FLOOD RESILIENCE MITIGATION PLANNING & FEASIBILITY FOR PRIVATE PROPERTIES

May 28, 2025

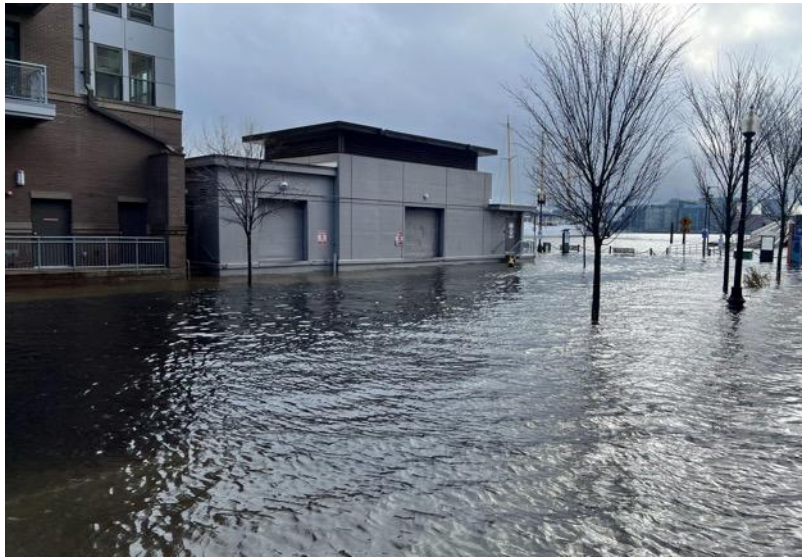
City of Boston
Planning Department

CLIMATE RISK, PLANS & EARLY ACTION

Flooding along Atlantic Avenue in Downtown Boston
(Source: Alison Brizius, January 2024)

Flooding along the Border Street waterfront in East Boston
(Source: Robin Seidel, January 2024)

Flooding beneath the Evelyn Moakley Bridge in South Boston's Fort Point Channel
(Source: Alison Brizius, December 2022)



Flooding along Lewis Mall in East Boston
(Source: Robin Seidel, January 2024)

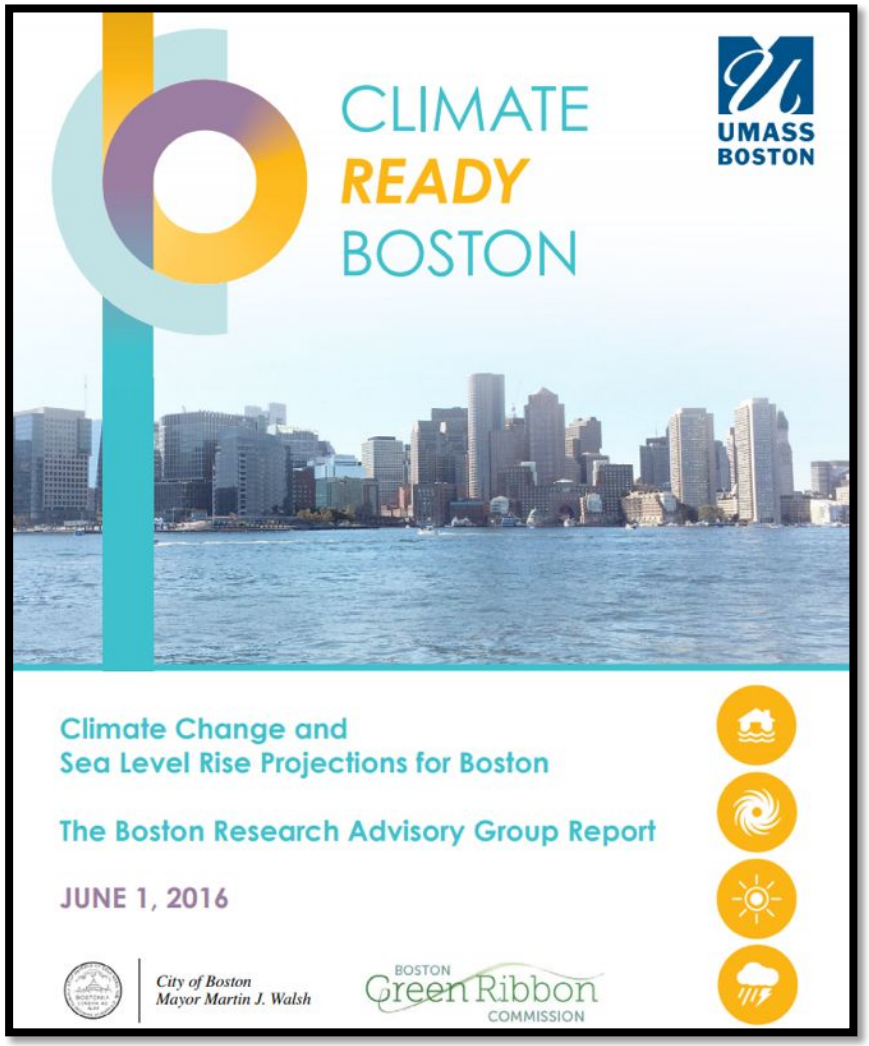
Flooding along the Harborwalk in the Charlestown Navy Yard
(Source: Gerry Angoff, Winter 2018)

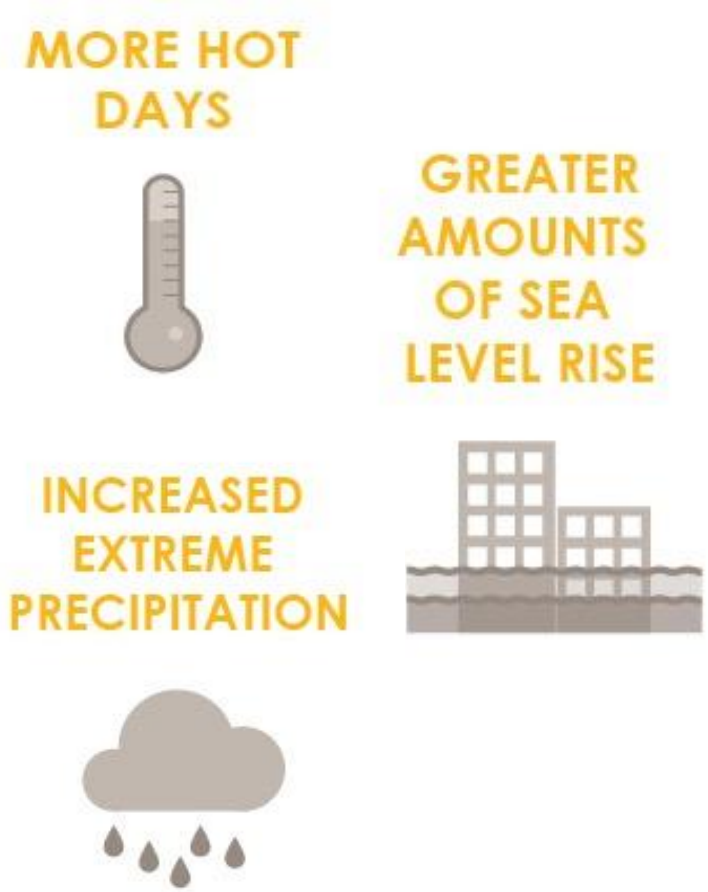
Flooding along the Harborwalk in Downtown Boston
(Source: Alison Brizius, December 2022)

IMPACTS ARE HAPPENING

Boston Research Advisory Group:

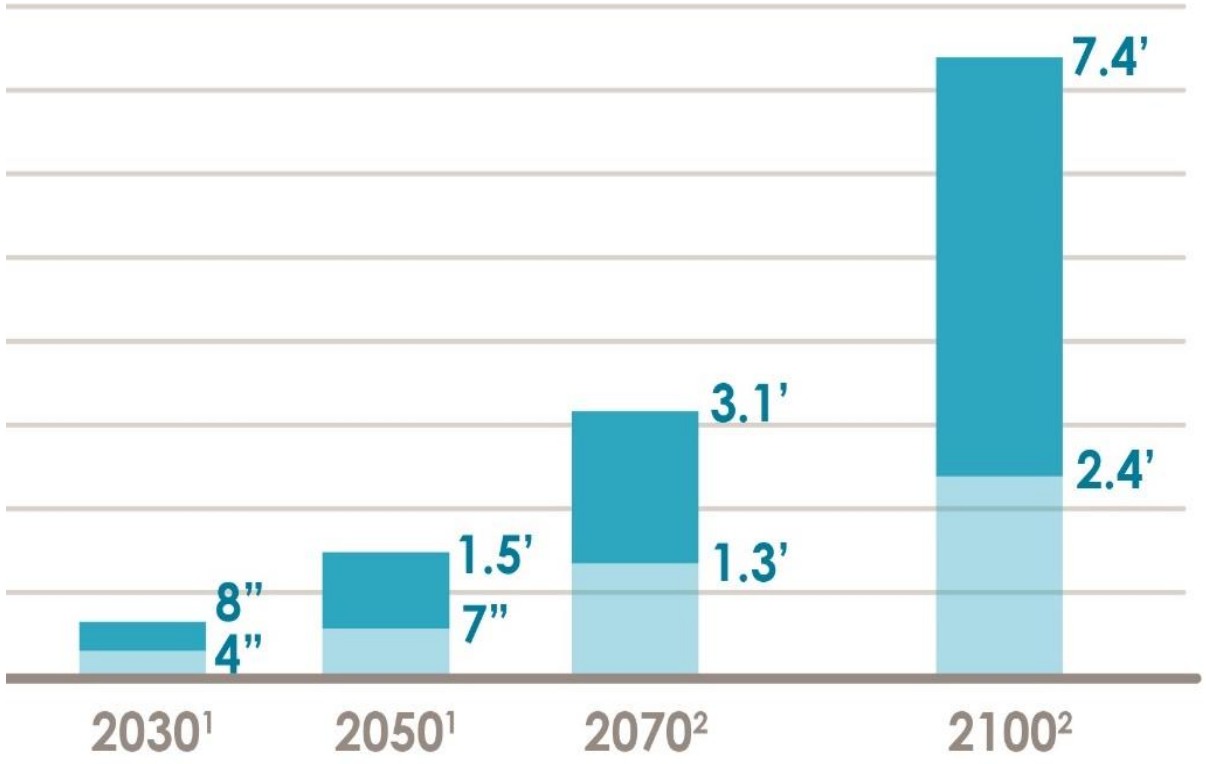
UMASS BOSTON
UMASS AMHERST
UMASS LOWELL
HARVARD
MIT
BU
NORTHEASTERN
TUFTS
RUTGERS
CORNELL
NOAA



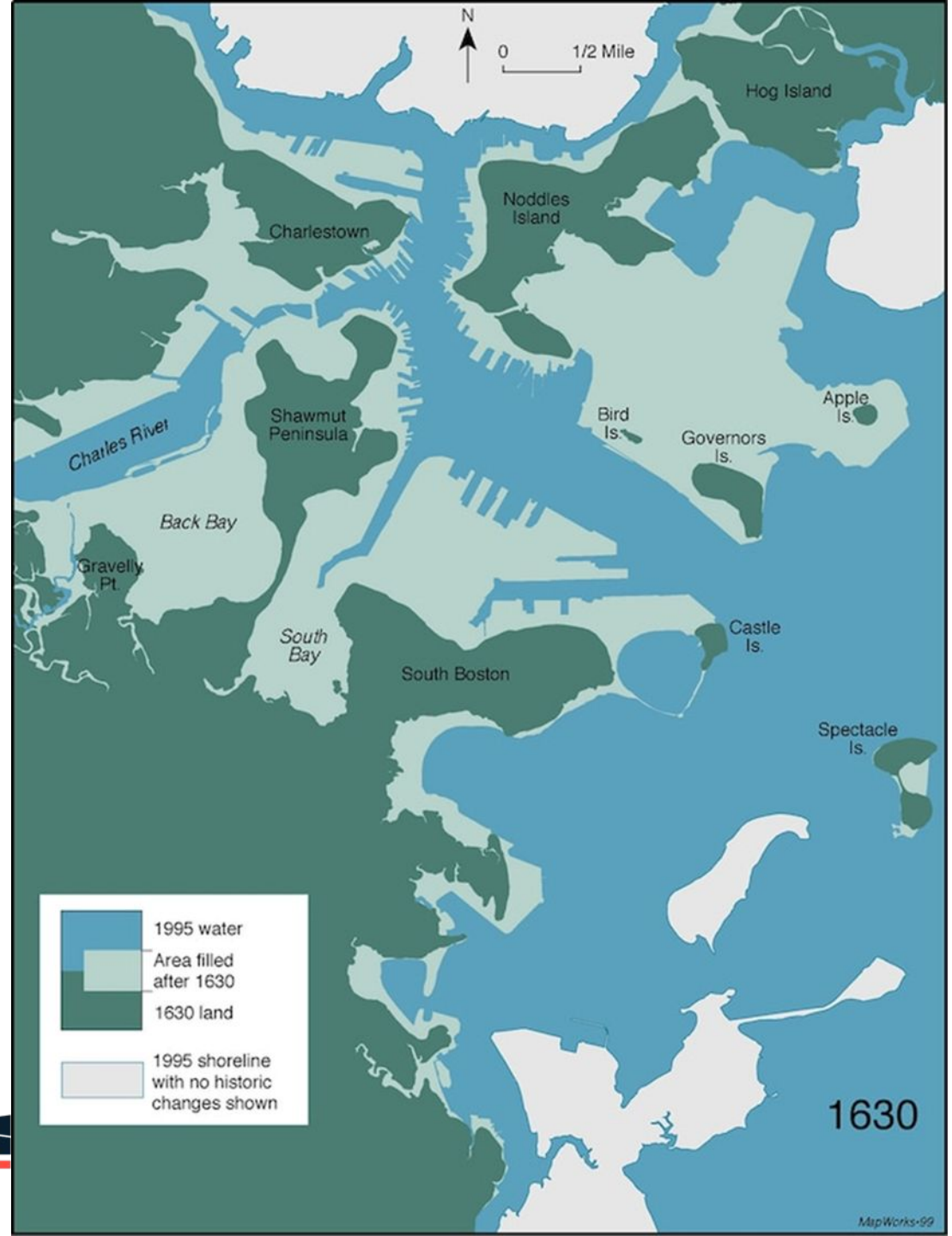


GREATER AMOUNTS OF **SEA LEVEL RISE**

BOSTON RELATIVE SEA-LEVEL RISE PROJECTIONS



Without reducing emissions, at least **3 feet of sea level rise** is likely during the second half of the century.


