CITY OF BOSTON CSRM FINAL ARRAY

RESOURCE AGENCY MEETING

Project Team:

Jeff Herzog - PM/Planner

Lisa Winter - Lead Engineer

Naomi Fraenkel - Lead Economist

Todd Randall - Lead Environmental

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Kate Roosa - Lead PM, CoB

December 2025
Todd Randall, ecologist
Christine San Antonio, biologist

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Study Objective Refined

- ***Economic Resilience: (Prepare)*** Manage coastal storm impacts to transportation infrastructure like roads, bridges and tunnels; ***(Absorb)*** manage flood risk to homes, businesses, academic institutions, and transportation systems; ***(Recover)*** while minimizing disruption to economic activity (business, working waterfront, maritime navigation) across Boston's coastal neighborhoods over the 50-year period of economic analysis.
- ***Social and Community Resilience: (Prepare)*** Manage impacts of coastal storms to public health and safety (evacuation routes, evacuation shelters); manage coastal storm impacts to community services (shelter, food-security) ; **(*Absorb)*** preserve neighborhood identity and cultural resources ***(Recover)*** Improve community resilience returning to residences after the storm, across Boston's coastal neighborhoods over the 50-year period of economic analysis.
- ***Environmental Resilience*:** manage impacts of coastal storms without and with project to coastal and natural resources (e.g., near shore marine environment, urban salt marsh, waterfront green spaces) while managing pollution and debris impacts from storm events, ensuring sustainable storm risk management solutions across Boston's coastal neighborhoods over the 50-year period of economic analysis.

Formulation Strategies

- Formulate by neighborhoods and then connect the system
- Formulate to integrate system with larger City of Boston Resilience Plan
- Formulate alternatives using the USACE Resilience cycle: Prepare, Absorb, Respond, (Adapt)
- Formulate plans that consider federal objectives of economic, socioeconomic, and environmental benefits to identify the plan that maximizes the three.
- Formulate plans that take advantage of existing expertise and efforts in the region.

Nonstructural Measures and Alternatives

- Vertical Structures on piers and piles are not being recommended for nonstructural treatment due to uplift concerns on the foundation structures. If we adapt the vertical structure, we must adapt the foundational structure. They will be considered residual risk.

- Port Norfolk is separable: There is no structural measure being recommended. Nonstructural can be included or separated out based on “pause” directive from USACE.

- Charlestown Navy Yard nonstructural adaptation requires complex design due to Historical nature of structures and Navy Yard. In the absence of a structural solution, the Navy Yard will likely be considered residual risk.

- Based on the above; **NS measures will be evaluated as part of Structural solutions but not as a standalone Alternative in the final array.**

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Neighborhood Approach

- Five Neighborhoods
  - East Boston
  - Charlestown
  - Downtown and North End
  - South Boston
  - Dorchester (Neponset River)

List of Measure Types

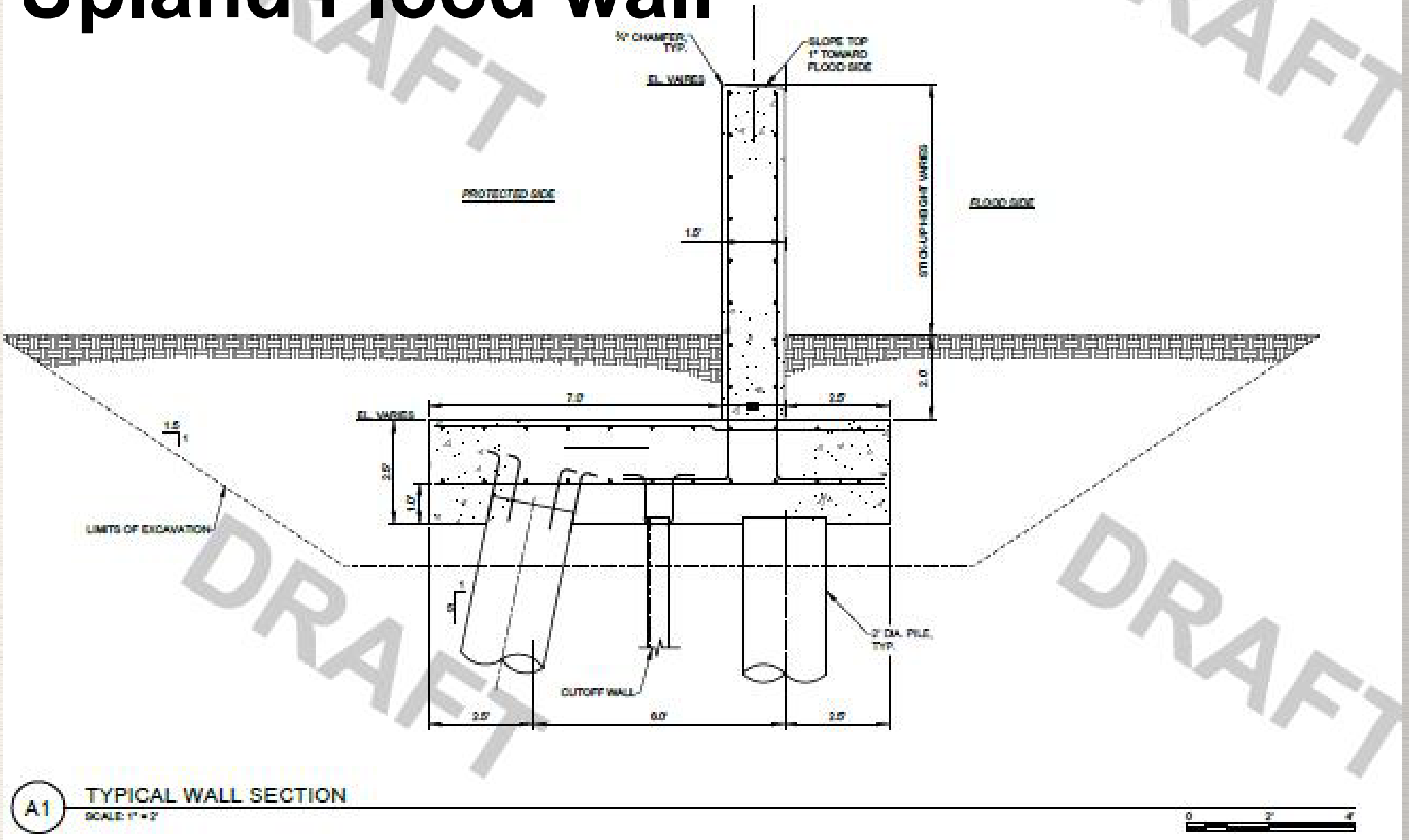
Measures

- Upland Vertical Wall (UV)
- Shallow Foundation Wall (SF)
- Outboard Solution (OB)

