by residents, users, visitors, and others that pass through the Project Site are neither limited to flooding or concentrated solely among waterfront industrial properties. The IER's adjacent neighborhoods experience many of the public health and environmental impacts that come with living in proximity to heavy industrial operations.

4.2 EXISTING CONDITIONS

The Project Site is in close proximity to densely populated neighborhoods defined as Environmental Justice (EJ) Populations based on the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) 2020 EJ Map Viewer, which is derived on 2020 Census Block Groups. As defined by the state, EJ is based on the principle that all people have right to be protected from environmental hazards and live in and enjoy a clean and healthy environment. EJ is equal protection and meaningful involvement of all people with respect to

development, implementation and enforcement of environmental laws, regulations, and policies and the equitable distribution of environmental benefits. Within a 5-mile radius of the Project Site, there are 602 census block group that trigger seven EJ criteria, which include: Minority; Income; English Isolation; Income and Minority; Minority and English Isolation; Income and English Isolation; and Minority, Income, and English Isolation (see Figure 4-1, EJ Populations Map: 5-Mile Radius). Within a 1-mile radius, there are 57 census block group that trigger four EJ criteria, which include Minority; Income and Minority; Minority and English Isolation; and Minority, Income, and English Isolation (see Figure 4-2, EJ Populations Map: 1-Mile Radius). Since the Project does not meet or exceed air quality review thresholds under 301 CMR 11.03(8)(a)-(b) or generate 150 or more new average daily trips of diesel vehicle traffic over a duration of one year or more, only the EJ Populations within one mile of the Project Site will be included in the evaluation of potential project-related impacts.

4.2.1 CHARACTERISTICS OF EJ POPULATIONS

Each of the EJ criteria were evaluated within 1-mile of the Project Site using the EEA Environmental Justice Maps Viewer.

The EJ criteria are as follows:

- *The annual median household income is not more than 65% of the statewide annual median household income,*
- *Minorities comprise 40% or more of the population,*
- *25% or more of households lack English language proficiency or,*
- *Minorities comprise 25% or more of the population and the annual median household income of the municipality in which the neighborhood is located does not exceed 150% of the statewide annual median household income.*

EJ Populations within 1-mile of the Project Site meet the following EJ criteria: Minority, Income, Minority and Income, and Minority, Income, and English Isolation. Table 4-1, Summary of EJ Characteristics provides a summary of their characteristics.

Table 4-1: Summary of EJ Characteristics

Block Group (Essex County, Massachusetts)	EJ Criteria	% Minority Population	Median Household Income	% of MA Median Income	% Households with Language Isolation
Block Group 2, Census Tract 3424.02,	Minority	61%	$93,850.00	111%	14%

Block Group (Essex County, Massachusetts)	EJ Criteria	% Minority Population	Median Household Income	% of MA Median Income	% Households with Language Isolation
Middlesex County, Massachusetts					
Block Group 1, Census Tract 3426, Middlesex County, Massachusetts	Minority	74%	$80,603.00	96%	6%
Block Group 2, Census Tract 3426, Middlesex County, Massachusetts	Minority, income and English isolation	74%	$51,108.00	61%	33%
Block Group 3, Census Tract 3426, Middlesex County, Massachusetts	Minority	68%	$58,849.00	70%	13%
Block Group 1, Census Tract 3398.03, Middlesex County, Massachusetts	Minority	59%	$96,250.00	114%	10%
Block Group 1, Census Tract 3501.06, Middlesex County, Massachusetts	Minority	44%	$109,234.00	129%	9%
Block Group 1, Census Tract 3421.01, Middlesex County, Massachusetts	Minority and income	70%	$49,299.00	58%	22%
Block Group 1, Census Tract 3424.01, Middlesex County, Massachusetts	Minority	65%	$71,250.00	84%	1%
Block Group 3, Census Tract 3424.01, Middlesex County, Massachusetts	Minority	70%	$89,387.00	106%	1%
Block Group 2, Census Tract	Minority and income	69%	$55,182.00	65%	4%

Block Group (Essex County, Massachusetts)	EJ Criteria	% Minority Population	Median Household Income	% of MA Median Income	% Households with Language Isolation
3425.01, Middlesex County, Massachusetts					
Block Group 2, Census Tract 3424.01, Middlesex County, Massachusetts	Minority, income and English isolation	72%	$33,806.00	40%	31%
Block Group 1, Census Tract 3424.02, Middlesex County, Massachusetts	Minority	58%	$135,500.00	161%	2%
Block Group 3, Census Tract 3424.02, Middlesex County, Massachusetts	Minority and English isolation	58%	$65,852.00	78%	38%
Block Group 1, Census Tract 3425.01, Middlesex County, Massachusetts	Minority and English isolation	69%	$95,515.00	113%	28%
Block Group 1, Census Tract 3425.02, Middlesex County, Massachusetts	Minority and English isolation	65%	$94,500.00	112%	28%
Block Group 2, Census Tract 3421.01, Middlesex County, Massachusetts	Minority	62%	$135,781.00	161%	2%
Block Group 4, Census Tract 3421.01, Middlesex County, Massachusetts	Minority and English isolation	61%	$99,181.00	118%	25%
Block Group 3, Census Tract 1605.01, Suffolk	Minority	91%	$101,875.00	121%	16%

Block Group (Essex County, Massachusetts)	EJ Criteria	% Minority Population	Median Household Income	% of MA Median Income	% Households with Language Isolation
County, Massachusetts					
Block Group 4, Census Tract 1605.01, Suffolk County, Massachusetts	Minority, income and English isolation	81%	$11,630.00	14%	55%
Block Group 5, Census Tract 1605.01, Suffolk County, Massachusetts	Minority and income	87%	$49,464.00	59%	0%
Block Group 1, Census Tract 1605.02, Suffolk County, Massachusetts	Minority, income and English isolation	87%	$28,333.00	34%	31%
Block Group 5, Census Tract 1605.02, Suffolk County, Massachusetts	Minority	78%	$67,818.00	80%	24%
Block Group 4, Census Tract 1606.01, Suffolk County, Massachusetts	Minority	75%	$111,932.00	133%	19%
Block Group 2, Census Tract 1603, Suffolk County, Massachusetts	Minority and income	43%	$51,429.00	61%	18%
Block Group 1, Census Tract 1604, Suffolk County, Massachusetts	Minority, income and English isolation	88%	$47,330.00	56%	37%
Block Group 2, Census Tract 1604, Suffolk County, Massachusetts	Minority, income and English isolation	90%	$35,069.00	42%	53%
Block Group 1, Census Tract	Minority and income	26%	$53,200.00	63%	0%

Block Group (Essex County, Massachusetts)	EJ Criteria	% Minority Population	Median Household Income	% of MA Median Income	% Households with Language Isolation
1606.01, Suffolk County, Massachusetts					
Block Group 1, Census Tract 1606.02, Suffolk County, Massachusetts	Minority	79%	$62,708.00	74%	21%
Block Group 1, Census Tract 1601.02, Suffolk County, Massachusetts	Minority and English isolation	80%	$59,201.00	70%	26%
Block Group 2, Census Tract 1601.02, Suffolk County, Massachusetts	Minority and English isolation	96%	$63,469.00	75%	39%
Block Group 3, Census Tract 1601.02, Suffolk County, Massachusetts	Minority	90%	$81,313.00	96%	7%
Block Group 4, Census Tract 1601.02, Suffolk County, Massachusetts	Minority, income and English isolation	89%	$25,451.00	30%	34%
Block Group 1, Census Tract 1601.03, Suffolk County, Massachusetts	Minority and English isolation	92%	$-	0%	40%
Block Group 2, Census Tract 1601.03, Suffolk County, Massachusetts	Minority and English isolation	93%	$69,713.00	83%	68%
Block Group 3, Census Tract 1601.03, Suffolk	Minority	76%	$65,865.00	78%	14%

Block Group (Essex County, Massachusetts)	EJ Criteria	% Minority Population	Median Household Income	% of MA Median Income	% Households with Language Isolation
County, Massachusetts					
Block Group 4, Census Tract 1601.03, Suffolk County, Massachusetts	Minority and English isolation	75%	$198,000.00	235%	32%
Block Group 1, Census Tract 1602, Suffolk County, Massachusetts	Minority and English isolation	93%	$61,679.00	73%	46%
Block Group 2, Census Tract 1602, Suffolk County, Massachusetts	Minority, income and English isolation	94%	$40,450.00	48%	59%
Block Group 3, Census Tract 1602, Suffolk County, Massachusetts	Minority and English isolation	91%	$58,688.00	70%	49%
Block Group 4, Census Tract 1602, Suffolk County, Massachusetts	Minority and income	83%	$51,827.00	61%	22%
Block Group 1, Census Tract 1603, Suffolk County, Massachusetts	Minority	49%	$78,427.00	93%	21%
Block Group 3, Census Tract 1604, Suffolk County, Massachusetts	Minority	45%	$105,880.00	125%	6%
Block Group 4, Census Tract 1604, Suffolk County, Massachusetts	Minority and income	90%	$25,125.00	30%	22%
Block Group 1, Census Tract 1605.01, Suffolk County, Massachusetts	Minority	90%	$75,156.00	89%	14%

Block Group (Essex County, Massachusetts)	EJ Criteria	% Minority Population	Median Household Income	% of MA Median Income	% Households with Language Isolation
Block Group 2, Census Tract 1605.01, Suffolk County, Massachusetts	Minority and income	86%	$47,188.00	56%	8%
Block Group 1, Census Tract 406, Suffolk County, Massachusetts	Minority	28%	$127,344.00	151%	0%
Block Group 2, Census Tract 501.01, Suffolk County, Massachusetts	Minority, income and English isolation	76%	$22,910.00	27%	38%
Block Group 1, Census Tract 408.01, Suffolk County, Massachusetts	Minority and income	87%	$12,116.00	14%	24%
Block Group 1, Census Tract 501.01, Suffolk County, Massachusetts	Minority	77%	$82,583.00	98%	24%
Block Group 3, Census Tract 501.01, Suffolk County, Massachusetts	Minority	72%	$71,053.00	84%	23%
Block Group 2, Census Tract 408.01, Suffolk County, Massachusetts	Minority and income	83%	$31,151.00	37%	8%
Block Group 1, Census Tract 503, Suffolk County, Massachusetts	Minority	55%	$66,250.00	79%	10%
Block Group 3, Census Tract 509.01, Suffolk	Minority, income and English isolation	74%	$37,333.00	44%	43%

Block Group (Essex County, Massachusetts)	EJ Criteria	% Minority Population	Median Household Income	% of MA Median Income	% Households with Language Isolation
County, Massachusetts					
Block Group 1, Census Tract 402, Suffolk County, Massachusetts	Minority and income	81%	$16,250.00	19%	12%
Block Group 2, Census Tract 402, Suffolk County, Massachusetts	Minority	25%	$179,266.00	212%	3%
Block Group 1, Census Tract 403, Suffolk County, Massachusetts	Minority	72%	$-	0%	4%
Block Group 1, Census Tract 404.01, Suffolk County, Massachusetts	Minority	29%	$86,734.00	103%	7%

4.2.2 LANGUAGES SPOKEN

The Proponents will be collaborating with Community Based Organizations (CBOs) to ensure meaningful engagement with EJ communities throughout the region. The City of Chelsea prioritizes multi-lingual engagement with residents, in order to promote inclusivity and robust community engagement. The Proponents have also identified languages spoken by 5 percent or more of residents who identify as not speaking English "very well" to conduct community outreach activities. There are 11 languages spoken within the 5-mile radius of the Project Site, which include: Arabic, Chinese, Korean, Vietnamese, French Creole, Portuguese or Portuguese Creole, Russian, Spanish or Spanish Creole, Mon-Khmer/Cambodian, African languages, and other Indic languages. There are five languages spoken within the 1-mile radius of the Project Site, which includes Arabic, Spanish or Spanish Creole, Chinese, French Creole, and Portuguese or Portuguese Creole. The Proponents are committed to conducting written and oral translation and interpretive services during community outreach efforts.

4.3 PUBLIC INVOLVEMENT ACTIVITIES

In accordance with the Massachusetts Environmental Policy Act ("MEPA") Public Involvement Protocol for Environmental Justice Populations, the Proponents have been conducting extensive formal and informal community processes with permitting agencies, neighboring residents and businesses, and a variety of advocacy groups since 2018. Collaboration between the municipalities, local organizations, and community stakeholders is vital to address risks holistically. The Proponents' community engagement strategy was to conduct early outreach to develop high-level goals and strategies for the Project that incorporated community feedback. This outreach is detailed in Table 4-2, Community Outreach Efforts below.

Table 4-2: Community Outreach Efforts

Participant(s)	Description
Neighbors and Community Based Organization	
GreenRoots	• Co-hosted two coastal environmental clean-ups at IER in 2020 and 2021 • Formed a Community Advisory Group ("CAG") in Spring 2022 that is comprised of members of the community who are compensated for their participation with the Project • April 7, 2022 – First CAG meeting on engagement structure and the Project's intent, area, and scope • May 5, 2022 – Held site visits for CAG members to review the Project Site and collaborate on community outreach ideas • May 12, 2022 – Held GreenRoots Open House event where various projects were discussed, including the IER Flood Resilience Project • May 18, 2022 – CAG meeting to plan community events for the Project • June 15, 2022 – Hosted Mystic River boat trip to inform community members, including youth eco-ambassadors, about the Project

Mystic River Watershed Association ("MyRWA")	• Approximately 20% of MyRWA time on the Project since December 2020 has been spent meeting with legislators and congressional staff to increase awareness of the Project • Participated in stakeholder recruitment, led Chelsea High School outreach, and co-hosted two coastal clean-ups at IER. Tasks included calling and emailing local stakeholders in English and Spanish in 2021 • Facilitated the IER Resilience Web Forum for local stakeholders to learn more details of the project and give feedback in 2021 • May 25, 2021 – Resilient Mystic Collaborative, quarterly meeting to discuss the Project with municipal and non-profit staff • November 3 and 5, 2021 – Hosted two Lower Mystic boat trips with state legislators and municipal staff
Stakeholder Engagement	
Stakeholder Working Group ("SWG")	• Sept. 8, 2021 – First SWG meeting, held virtually to introduce the project origin and concepts • Oct. 20, 2021 – Site walk held for SWG to walk the project area, understand existing site operations/conditions, and conceptualize project. • November 18, 2021 – Virtual SWG meeting held to review project progress, including design considerations and flood barrier alignment concepts. • January 20, 2022 – Virtual SWG meeting to review project progress, including alternative analysis for flood barrier concepts. • April 14, 2022 – Site walk held to walk the current alignment and review existing conditions/operations in greater detail. • June 21, 2022 - Virtual SWG meeting to review project progress, including permitting, legal, and field work updates
City of Everett	
Department of Planning and Development	• Co-hosted a regional promotion presentation with the City of Chelsea on March 26, 2021 • Organized and facilitated the Everett Spring Community Clean-Up where the IER Flood Resilience Project was highlighted May 15, 2021 Organized and facilitated the Everett Earth Day Community Clean-Up where the IER Flood Resilience Project was highlighted April 23, 2022 • Presented to Everett Conservation Commission for an information session June 16, 2022

City of Chelsea	
Department of Housing and Community Development	• Held a virtual open house on October 21, 2020 • Held a public meeting on November 5, 2020 on the IER Park • Organized and distributed flyers for a community-wide clean-up of the IER on September 26, 2020 and on May 22, 2021 in both English and Spanish language • Held an open house for the community on the Project • Co-hosted a regional promotion presentation with the City of Everett on March 26, 2021 • Organized and facilitated the Chelsea Earth Day Clean-Up where the IER Flood Resilience Project was highlighted April 23, 2022

4.3.1 ADVANCE NOTIFICATION

The Proponents used the EJ Reference List of community-based organizations (CBOs) and tribes for the designated geographical area around the Project Site available through the EEA EJ Director. In addition, the Proponents conducted their own research and consulted with planners from the Cities of Everett and Chelsea and GreenRoots to identify a list of CBOs. The list represents the interests of residents in the municipalities within a 1-mile radius of the Project Site, including Everett, Chelsea, Boston, and Somerville. These organizations are included in Table 4-3: CBO Distribution List (Proximity).