N
0
1/2 Mile
Hog Island
Noddles Island
Charlestown
Charles River
Shawmut Peninsula
Bird Is.
Governors Is.
Apple Is.
Back Bay
Gravelly Pt.
South Bay
South Boston
Castle Is.
Spectacle Is.
1995 water
Area filled after 1630
1630 land
1995 shoreline with no historic changes shown
1630
MapWorks-99


MEDFORD
REVERE
EVERETT
CHELSEA
19.5
19
CHARLESTOWN
EAST BOSTON
18
NORTH END
WEST END
13.5
DOWNTOWN
BEACON HILL
17
16
BACK BAY
90
CHINATOWN
SOUTH BOSTON WATERFRONT
SOUTH END
18.5
SOUTH BOSTON
BOSTON
ROXBURY

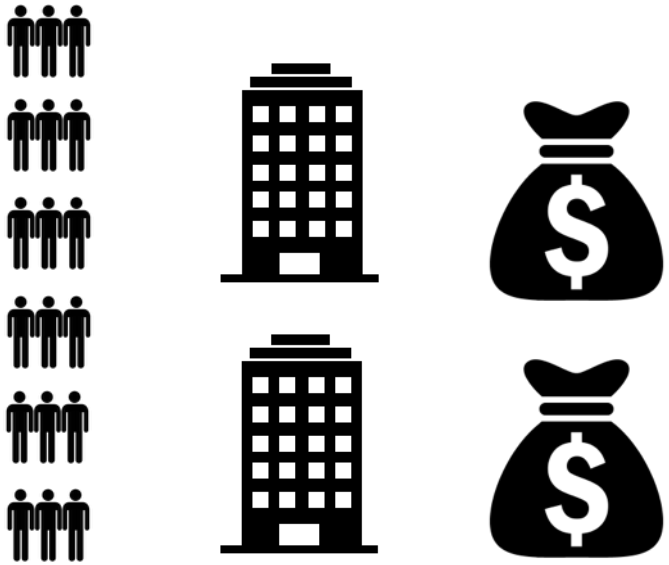
WHAT'S AT STAKE?

People and Buildings Exposed to a 1% Flood Risk

Boston is the world's **8th most vulnerable city** to financial loss from sea level rise, and **4th** in the US.

18,000 PEOPLE

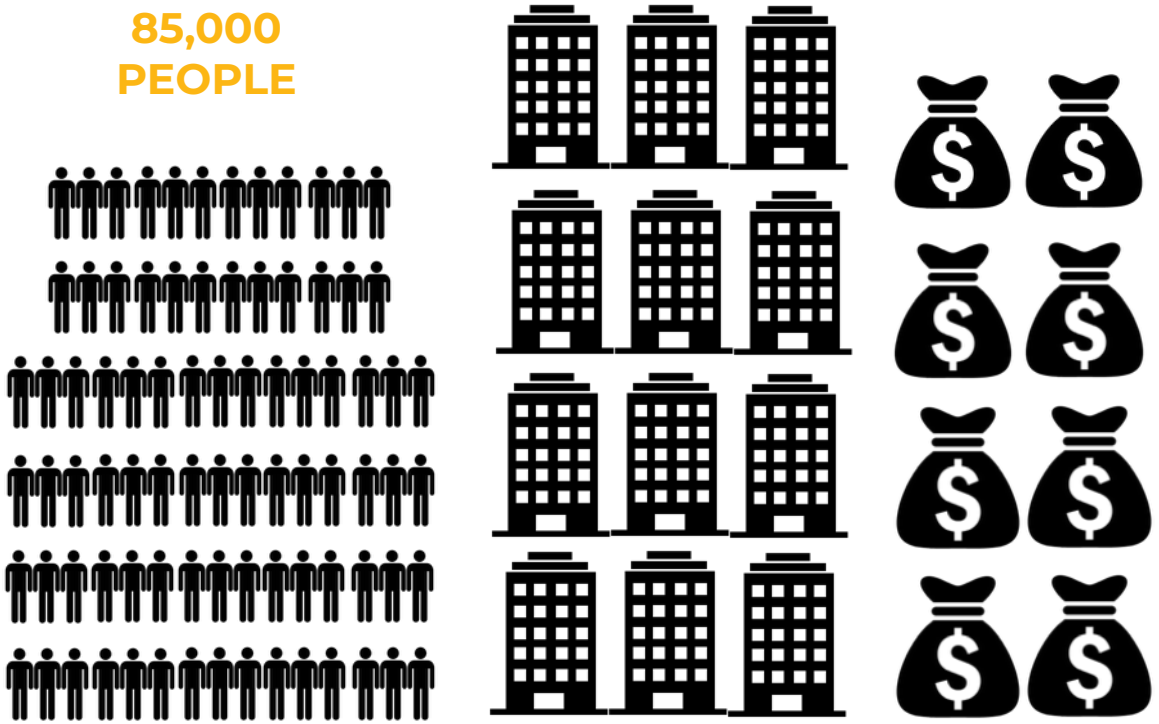
2,000 BUILDINGS (Worth $20B)



2030+

85,000 PEOPLE

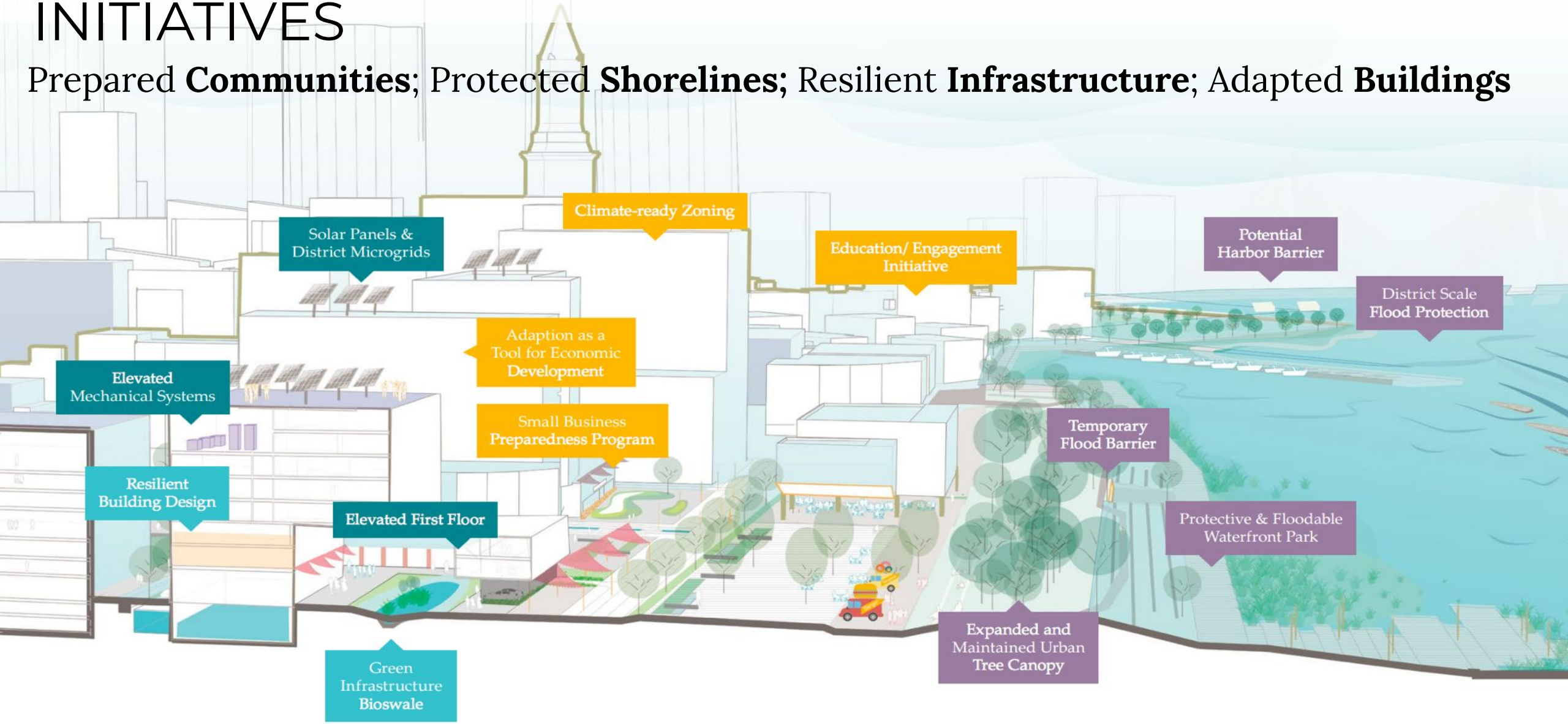
12,000 BUILDINGS (Worth $85B)



2070+

CLIMATE READY RESILIENCY INITIATIVES

Prepared **Communities**; Protected **Shorelines;** Resilient **Infrastructure**; Adapted **Buildings**



COASTAL RESILIENCE IMPLEMENTATION: THREE CONCURRENT STRATEGIES

TODAY'S STORMS

Key Goal:
Strengthen our response to today's flooding

How?

Educate residents about emergency preparedness, strengthen protocols for preparing for and responding to extreme weather, and operationalize deployable barriers

Key City Agencies:

Office of Emergency Management
Office of Climate Resilience

THIS DECADE'S STORMS

Key Goal:
Address 2030 flood pathways

How?