Combinations

- SF/OB
- SF/UV

Upland Flood wall



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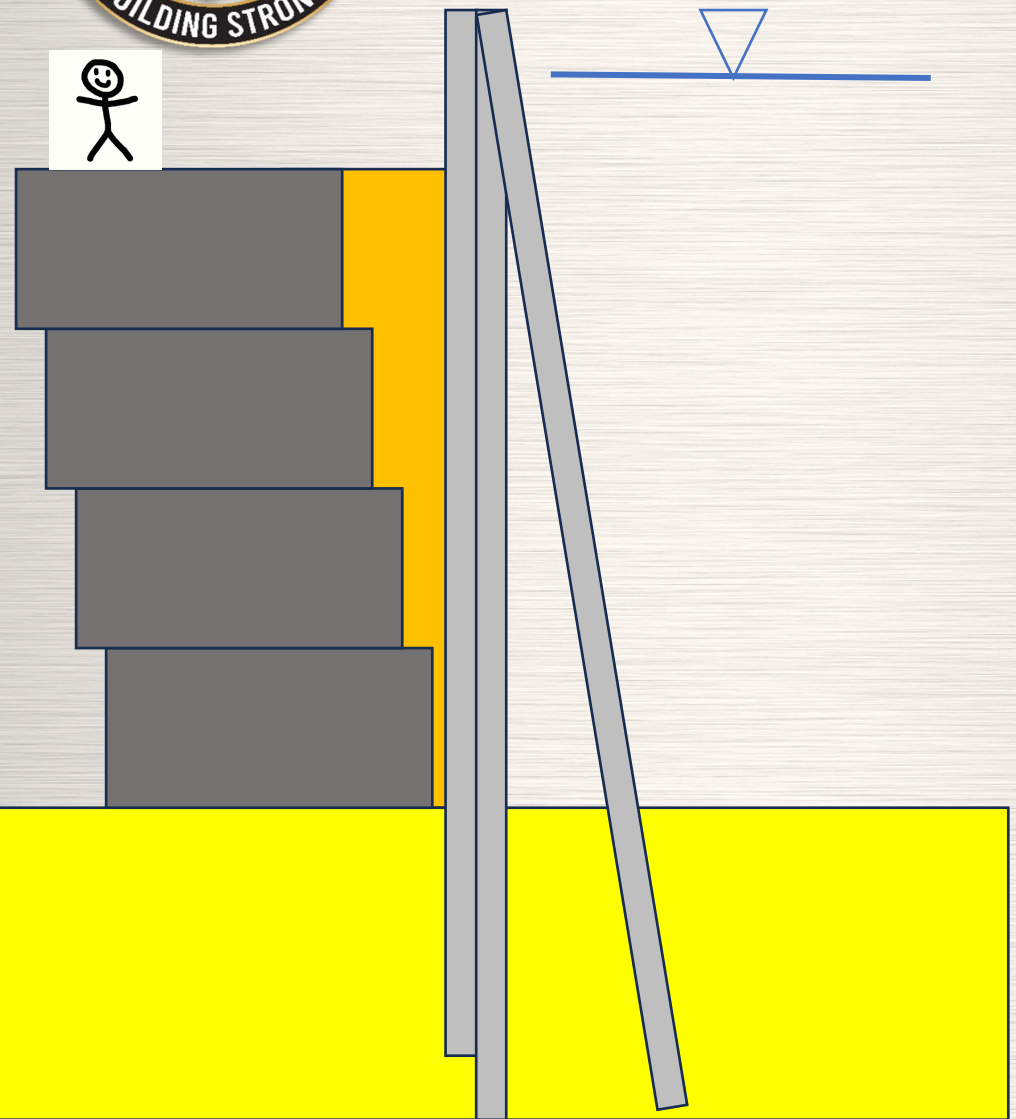
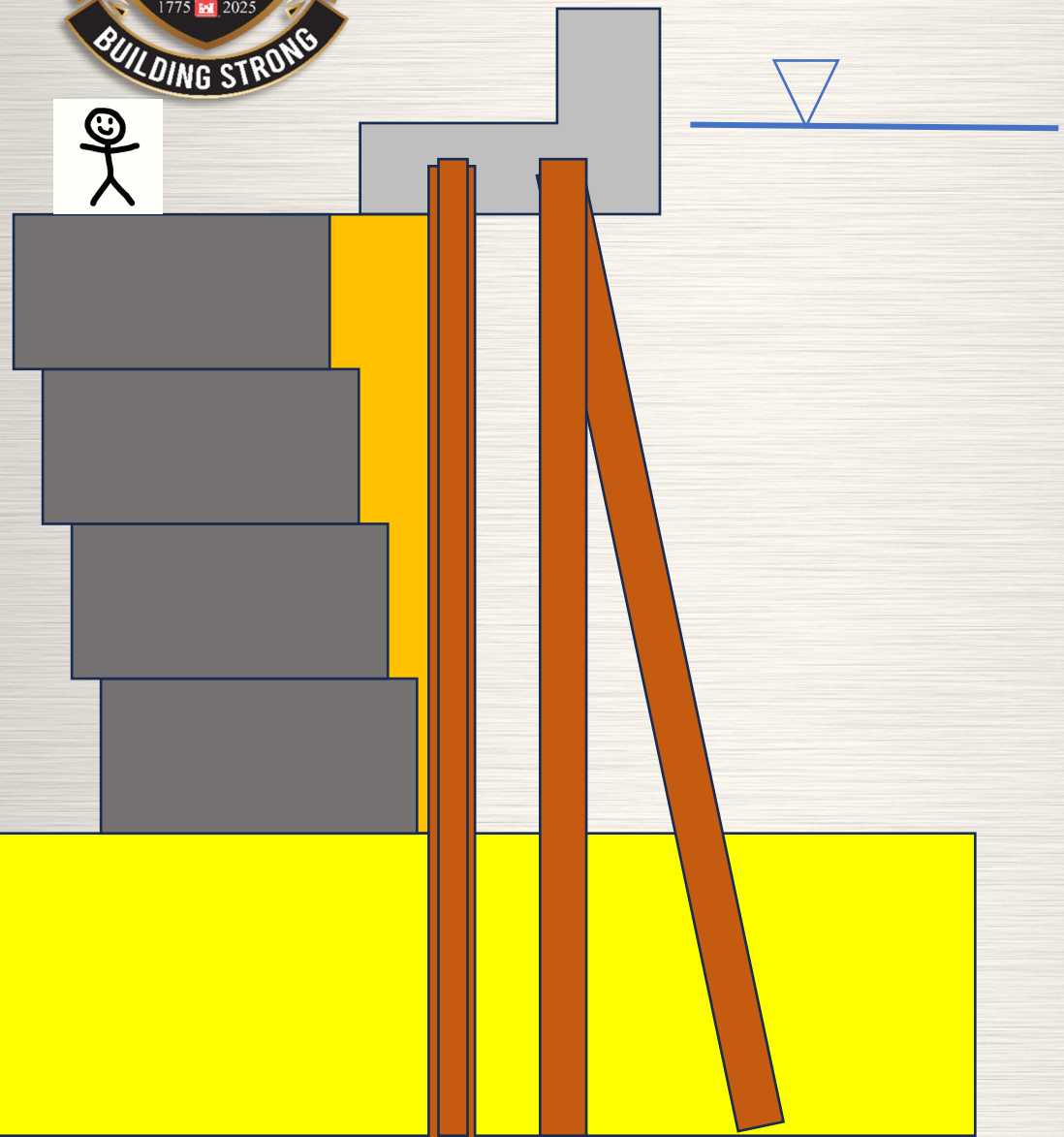
Concrete Seawall with King Piles



- Pros:
  - Adequate Cutoff
  - Limited Footprint
  - Cement type may have significant corrosion resistance and splash zone resistance.
  - All precast materials, quickly installed.
  - May use concrete sheet piles for additional capacity.
- Cons:
  - Long precast piles must be barged in or spliced.
  - Driving outboard batter piles may conflict with nearby buildings.

Raised Pier/Combo Wall



- Pros:
  - Adequate Cutoff
  - Adequate Lateral Capacity
  - Adequate Lateral Deflection
  - Outboard batter pile supports static loads (but less support for flood and wave loads)
  - Less fill than Norfolk option.
- Cons:
  - High Static Uplift and Wave Uplift
  - All piles exposed to splash zone. Properly designed concrete piles may be used to reduce corrosion.
  - Driving outboard batter piles may conflict with nearby buildings.