Table 4-3: CBO Distribution List (Proximity)

Organization	Municipality Represented
Air, Inc	East Boston
Asian Community Development Corporation	Somerville, Cambridge
Charles River Watershed Association	Somerville, Cambridge
Cambridge Food and Fitness Policy Council	Cambridge
Chelsea Collaborative, Inc.	Chelsea
GreenRoots	Chelsea
Groundwork Somerville	Somerville
Harborkeepers	Chelsea
Mystic River Watershed Association	Chelsea, Everett, Medford, Somerville

On August 1, 2022, 45 days in advance of the original targeted EENF filing date, the Proponents sent an email to each CBO describing their intent to promote awareness

of and offer opportunities to engage with the Project. On December 29, 2022, 30 days in advance of the new targeted EENF filing date, the Proponent sent out an additional notification to each CBO offering opportunities to engage with the Project. These emails included the anticipated EENF filing date and invited recipients to reach out with questions, comments, and ideas or to schedule a meeting with the Proponents to discuss the Project. Attached to the email was a complete EJ Screening Form translated into five languages: Arabic, Spanish or Spanish Creole, Chinese, Haitian Creole, and Portuguese or Portuguese Creole (see Appendix E, EJ Screening Form). Both the MEPA Office and EEA EJ Director were copied on this correspondence.

4.3.2 PRE-FILING MEETING

Representatives from EEA responded to the Proponents request for a pre-filing meeting. A virtual meeting held on May 5, 2022, was attended by three members of the Project Planning/Permitting Consultant firm, four EEA representatives, and a representative of GreenRoots, the representative CBO. The meeting participants discussed the Project in the context of EJ outreach and community benefits.

4.3.3 ADDITIONAL OUTREACH

Other public involvement strategies implemented by the Proponents in advance of filing this EENF included providing hard copies of the EJ Screening Form at publicly accessible locations. Hard copies of the EJ Screening Form in all five languages were made available at Everett City Hall in the Department of Planning and Development and Chelsea City Hall in the Department of Housing and Community Development. The Proponents will distribute notice to the CBO Distribution List via email a week prior to a scheduled public hearing of the Project. The notice invites organizations to provide feedback on the Project or set up a meeting with the Proponents.

4.3.4 FUTURE STRATEGIES

The Proponents are committed to further engaging the surrounding EJ Populations to seek feedback on issues of importance to these communities. Throughout the design and permitting phase of the Project, the Proponents anticipate meeting with additional CBOs and providing notice of any public meetings, site visits, or other updates to the CBO Distribution List.

4.4 ASSESSMENT OF EXISTING UNFAIR OR INEQUITABLE ENVIRONMENTAL BURDEN

The Proponents assessed existing unfair or inequitable environmental burdens and related public health consequences impacting the EJ Population.

4.4.1 VULNERABLE HEALTH CRITERIA

The Proponents have utilized additional data layers through the Massachusetts Department of Public Health (Mass DPH) EJ Tool to determine other potential sources of pollution within the 1-mile radius of the Project Site. The Mass DPH EJ Tool exhibits four vulnerable health criteria. The four vulnerable health criteria per municipality include Heart Attack per 10,000, Pediatric Asthma Emergency Department (ED) Visits Rate per 10,000, Elevated Blood Lead Prevalence per 1,000, and Low Birth Weight (LBW) per 1,000. Elevated Blood Lead Prevalence per 1,000 and Low Birth Weight per 1,000 are based on 2010 census tract data. EJ communities that exist within these vulnerable health areas could potentially bear an unfair or inequitable environmental burden and related public health consequence. The EJ criterion is met if they are equal to or greater than 110% of the state prevalence.

4.5.1.1 HEART ATTACK (MUNICIPALITY)

According to the Mass DPH, heart attack hospitalization is a criterion used to identify vulnerable health EJ Populations because exposure to air pollution can increase the risk for heart attack and other forms of heart disease, and it is indicative of a serious chronic illness that can lead to disability, decreased quality of life, and pre mature death. People living in EJ areas with higher than average heart attack hospitalization rates may be more vulnerable to adverse environmental exposure. The Massachusetts statewide rate was 26.4 per 10,000 from 2013-2017. Municipalities with higher than average heart attack hospitalization rates are included in Table 4-4, Nearby Municipalities Meeting EJ Vulnerable Health Criterion for Heart Attacks, 2013 – 2017.

Table 4-4: Nearby Municipalities Meeting EJ Vulnerable Health Criterion for Heart Attacks 2013 – 2017

Municipality	Case Count	Statewide Rate Per 10,000	110% of the Statewide Rate	Municipality Rate per 10,000
Chelsea	53.8	26.4	29.1	34.9
Everett	79.2	26.4	29.1	34.8

Source: Mass DPH – Bureau of Environmental Health, 2022

4.5.1.2 CHILDHOOD ASTHMA (MUNICIPALITY)

According to Mass DPH, childhood asthma is a criterion used to identify vulnerable health EJ Populations because people of color and low-income individuals are at greater risk for asthma exacerbations due to increased exposure to asthma triggers, and uncontrolled asthma can impact an individual's overall health and wellbeing. Asthma has been directly linked to air pollution, exposure to environmental contaminants, and poor housing conditions. The Massachusetts statewide rate was 83.1 Pediatric Asthma ED Visits per 10,000 from 2013 – 2017. Municipalities with higher than average childhood asthma rates are included in Table 4-5, Nearby Municipalities Meeting EJ Vulnerable Health Criterion for Childhood Asthma, 2013 – 2017.

Table 4-5: Nearby Municipalities Meeting EJ Vulnerable Health Criterion for Childhood Asthma, 2013 – 2017

Municipality	Case Count	Statewide Rate per 10,000	110% of the Statewide Rate	Community Rate per 10,000
Boston	1,059	83.1	91.4	172.8
Chelsea	79.2	83.1	91.4	167.7
Everett	75	83.1	91.4	131.2
Somerville	58.6	83.1	91.4	125.2

Source: Mass DPH – Bureau of Environmental Health, 2022

4.5.1.3 CHILDHOOD BLOOD LEAD EXPOSURE (CENSUS TRACT)

According to Mass DPH, childhood lead exposure is used to identify vulnerable health EJ Populations because lead exposure disproportionately impacts lower income communities and communities of color, and childhood exposure to relatively low levels can cause severe and irreversible health effects, including damage to a child's mental and physical development. Within one mile of the Project Site, seven census tracts are triggered for having Elevated Blood Lead Presence with a total of 53.2 cases from 2015-2019 The Massachusetts statewide rate was 16.1 per 1,000. Census Tracts with higher than average elevated blood lead prevalence rates are included in Table 4-6, Elevated Blood Lead Prevalence Per 1,000, 2015 – 2019.

Table 4-6: Elevated Blood Lead Prevalence Per 1,000, 2015 – 2019

2010 Census Tract	Community Case Count	Statewide Rate per 1,000	110% of the Statewide Rate	Community Rate per 1,000
25025160400	3.8	16.1	17.7	22.9
25025160502	7.2	16.1	17.7	27.8
25025160501	9.6	16.1	17.7	35.1
25025050101	4.8	16.1	17.7	25.2
25025050901	7.4	16.1	17.7	40.5
25025160101	13.2	16.1	17.7	31.1
25017342500	7.2	16.1	17.7	26.8
Total	53.2			

Source: Mass DPH – Bureau of Environmental Health, 2022

4.5.1.4 LOW BIRTH WEIGHT (CENSUS TRACT)

According to Mass DPH, low birth weight (LBW) is a criterion used to identify vulnerable health EJ Populations because exposure to environmental contaminants can increase the risk of delivering a LBW baby and LBW is a significant predictor of maternal and infant health. Women of color and women of low income have a higher risk of delivering a LBW baby. LBW can increase the risk of infant mortality and morbidity, health problems throughout childhood, developing cognitive disorders, developmental delay, and chronic diseases as an adult such as cardiovascular diseases and type 2 diabetes. Within one mile of the Project Site, 13 census tracts were triggered for being LBW vulnerable with a total of 23.2 cases from 2011-2015. The Massachusetts statewide rate was 216.8 per 1,000. Census Tracts with low birth weight rates are included in Table 4-7, Low Birth Weight Rate Per 1,000, 2011 – 2015.

Table 4-7: Low Birth Weight Rate Per 1,000, 2011-2015

2010 Census Tract	Community Case Count	Statewide Rate per 1,000	110% of the Statewide Rate	Community Rate per 1,000
25025160400	1.6	216.8	238.5	315
25025160200	2.2	216.8	238.5	294.1
25025160502	2.6	216.8	238.5	298.2
25025160501	3.6	216.8	238.5	387.9
25025160602	1.8	216.8	238.5	271.1
25025050101	2	216.8	238.5	280.1
25025050901	2.6	216.8	238.5	380.1

25025040600	1.2	216.8	238.5	262
25025040401	1.4	216.8	238.5	295.4
25025160601	1.6	216.8	238.5	285.7
25017342400	2.6	216.8	238.5	268.6
No Statistical Data				
25025160300	NS	216.8		NS
25025050300	NS	216.8		NS
Total	23.2			

Source: Mass DPH – Bureau of Environmental Health, 2022

4.4.2 OTHER POTENTIAL SOURCES OF POLLUTION

The Proponents have also consulted the Mass DPH EJ Tool to survey other potential sources of pollution within the boundaries of the EJ Populations. Within one mile of the Project Site, there are: three Air Operating Permits, 12 Hazardous Waste Treatment storage/disposal sites, five Large Quantity Toxic Users, 14 Large Quantity Generators, 26 M.G.L. c. 21E Sites, 15 Tier II Toxics Use Reporting Facilities, 84 MassDEP Sites with AULs, one MassDEP Groundwater Discharge Permit, one MassDEP Public Water Supplier, four NPDES Points (Draft), 20 Underground Storage Tanks, and five EPA Toxic Release Inventory Sites. The Project Site is approximately 0.1-miles away from transportation provided by the Massachusetts Bay Transportation Authority (MBTA). Within one mile of the Project Site, there are 76 MBTA bus stops, one Silver Line connection, and three commuter rail stops.

4.4.3 RMAT CLIMATE RESILIENCE DESIGN STANDARDS

The Proponents consulted the Resilient MA Team Climate Resilience Design Tool (the "RMAT Tool") to understand the risks associated with climate change at the Project Site. The RMAT tool integrates best available statewide climate change projections into conceptual planning and design of project with physical assets to help inform and guide planning and design of infrastructure. The Project was identified as having a high risk of sea level rise/storm surge, extreme precipitation-urban flooding, and extreme heat. See Appendix F for RMAT Tool Output Report.

4.4.4 SEA LEVEL RISE

The Project Site is at high risk of sea level rise and storm surge over the Project's expected life. The Project Site has a history of coastal flooding and is currently exposed to the 1% annual coastal flood event per the current Federal Emergency Management Agency (FEMA) Flood Insurance Risk Map (FIRM). The effects of sea level rise due to climate change will increase the vulnerability of the Project Site.

The EJ Populations surrounding the Project Site are at risk of climate-related flooding. Enhancement of the coastline protection with a new 4,640 lf coastal and inland storm surge barrier will protect the area's industrial, commercial, and community uses. In addition, the Project will protect over 500 acres of densely developed urban neighborhoods in Chelsea and Everett to the projected 2070 1% coastal storm still water elevation at minimum.

4.4.5 PRECIPITATION

Rainfall amounts and intensity are expected to increase due to climate change at the Project Site, as an accelerated trend has been measured in recent decades for the Northeastern United States. The Project is classified as being highly exposed to urban flooding due in relation to extreme precipitation over its expected useful life, with a maximum annual daily rainfall exceeding 10 inches. The Project is classified as being moderately exposed to riverine flooding in relation to extreme precipitation.

The Project will decrease impervious area in the final condition than currently exists on site and all areas will be re-graded to promote drainage to existing drainage structures or to new structures. The Project intends to install backflow preventers on the existing stormwater pipes that the barrier crosses over to prevent flood water from surcharging inland of the barrier. The increase of pervious surface and new stormwater infrastructure will reduce this impact of urban flooding around the Project Site.

4.4.6 TEMPERATURE

The Project is classified as having a high exposure to extreme heat risk due to expected changes in climate conditions. It is expected that there will be a $+30$ day increase in the number of days with daytime temperatures over 90 degrees Fahrenheit within the Project's useful life. High impervious surface cover in and around the Project Site contribute to increased public health risk from urban heat island effect.

The Cities of Chelsea and Everett suffer from the impacts of extreme heat, and many areas throughout the region are identified as 'urban heat islands'. The urban heat island effect is a phenomenon that plagues urban areas that contain high amounts of impervious surface and have low urban tree canopies. Impervious surfaces absorb solar radiation, therefore roadways and infrastructure will retain heat for a longer period of time, causing extreme heat waves throughout the region. Absorption and retention of solar energy are exacerbated when tree canopy and shade structures are limited. Additionally, waste heat from industrial equipment and processes exacerbates the urban

heat island effect in this area. Inherently, EJ Populations are at higher health risks associated with the impacts of the Urban Heat Island Effect. The Project will provide EJ Populations access to shaded spaces and shelter from extreme heat through improving urban tree canopy and access to the waterfront, reducing the effects of urban heat island.

4.4.7 ENVIRONMENTAL PROTECTION AGENCY EJ SCREEN

The Proponents have also consulted the U.S. EPA's EJ Screen tool, which provides percentile ranking by census block group, compared against statewide averages for 11 environmental indicators. The Proponents used the environmental indicators to assess the potential environmental exposures that further create unfair or inequitable environmental burdens on EJ Populations

The EJ Screen assessed a 1-mile radius around the Project Site and reported an approximate population of 52,372. Within this radius, there are nine Hazardous Waste Treatment, Storage, and Disposal Facilities Sites reporting to EPA. The Project Site falls within the 83rd percentile for Particular Matter (PM2.5) at 7.48 ug/m^3, the 36th percentile for Ozone at 39 ppb, the 91st percentile for NATA Diesel PM at 0.642 ug/m^3, the 99th percentile for 2017 Air Toxics Cancer Risk at 30 lifetime risk per million, the 99st percentile for 2017 Air Toxics Respiratory HI at 0.49, the 88th percentile for Traffic Proximity with 4,400 daily vehicles/meter, the 70th percentile for Lead Paint with 0.69 percent pre-1960, the 94th percentile for Superfund Proximity with 0.076 sites/km, 94h percentile for RMP Proximity with 2.3 facilities/km, the 93rd percentile for Hazardous Waste Proximity with a Treatment, Storage, and Disposal Facilities proximity of 19 facility/km, the 82nd percentile for Underground Storage Tanks with 5.7 count/km^2, and the 96th percentile for the Wastewater Discharge Indicator with 0.13 toxicity weighted concentration/meter. This accumulation of environmental burden is unprecedented throughout the commonwealth.