Advance near-term priority projects identified in coastal resilience plans from conceptual design to construction

Key City Agencies:

Office of Climate Resilience
Planning Department
Parks & Recreation Department

BEYOND 2030

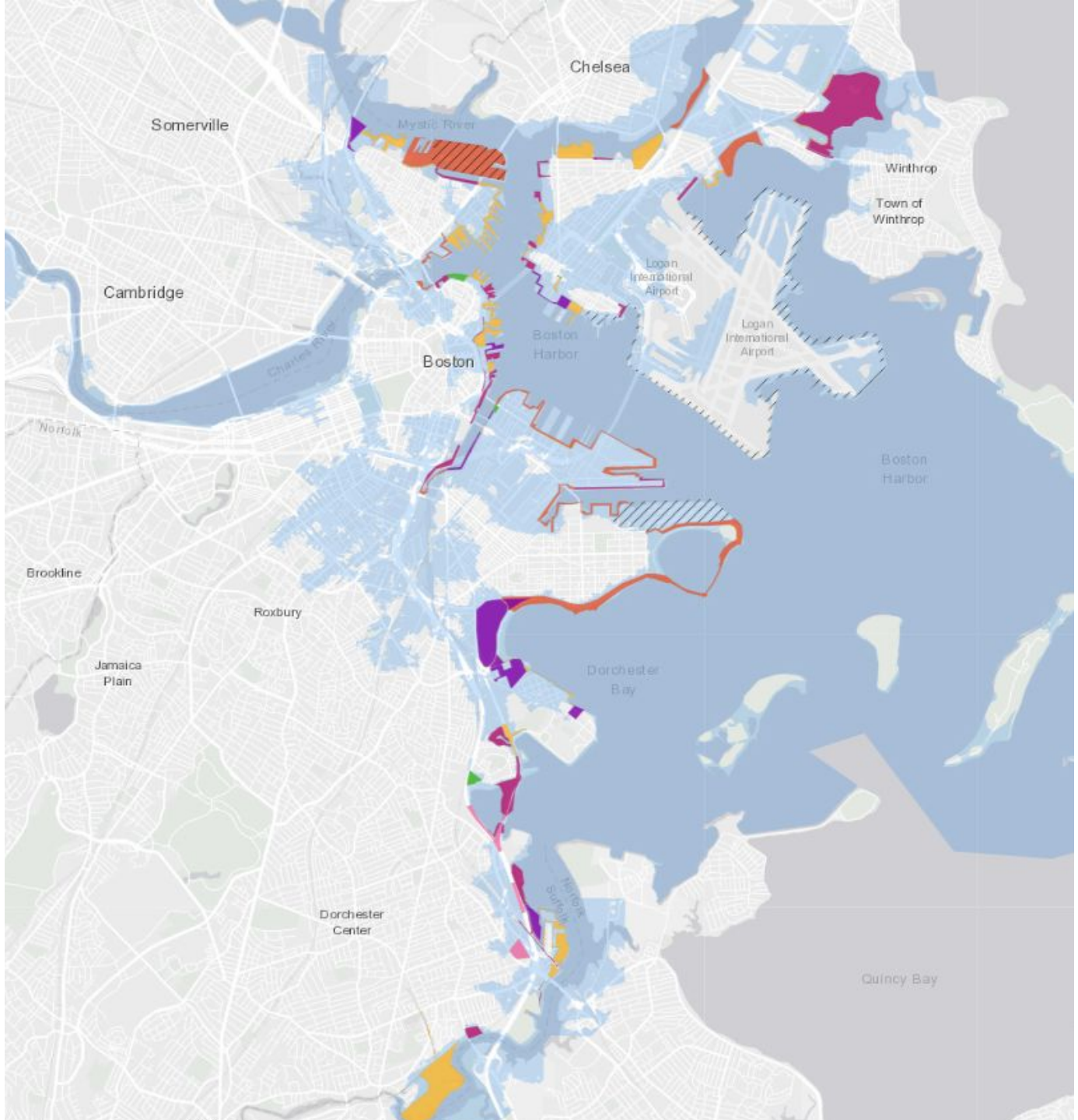
Key Goal:
Transform our 47 miles of coastline

How?

Through an ongoing partnership with the U.S. Army Corps of Engineers, advance mid- and long-term priority projects from conceptual design to construction

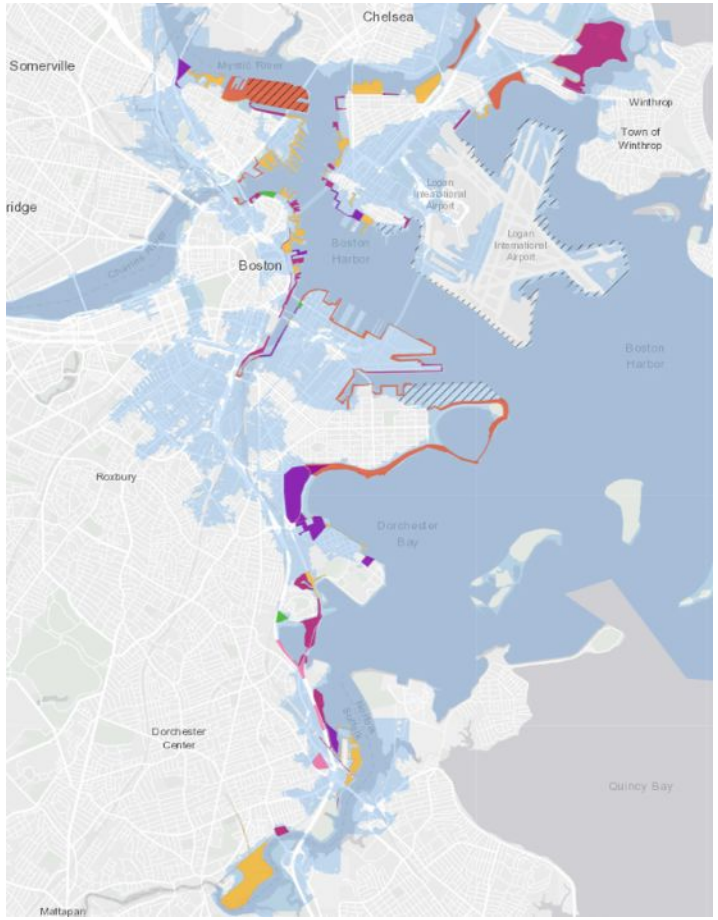
Key City Agencies:

Office of Climate Resilience,
Planning Department,
Boston Water & Sewer Commission, and many more!

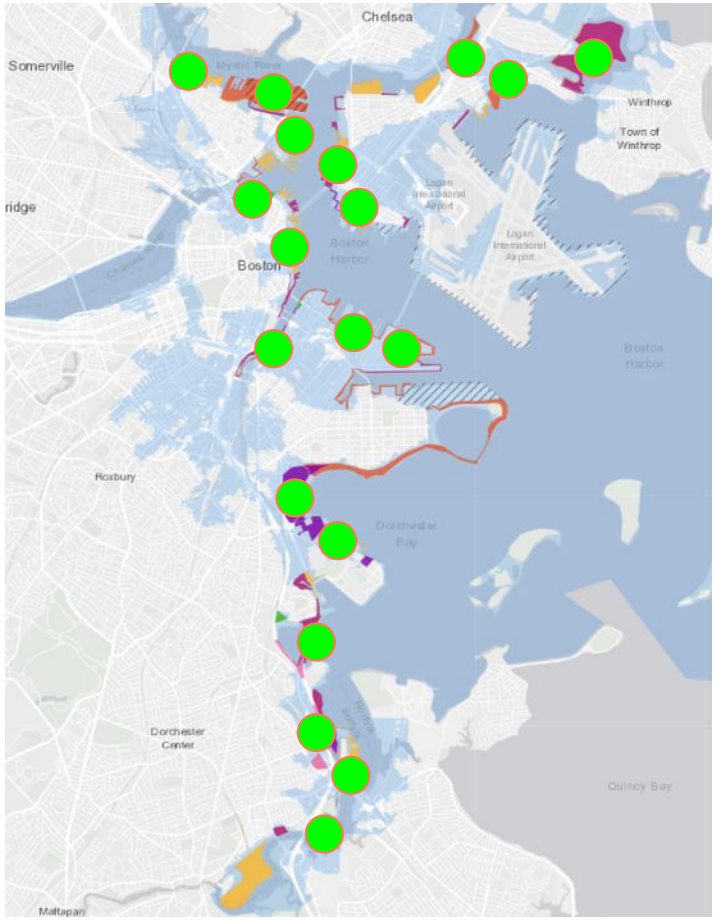

Chelsea
Somerville
Mystic River
Winthrop
Town of Winthrop
Logan International Airport
Cambridge
Boston Harbor
Boston
Charles River
Norfolk
Brookline
Roxbury
Jamaica Plain
Dorchester Bay
Dorchester Center
Suffolk
Quincy Bay

Coastal Resilience Projects: From Planning to Action

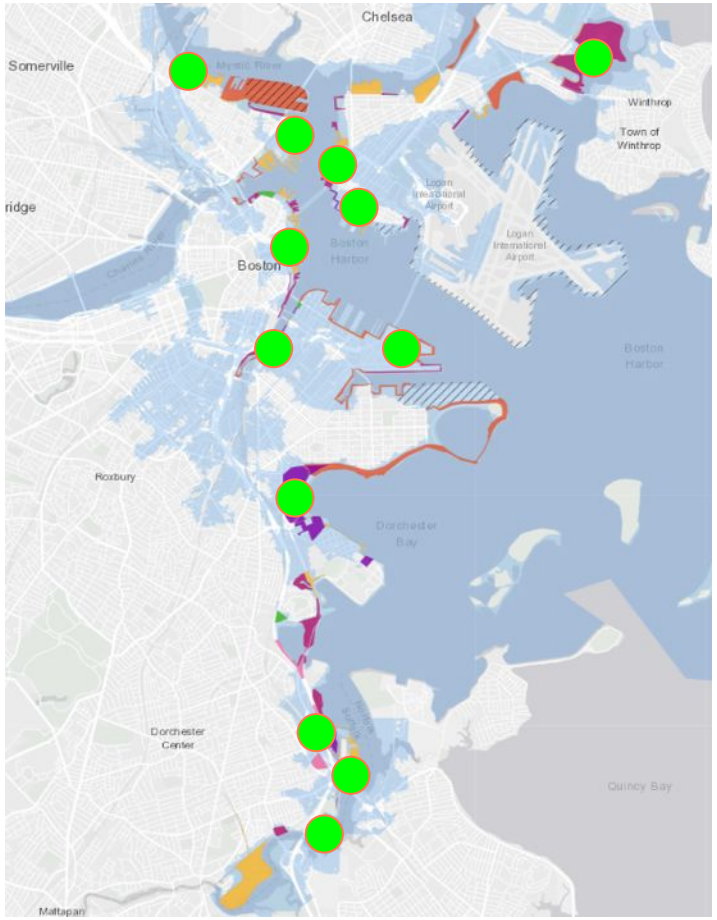
Our Long Term Focus
Increase Resilience Across 47 Miles of Coastline



Our Near Term Focus
Closing the 2030 Floodpaths



Our Focus for the Capital Plan
2030 Floodpaths That Will Require City Leadership



WHAT ARE SOME EXAMPLES OF COASTAL RESILIENCE STRATEGIES?