Final Array of Alternative Plans East Boston Measures-

1) Chelsea Creek preference from Mass DoT, City, and NAE is to use the RoW at coastal edge. Route 1A Median alignment presents challenges.
2) Screened Belle Isle Marsh @Bennington St. due to flood pathways through Revere. Replaced with Gate @ Suffolk Downs Station.
3) Constitution Beach is setback to Blue Line.
4) Jeffries Point is looking at a grade change to Tomahawk Dr. or Raised Harborwalk.
5) Lewis Street Carlton Wharf. Partial existing Project
6) Lo Presti Park requires cutoff for floodpath between high-ground. May elevate features in park in lieu of perimeter.
7) Border Street Alignment requires high-ground tie-ins for completeness

Final Array of Alternative Plans East Boston-

EB1: Upland Vertical Barrier along Railway RoW at Coastal Edge of Chelsea Creek; Closure Structure at Suffolk Downs Station; Orient Heights Railyard Upland Vertical Structure; Constitution Beach.

EB 1(A): Replace Upland Vertical Barrier at Coastal Edge with Inland barrier along Route 1A with or without NS along Chelsea Creek.

EB2: Wood Island Marsh Upland Vertical Feature with closure IVO Wood Island Station; Border Street Upland Vertical Feature; Lo Pristi Park; Lewiston Carlton Wharf; Jeffries Point/Tomahawk Drive

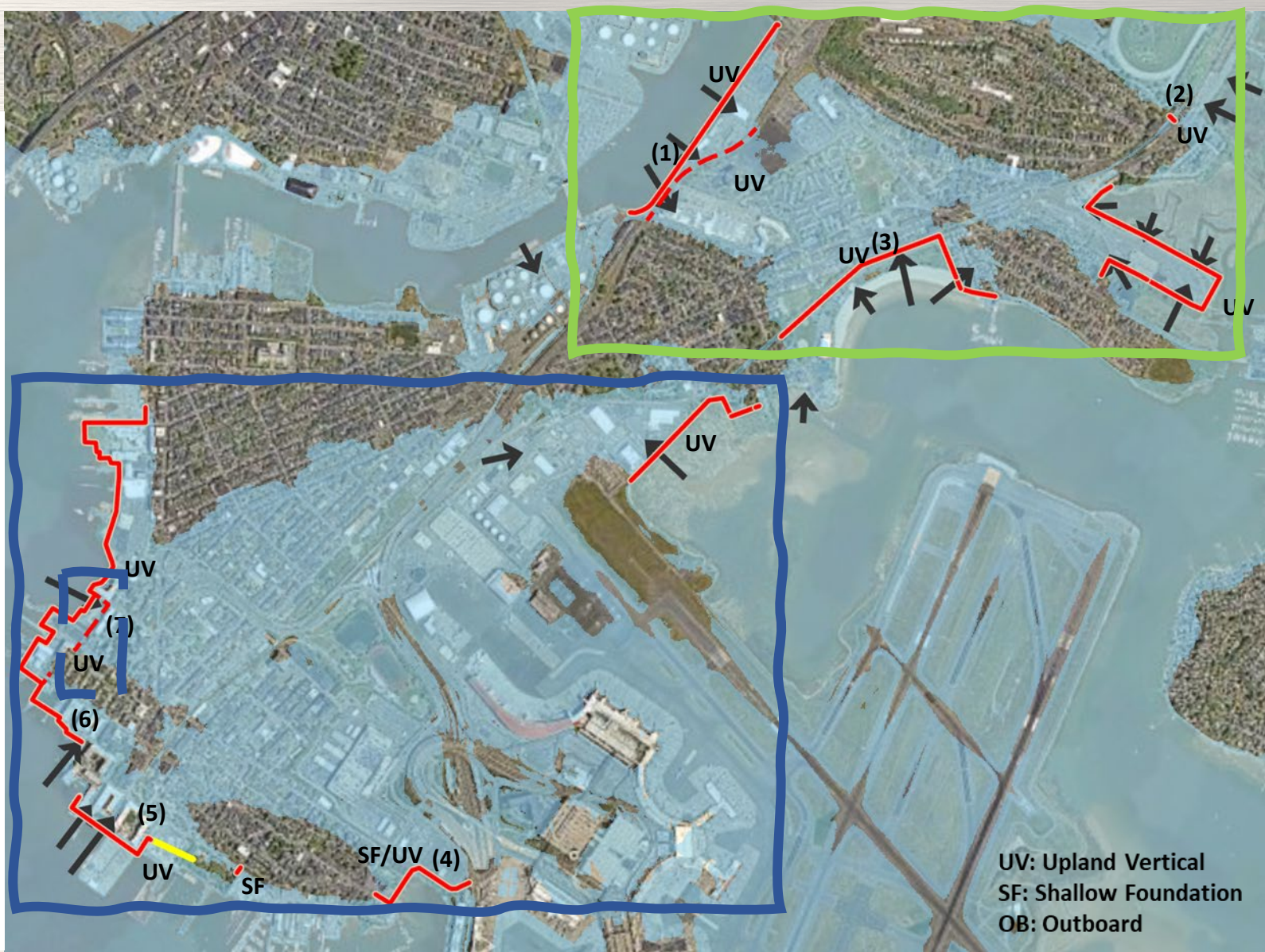
EB2(A): Cut Border Street distance and avoid full outboard perimeter solution in favor of tying into high ground vicinity of Maverick Street.

EB3: Combination of EB1&2*

EB 4: Eagle Hill Nonstructural.

EB5: All of the Above.

*Run optimization of 1(A) and 2(A) before Running EB3 to eliminate additional runs.



Final Array of Alternative Plans Charlestown Measures-

1) Ryan Playground existing city project. Alford Street/Rutherford Ave shallow foundation. Medford St. Existing Harborwalk Alignment.
2) Massport Autoport Residual Risk. Waiting for additional information on potential Wind Farm testing facility; screened Perimeter Solution to date.
3) Little Mystic Channel outboard solution due to proximity to residential condos. Socially vulnerable, affordable housing community.
4) Outboard solution manages risk to Historic Charlestown Navy Yard and Residences. Some Residual Risk remains.
5) Alternative to OB solution closes floodpath at Chelsea St. and Vine with a wall and closure. Navy Yard is residual risk.
6) Paul Revere Park changes grade within edge of park abutting New Charles River Dam. Adaptable if and when Dam is modified in the future.