4.5 POTENTIAL EFFECTS ON EJ POPULATIONS

The Project will result in a considerable long term net benefits and some potential short term construction impacts to EJ Populations. A potential source of negative health impacts for the local community are related to construction period air quality impacts, which may include dust from demolition and site excavation, and emissions from construction equipment. The Proponents will follow local construction regulations and best practices to minimize these air quality impacts in the surrounding community.

The Project is anticipated to provide several economic and environmental benefits. Environmental benefits of the Project include an improved public realm, enhanced pedestrian safety conditions, ecological improvements such as improved water quality and flood

protection from highly regulated industrial sites within the floodplain. The Project will provide additional community benefits including, new sidewalks with shade trees, scenic overlooks, and bike racks and benches, and include a 1/5-mile riverfront park to access the waterfront and provide expanded public open space. This landscaping will contribute to a reduction in the overall impervious surface area and urban heat island effect on the Project Site.

Flood protection measures will protect over 500 acres of densely developed urban neighborhoods in Chelsea and Everett. The Project has been informed by public engagement with key target populations. An elevated pedestrian boardwalk with seating, viewing platforms, and lighting is included as the Resilient Riverwalk in the design of the flood protection system. The Resilient Riverwalk will have pillars to support a handrail in the near-term, and stoplogs for additional flood protection in the long-term. Although the flood barrier is not nature-based throughout, the protective measures are critical to protecting the health of human and wildlife populations along the Mystic River. The Project will provide construction-related jobs and protect hundreds of existing jobs from the risks associated with flooding.

MassDEP has identified over 30 sites within the IER District documenting the release of oil and/or hazardous material ("OHM"). Flood protection will significantly decrease the probability that a storm event could cause the release of OHM. The Proponents will build upon ongoing work by Massachusetts Coastal Zone Management (CZM) to address flood resilience within working waterfront areas and work with industrial property owners and operators to protect their active uses and prevent release of hazardous materials if compromised by floodwaters.

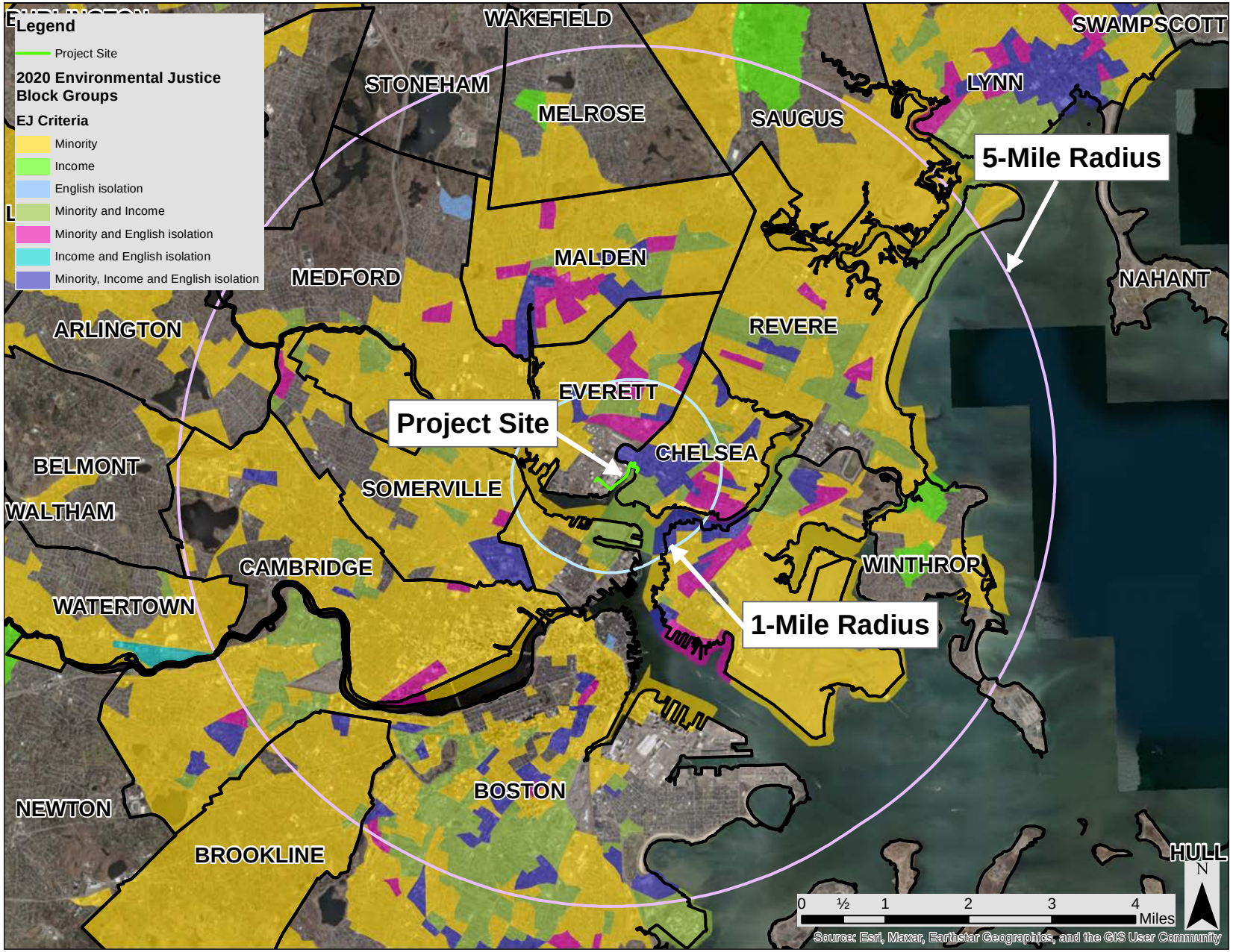
In addition, the Project will help prevent disruption of important commercial and industrial activities that could have economic repercussions for employees, many of whom are low-income BIPOC residents. Flood resilience will also protect residents from potential loss or damage of private property, including personal vehicles and homes, due to flooding. These assets are often not easily replaced, and property damage to low-income residents can be financially devastating.

4.5.1 COMPARABLE IMPACTS ON ENVIRONMENTAL JUSTICE POPULATIONS VS. NON-ENVIRONMENTAL JUSTICE POPULATIONS

Within the 1-mile radius of the Project Site, there are both EJ and non-EJ populations. Non-EJ Populations within the 1-mile radius are located across the Mystic River in the Charlestown Waterfront neighborhood of Boston and Everett's un-populated Industrial District. The Project Site is directly adjacent to both the uninhabited non-EJ Population and EJ Populations, therefore**,** there is a disproportionate effect on EJ Populations when compared to non-EJ Populations**.** Short-term construction related impacts as described above will also have a disproportionate effect on the

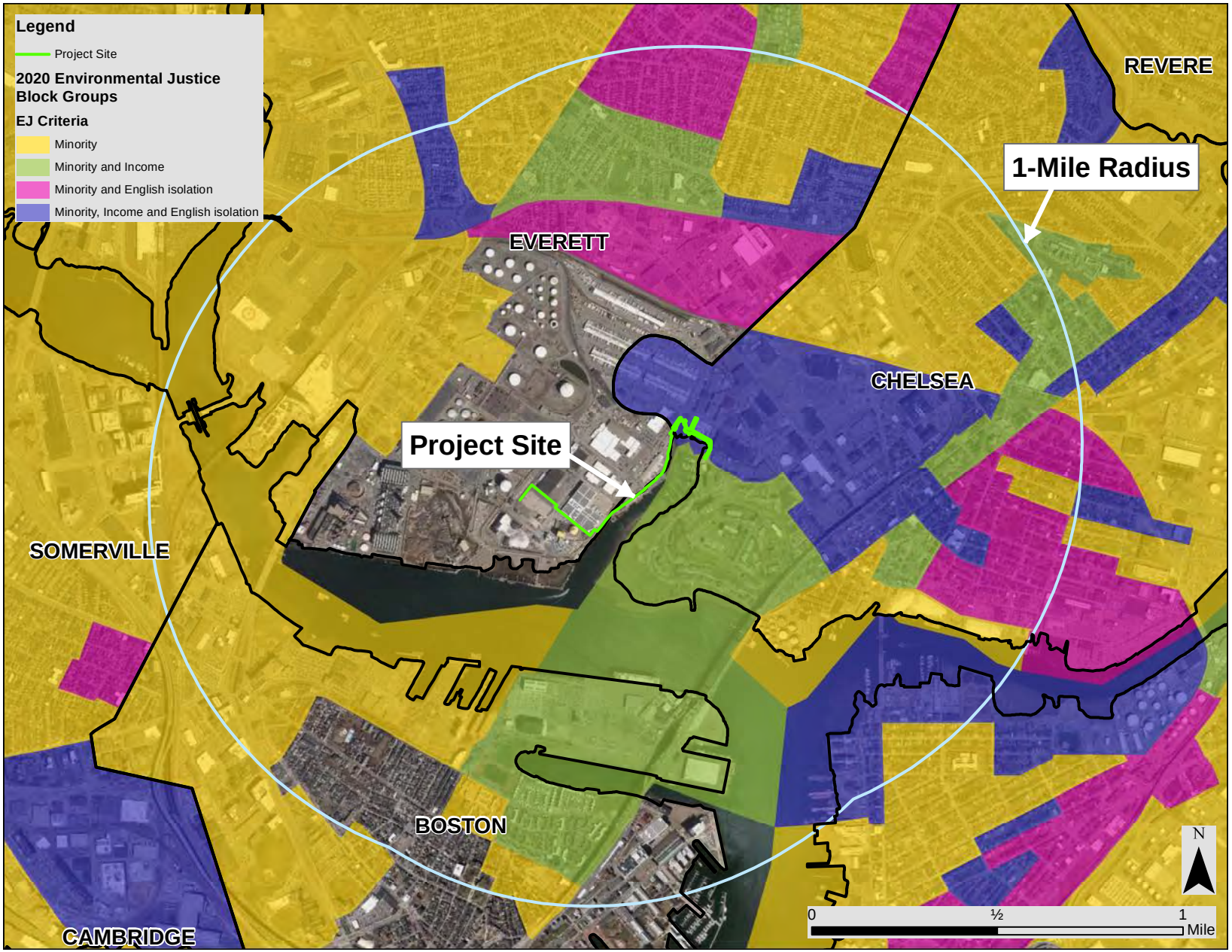
surrounding EJ Populations than it would the non-EJ Populations. Project benefits from the flood protection barrier will disproportionately benefit EJ Populations.

The Cities of Chelsea and Everett meet the vulnerable heath criterion for heart attacks, childhood asthma, childhood blood lead exposure, and LBW. Of these four, the Project has the potential to impact EJ Populations for childhood asthma. EJ Populations are at greater risk for asthma exacerbations due to increased exposure to asthma triggers. Potential asthma triggers from the construction work environment include fugitive dust and diesel exhaust emissions. The Proponent is committed to avoiding or minimizing fugitive dust and diesel exhaust emissions to the greatest extent practicable to protect the surrounding communities. Mitigation includes wetting down areas during construction and the use of diesel retrofitted equipment. However, these will be short-term impacts and they are greatly outweighed by the long-term benefits for the surrounding EJ Population.



Chelsea, MA
Everett, MA

Figure 4-1
Environmental Justice (EJ) Populations Map (5-Mile Radius)
Source: Fort Point Associates, Inc., 2022



Chelsea, MA
Everett, MA

Figure 4-2
Environmental Justice (EJ) Populations Map (1-Mile Radius)
Source: Fort Point Associates, Inc., 2022

Chapter 5

INFRASTRUCTURE & PROJECT CONSTRUCTION

CHAPTER 5: INFRASTRUCTURE & PROJECT CONSTRUCTION

5.1 INTRODUCTION

The Cities of Chelsea and Everett (the "Proponents") propose to construct a coastal storm surge barrier, storm surge control facility, nature-based solutions along the riverfront, and related amenities at the Island End River ("IER") in the Cities of Chelsea and Everett (the "Project Site"). The approximately 9.5-acre Project Site is currently composed of a mix of commercial and industrial uses and supporting roadway and utility infrastructure. The existing banks of the river are highly degraded by legacy industrial uses and are comprised of hardened slope stabilization measures and littered with debris. The proposed IER Flood Resilience Project (the "Project") will construct an approximately 4,640 linear foot ("lf") storm surge barrier, an approximately 2,900 square foot ("sf") underground storm surge control facility, approximately 50,000 square feet of nature-based solutions along the riverfront, and associated wetland and public access improvements along the IER.

This chapter addresses the existing and proposed utility infrastructure within the Project Site, the Project's compliance with the DEP Stormwater Standards, and any potential impacts on the existing utility systems that may result from construction of the Project. To support the construction and maintenance of the Project, there will be minor utility interventions as needed to maintain utility access and performance along the proposed flood barrier alignment. The utility systems discussed herein include the wastewater system, water system, storm drainage system, and other utilities, including electrical, telecommunications, and natural gas service, within the Project Site.

5.2 WASTEWATER SYSTEM

5.2.1 EXISTING SEWER SYSTEM

The Cities of Chelsea and Everett, as well as private entities, maintain wastewater utilities within the Project Site and surrounding area. The City of Everett maintains wastewater utilities, including corrugated metal and vitrified clay piping, sewer manholes, and other fittings. Sewer piping within the public rights-of-way of Behen Street, Beacham Street, and Market Street varies from 4 to 12 inches in diameter. Sewer utility infrastructure within Commercial Street private way was installed by private entities and is maintained by the City and various private property owners along the Commercial Street corridor. Sewer pipes within the private right-of-way range from 4 to 8 inches in diameter. Within the City of Chelsea, the municipality maintains the wastewater utilities, also consisting of corrugated metal and vitrified clay piping, manholes, and other fittings. Justin Drive, a private right-of-way adjacent

to the Project Site, is serviced by at least a 6″ clay pipe and manholes along the right-of-way as shown on record plans. The Beacham and Williams Street corridors also recently completed a roadway project that included improvements to wastewater facilities within the right-of-way. Figure 5-1, Existing Wastewater Infrastructure Exhibit shows record wastewater utility lines near the Project Site.

5.2.2 PROPOSED SEWER SYSTEM MODIFICATIONS

The Project is not proposing any additional sewer utilities within Project Site and surrounding area. However, the Resilience Provisions West storm surge barrier will cross three 4″ diameter sewer pipes within Commercial Street. The Project intends to confirm that each facility served by the wastewater system has proper backwater prevention valves in place and to waterproof the frames and covers for all sewer manholes located outside of the flood barrier system.