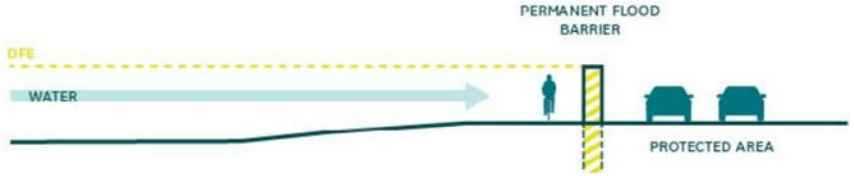
RAISED HARBORWALK / RAISED PARK SPACE

RAISED BERMS AND DUNES

NATURE-BASED SOLUTIONS

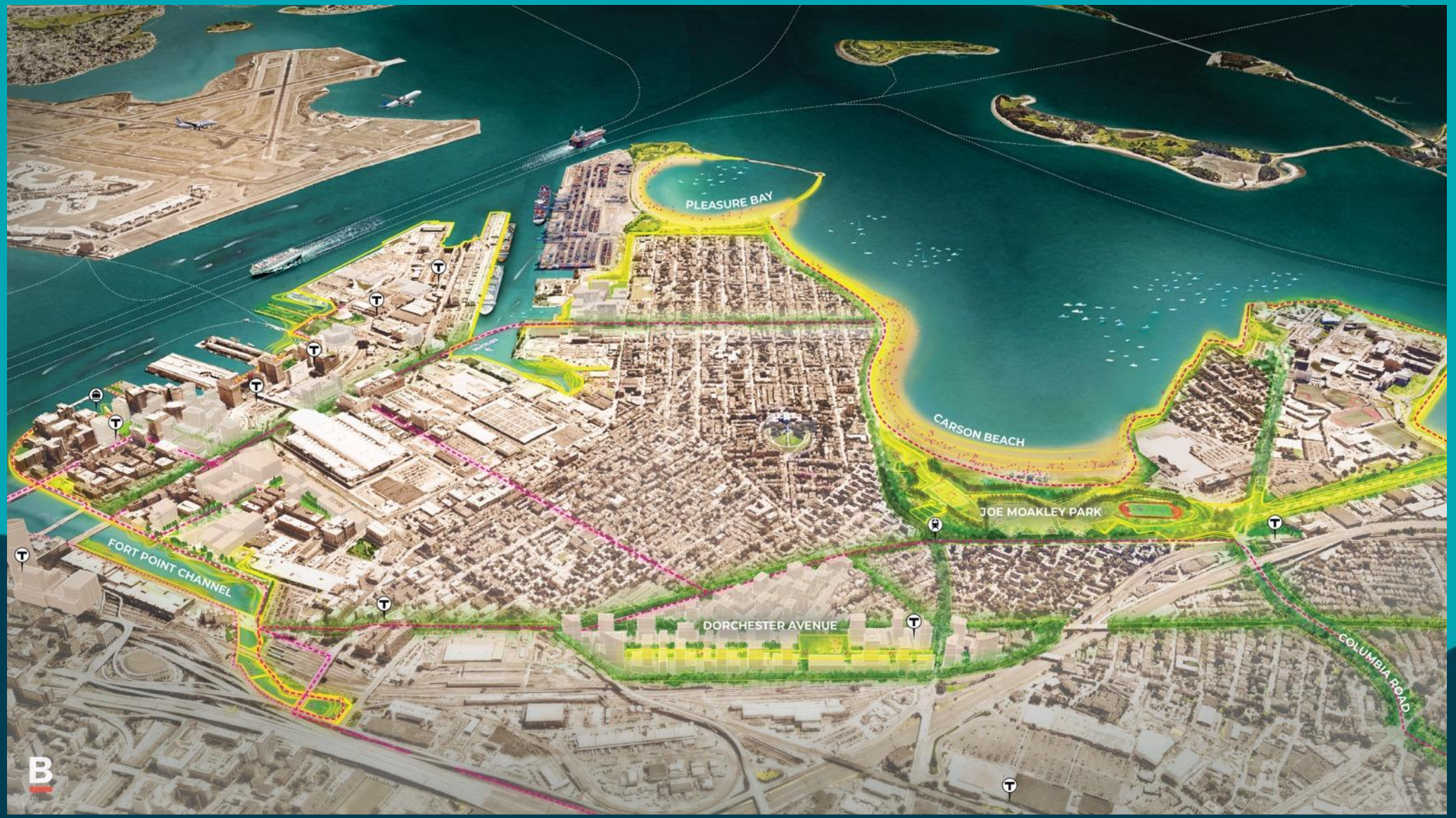
RAISED ROADWAYS / MEDIAN FLOODWALLS

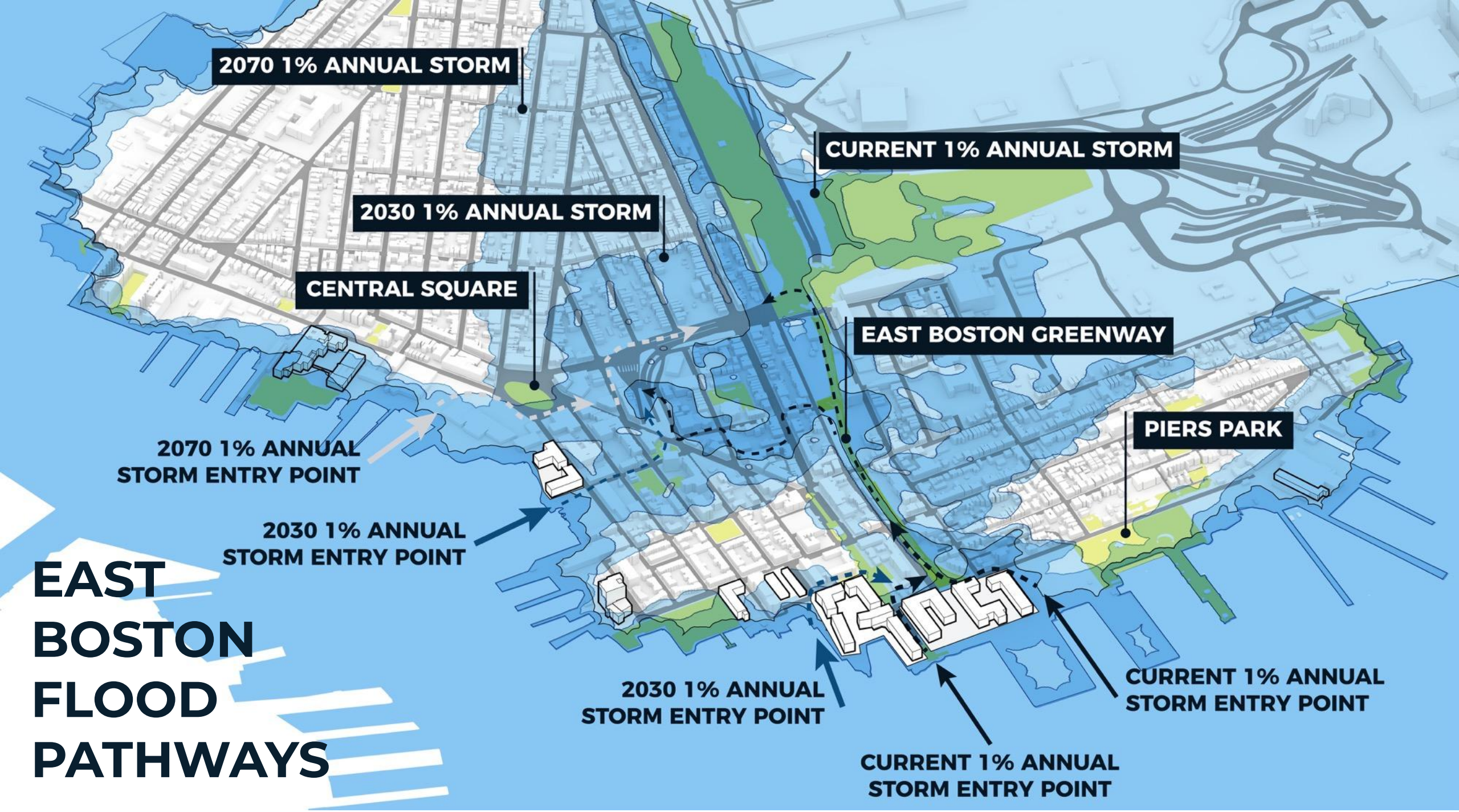
VERTICAL FLOODWALLS

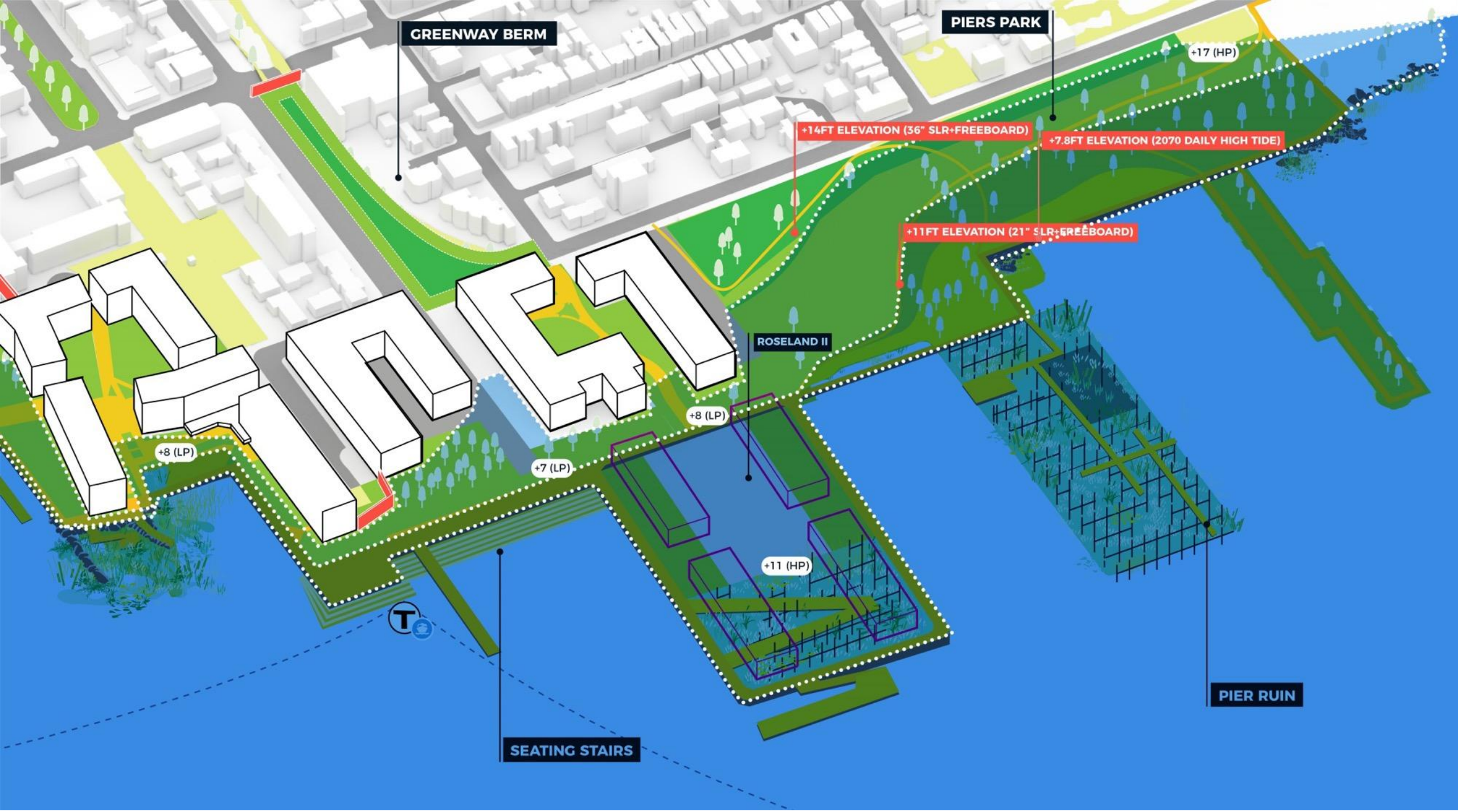


ADAPTED BUILDINGS AND STRUCTURES

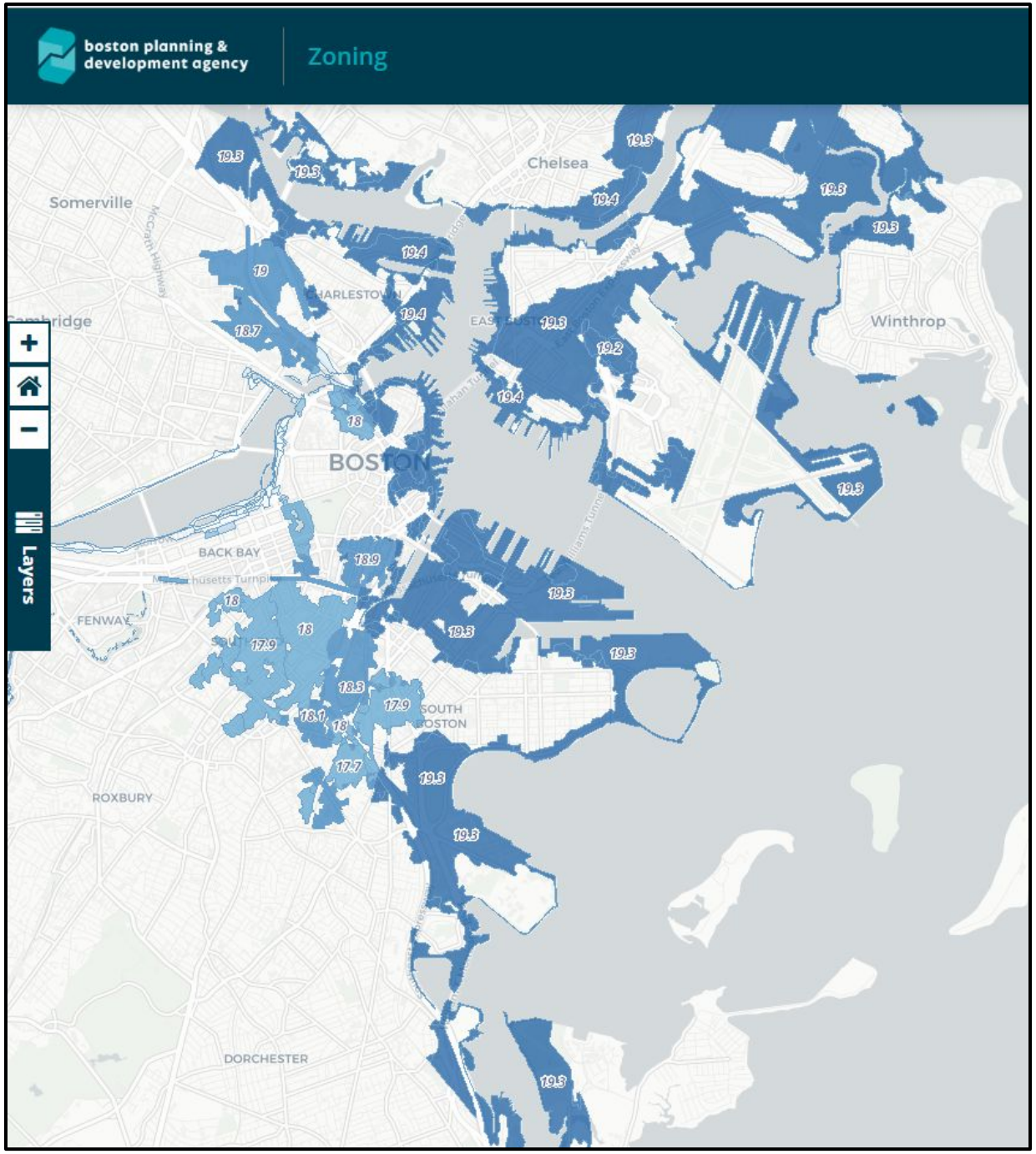
Resilient Boston Harbor


PLEASURE BAY
CARSON BEACH
JOE MOAKLEY PARK
FORT POINT CHANNEL
DORCHESTER AVENUE
COLUMBIA ROAD


2070 1% ANNUAL STORM
2030 1% ANNUAL STORM
CENTRAL SQUARE
CURRENT 1% ANNUAL STORM
EAST BOSTON GREENWAY
PIERS PARK
2070 1% ANNUAL STORM ENTRY POINT
2030 1% ANNUAL STORM ENTRY POINT
2030 1% ANNUAL STORM ENTRY POINT
CURRENT 1% ANNUAL STORM ENTRY POINT
CURRENT 1% ANNUAL STORM ENTRY POINT
EAST BOSTON FLOOD PATHWAYS