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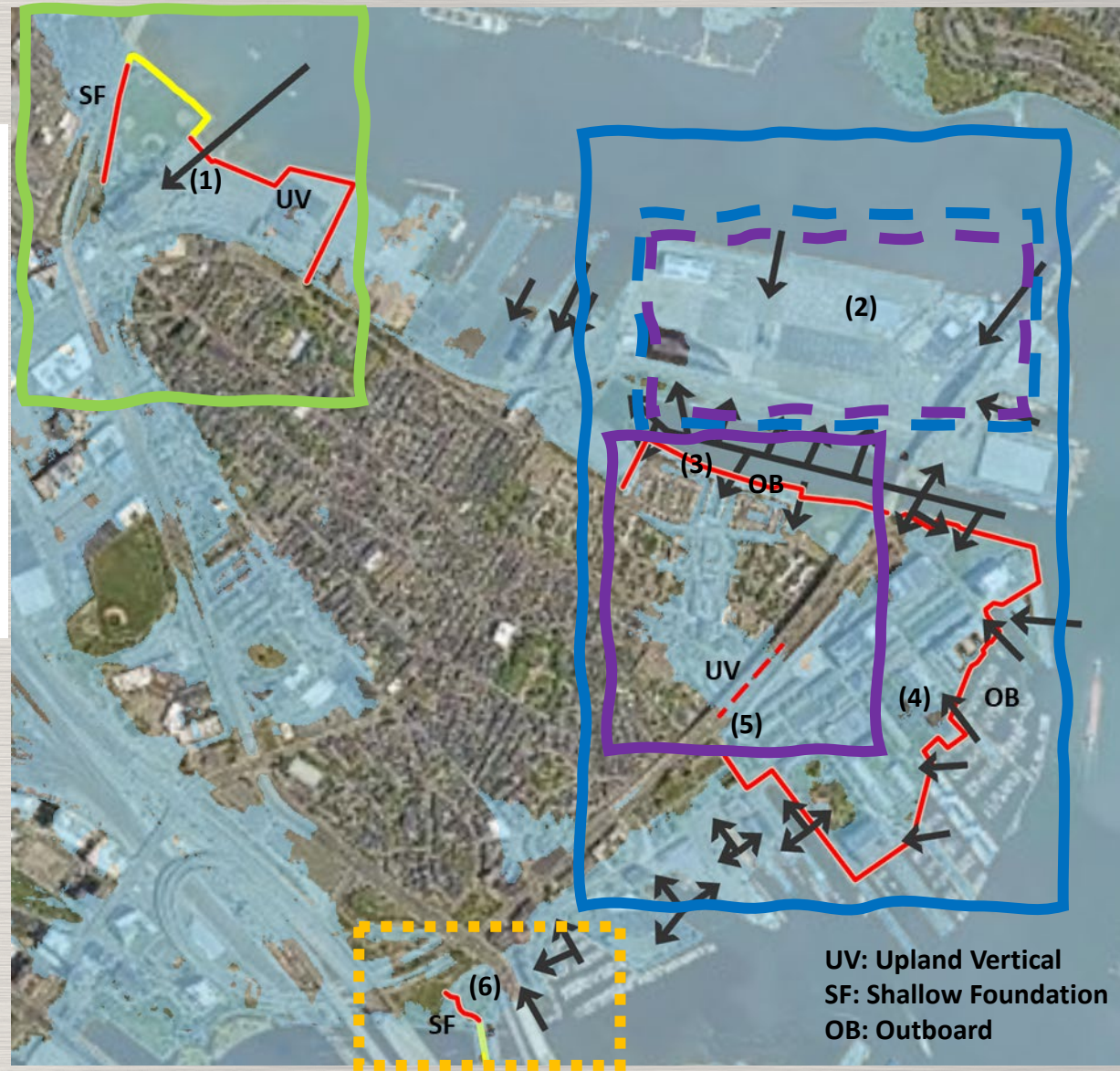
Final Array of Alternative Plans Charlestown-

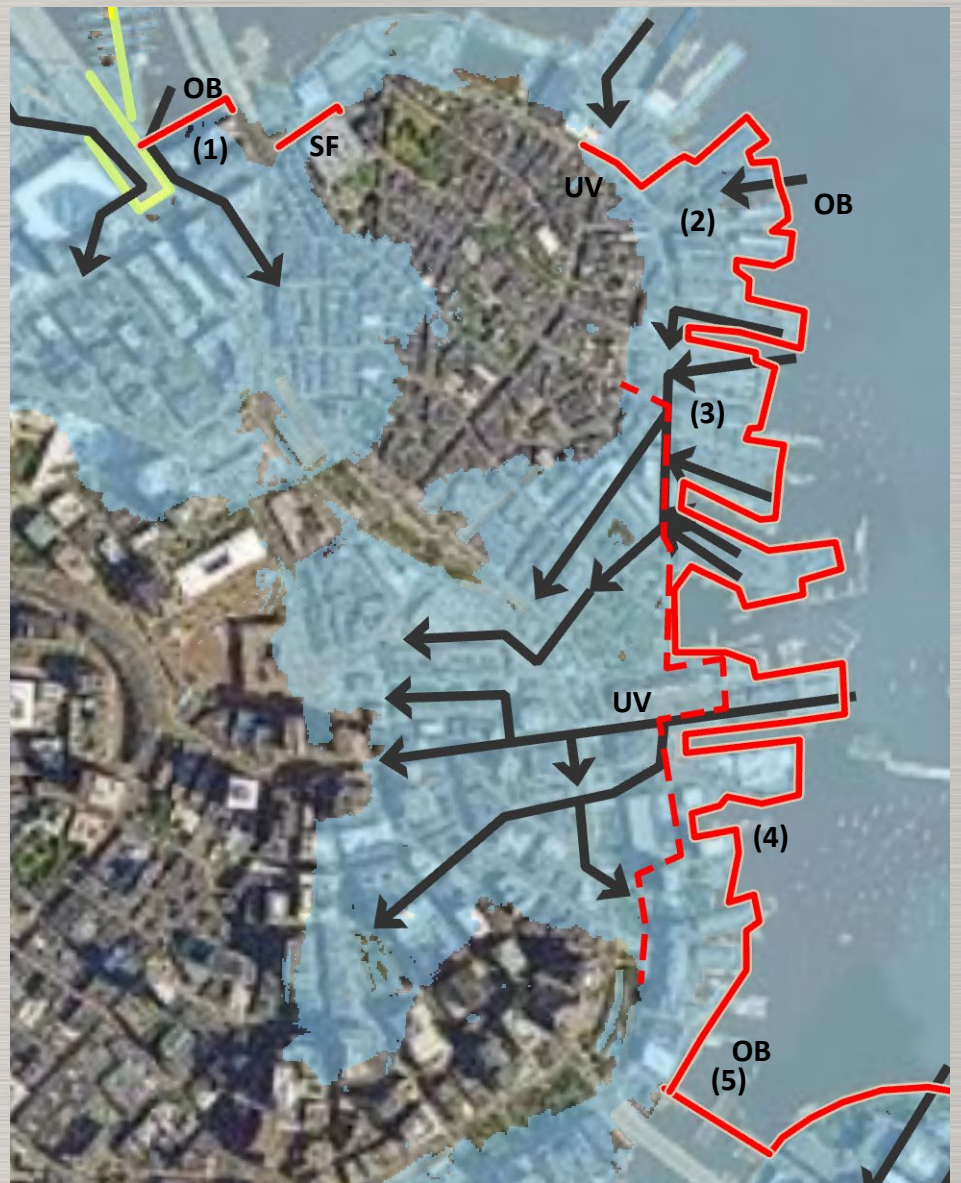
CH1: Ryan Playground/Rutherford Avenue Shallow Foundation; 425 Medford Upland Vertical (Harborwalk)
CH2: Little Mystic tie into Chelsea St. Bridge; NS Little Mystic Community Center; Flood Wall at Chelsea St. and Vine Street with Closure.
CH2(A): NS in Autoport
CH3: Little Mystic; NS Little Mystic Community Center; NS Autoport; Perimeter around Coastal Edge.
CH3(A): No NS Autoport
CH4: Combination. Optimize CH2 and CH2(A); as well as Compare CH2 and CH3 before combination.