5.3 WATER SYSTEM

5.3.1 EXISTING WATER SYSTEM

The Cities of Chelsea and Everett each maintain public water supply utilities within the Project Site and surrounding area. The City of Everett maintains water utilities, including cast iron piping, hydrants, water gates, and other fittings. Water main pipes within the public rights-of-way of Behen Street, Beacham Street, and Market Street vary from 2 to 18 inches in diameter. Water utility infrastructure within Commercial Street was installed by private entities but is maintained by the City of Everett and various private property owners along the Commercial Street corridor. Water mains within this right-of-way range from 2 to 12 inches in diameter. The City of Chelsea water utilities within the public right-of-way in Beacham Street consist of cast iron and ductile iron piping, hydrants, water gates, and other fittings. Record utility mapping obtained does not indicate water utilities in Justin Drive serviced from Beacham Street. The Beacham Street Roadway & Utility Improvements Project also included improvements to the public water utility system. Figure 5-2, Existing Water Infrastructure Exhibit, shows record water utility lines near the Project Site.

5.3.2 PROPOSED WATER SYSTEM MODIFICATIONS

The Resilience Provisions East portion of the Project includes installation of 2″ diameter polyvinyl chloride (PVC) irrigation piping to service proposed plantings along the proposed walkway. This irrigation line will be connected to the 12″ diameter water main within Beacham Street via a corporation stop. The proposed storm surge barrier within Resilience Provisions West will also cross over the 12″ cast iron cement-lined (CICL) water main within Commercial Street. No further modification of that utility infrastructure is anticipated.

5.4 STORMWATER SYSTEM

5.4.1 EXISTING STORM DRAIN SYSTEM

The existing stormwater infrastructure within the Project Site currently consists of a catch basin collection network along Commercial Street, Market Street, Behen Street, Beacham Street, and Justin Drive. The stormwater network contains a series of manholes and pipes within the public rights-of-way of Market, Behen, and Beacham streets contributing to stormwater outfalls along the existing IER shoreline. Drainage infrastructure is also provided along Commercial Street, consisting of catch basins, manholes, and piping. Stormwater utilities were installed by private entities but are currently maintained by the City of Everett and various private property owners along the Commercial Street corridor. Within the City of Chelsea, the public stormwater network similarly consists of a series of catch basins, manholes, and pipes within the public right-of-way in Beacham Street. Record plans also indicate that the Justin Drive right-of-way contains at least a 12″ stormwater pipe, manholes, and catch basins servicing the properties along this street. The roadway and utility improvements along Beacham Street and Williams Street of Chelsea included improvements to the stormwater system as well. The drainage within this area conveys stormwater to a series of existing outfalls at IER and Mystic River. Near the intersection of Beacham and Market Street, the Beacham Street drainage system and Market Street culvert outfall into the IER, among other drainage outfalls. The Beacham Street Drainage is an 8′-6″ x 6′-1″ corrugated metal pipe within Beacham Street, and the Market Street Culvert is a 15′-6″ x 9′-5″ corrugated metal pipe within Market Street. The two systems align in parallel through the #357 Beacham Street property to IER. Figure 5-3, Existing Stormwater Infrastructure Exhibit shows record stormwater utility lines near the Project Site.

5.4.2 PROPOSED STORM DRAIN SYSTEM MODIFICATIONS

The Project Site and surrounding area will not be negatively impacted by the Project, as impacted areas will be replaced such that there is less impervious area in the final condition than currently exists on site, and all areas will be re-graded to promote drainage to existing drainage structures or to new structures if required. Storm drain system modifications are limited to isolated areas where existing drainage patterns will be interrupted by the construction of the storm surge barrier system. Minor relocation of existing catch basins and installation of trench drain systems will ensure that no stormwater runoff unintentionally ponds behind the flood barrier. All existing stormwater management systems on-site will be maintained during the project construction. The Project intends to install backflow preventers on the existing stormwater pipes that the barrier crosses over to prevent flood water from surcharging inland of the barrier.

5.4.3 COMPLIANCE WITH DEP STORMWATER STANDARDS

The following section described Project compliance with DEP Stormwater Standards, as outlined in the Wetlands Regulations:

Standard 1: *No new stormwater conveyances may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.*

Compliance: The Project will fully comply with this Standard. There will be no new untreated stormwater discharges associated with the Project and construction will not cause erosion in any wetlands or waters of the Commonwealth.

Project construction will strictly adhere to a Stormwater Pollution Prevention Plan (SWPPP) to prevent construction period erosion and sedimentation from entering the abutting storm drainage system.

Standard 2: *Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.*

Compliance: The Project will decrease impervious surface cover over the Project Site and will comply with Standard 2. The post-development peak discharge rate will be less than the pre-development discharge rate for the impacted area as it will be largely restored in-kind, except where new pervious cover is established to promote groundwater recharge. Additionally, the Project discharges to Land Subject to Coastal Storm Flowage where this standard may be waived.

Standard 3: *Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required volume as determined in accordance with the Massachusetts Stormwater Handbook.*

Compliance: The Project will decrease impervious surface cover over the Project Site and will comply with Standard 3. The Proponents will construct new pervious vegetated spaces throughout the Project Site to promote groundwater recharge.

Standard 4: *Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This standard is met when:*

(a) Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;
(b) Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and
(c) Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

Compliance: The Project is considered a redevelopment project and includes stormwater Best Management Practices (BMPs) suited to the site conditions that will achieve TSS removal to the maximum extent practicable. A Long-Term Pollution Prevention Plan will be used to promote appropriate operation and maintenance (O&M) of the Project BMPs going forward.

Standard 5: *For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, ss 26-53, and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.*

Compliance: The Project is not considered a land use with higher pollutant load (LUHPPL). Standard 5 is not applicable to this project.

Standard 6: *Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "storm water discharge" as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314*

CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.

Compliance: The Project is not located within the Zone II or Interim Wellhead Protection Area of a public water supply; is not within or near any other critical area and will not discharge stormwater to an Outstanding Resource Water, Special Resource Water, or to a Zone I or Zone A of a public water supply.

Standard 7: *A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.*

Compliance: The Project is a redevelopment of a previously developed site and will comply with the Stormwater Management Standards to the maximum extent practicable.

Standard 8: *A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.*

Compliance: Erosion and sediment controls are included in the permit plans, and the Contractor will be responsible for implementation and maintenance of all erosion control measures for the duration of construction.

Standard 9: *A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.*

Compliance: A Long Term Operation and Maintenance Plan will be implemented for the Project.

Standard 10: *All illicit discharges to the stormwater management system are prohibited.*

Compliance: The Project will not have any illicit discharges. An Illicit Discharge Compliance Certification will be prepared and included with Notice of Intent (NOI) permit filings to the Chelsea and Everett Conservation Commissions.

5.5 OTHER UTILITIES

The Proponents researched and compiled documentation on various other utility infrastructure in the Project Site and surrounding area to assess any potential conflicts or impacts from the construction of the Project. Utility research identified high pressure natural gas, overhead telecommunication, and overhead electrical utility infrastructure in the area in addition to the existing municipal public utilities including stormwater, water, and wastewater facilities. The Proponents will continue to work with utility providers and their private customers within the Project Site to coordinate construction of the Project.

5.6 PROJECT CONSTRUCTION CONSIDERATIONS

5.6.1 DREDGING DISPOSAL CONSIDERATIONS

Dredge material sampling has occurred at within and next to the Project Site as part of previous dredging activities. In 2005, KHB Venture, LLC and their representatives prepared a Release Abatement Measure (RAM) Plan that was submitted to MassDEP to support their construction of a Confined Disposal Facility along the IER adjacent to 155 Market Street and 95 Behen Street properties. Based upon the legacy of the Former Coal Tar Processing Facility (FCTPF) in Everett's adjacent industrial district, it was necessary for KHB Venture, LLC and their representatives to dredge more than 72,000 cubic yards of IER sediment containing polycyclic aromatic hydrocarbons (PAHs). Existing sediments within the CDF limits are now contained within a shoreline barrier wall to mitigate potential discharges from the upland into the IER. Another 20,000 cubic yards of dredged sediment was transported to an approved off-site disposal facility as part of this work. See Appendix H, 2005 Sediment Sampling Information.

Additional samples will be collected, and dredge material will be tested before dredging commences at the Project Site in compliance with state and federal regulations. The anticipated sampling locations are representative of the prior dredged areas and are expected to have results similar to those analyzed for disposal at the CDF. A new Sampling Analysis Plan ("SAP") is being developed with key stakeholders, including KHB Venture, LLC, and will be submitted to state and federal regulators for continued review and approval.

5.6.2 SHORT-TERM CONSTRUCTION IMPACTS

The Project construction may affect existing street operations on a temporary basis. Barricades and security fencing will be used to isolate the Project Site construction areas from private property operations and surrounding streets. The General Contractor will coordinate with the Cities of Chelsea and Everett, all pertinent regulatory agencies, and property owner and operators in the surrounding

neighborhoods to ensure they are informed of any changes in construction activities and schedule. Details of the overall construction schedule, working hours, number of construction workers, worker transportation and parking, number of construction vehicles, and routes will be addressed in detail in a Construction Management Plan ("CMP") to be prepared on behalf of the Proponents. The CMP will also address the need for pedestrian detours, lanes closures, and/or parking restrictions, if necessary, to accommodate a safe and secure work zone. As the Project Site is surrounded by a heavily industrialized area with significant existing tractor trailer truck traffic, it is not anticipated that the Project will have a meaningful impact on existing traffic patterns or volumes.

Construction access will be provided from Market and Beacham Streets through private properties to access Project Site. The General Contractor will establish erosion and sedimentation control devices around the work area and begin to remove existing asphalt pavement and concrete ground cover surfaces. Following demolition of existing impervious surfaces in the work area, deep foundation pile materials be delivered to the site by trailer trucks.

After pile operations, the Project will begin constructing the storm surge barrier and associated storm surge control facility. Based on preliminary earthwork and pile estimates and the projected length of construction, the Project is expected to generate approximately 4,400 total truck trips, or 8 average daily truck trips, for construction vehicles hauling backfill and excavated material to/from the Project Site. This estimate is based on approximately 30 months of construction and does not include excavation/hauling of materials such as concrete, asphalt, and structures. The proposed construction vehicle routes are anticipated to be from Route 99/Alford Street to Beacham Street from the north and from Route 1 to Williams/Beacham Street to the south. Final truck routes will be coordinated with City traffic/transportation staff members and will be presented in the CMP. Specific truck deliveries and routes will be confirmed in the CMP. Construction of the Project will have expected days where there will be larger volumes of traffic entering and exiting the Project Site. During these times, a police detail will be stationed to ensure public safety.

Measures will be employed during construction to minimize the impact of construction workers on the transportation network. These measures will be incorporated into the CMP for the Project prior to commencement of construction activities. Mitigation measures include:

1. No personal vehicles will be allowed to park at the Project Site.
2. Jobsite personnel will be encouraged to utilize public transportation to the extent feasible.
3. Lock-up facilities for work tools will be provided to make public transportation more convenient and desirable for workers.

4. Terms and conditions related to workforce parking and public transportation use will be written into each subcontract.

The construction workforce will arrive prior to AM peak traffic period and depart prior to the PM peak period, so these trips are not expected to have an appreciable impact on the transportation system. Should some workers choose to drive to the site, there is limited available street parking on Market Street. Contractors will need to identify and secure offsite parking for workers. As a result of all these transportations measures and options, little automobile traffic is expected to be generated by this Project.

5.6.3 GREENHOUSE GAS EMISSIONS

During construction, greenhouse gas ("GHG") emissions will be limited to the mobilization, hauling, excavation/fill, and other mechanical activities by the General Contractor's equipment. These mechanical activities will result in GHG emissions due to the burning of fossil fuels but will be mitigated through the construction work force using public transportation and other non-vehicular modes of transportation to the work site.

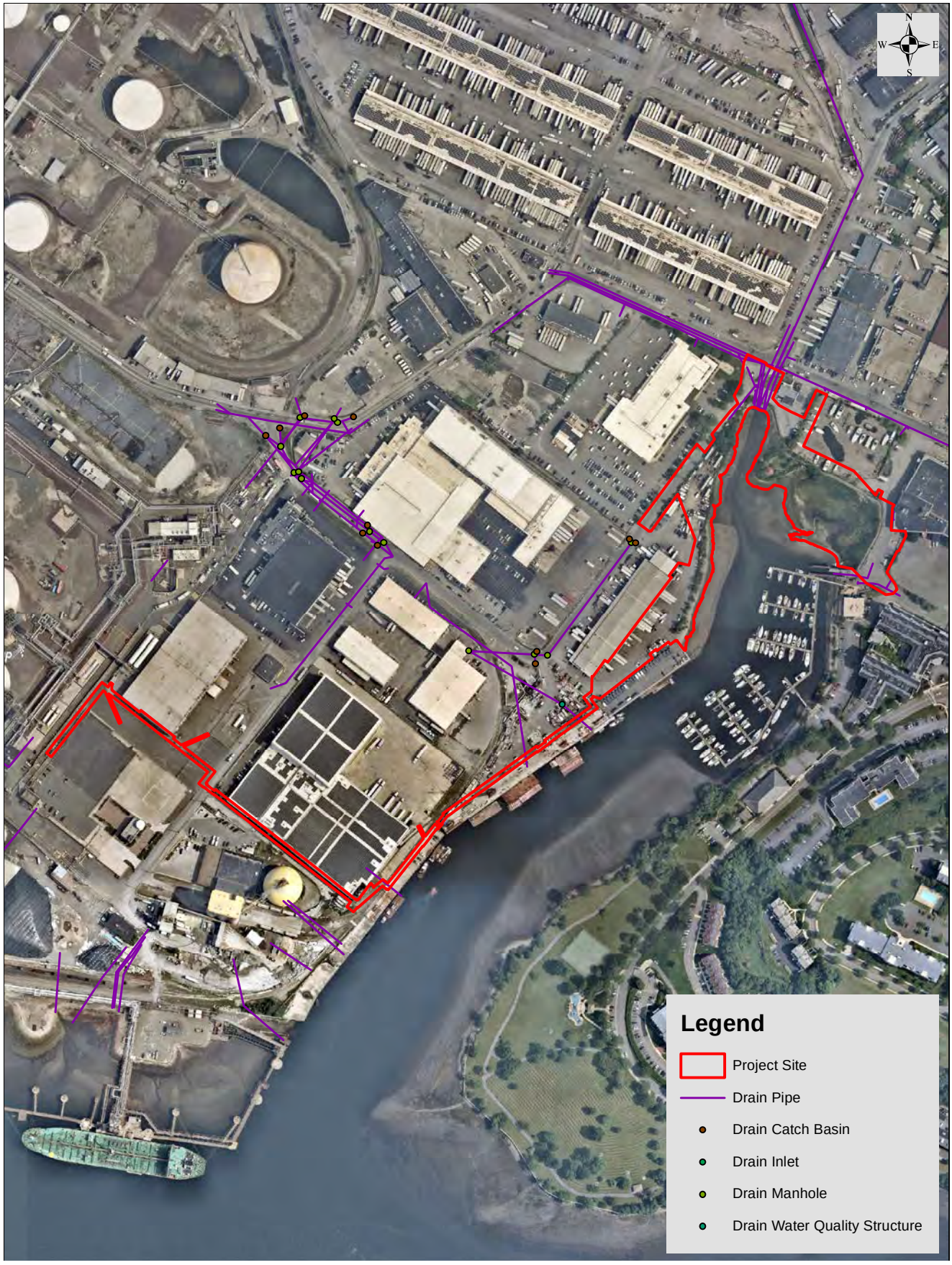
Once the Project is constructed, GHG emissions from the Project will be minimal day-to-day. The Project Site will have GHG emissions stemming from the operations of periodic events held around the Island End Park and typical maintenance visits on a seasonal/post-event basis. These day-to-day emissions will be mitigated by the extensive planting schedule proposed at the Project as well as environmentally conscious transportation methods, including pedestrian and bicycle transportation, for park visitors to the Project Site along the newly constructed multi-use pathway along the Beacham/Williams Street corridor. These non-vehicular modes of transportation will reduce the number of personal vehicles needed to transport visitors and thus limit the burning of fossil fuels. The additional plantings and increase in net pervious area on-site will help capture and store carbon dioxide and other GHG and mitigate event emissions.