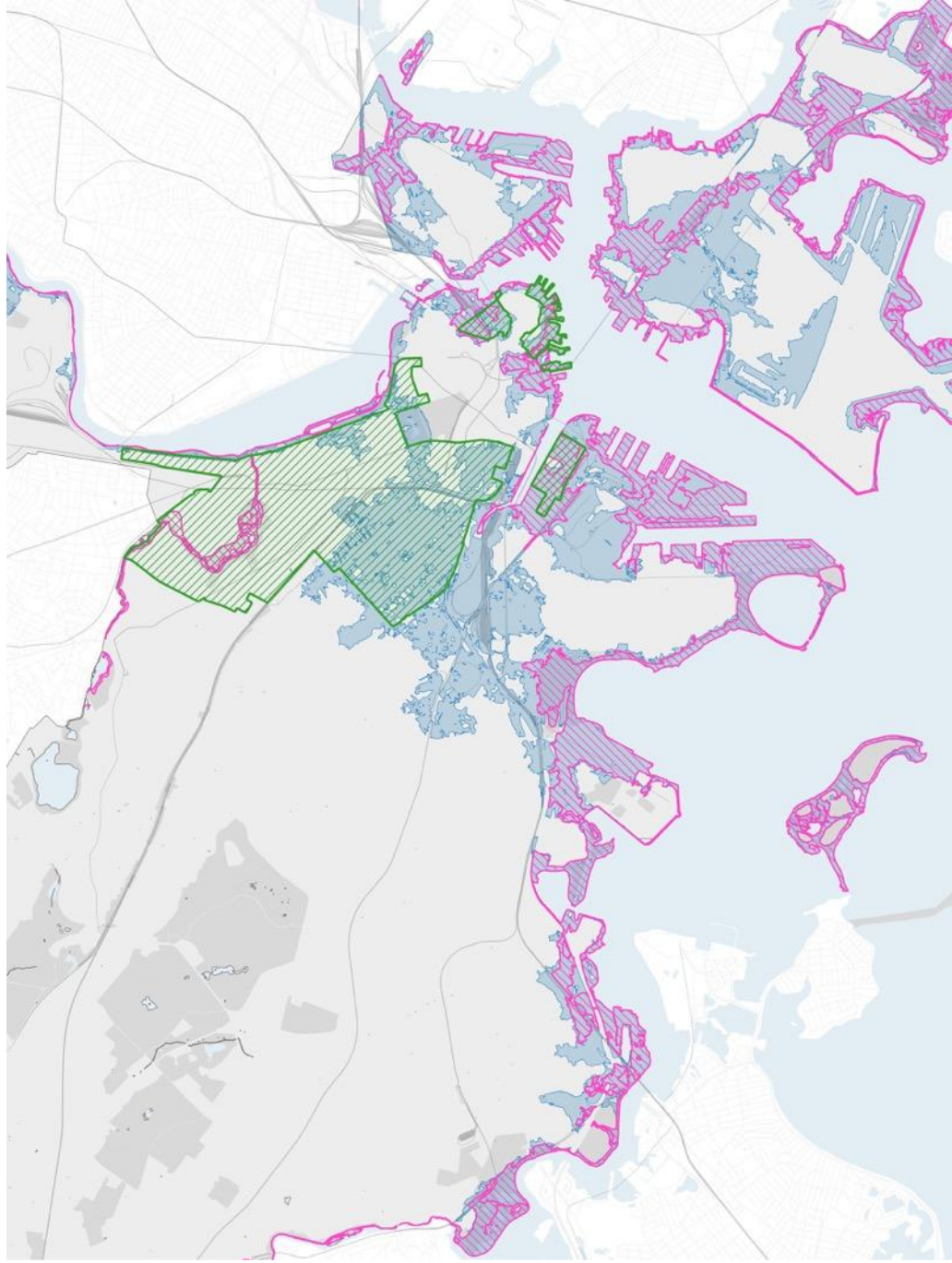

GREENWAY BERM
PIERS PARK
+17 (HP)
+14FT ELEVATION (36" SLR+FREEBOARD)
+7.8FT ELEVATION (2070 DAILY HIGH TIDE)
+11FT ELEVATION (21" SLR+FREEBOARD)
ROSELAND II
+8 (LP)
+8 (LP)
+7 (LP)
+11 (HP)
SEATING STAIRS
PIER RUIN

BPDA Resiliency Checklist – Sea Level Rise Flood Hazard Map



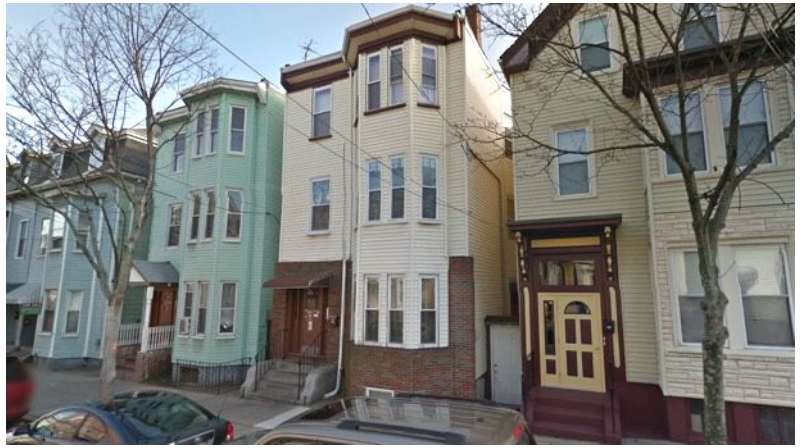
boston planning & development agency

Identify requirements and conflicts - City Zoning



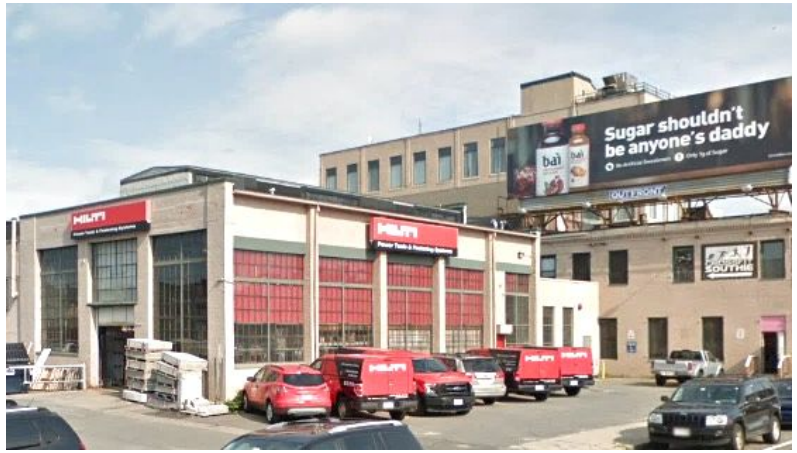
Building Typologies in the 2070 floodplain

Detached two-family
(Dorchester)



Triple decker
(East Boston)

Attached multi-family
(South End)



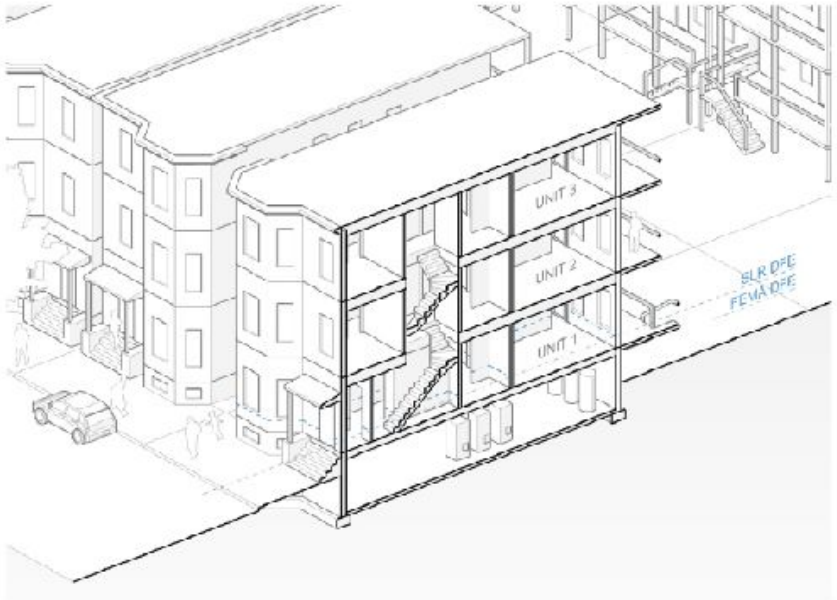
General industrial
(Dot Ave, South Boston)

Pre-war commercial / wharf buildings
(South Boston Waterfront, Financial district, North End)

Contemporary high-rises
(Financial district, South Boston Waterfront)

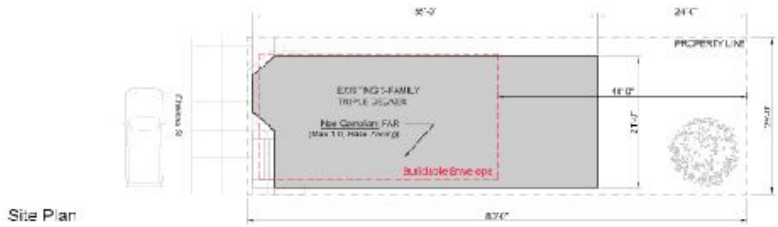
Case Study: Triple Decker

Existing Conditions

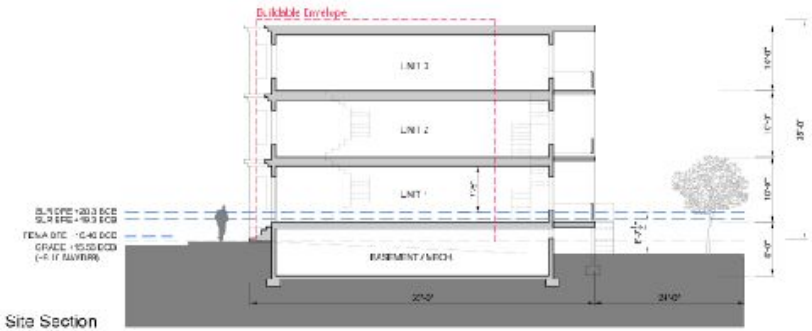


Case Study

Buildings < 20,000 gsf



Site Plan



Site Section

Key Characteristics

SLR BFE:	19.30 BCB
SLR DFE:	20.30 BCB
FEMA BFE:	17.46 BCB
Grade Elevation:	15.56' BCB
Lowest Occupiable Floor:	18.75' BCB
Cellar Elevation:	10.10' BCB
Critical Systems Location:	Basement
Construction Type:	Wood frame
Year Built:	Unknown
Stories:	3
Units:	3
Sidewalk Width:	10'
Zoning District:	Three-Family

Neighborhood Examples

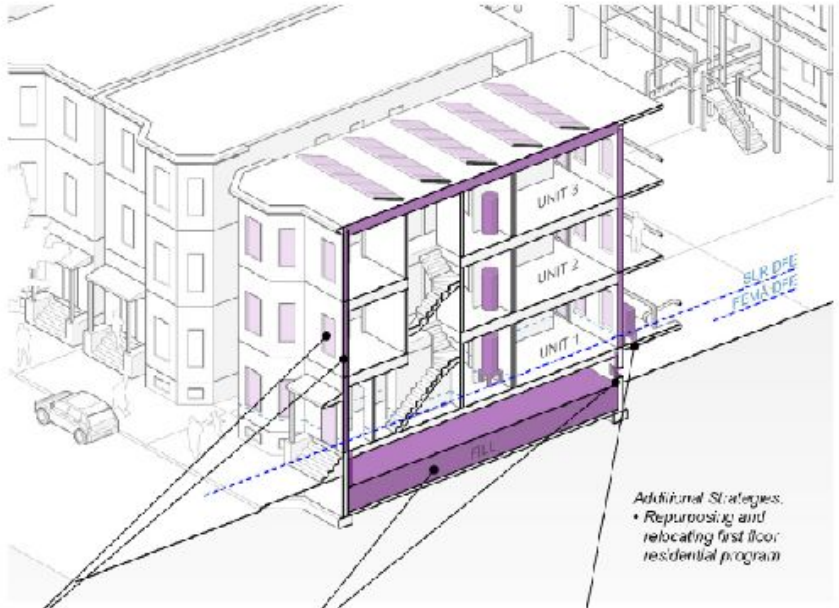
Zoning Viewer

Zoning Metrics

	Existing	Allowed
Use	3-Family Res	3-Family Res (some community uses)
Ground Elev.	14.71 BCB (8.29 NAVD88)	NA
Building Height	35	3 stories / 35'
Building Setback	- Front: 2' - Rear: 33' Side: 11, 3'	- Front: min. 5' (or align to context) - Rear: min. 40' - Side: min. 2.5'
FAR	1.03	1.0
Open Space	940 sf	Min. 300 sf per unit

Case Study: Triple Decker

Retrofit Strategy



Building Adaptation

Enhanced Envelope

Conduct energy audit and blower door test to identify air leaks.