Necessary for NCRD Alternative in Downtown Neighborhood (Larger System Tie-in)



Final Array of Alternative Plans Downtown/North End-

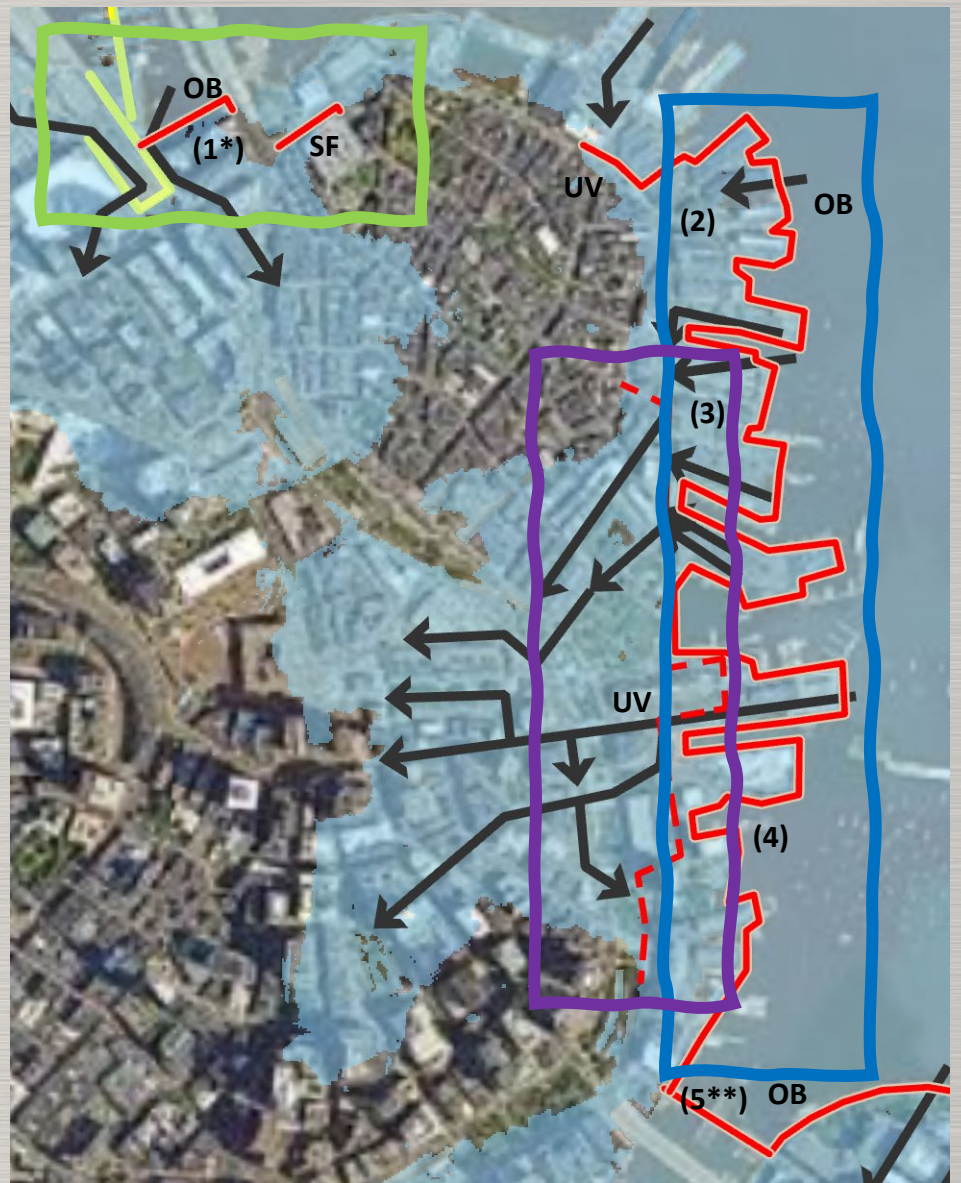
1) Ties into NCRD; does not modify existing Dam and would leave residual risk above 11.7' NAVD88 at Dam itself. Tie-in structure will support higher elevation to manage risk and adaptability.
2) City prefers perimeter alignment
3) Without perimeter alignment; seaward structures are likely residual risk due to uplift risk in the future. Piers are not resilient to uplift and would require tie-down. See WTC Boston, 300-tie-downs.
4) Wharf District and NE Aquarium prefer perimeter alignment around campus. Nonstructural would be extremely complex.
5) Ties into Surge Barrier at Fort Point Channel to the south.



Final Array of Alternative Plans Downtown/North End-

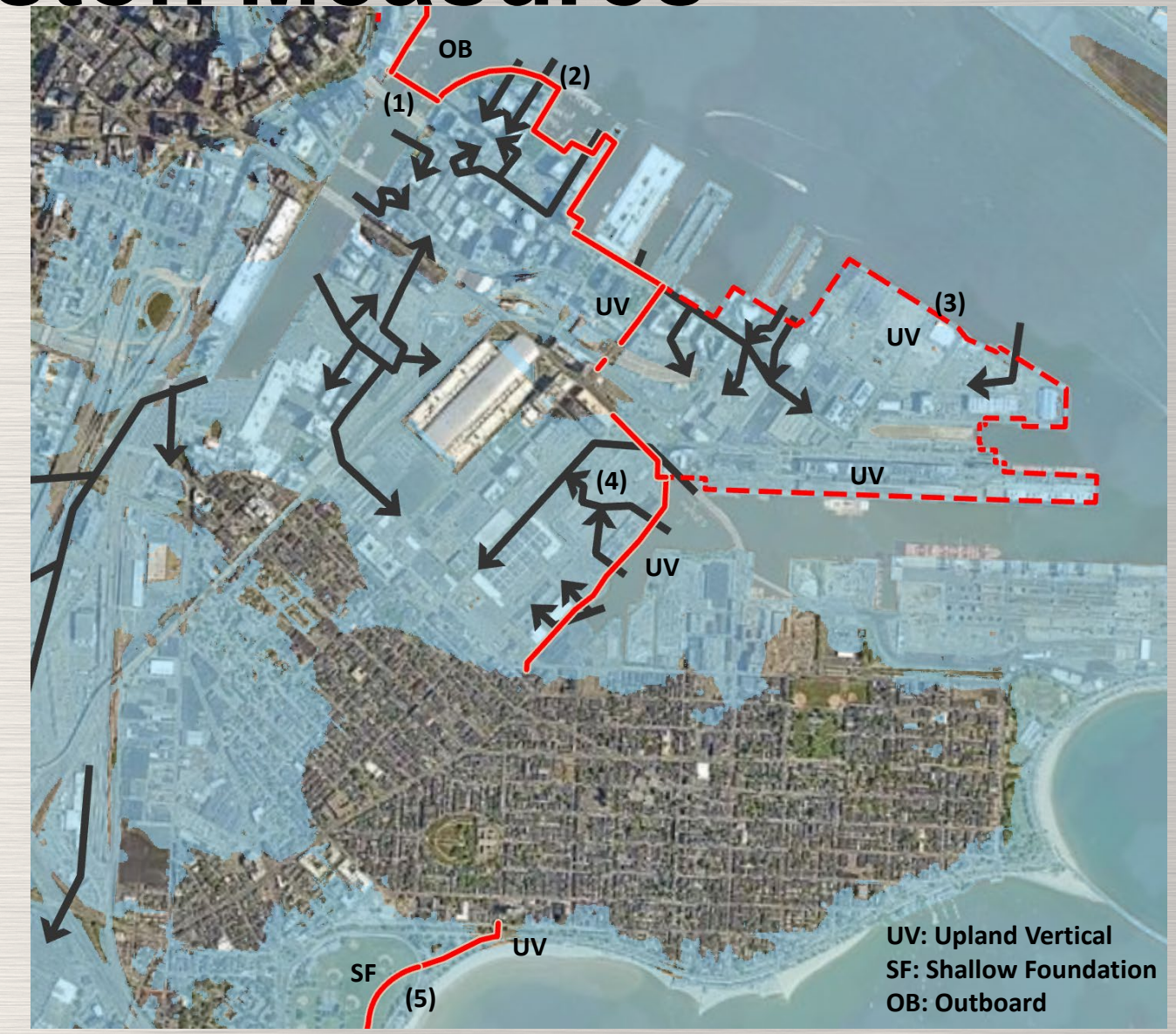
DT1: North Washington Street Bridge and TD Gardens and Charlestown Paul Revere Park Measure.
DT2: Inner Alignment
DT3: Full Perimeter
DT4: Combination Alternative; evaluate DT2 and DT3 before evaluating combination.