Chelsea, MA
Everett, MA

Figure 5-1
Existing Wastewater Infrastructure Exhibit
Source: Fort Point Associates, Inc., 2023

Chelsea, MA
Everett, MA

Figure 5-2
Existing Water Infrastrcuture Exhibit
Source: Fort Point Associates, Inc., 2023



Chelsea, MA
Everett, MA

Figure 5-3
Existing Stormwater Infrastructure Exhibit
Source: Fort Point Associates, Inc., 2023

Chapter 6

FLOOD RESILIENCY

CHAPTER 6: FLOOD RESILIENCY

6.1 INTRODUCTION

The Cities of Chelsea and Everett (the "Proponents") propose to construct a coastal storm surge barrier, storm surge control facility, nature-based solutions along the riverfront, and related amenities at the Island End River ("IER") in the Cities of Chelsea and Everett (the "Project Site"). The approximately 9.5-acre Project Site is currently composed of a mix of commercial and industrial uses and supporting roadway and utility infrastructure. The existing banks of the river are highly degraded by legacy industrial uses and are comprised of hardened slope stabilization measures and littered with debris. The proposed IER Flood Resilience Project (the "Project") will construct an approximately 4,640 linear foot ("lf") storm surge barrier, an approximately 2,900 square foot ("sf") underground storm surge control facility, approximately 50,000 square feet of nature-based solutions along the riverfront, and associated wetland and public access improvements along the IER.

The most significant climate hazard affecting Everett and Chelsea in the project area is sea level rise and coastal storm surge. This area chronically floods during extreme tide events and experienced damaging coastal flooding during the 1% coastal Nor'easters in January and March 2018. The Proponents utilized the Massachusetts Coastal Flood Risk Model (MC-FRM), to assess the current and projected coastal flood risk at IER and to evaluate the effectiveness of proposed flood protection interventions. The MC-FRM has been adopted by the State's Resilient Massachusetts Action Team (RMAT) for use by all state agencies as part of their Climate Resilience Design Standards and Guidelines, which help coastal communities prioritize adaptation investments over time using a strategic risk-based framework.

This chapter provides coastal flood hazard data for the IER derived from the MC-FRM as recommended in the State's RMAT Tool, as well as additional location-specific wave modeling work, including:

- Coastal flood maps for IER and surrounding area showing the extent, probability, and 1% annual chance depth of flooding in the present, 2030, 2050, and 2070 time horizons.
- Tidal benchmark elevations (MLLW, MLW, MTL, MHW, and MHHW) for the 2030, 2050, and 2070 time horizons.
- Tidal benchmark map for IER and surrounding area showing the location of the mean higher high water (MHHW) line in the present, 2030, 2050, and 2070 time horizons.
- Probability of exceedance stillwater surface elevations across a distribution of return periods for the present, 2030, 2050, and 2070 time horizons.
- Design flood elevations for the IER Flood Resilience barrier in the 2050 and 2070 time horizons, at the 1% annual probability of exceedance including wave heights.

- Wave loads and forces for the 2050 and 2070 time horizons to inform structural feasibility analysis of potential coastal flood protection measures.

In addition to coastal flood modeling, the Proponents evaluated the intersection of overland coastal flooding and stormwater sewer flooding in the tributary area to the IER. The Proponents engaged with a stormwater modeler to generate a 2D hydrologic and hydraulic (H&H) stormwater model that used inputs from MC-FRM outputs to evaluate the stormwater drainage network using Infoworks integrated catchment model (ICM) software. Proposed system conditions were evaluated with construction of flood barrier system and a surge control structure on the Market Street culvert and Beacham Street drainage system to determine if future stormwater pumping or storage infrastructure will be necessary to protect Chelsea and Everett from inland stormwater flooding impacts in the future.

6.2 EXISTING FLOOD IMPACTS

The Project Site and surrounding area, anchored by the Beacham Street corridor, were constructed on top of former tidal flats and marshes. The river and surrounding tidal flats were gradually filled for development starting in the late 1800s and accelerating through the 1960s, facilitating the introduction of the New England Produce Center. The Project Site and surrounding area are inherently vulnerable to coastal flooding because of the area's topography and hydrology. Low-lying areas along the Island End River's original pathway experience frequent coastal and stormwater flooding, and the area's vulnerability to climate change was magnified by recent storms that occurred during the winter storms of 2015 and a string of nor'easters in 2018. The flooding problem in the area will continue to worsen with rising sea levels and increasing storm severity.

The 1% (or 100-year) coastal storm event in 2050 will push saltwater flooding north of Route 16/Revere Beach Parkway in Chelsea and Everett and will extend west to Route 99/Broadway in Everett and to Route 1 in Chelsea. By 2070, the area surrounding the Amelia Earhart Dam ("AED") also becomes a regional flood pathway will floodwater flanking the AED and connecting to the projected IER floodplain. In 2050, these projected coastal flood depths will exceed 3 feet in depth in Everett and 5 feet in depth in Chelsea. By 2070, projected coastal flood depths will become catastrophic with floodwaters exceeding 5 feet in depth in Everett and reaching up to 10 feet in depth in Chelsea. Projected coastal flood maps for IER and surrounding area showing the extent, probability, and 1% annual chance depth of flooding in the present, 2030, 2050, and 2070 time horizons are included in Appendix E.

According to a 2017 report titled "Designing Coastal Community Infrastructure for Climate Change," more than 35,000 residents and 16,000 jobs will be impacted by future flooding from IER. Businesses in this area are served by the Beacham/Williams Corridor, a federally designated Critical Urban Freight Corridor linking East Boston, Chelsea, and Everett to the interstate highway system while acting as a principal evacuation route. Already, principal arteries such as Beacham Street and Williams Street have exhibited signs of deterioration due

to coastal flooding. Furthermore, the MBTA's Newburyport/Rockport commuter rail line, where CSX and Pan Am also provide freight rail service to industrial customers, parallels Beacham Street to the north. See Figure 6-1, Critical Facilities and Infrastructure within Projected 2070 Floodplain.

The public relies on other critical infrastructure, some seemingly invisible, scattered throughout the project area. This infrastructure includes Chelsea High School and Williams Middle School, Chelsea's sole middle and high schools, which dually function as emergency shelters. The Carter Street stormwater pumping station, responsible for managing storm water runoff from a 120-acre catchment area in Chelsea and Everett, is situated within the flood zone. This pumping station interconnects to the Market Street Culvert, a large diameter storm water culvert spanning Market Street in Chelsea and Everett. Combined, this culvert shoulders storm water from over 550 acres in Chelsea and Everett. Other critical infrastructure warranting action includes Chelsea's DPW facility, the Massachusetts Information Technology Center (the state's computing and data storage center), the FBI's regional headquarters, and Massachusetts General Hospital's Chelsea Health Center. See Figure 6-1, Critical Facilities and Infrastructure within Projected 2070 Floodplain.

The project area supports the backbone of New England's fresh produce system, the Chelsea/Everett food cluster. In total, the food cluster in this area generates $2.3 billion in annual economic activity. The food cluster sustains approximately 11,000 indirect jobs and 3,000 direct jobs according to MA Office of Labor and Workforce Development's 2018 Local Labor Market Statistics. Based on the MAPC's 2017 study, jobs are held by a range of employees, including local Chelsea/Everett residents, as well as residents of Boston and other areas of the Commonwealth. The most prominent employer in the food sector is the New England Produce Center (NEPC). Due to the geographic concentration of food sector industries, IER flood events can severely impact the region's food supply chain, which would result in an increase of food prices and potential food scarcity. Damage to these facilities would also have cascading impacts on food availability throughout the region.

In Everett, critical infrastructure includes a USPS federal postal facility and multiple produce distribution facilities. Other infrastructure includes online retail distribution centers, a regional craft guild beer distribution center, and access networks for metal recycling, cement, salt, sand/gravel, and other heavy industrial materials distribution/handling facilities along the Mystic River. See Figure 6-1, Critical Facilities and Infrastructure within Projected 2070 Floodplain.

In 2022, the Proponents commissioned a Benefit-Cost Analysis (BCA) to support the preparation of a 2022 FEMA Building Resilient Infrastructure & Communities (BRIC) grant. A BCA is a "method that determines the future risk reduction benefits of a hazard mitigation project and compares its benefits to its cost". A BCA generates a resulting Benefit-Cost Ratio (BCR) and a project is considered cost-effective by FEMA when the Project's BCR is 1.0 or greater. The Benefits (B) of the Project were estimated at over $3.6 billion dollars in protection

of high risk assets within the Project Site and surrounding area. The resulting BCR exceeded 38.0, which highlights the importance and value of the Project.

6.3 PROJECT DESIGN PARAMETERS

6.3.1 INTRODUCTIONS

This section outlines the approach, including review of state-recommended design standards such as the Resilient MA Action Team (RMAT) Climate Resilience Design Standards, to the design of the Project. Due to the unique nature of coastal land uses in the Project Site, the Proponents engaged additional MC-FRM modeling to evaluate a variety of categories of wave types to inform the design of the Project. The MC-FRM model was also used to evaluate the projected tidal benchmarks to inform design of wetlands enhancements and coastal open space.

6.3.2 RESILIENT MA ACTION TEAM CLIMATE RESILIENCE DESIGN STANDARDS TOOL OUTPUTS

As required by the Massachusetts Executive Office of Energy & Environmental Affairs (EEA) Municipal Vulnerability Preparedness (MVP) grant program, the Project was entered into the RMAT Climate Resilience Design Standards Tool ("Tool"). The beta Climate Resilience Design Standards Tool provides:

- *a preliminary climate change exposure and risk rating;*
- *recommended climate resilience design standards for projects with physical assets; and;*
- *guidelines with best practices to support implementation.*

Assets within the IER corridor, including the proposed flood barrier system, were entered into the Tool to generate climate resilience recommendations. The Tool output is summarized below and included in full in Appendix F.

Table 6-1 RMAT Climate Resilience Design Standards Tool Outputs

Target Planning Horizon – 2070
Intermediate Planning Horizon – 2050
Return Period – 200-year (0.5%)

Projected Tidal Datums -

Climate Horizon	Tidal Benchmarks (feet, NAVD88)				
	MHHW	MHW	MTL	MLW	MLLW
2050	7.8	7.5	2.5	-2.4	-2.7
2070	9.8	9.4	4.3	-0.8	-1.1

Projected Water Surface Elevation –

Climate Horizon	Water Surface Elevation (feet, NAVD88)		
	Maximum	Minimum	Weighted Average
2050	12.7	12.2	12.2
2070	14.3	14	14

Projected Wave Action Water Elevation –

Climate Horizon	Wave Action Elevation (feet, NAVD88)		
	Maximum	Minimum	Weighted Average
2050	15.8	12.2	13.3
2070	17.4	14	15.2

Projected Wave Height –

Climate Horizon	Wave Height (feet)		
	Maximum	Minimum	Weighted Average
2050	4.5	0	1.7
2070	4.5	0	1.9

Per the RMAT Tool outputs, the Project Site should also prepare for 9.7 inches of precipitation in the 50-year (2%) return period and high heat risk in 2070.

6.3.3 DESIGN FLOOD ELEVATIONS FROM MC-FRM

The design team reviewed the RMAT Tool outputs and compared these recommendations to existing topography and operations within the Project Site and surrounding area. Overall, the Project can protect over 500 acres of densely developed urban neighborhoods in Chelsea and Everett to the projected 2070 1% coastal storm still water elevation at minimum. As the Project spans a large area of coastline and inland spaces, more specific wave impact data along specific points of the flood barrier alignment at Market Street Culvert, at dock of #95 Behen Street, and inland at Commercial Street was needed to evaluate the appropriate design flood elevation (DFE) as shown in Table 6-2, 2050 1% Return Period Design Flood Elevations from MC-FRM and Table 6-3, 2070 1% Return Period Design Flood

Elevations from MC-FRM. DFEs from still water elevations, as well as two categories of ocean wave data were prepared for consideration. An H_{max} wave indicates the maximum height of wave associated with the modeled coastal storm event. A H_{sig} wave indicates the average height of the top third of waves associated with the modeled coastal storm event.

Table 6-2 2050 1% Return Period Design Flood Elevations from MC-FRM

Location	2050 1% Return Period		
	Still water (ft, NAVD88)	DFE (H_{sig}) (ft, NAVD88)	DFE (H_{max}) (ft, NAVD88)
Market St Culvert	11.7	12.6	13.2
#95 Behen Street	12.3	13.6	14.6
Commercial St.	Dry	Dry	Dry

Table 6-3 2070 1% Return Period Design Flood Elevations from MC-FRM

Location	2070 1% Return Period		
	Still water (ft, NAVD88)	DFE (H_{sig}) (ft, NAVD88)	DFE (H_{max}) (ft, NAVD88)
Market St Culvert	13.6	14.5	15.1
#95 Behen Street	13.6	14.9	15.9
Commercial St.	13.6	14.0	14.4

After discussions with property owners and design consultants, the Proponents elected to proceed with the following DFEs by location as shown in Table 6-4, Project Design Flood Elevations by Location.

Table 6-4 Project Design Flood Elevations by Location

Location/Project Element	Project Design Flood Elevation (ft, NAVD88)
Market St Culvert/ Resilience Provisions East	14.0 (protection to stillwater elevation)
#95 Behen Street/ Resilience Provisions West	15.0 (protection to H_{sig} elevation)
Commercial St./ Resilience Provisions West	14.0 (protection to H_{sig} elevation)

A DFE of 14.0 NAVD88 was selected for Resilience Provisions East based upon adjacent low-lying topography, lower risk of wave impacts, and a desire to maintain accessible public access to Island End Park from Beacham Street. In the future, it will be possible to achieve up to a DFE of 15.0 NAVD88 in this location through incremental adaptation design strategies such as implementing stop log flood protection products on the riverwalk structure over time. Properties along the Everett IER waterfront are higher in elevation and can accommodate the higher DFE of 15.0 to address waves associated with the top third (H_{sig}) wave heights. A DFE that varies

from 14.0 NAVD88 inland at Commercial Street to 15.0 NAVD88 at the coastline was selected for Resilience Provisions West where existing topography is higher, and impact of wave action is more severe. Existing grades in the project area range from elevation 8-10 feet NAVD88, meaning the barrier will range from 3-7 feet above existing grades to protect to between elevation 14-15 NAVD88.