Install blown-in cellulose insulation to wall cavities; add roof insulation outboard of deck.

Upgrade windows to low-e, ow-U-factor casement windows.

Building Adaptation

Wet Floodproof

Abandon basement and fill it to the lowest adjacent grade.

Install flood vents at foundation walls in order for water to enter and balance hydrostatic forces.

Use saltwater damage-resistant materials below SLR-DFE.

Building Systems

Elevate Systems

Locate water heater and critical systems above the SLR-DFE.

Upgrade heating to high-efficiency mini-split heat pump system with equipment located outside and above the SLR-DFE.

Case Study

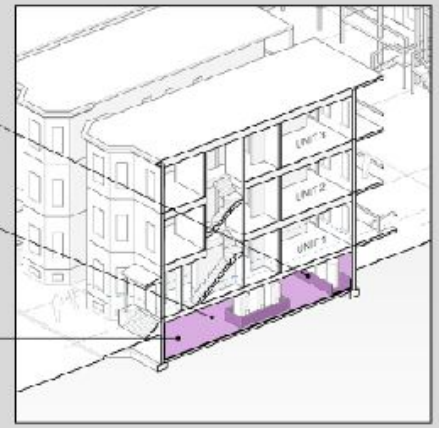
Buildings < 20,000 gsf

Incremental Strategies

Elevate Systems
Raise equipment as high as possible and build dry floodproofed enclosure around equipment.

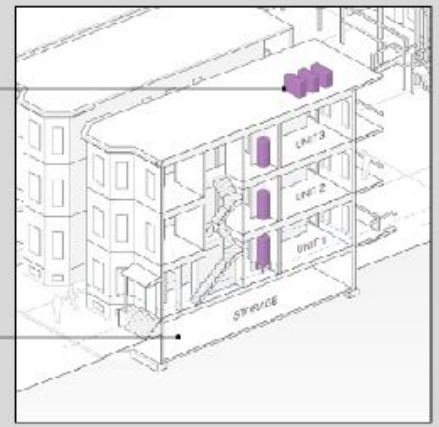
Reinforce Structure
Reinforce foundation, seal all penetrations, provide temporary floodshields at basement windows (up to 3' above grade).

Resist Flooding
Provide interior drainage system (sump pump and emergency power source). Install backwater preventers

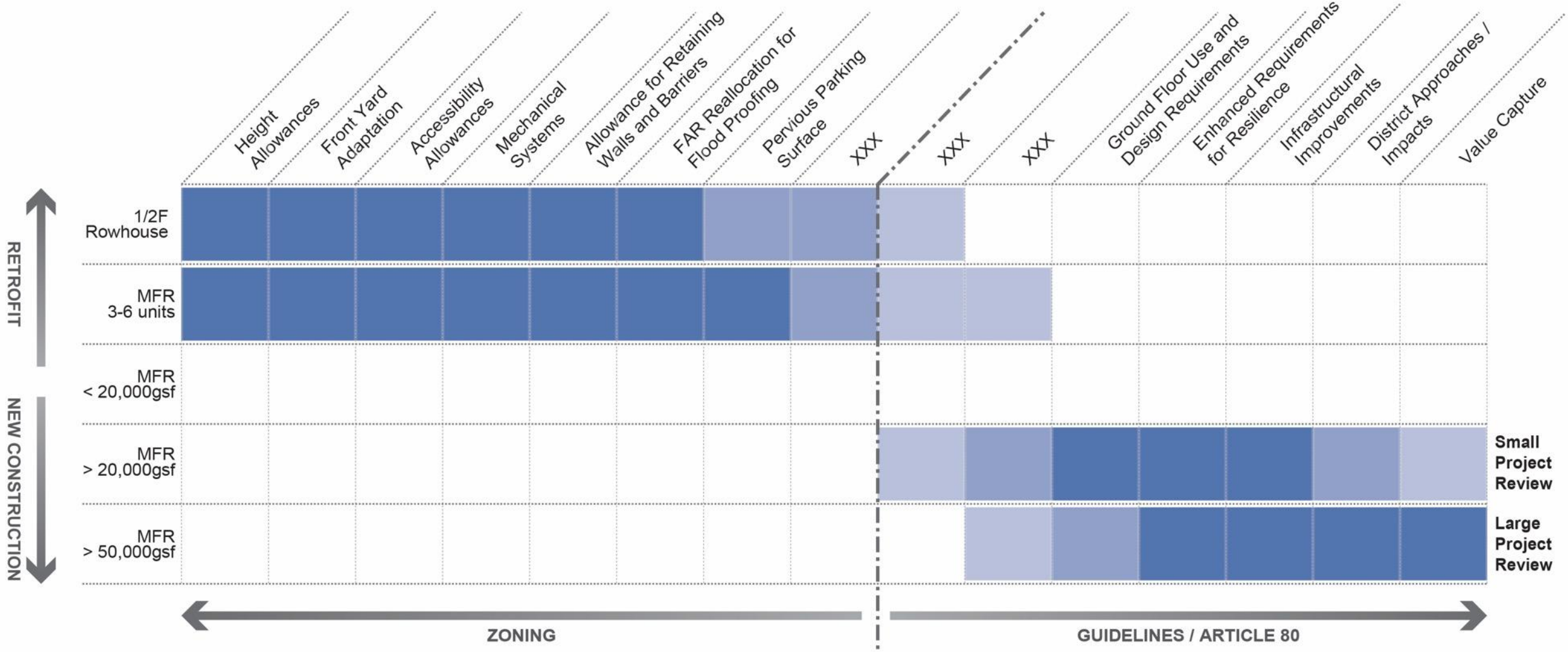


Elevate Systems
Elevate critical systems above DFE. Consider upgrading heating to mini split system with equipment on roof.

Resist Flooding
Provide interior drainage system (sump pump and emergency power source). Install backwater preventers

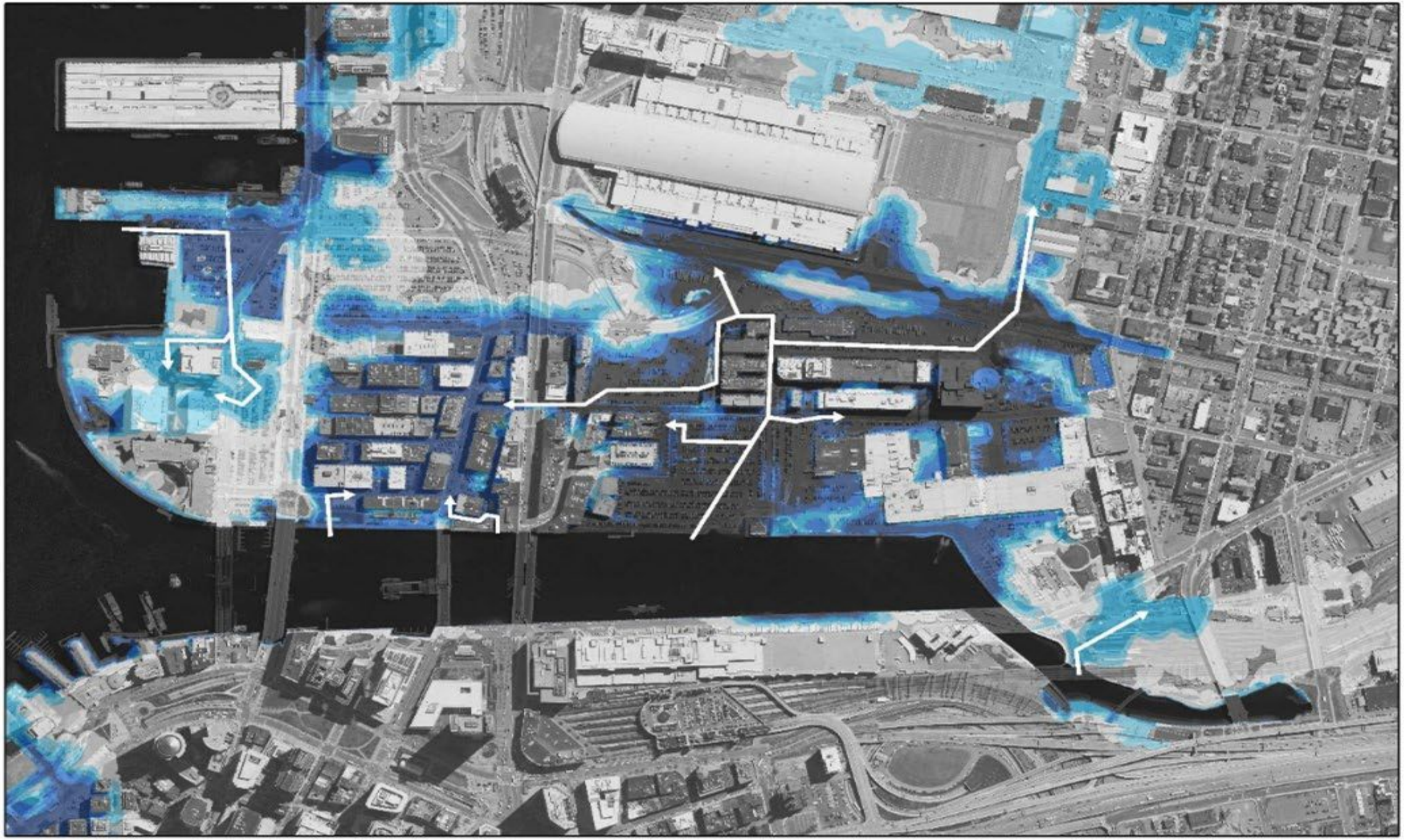


Zoning and Guidelines



Resilient Fort Point Channel

Fort Point Channel - Flood Pathway Analysis



KAYAK LAUNCH

100 ACRE MASTER PLAN OPEN SPACE

GE CAMPUS

BOARDWALK

A SELF DEPLOYING TIDAL GATE

B RELOCATE HARBOR WALK TO NEW LOCATION. MAKE BUILDING FLOOD PROOF.