*Requires Paul Revere Park in Charlestown Measure for effectiveness
**Surge Barrier for both DT and South Boston



Final Array of Alternative Plans South Boston Measures-

1) Surge Barrier, likely combined with Boston Water Sewer Commission Stormwater Plan (Betterment or LPP). Surge Barrier may still require perimeter channel structures, depending on operations, activation requirements and sizing of Surge Barrier.
2) Outboard around Fan Pier Park due to upland complexity and uncertainty. No need to wrap WTC Boston; structure is resilient including pier tie-downs for uplift.
3) City prefers perimeter alignment across Ray Flynn Marine Industrial Park and up Reserve Channel.
4) Requires parapet walls to keep I-90 tunnel entrance and highway dry during storm.
5) Moakley Park connects to Dorchester area plans.



Final Array of Alternative Plans South Boston

SB1: South Boston Inland D Street Alignment
SB2: South Boston Full Perimeter (City Preferred)

= Difference between SB1 and SB2

*Requires Tie-In for Dorchester Moakley Park
**Surge Barrier for both DT and South Boston

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Final Array of Alternative Plans Dorchester Measures-

1) Tie into natural high ground around stadium at Moakley Park.

2) Shallow Foundation across the full stretch of Harbor Point Community.

3) Shallow Foundation around Patten's Cove. Grade Change at intersection of Bianculli and Morrisey BLVD into shallow foundation.

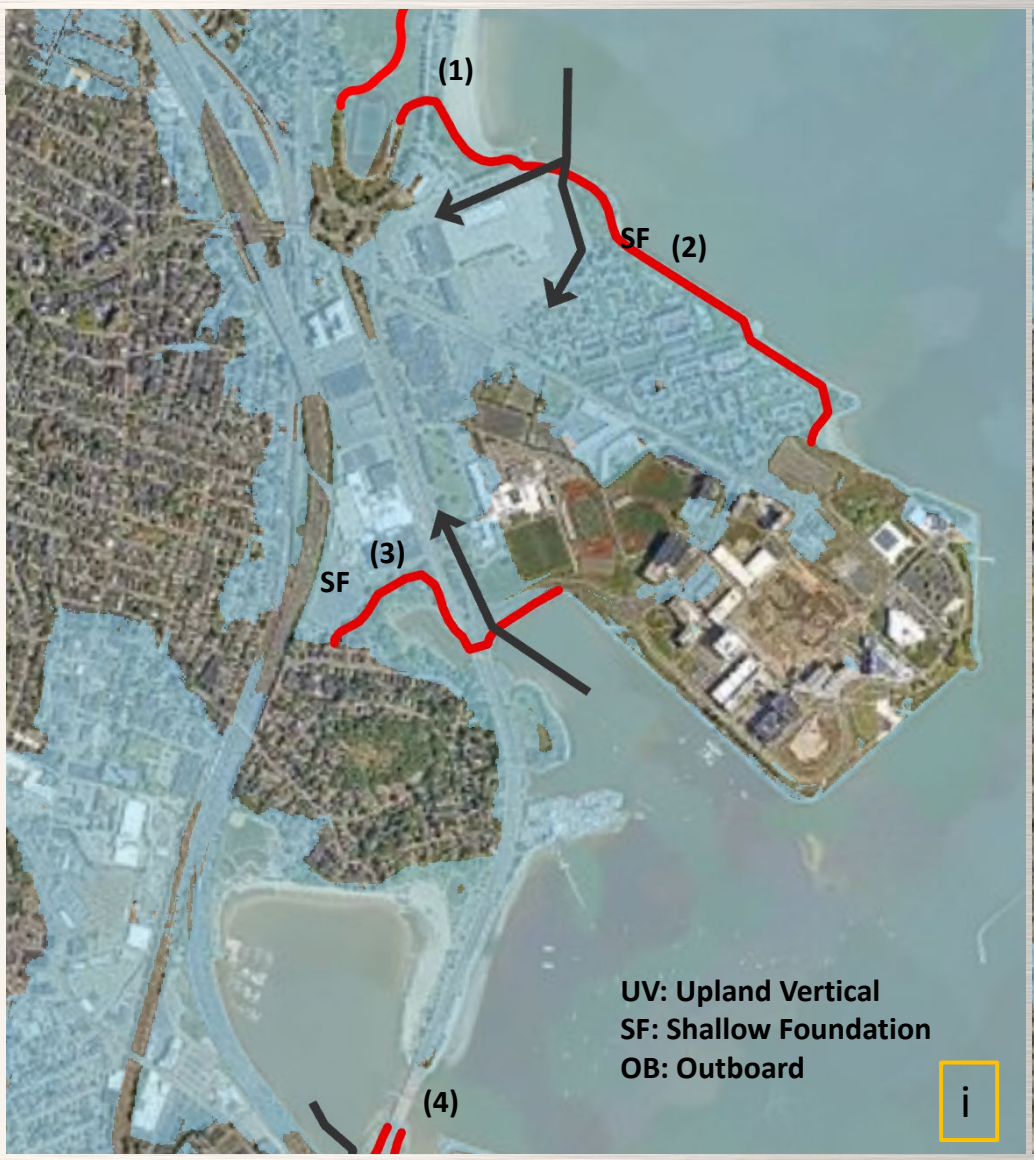
4) Vertical wall at Morrisey BLVD Bridge. Adaptable for MassDot to replace bridge.