6.3.4 TIDAL BENCHMARKS FROM MC-FRM

The Proponents also had tidal datum projections evaluated for future conditions at IER. Mean higher high water (MHHW), or the average highest daily tide, is an important benchmark for evaluating potential future exposure to daily flooding from tides only – a significant nuisance to ongoing use. Present and projected future MHHW lines in 2030, 2050, and 2070 were mapped for the project area based on the projected tidal datum elevations. Figure 6-2, Tidal Benchmark MHHW Projections for IER shows the projected tidal datum elevations and MHHW lines. Projected tidal datums are also summarized in Table 6-5, Future Tidal Benchmarks Developed from MC-FRM, below.

Table 6-5 Future Tidal Benchmarks Developed from MC-FRM

Climate Horizon	Tidal Benchmarks (feet, NAVD88)				
	MLLW	MLW	MTL	MHW	MHHW
2030	-3.8	-3.6	1.3	6.2	6.6
2050	-2.7	-2.4	2.5	7.5	7.8
2070	-1.1	-0.8	4.3	9.4	9.8

Tidal benchmark projections were used to inform design of the storm surge facility, wetlands enhancements and coastal open space, particularly planting selections, and consideration to adaptation over time along the coastline.

Coastal storm flowage through the Market Street Culvert, the Beacham Street drainage system, and the connected stormwater system would present through hydraulicly connected manholes, catch basins, and the open-air culvert behind the NEPC. Streets and lots hosting these features hydraulicly connected to culverts vary in elevation approximately 6.0′ to 9.0′. Surcharge of culvert structures and associated systems would quickly fill district low areas such as federally designated Critical Urban Freight Corridor Beacham Street near #359 Beacham Street where roadway gutter is as low as elevation 6.9′. The open-air section of culvert generally has banks to elevation 7.5′ to 9.0′ and would provide a high-capacity avenue for flooding the fresh produce distribution facilities, power industry facilities, regional transit infrastructure, and floodplain civic features beyond via overland flow. Proximate streets such as Second Street, Vale Street, and Eastern Avenue each have low roadway elevations ranging from 4.0′ to 6.0′ and would quickly be subject to flooding via over land flow.

Preliminary evaluation suggests that the coastal water surface elevation that should trigger for storm surge control facility operation should be approximately elevation

7.0' NAVD88, which is the first elevation flood waters will present to grade at the lowest points in system hydraulicly connected to the culvert and drainage systems and which do not contain separate surge control measures. With a trigger level of elevation 7.0' NAVD88, the Storm Surge Control Facility would be operational at projected Mean High Water (MHW) elevations in approximately 2030 and between Mean Tide Level (MTL) and MHW in 2050 and 2070.

6.4 COASTAL FLOOD PERFORMANCE MODELING

6.4.1 INTRODUCTION

The Proponents utilized the MC-FRM to verify the performance and assess potential impacts associated with the Project. In addition to focusing on the overall performance of the Project under both present and future climate change conditions, this evaluation also included influences of the Project on flood extents, flood depths, wave heights and forces and velocities at both the Project Site, and neighboring and adjacent properties. The goal of this hydrodynamic modeling and engineering effort was to gauge the performance of the Project and to determine if there are impacts on neighboring properties under present day and changing climate conditions.

The following section summarizes the results of the performance modeling. This summary includes an analysis of flooding extents and flood depths under a series of future return-period storm events for existing and proposed conditions. This analysis also included assessment of potential velocity changes in the vicinity of the proposed adaptation measures. Influence on waves, wave run-up and overtopping, and wave forces are also provided.

6.4.2 PERFORMANCE MODELING

The MC-FRM is a high-resolution, probabilistic flood risk model created specifically to assess physics-based, coastal forced, flooding conditions under present and future climate conditions for the entire coast of Massachusetts. The model uses a two-way coupled version of the Advanced Circulation (ADCIRC) and Unstructured Simulating Waves Nearshore (UnSWAN) models to fully simulated a variety of storm conditions (e.g., tropical and extra-tropical cyclones, etc.). The MC-FRM incorporates the state standard sea level rise conditions over time as presented by Massachusetts Coastal Zone Management and Resilient MA (https://resilientma.mass.gov/changes/sea-level-rise). Storm intensification due to climate change is also incorporated within the MC-FRM. The model has, and is currently, being used for numerous coastal planning and design projects throughout Massachusetts and is recommended by the Commonwealth of Massachusetts Climate Resilience Design Standards as the basis for resilient coastal design.

The MC-FRM provides a probabilistic distribution of water levels for locations throughout Massachusetts based on thousands of storms. From these thousands of storm events, individual storms corresponding closely to specific return-periods water surface elevations can be selected to evaluate the performance of flood resiliency projects. For this modeling effort, two representative storms, under three different climate horizons were simulated for existing conditions (existing elevations) and proposed conditions (with the Project constructed) within the MC-FRM framework.

The two specific storm return period cases simulated were:

1. A 1% annual exceedance probability (100-year return period) storm event in 2050; and

2. A 1% annual exceedance probability (100-year return period) storm event in 2070.

The peak stillwater levels at the Project Site (associated with these storm events) are listed in Table 6-6, Peak Water Levels Utilized for Performance Modeling.

Table 6-6 Peak Water Levels Utilized for Performance Modeling

Storm Event Case (Annual Exceedance Probability)	Climate Horizon	Stillwater Level (ft, NAVD88)
1%	2050	12.0
1%	2070	13.6

6.4.2.1 RESULTS OF PERFORMANCE MODELING – EXTENT OF FLOODING

Flooding extents within the Project Site and surrounding area were analyzed with and without the Project in place. Figure 6-3, Existing and Proposed Flood Extents during a 1% Annual Exceedance Probability Storm in 2050 and Figure 6-4, Existing and Proposed Flood Extents during a 1% Annual Exceedance Probability Storm in 2070 present the maximum flood extents under existing and proposed conditions for the 1% annual exceedance probability (AEP) storms in 2050 and 2070, respectively. The results indicate that during the 1% storm event in 2050, flooding from the IER pathway is mitigated. Therefore, the storm surge barrier succeeds in a projected 2050 climate condition at intercepting a significant flood pathway for both Chelsea and Everett.

By 2070, the storm surge barrier remains effective at mitigating flooding originating from the IER flood pathway. The total flood extent has been reduced due to the proposed adaptation at the head of the IER due to reduced volume of flood waters entering the area. However, under 2070 1% AEP storm conditions, flood waters do still enter the Chelsea and Everett from other flood pathways, primarily flood waters

from the flanking and overtopping of the AED and other overland pathways in the areas adjacent to the AED.

To ensure that the IER proposed adaptation was performing as expected in a 2070 1% AEP condition, a secondary model simulation was conducted that installed a temporary mitigative measure at all the flood pathways near the AED, and the 2070 1% AEP storm was simulated again. Figure 6-5, Existing and Proposed Flood Extents during a 1% Annual Exceedance Probability Storm in 2070 with AED Project presents the results of this model simulation. These results indicate that the Project will perform well at reducing the flood risk in this area under a 2070 1% AEP conditional storm.

Overall, the Project does mitigate flood risk in the area through the projected 2070 1% AEP level storm event. There is no redirection of flood extent into other areas or neighboring properties caused by the inclusion of the proposed adaptation measures for all cases evaluated.

6.4.2.2 RESULTS OF PERFORMANCE MODELING – DEPTH OF FLOODING

Potential changes to flood depths within the Project Site and on adjacent properties were analyzed with and without the Project in place. Figure 6-6, Existing and Proposed Flood Depths during a 1% Annual Exceedance Probability Storm in 2050 and Figure 6-7, Existing and Proposed Flood Depths during a 1% Annual Exceedance Probability Storm in 2070 present the depth of flooding (in feet) from the 1% AEP storms for 2050 and 2070, respectively. During the 2050 1% AEP event, the Project eliminates flooding from the region landward of the barrier, and as such depths are non-existent for proposed conditions. Additionally, the model results indicate that there is no change in the flood depths on adjacent properties.

Under 2070 1% AEP storm conditions, however, flooding landward of the proposed flood barrier occurs as shown in Figure 6-8, Existing and Proposed Flood Depths during a 1% Annual Exceedance Probability Storm in 2070 with Amelia Earhart Dam Project. However, the source of these flood waters is not the IER, but rather from areas at and around the AED. Figure 6-6 does indicate the reduction of flood depth associated with the flooding throughout Chelsea and Everett resulting from the Project. The Project significantly reduces the flood depths throughout the area by up to 2 to 3 feet throughout the region. As such, the Project is reducing the volume of flood waters entering the area.

All results indicate that there are no increased depths on adjacent areas.

6.4.2.3 RESULTS OF PERFORMANCE MODELING – VELOCITY IMPACTS ON ADJACENT PROPERTIES

As flood waters flow inland and interact with infrastructure (both existing and proposed), various patterns and potential redirection of flow magnitudes and directions can occur. Proposed infrastructure can function as a barrier to flow, which can potentially alter the flow patterns and modify flow velocities in the vicinity of these changes. To assess the impacts of the Project on these overland flow conditions, velocity magnitudes at the peak of the 1% storm events were analyzed under 2050 and 2070 sea level rise conditions, where significant flooding of adjacent properties seaward of the Project exists.

To assess the changes in velocity, proposed flood water velocity magnitudes (maximums) were subtracted from existing conditions flood water velocity magnitudes (maximums) to identify changes in velocity that may occur due to the presence of the proposed adaptation measures. Results from the model are presented in Figure 6-9, Potential Velocity Increases in Floodwater Evaluation Results – 2050 and 2070 for a 1% AEP storm event in 2050 and for a 1% AEP storm in 2070. Overall, the velocity changes throughout the area are mostly minor. However, at one location, there is a velocity increase of approximately 1 ft/s for the proposed conditions compared to existing conditions. This increase in velocity occurs in both the 2050 and 2070 1% AEP events, at the point where Resilience Provisions West turn inland and parallels the #202 Rover Street property, before crossing Commercial Street. The magnitude of the velocity went from approximately 0.2 feet per second in this area under existing conditions to approximately 1.3 feet per second in this area for proposed conditions. These increases are similar in both the 2050 and 2070 1% AEP storm events. At this location there are ephemeral mounds of materials and supplies (e.g., sand, gravel), as well as infrastructure (buildings and storage tanks) located directly adjacent to the adaptation barrier that create a slightly narrower area of flow between the physical barriers (contraction flow) once the barrier is in place. However, this reduction in width is only approximately 10-15 feet (40 feet with to approximately 27 feet width) in this area as there is already an existing building at this location that may already cause flow channelization. While it is unlikely that this magnitude of increase (~1 foot per second) will result in any significant erosion or scour concerns as these velocities occur primarily in impervious areas, this area will be further investigated in a refined modeling effort that will include buildings and other elevational anthropogenic features to identify influences on velocities in this particular area.

6.4.2.4 CONCLUSIONS

Based on the performance modeling results and analysis, key findings include:

- The Project effectively reduces landward flood risk for the 2050 1% AEP coastal storm event. The Project mitigates a key flood pathway originating

from the IER during the 2050 1% storm event, eliminating flooding that occurs during the event for the cities of Chelsea and Everett.

- The Project effectively performs for the 2070 1% AEP coastal storm event; however, to be fully effective, needs to be combined with other flood mitigation solutions at and around the AED. While the Project alone does reduce the flood extent and depths during the 2070 1% AEP coastal storm event, to eliminate flooding, other solutions are required to eliminate secondary flood pathways.

- Model results indicate that the Project is not expected to increase flooding extents or depths at adjacent properties for any of the storm conditions simulated.

- The Project will alter the flow patterns in the vicinity of the barrier system due to the flood waters interacting with the existing infrastructure and barrier system. Modeling results show that this has the potential to have some increase to the velocities along the property line of #202 Rover Street property, as the interaction between the new flood wall and existing topography and infrastructure create a slightly narrower flow channelization. While it is unlikely that this magnitude of increase (~1 foot per second) will result in any significant erosion or scour concerns as these velocities occur primarily in impervious areas, this area will be further investigated in a refined modeling effort that will include buildings and other elevational anthropogenic features to identify influences on velocities in this particular area.

6.5 HYDROLOGIC AND HYDRAULIC (H&H) MODELING

In addition to coastal flood modeling, the Proponents evaluated the intersection of overland coastal flooding and stormwater sewer flooding in the tributary area to the IER. The H&H model uses inputs from MC-FRM outputs to evaluate the stormwater drainage network using Infoworks integrated catchment model (ICM) software. To model coastal inundation, the H&H model uses time series of water surface elevations (WSEs) provided from the MC-FRM and propagated inland via pipes and overland flows using a coastal boundary line within Infoworks ICM. This propagation is performed by Infoworks ICM using 2D Saint-Venant shallow water equations, thus accounting for horizontal mass and momentum (velocity and acceleration) effects. Rainfall events incorporated by this H&H modeling work were based upon specific climate vulnerability work commissioned by the City of Cambridge and shared with the communities of the Mystic River watershed to reflect present and future rainfall design events.

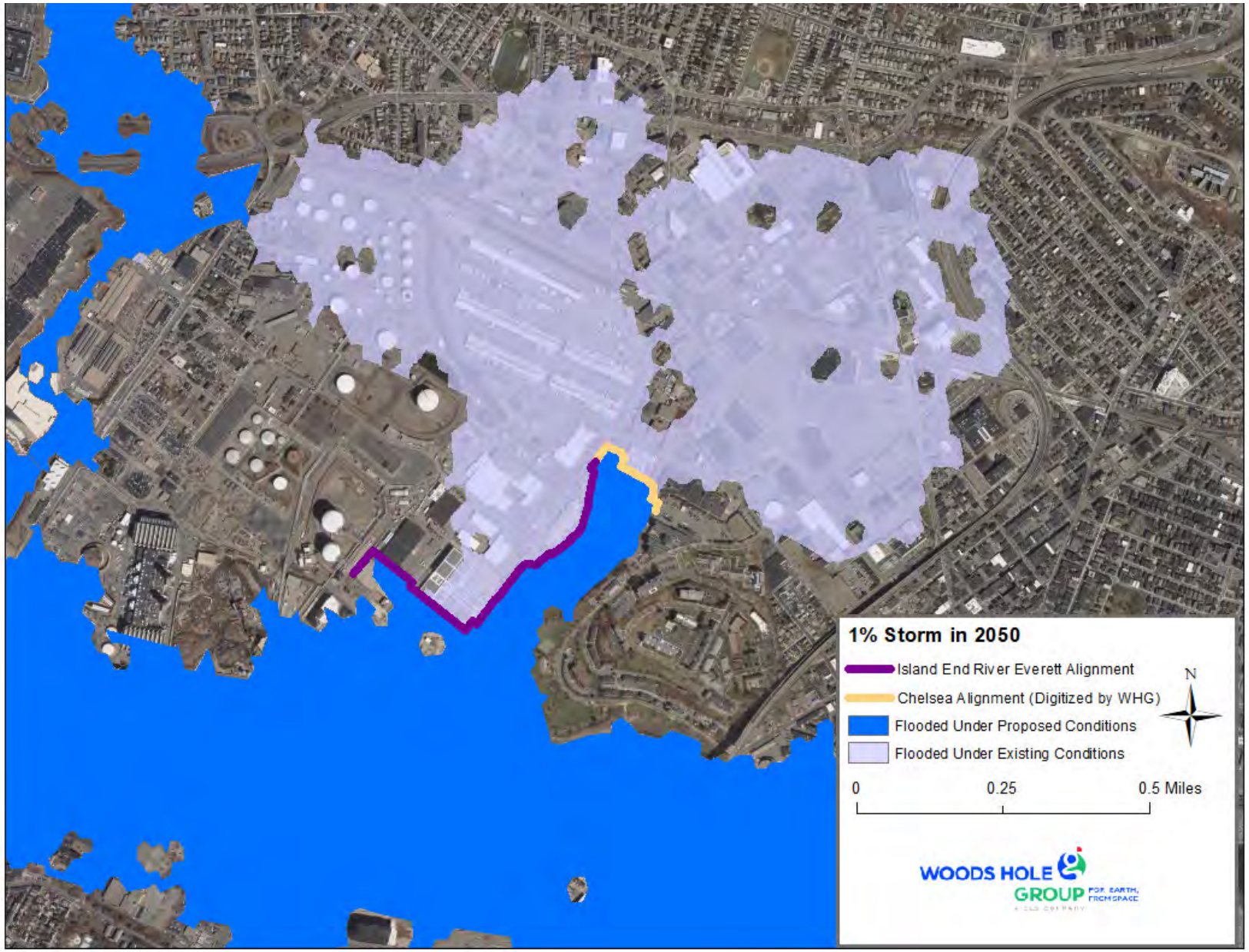
Proposed system conditions were evaluated with construction of a storm surge barrier system and a storm surge control facility on the Market Street and Beacham Street culverts to determine if future pumping or flood storage infrastructure is recommended for continued adaptation in the Project Site and surrounding area. Additionally, the impacts of the existing Carter Street pump station in Chelsea, as well as ongoing upstream stormwater projects by the MBTA and others, were incorporated into this work.