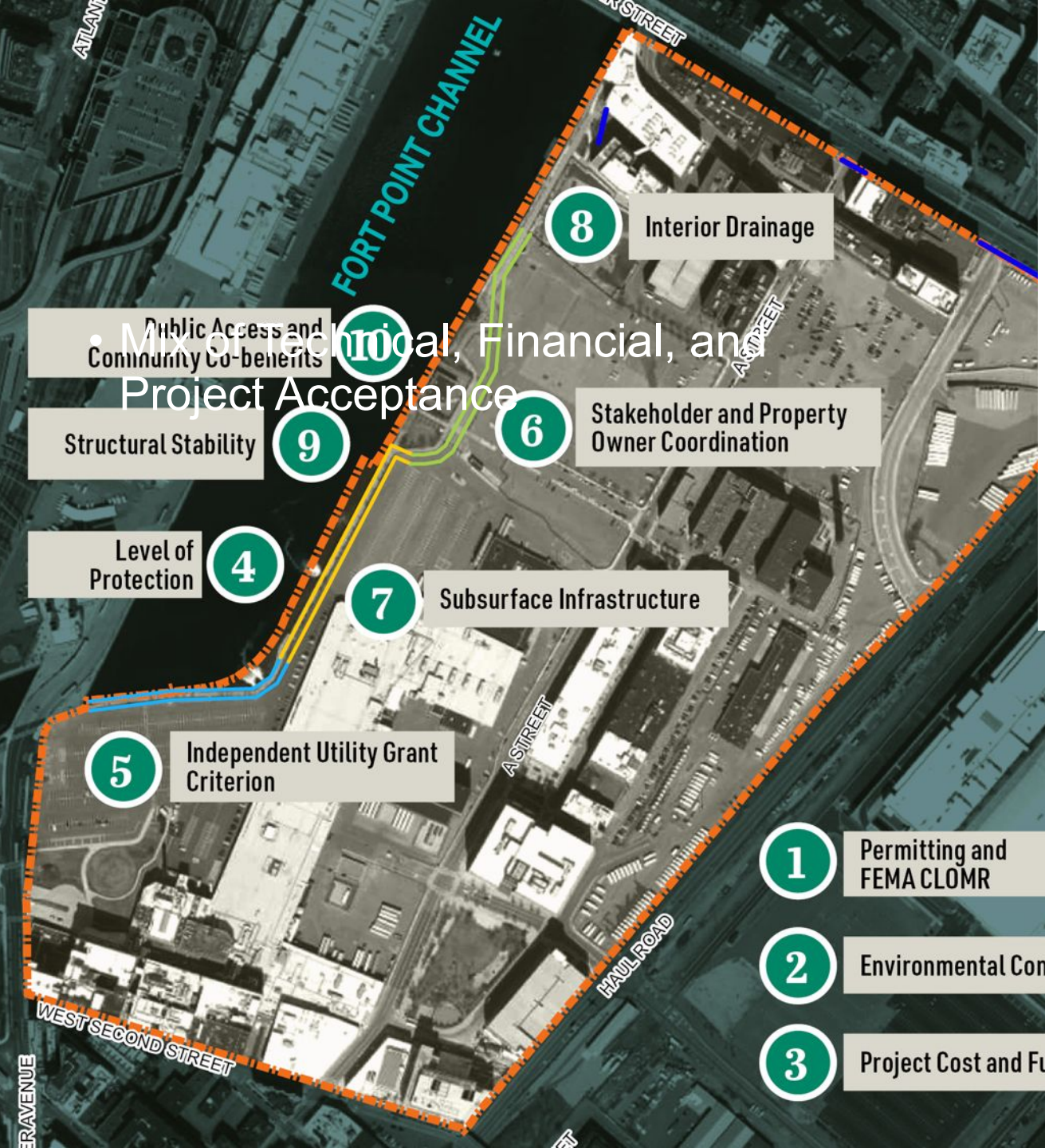
C NEW HARBOR WALK BOARDWALK OUTSIDE OF EXISTING BUILDING

FLOOD PROTECTION CREST 14' ELEVATION

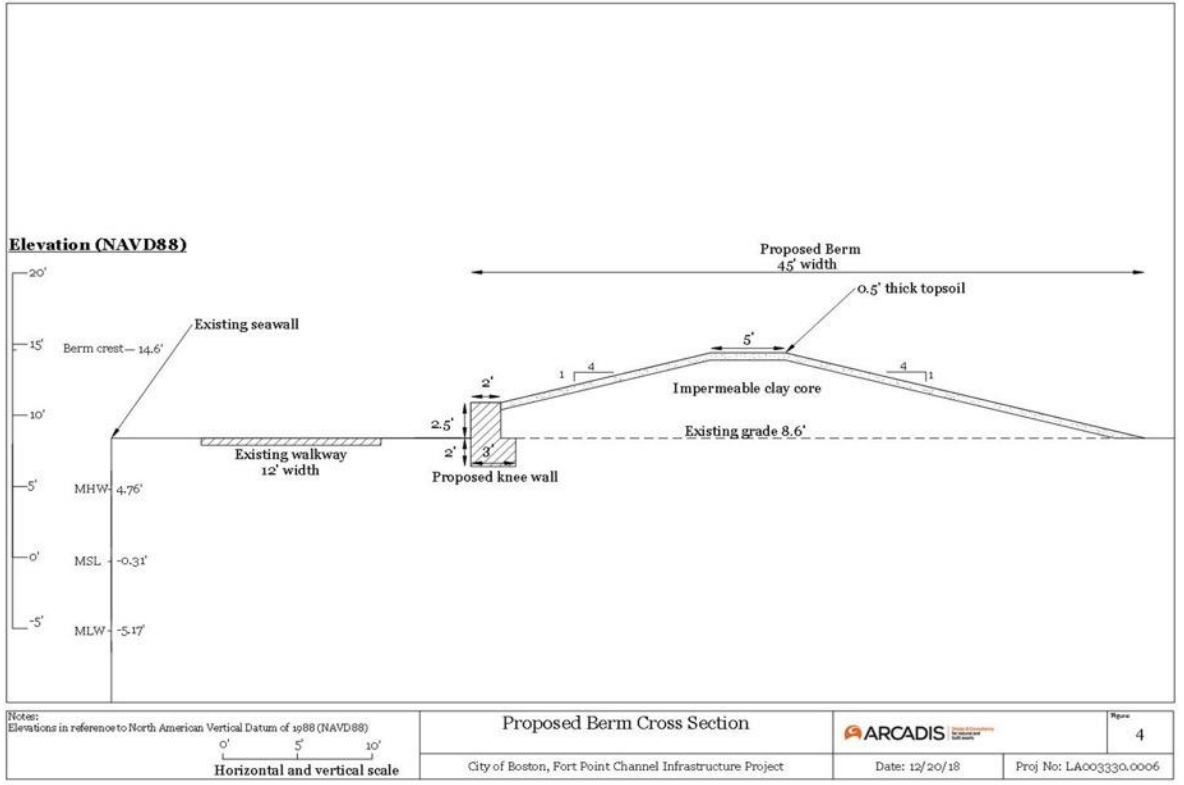
E FLOOD PROOF BUILDING

D ELEVATED NEW PARK SPACE WITH HARBOR WALK

F UPDATED HARBOR WALK AND SEAWALL IN LOCATIONS WITH LIMITED WIDTH



- Mix of Technical, Financial, and Project Acceptance



AECOM

Barrier Styles – Berm

- Concepts – Final layout, configuration, and features to be determined

Key Project Stakeholders

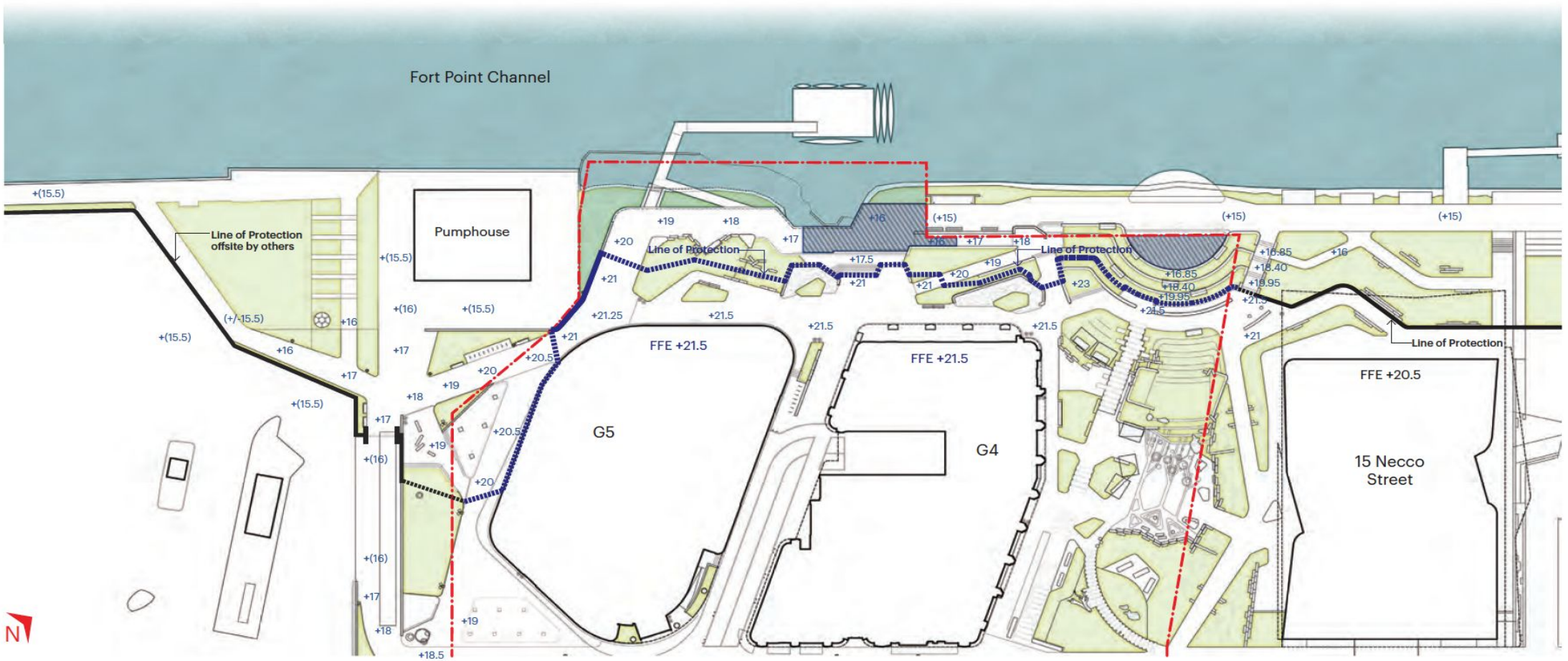
5-15 Necco, National Development

244-284A Project, Related Beal

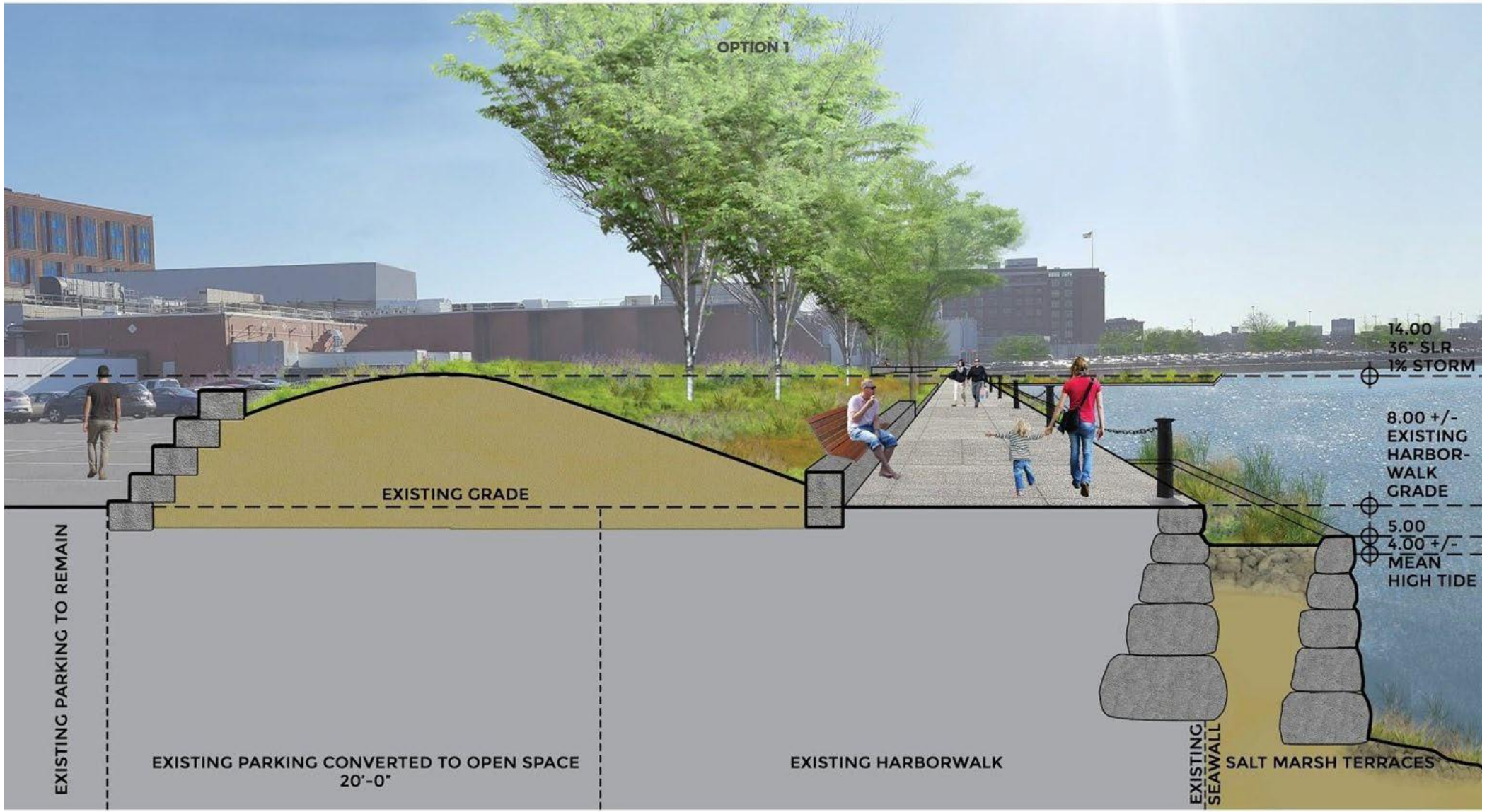
232 A St. Project, Tishman Speyer

Gillette