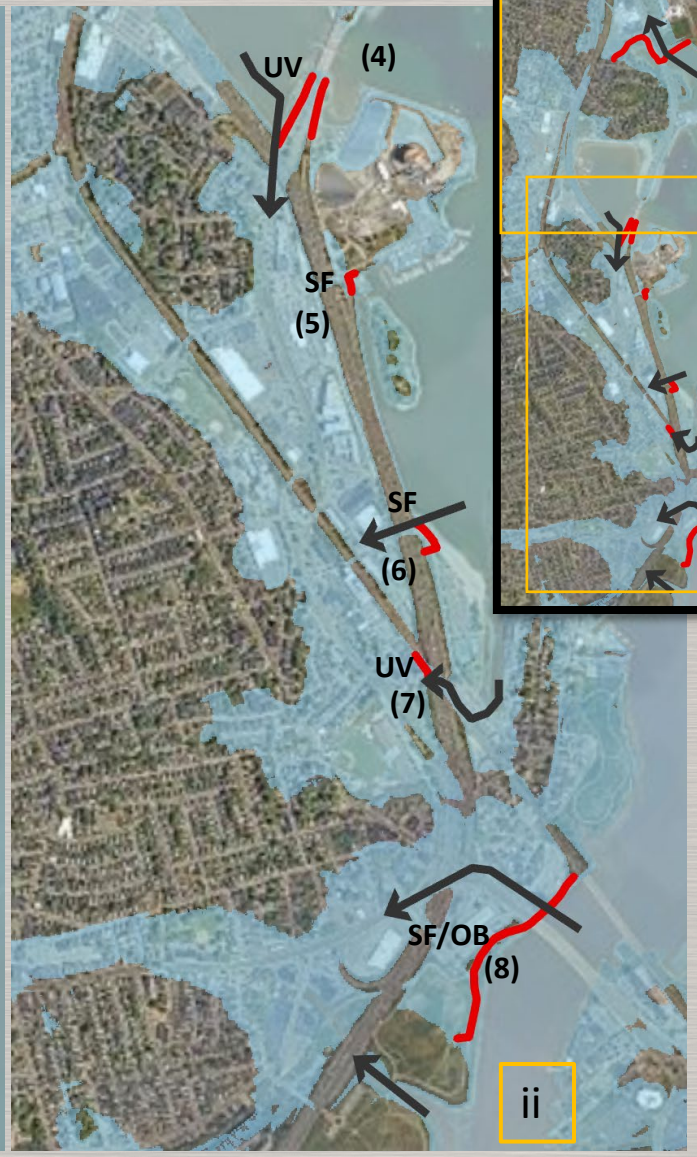
5) Modify Victory Rd. Off-ramp

6) Tenean Beach and Conley St. Change grade of Conley with shallow foundation.

7) Close Pine Neck Creek pathway

8) Use existing park layout and Harborwalk with SF

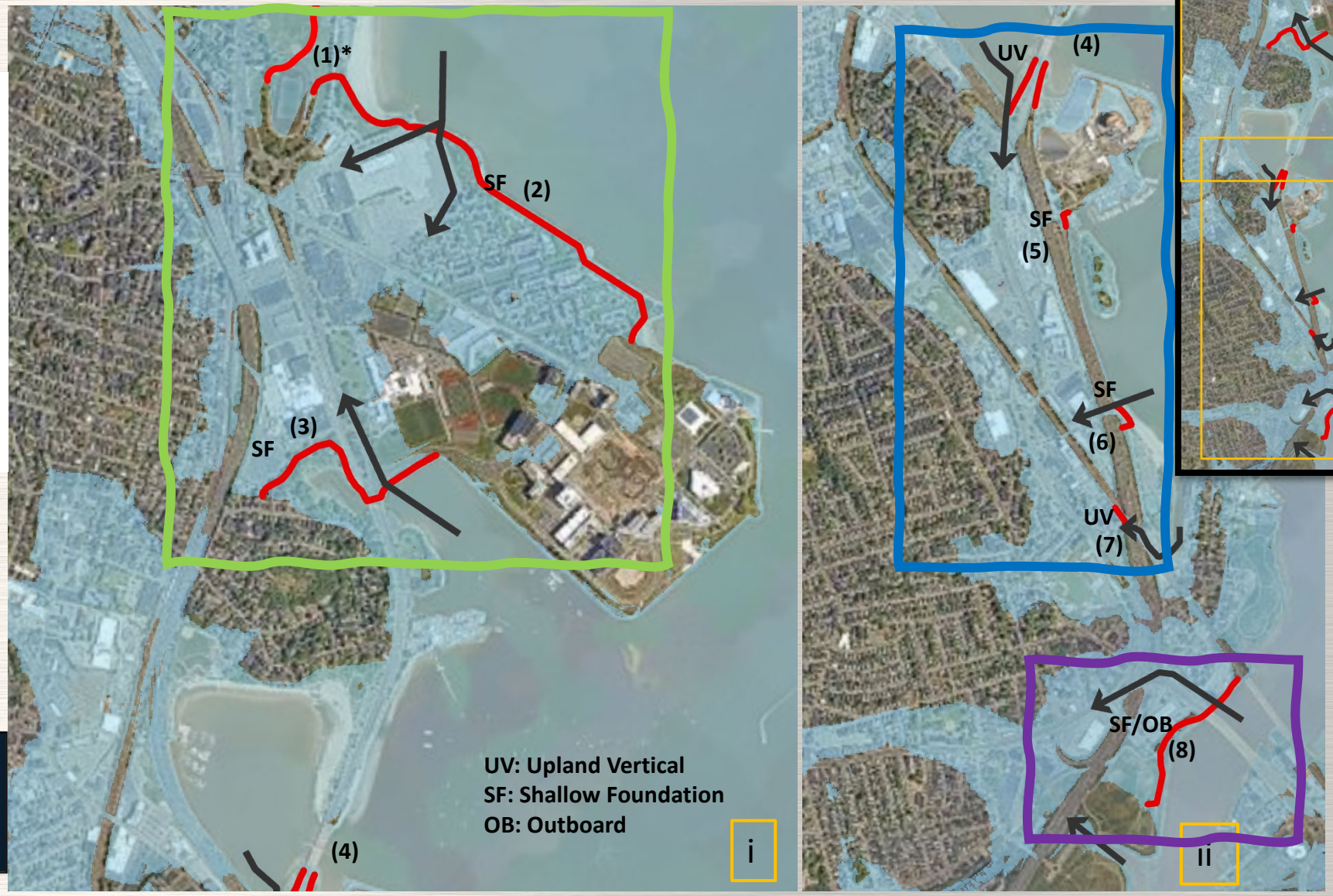




Final Array of Alternative Plans Dorchester-

DOR1*: Harbor Point Community and Moakley Park (Requires tie-in at South Boston Moakley Park)
DOR2: Morrissey BLVD Bridge to Tenean Beach
DOR3: Neponset River
DOR4: Any Combination of DOR1-3

* Moakley Park measure is also directly tied to the South Boston Plan at the Northern Moakley Park Connection Measure.



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Protected Species – USFWS

		Charlestown	Downtown	South Boston	Dorchester	East Boston
Roseate Tern	E	X	X	X	X	X
Piping Plover	T				X	
TCB	PE	X	X	X	X	X
Monarch Butterfly	PT	X	X	X	X	X

- No Critical Habitats
- No Rufa Red Knot or NLEB identified in the project areas

Expected Determinations:

- **No effect for TCB, monarch butterfly**
- **NLAA for roseate tern, plover**

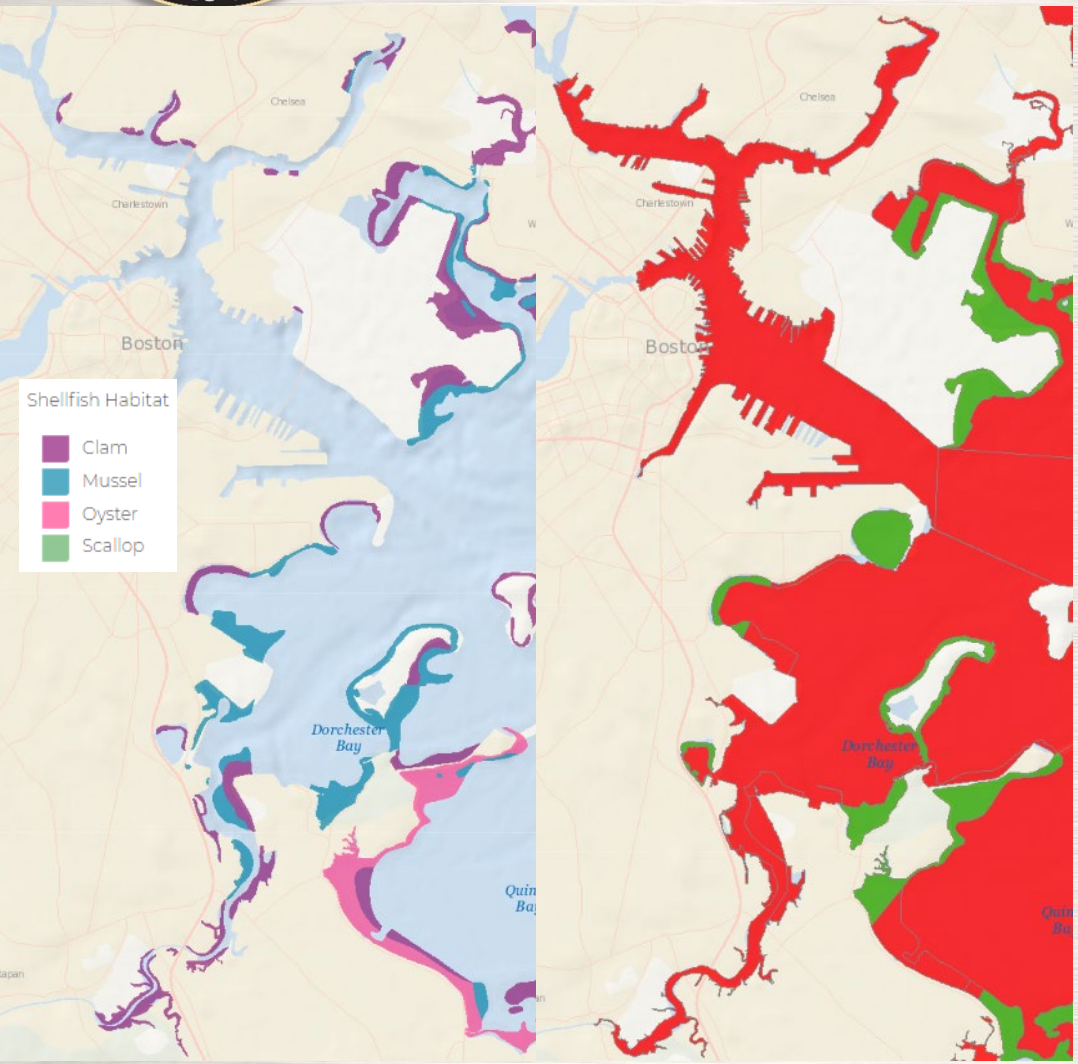
Protected Species – NMFS

		Life Stages	Notes
Atlantic Sturgeon*	T	subadult, adult	migrating, foraging
Shortnose Sturgeon*	E	adult	migrating, foraging
NARW	E	juvenile, adult	migrating, foraging, overwintering
Fin Whale	E	juvenile, adult	foraging, overwintering
Green Turtle	T	juvenile, adult	migrating, foraging
Loggerhead	T	juvenile, adult	migrating, foraging
Leatherback	E	juvenile, adult	migrating, foraging
Kemp's Ridley	E	juvenile, adult	migrating, foraging

*Only Atlantic and shortnose sturgeon have potential to overlap with the Mystic River and Chelsea Creek alignments in Charlestown and East Boston, respectively

Expecting NLAA determinations for listed species

Fisheries/Wildlife Resources



	Alewife	Blueback Herring	Rainbow Smelt	American Eel	White Perch	Atlantic Tomcod	Sea Lamprey	Shortnose Sturgeon	Atlantic Sturgeon	American Shad	Fall Run	Spring Run
Chelsea Creek	N	N	Y	Y	N	N	N	N	N	N	15 Sep – 31 Oct	1 Mar – 30 June
Mystic River	Y	Y	N	Y	Y	Y	N	N	N	Y	1 Sep – 15 Nov	15 Feb – 15 July
Charles River	Y	Y	Y	Y	Y	Y	N	N	N	Y	1 Sep – 15 Nov	15 Feb – 15 July
Inner Harbor	Y	Y	Y	Y	Y	Y	N	N	N	Y	1 Sep – 15 Nov	15 Feb – 15 July
Neponset River	Y	Y	Y	Y	Y	Y	N	N	N	Y	1 Sep – 15 Nov	15 Feb – 15 July

- No eelgrass, limited macroalgae
- Benthic resources documented in USACE survey, limited resources within action areas
- No lobsters documented; limited potential habitat in action areas
- Upland vegetation primarily landscaped urban trees/shrubs

Essential Fish Habitat

Species	Egg	Larvae	Juvenile	Adult
American plaice (*Hippoglossoides platessoides*)	X	X	X	X
Atlantic Butterfish (*Peprilus triacanthus*)	X	X		X
Atlantic cod (*Gadus morhua*)	X	X	X	X
Atlantic herring (*Clupea harengus*)		X	X	X
Atlantic Mackerel (*Scomber scombrus*)	X	X	X	X
Atlantic Surf clam (*Spisula solidissima*)			X	X
Atlantic wolffish (*Anarhichas lupus*)	X	X	X	X
Black Sea Bass (*Centropristis striata*)				X
Bluefin tuna (*Thunnus thynnus*)				X (D, EB, SB only)
Bluefish (*Pomatomus saltatrix*)			X	X
Haddock (*Melanogrammus aeglefinus*)			X (SB only)	
Little skate (*Leucoraja erinacea*)			X	X
Longfin Inshore Squid (*Doryteuthis pealeii*)			X	X
Northern Shortfin Squid (*Illex illecebrosus*)				X

Species	Egg	Larvae	Juvenile	Adult
Ocean pout (*Macrozoarces americanus*)	X (SB only)		X	X
Pollock (*Pollachius virens*)	X	X	X	
Red hake (*Urophycis chuss*)	X	X	X	X
Scup (*Stenotomus chrysops*)			X	X (SB only)
Silver hake (*Merluccius bilinearis*)	X	X		X
Spiny dogfish (*Squalus acanthias*)				X
Summer Flounder (*Paralichthys dentatus*)				X
Thorny skate (*Amblyraja radiata*)			X	
White hake (*Urophycis tenuis*)	X	X	X	X
White shark (*Carcharodon carcharias*)			X (D, SB only)	X (D, SB only)
Windowpane flounder (*Scophthalmus aquosus*)	X	X	X	X
Winter flounder (*Pseudopleuronectes americanus*)	X	X	X	X
Winter skate (*Leucoraja ocellata*)			X	X
Yellowtail flounder (*Limanda ferruginea*)	X	X	X	X

*Juvenile Cod HAPC mapped but not within action areas

Environmental Coordination

	Agency	Notes
NEPA	All	Integrated Feasibility Report and Environmental Impact Statement; NEPA Scoping in March 2026; targeting draft release/public comment period in July 2026
ESA	USFWS & NMFS	No effect, NLAA determinations expected
FWCA	USFWS or NMFS	Determine Service for FWCA; seek PAL
MSFCA	NMFS	EFH, HAPC mapped; no significant impacts expected for most; potential mitigation subtidal habitat lost due to alignment footprints
CWA	MA DEP	404(b)(1) eval; 401 WQC will be sought
CZMA	MA EEA	Consistency determination being developed; conversations ongoing
CAA	EPA	MA in attainment for all NAAQS
NHPA	SHPO/Tribes	Coordination ongoing; significant cultural resources

*Also supporting COB with MEPA application and Chapter 91 license

Questions/Comments/Discussions

- Missing resources
- Accurate impact assessments & initial effects determinations
- FWCA – Planning Aid Letter
- Recommendations?