Six scenarios that ranged from present day storm events at normal high tide conditions to projected 2030 storm events at a multitude of tidal conditions and the 1% coastal storm surge conditions were developed for this evaluation. The H&H report highlights the need for a flexible, adaptive solution to upstream watershed management, including the eventual need to combine stormwater pumping and storage options to address stormwater flooding risk in IER and surrounding area. While the Project does not propose the inclusion of stormwater pumping or storage facilities, the Proponents are acutely aware of the need to continue investing in stormwater infrastructure in the area to address this risk.

Chelsea, MA
Everett, MA

Figure 6-1
Critical Facilities and Infrastructure within Projected 2070 Floodplain
Source: Fort Point Associates, Inc., 2022

Figure 6-2
Tidal Benchmark MHHW Projections for IER
Source: Fort Point Associates, Inc., 2022

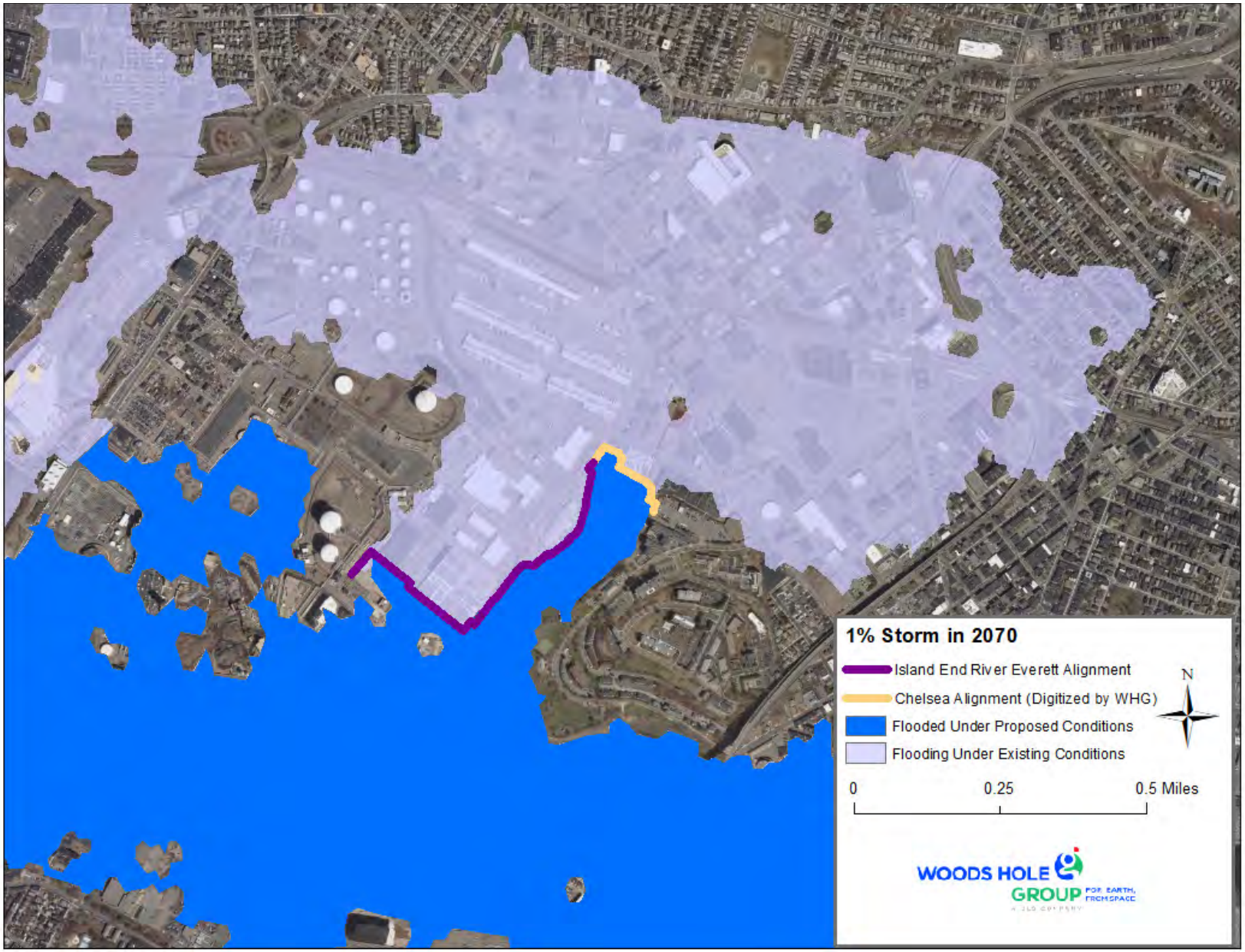


Chelsea, MA
Everett, MA

Figure 6-3
Existing and Proposed Flood Extents during a 1% Annual Exceedance Probability Storm in 2050
Source: Woods Hole Group, 2022

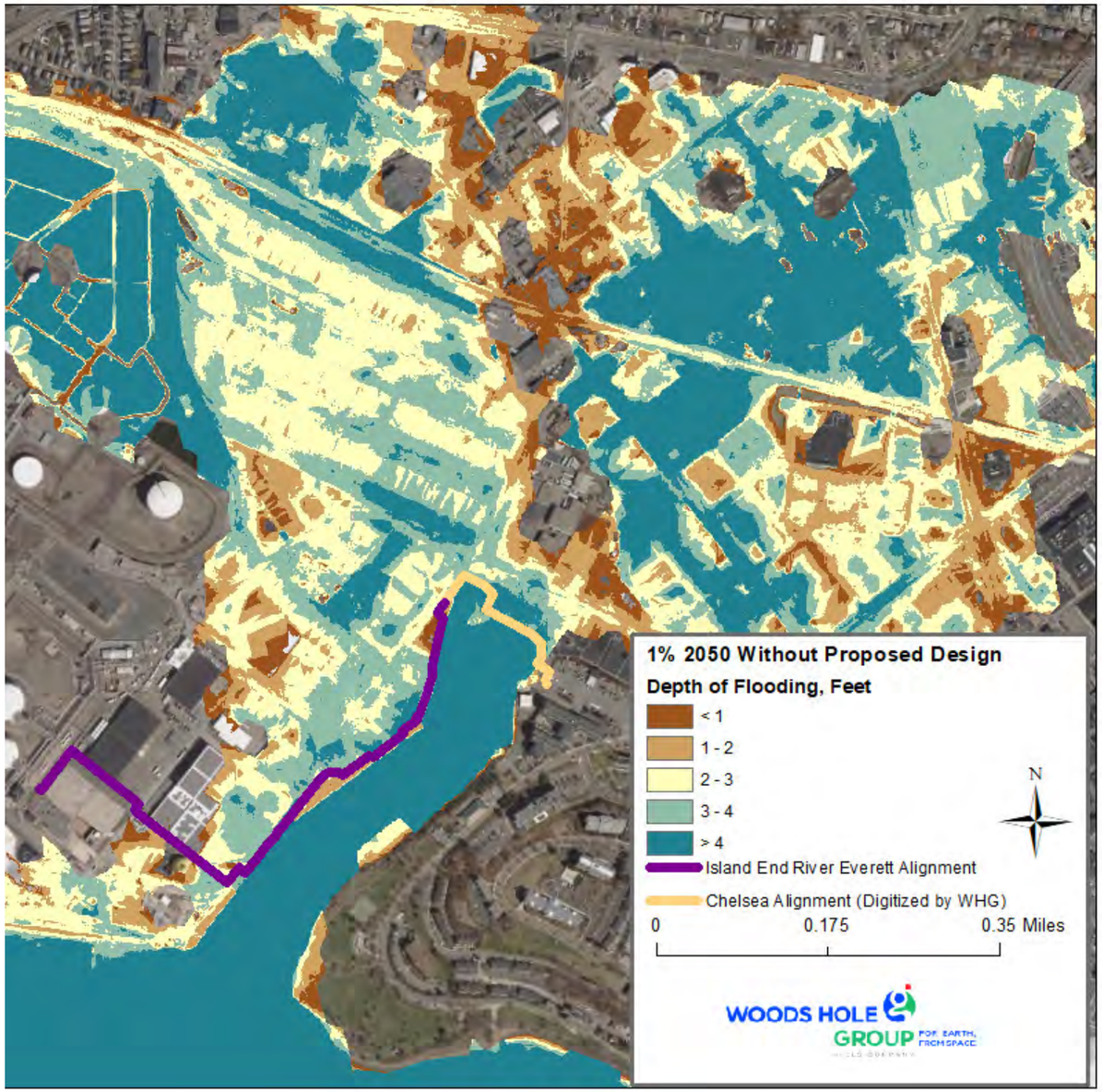
Chelsea, MA
Everett, MA

Figure 6-4
Existing and Proposed Flood Extents during a 1% Annual Exceedance Probability Storm in 2070
Source: Woods Hole Group, 2022



Chelsea, MA
Everett, MA

Figure 6-5
Existing and Proposed Flood Extents during a 1% Annual Exceedance Probability Storm in 2070 with Amelia Earhart Dam Project
Source: Woods Hole Group, 2022



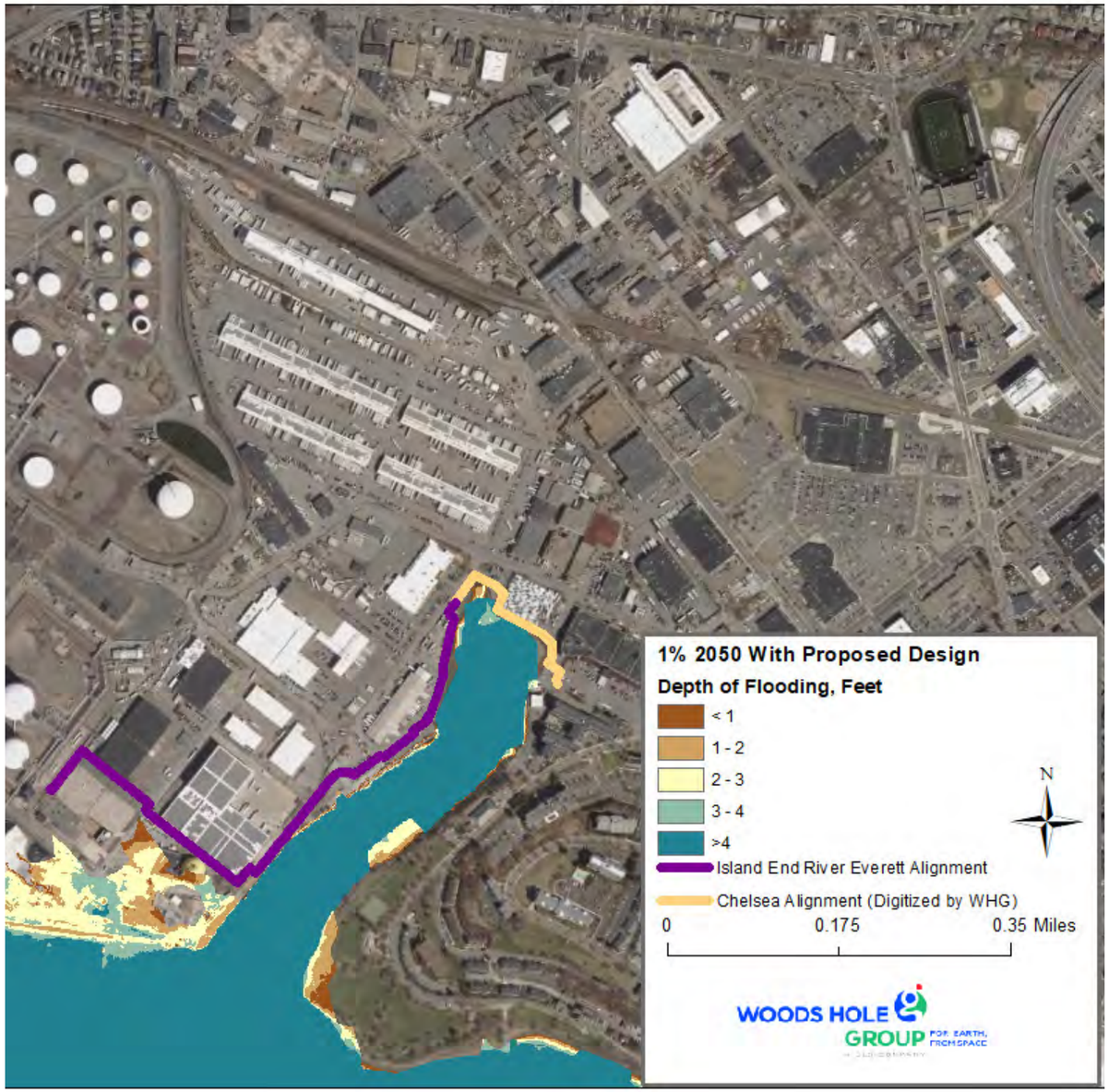
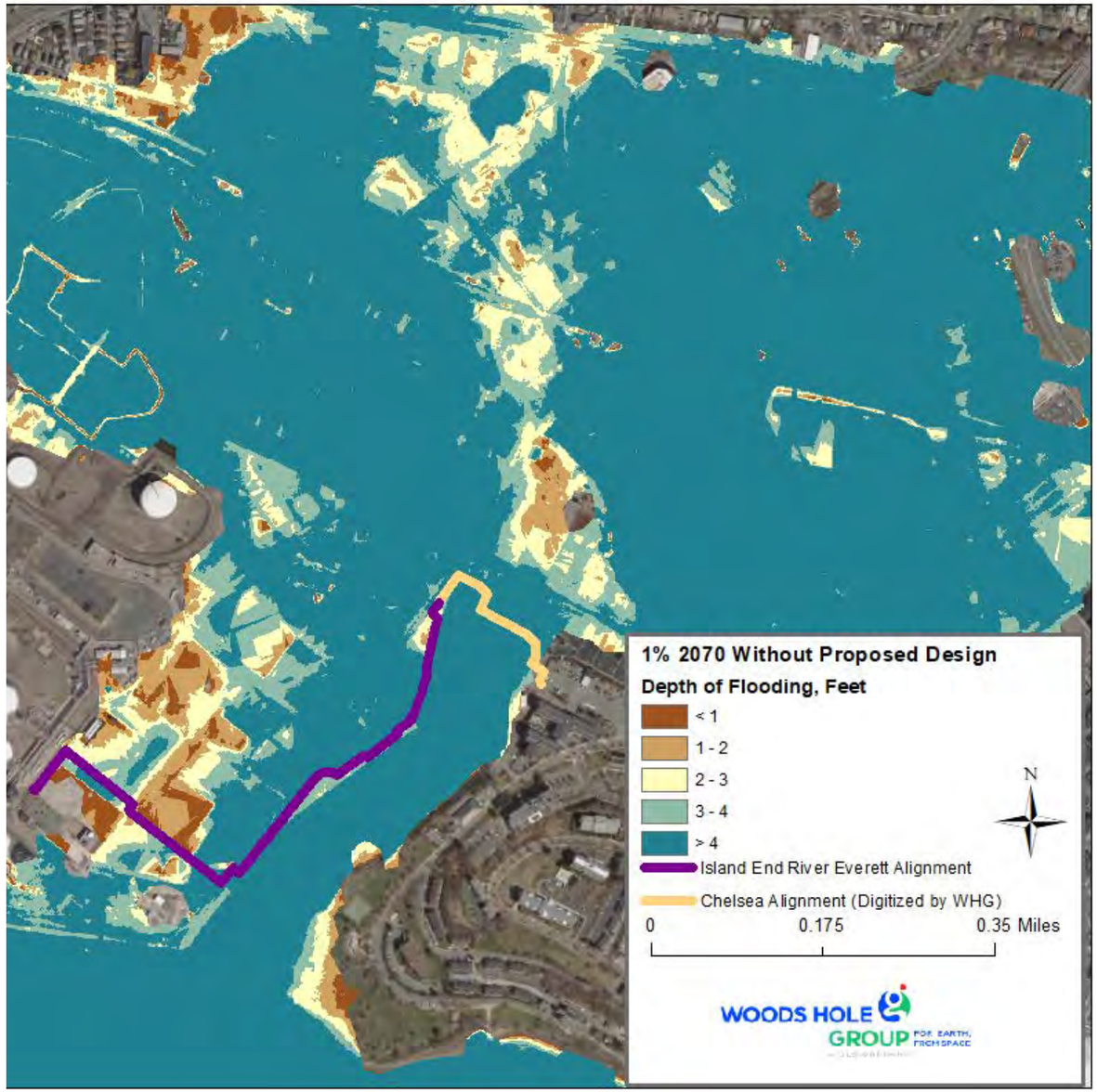