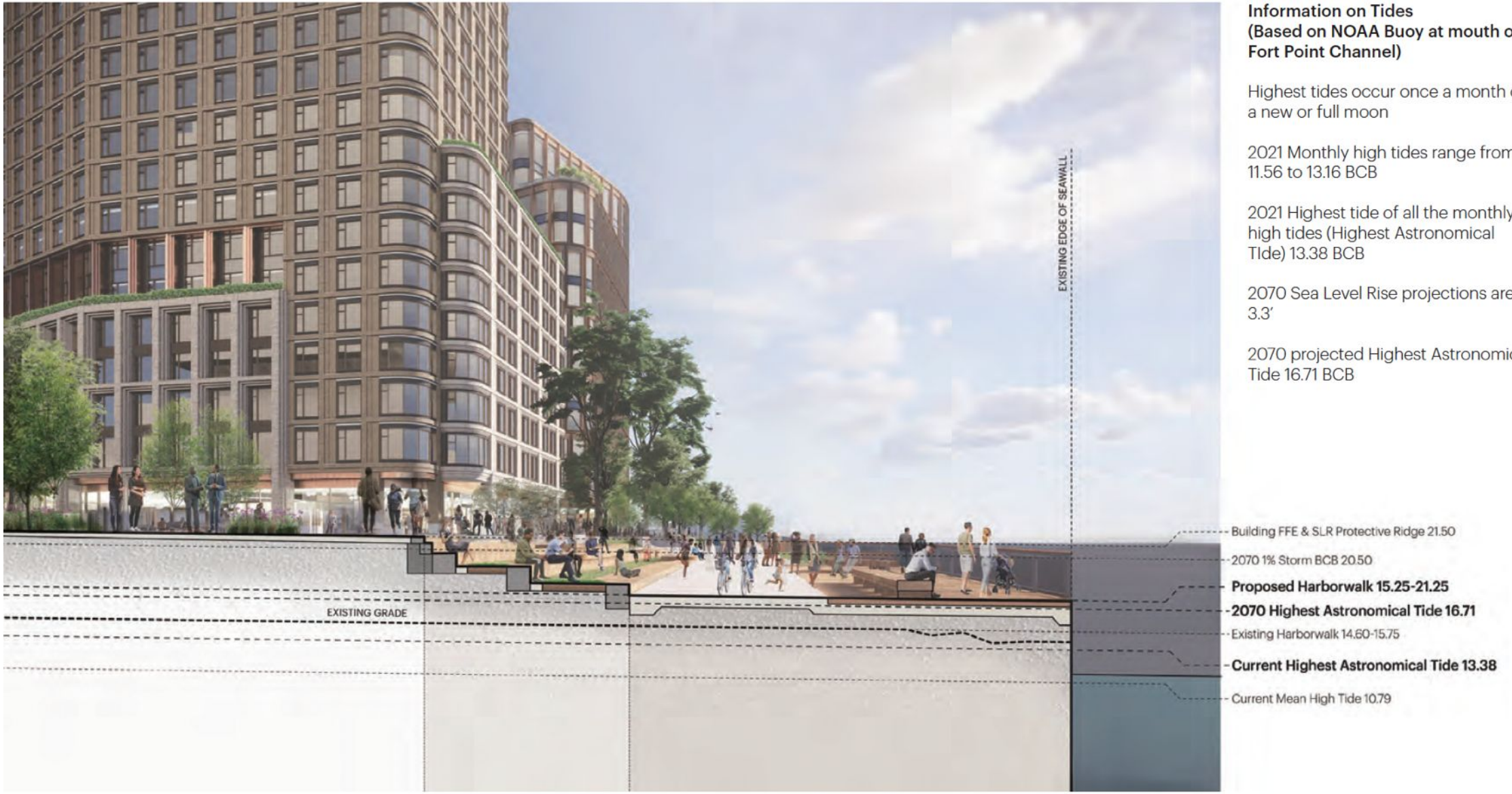
2070 Highest Astronomical Tide
+16.71 (BCB)
40" SLR



Project Design



244-284 A St Proposed Design at Harborwalk



Information on Tides (Based on NOAA Buoy at mouth of Fort Point Channel)

Highest tides occur once a month on a new or full moon

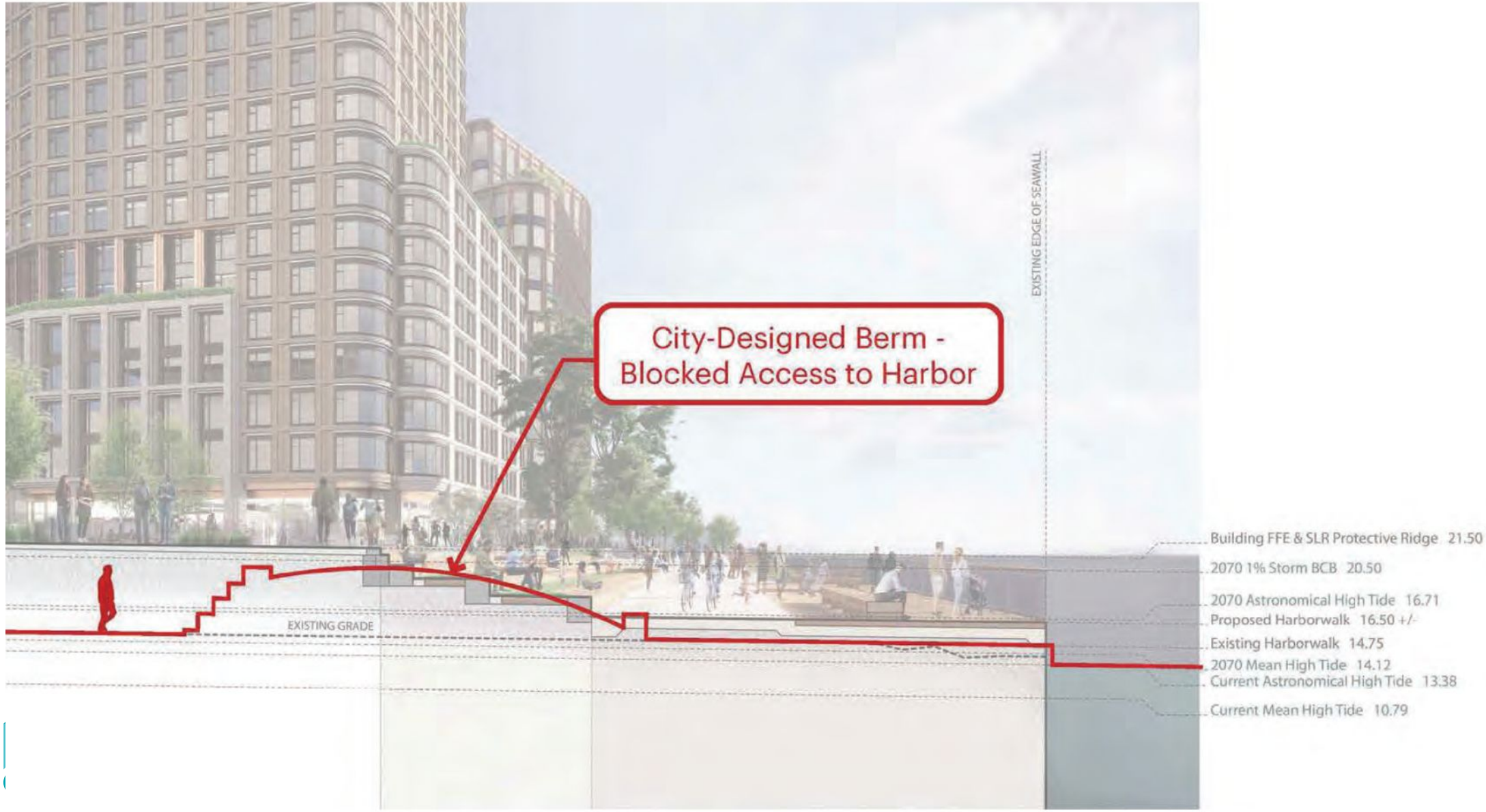
2021 Monthly high tides range from 11.56 to 13.16 BCB

2021 Highest tide of all the monthly high tides (Highest Astronomical Tide) 13.38 BCB

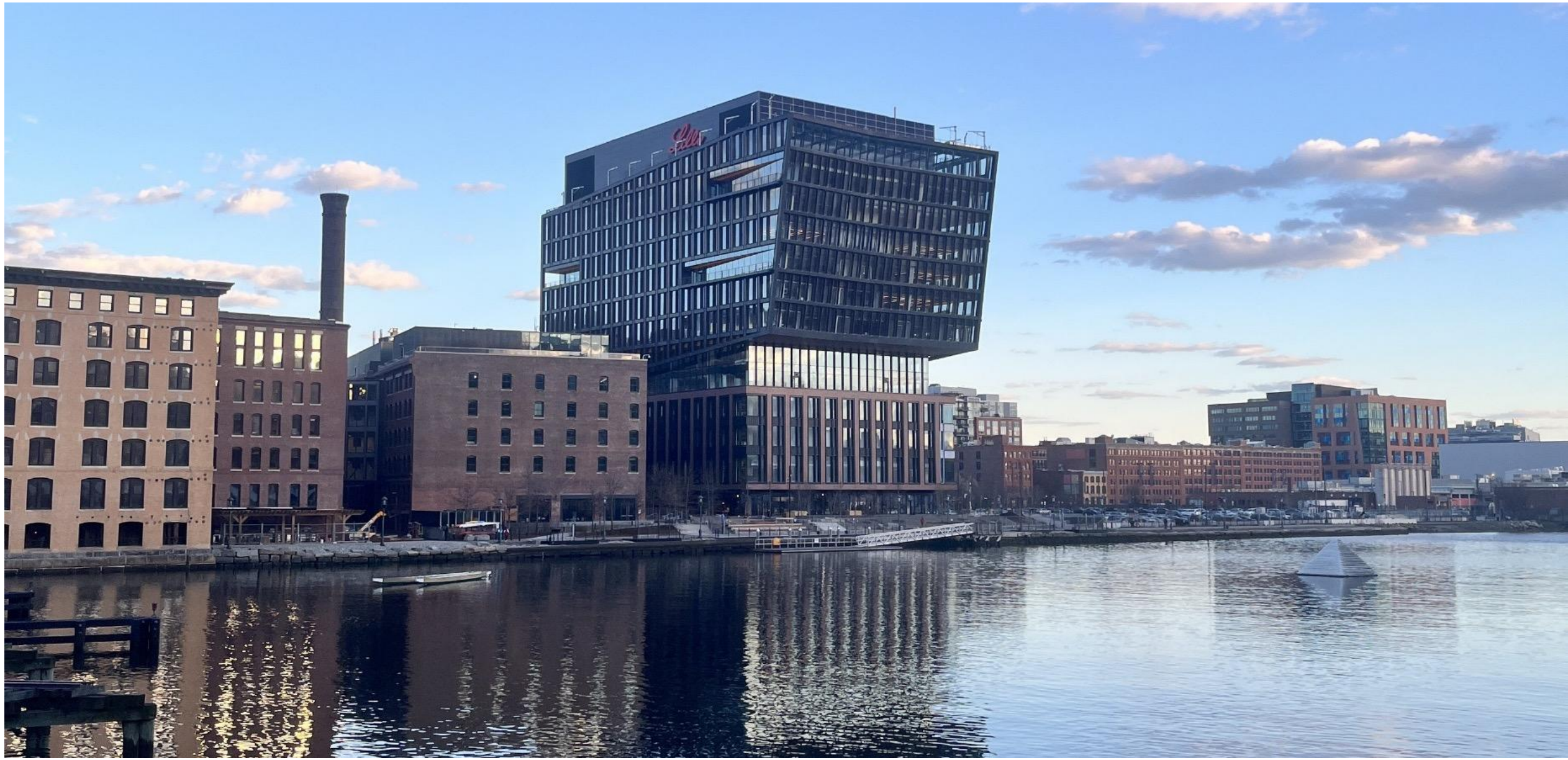
2070 Sea Level Rise projections are 3.3'

2070 projected Highest Astronomical Tide 16.71 BCB

244-284 A St Proposed Design at Harborwalk



5-6 & 15 Necco Street



5.

THANK YOU