Figure 6-6
Existing and Proposed Flood Depths during a 1% Annual Exceedance Probability Storm in 2050
Source: Woods Hole Group, 2022



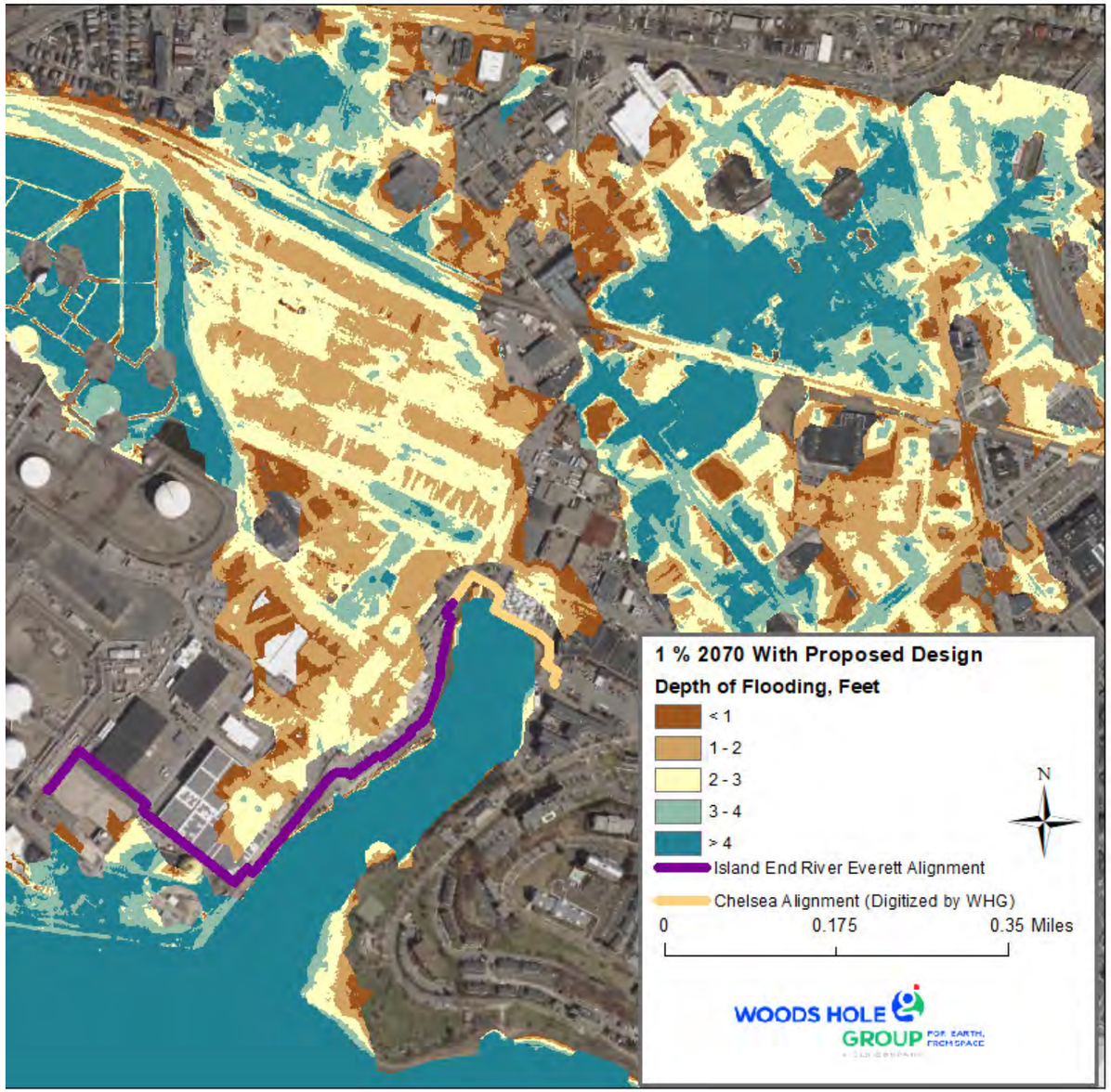


Figure 6-7
Existing and Proposed Flood Depths during a 1% Annual Exceedance Probability Storm in 2070
Source: Woods Hole Group, 2022

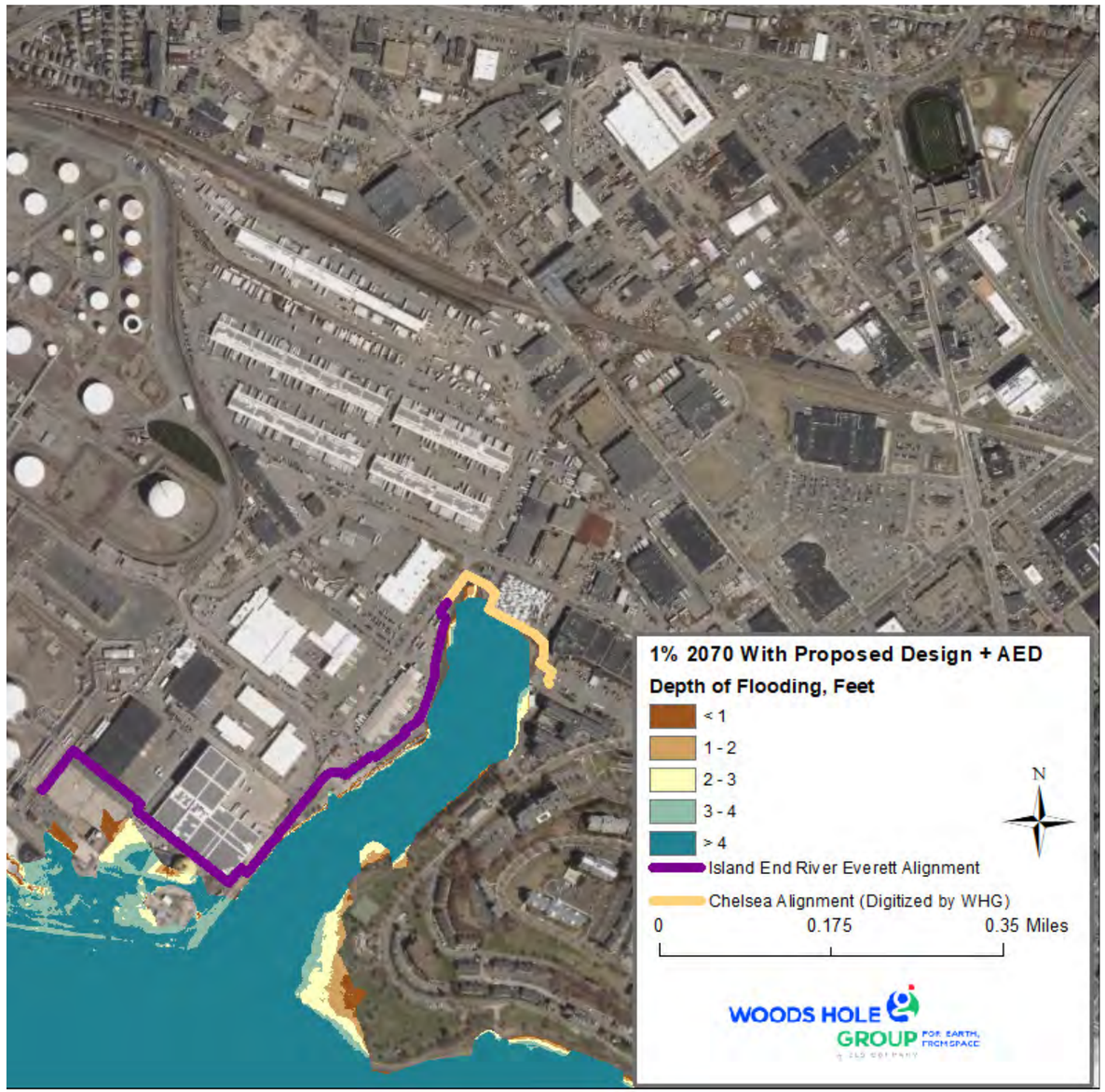


Figure 6-8
Existing and Proposed Flood Depths during a 1% Annual Exceedance Probability Storm in 2070 with Amelia Earhart Dam Project
Source: Woods Hole Group, 2022

Chelsea, MA
Everett, MA

Figure 6-9
Potential Velocity Increases in Floodwater Evaluation Results – 2050 and 2070
Source: Woods Hole Group, 2022

Chapter 7

HISTORIC RESOURCES

CHAPTER 7: HISTORIC RESOURCES

7.1 INTRODUCTION

The Cities of Chelsea and Everett (the "Proponents") propose to construct a coastal storm surge barrier, storm surge control facility, nature-based solutions along the riverfront, and related amenities at the Island End River ("IER") in the Cities of Chelsea and Everett (the "Project Site"). The approximately 9.5-acre Project Site is currently composed of a mix of commercial and industrial uses and supporting roadway and utility infrastructure. The existing banks of the river are highly degraded by legacy industrial uses and are comprised of hardened slope stabilization measures and littered with debris. The proposed IER Flood Resilience Project (the "Project") will construct an approximately 4,640 linear foot ("lf") storm surge barrier, an approximately 2,900 square foot ("sf") underground storm surge control facility, approximately 50,000 square feet of nature-based solutions along the riverfront, and associated wetland and public access improvements along the IER.

An area of potential effect (APE) of one-quarter mile has been analyzed for the purposes of identifying historic resources and assessing potential project-related impacts. A review of the Massachusetts Historical Commission (MHC) inventory revealed two National Register of Historic Places and one inventoried historic property within the APE, all within the City of Chelsea.

7.2 HISTORIC AND ARCHAEOLOGICAL RESOURCES

The Project Site does not contain any known structure, site, or building listed or potentially eligible for listing on the National Register of Historic Places or the State Register of Historic Places. Historic inventory areas and resources within approximately one quarter mile of the study area are described in Table 7-1, Historic Resources in the Area of Potential Effect (APE) and are shown in Figure 7-1, Historic Resources in the Area of Potential Effect (APE). The Project Site is partly within the Naval Hospital, Boston Historic District, a National Register Historic District. The Naval Hospital Historic District (the "District") is approximately 85 acres, extending from the IER east to the Chelsea Bridge and from the Mystic River north to Justin Drive, and is comprised of five buildings built prior to 1858 and the multiple buildings built until 1920.

Table 7-1: Historic Resources in the Area of Potential Effect (APE)

#	Historic Name	Address	Description of Resource	Impact of Project on Resource
CLS.602	Naval Hospital Chapel	#6 Admirals Way	Ineligible due to year of construction	N/A
CLS.586	Boston Naval Hospital – Building 2	#285 Commanders Way	Oldest Naval Hospital in continuous active service in the United States	N/A
CLS.587	Boston Naval Hospital – Building 3	#255 Commanders Way	Oldest Naval Hospital in continuous active service in the United States	N/A
CLS.D	Naval Hospital Boston Historic District	Chelsea	Comprised of 5 buildings erected prior to 1858 and several others prior to 1920	N/A

Source: Massachusetts Cultural Resource Information System (MACRIS), Massachusetts Historical Commission

7.3 HISTORIC RESOURCES ASSESSMENT

Most of the Project is located outside of the District except for the existing wetland resource area and flood protection elements in the eastern part of the Site along Justin Drive. Within in this part of the District, there will be substantial wetland improvements, a new elevated boardwalk, and a new flood wall that will fit into the existing landscape. Much of this part of the District has been altered with several new buildings since it was put on the National Register of Historic Places in 1973, and no additional impacts are expected due to the Project. The Naval Hospital Chapel, which was inventoried and determined ineligible because its construction date (1945) falls outside of the period of significance, is now a two-unit apartment. The naval hospital buildings at #255 and #285 Commanders Way and the Naval Hospital Chapel are not visible from the Project Site.

The remaining portion of the Project in the northern and western parts of IER will include either replacement of existing infrastructure or a flood wall that will fit with the existing industrial character of this area. No additional impacts to the historic resources are expected.

The Project keeps with the industrial character of the area and will not impact the Naval Hospital Historic District or resources. The Project will provide flood protection to the area, increase public access to the waterfront, and improve the natural conditions of the IER.

Chelsea, MA
Everett, MA

Figure 7-1
Historic Resources in Area of Potential Effect (APE)
Source: Fort Point Associates, Inc., 2022