

NEW YORK-NEW JERSEY HARBOR AND TRIBUTARIES COASTAL STORM RISK MANAGEMENT STUDY

Briefing to Brooklyn Community Board 1
Environmental Protection Committee
Meeting

New York District
November 29, 2022



US Army Corps
of Engineers®



NON-FEDERAL PARTNERS



Department of
**Environmental
Conservation**

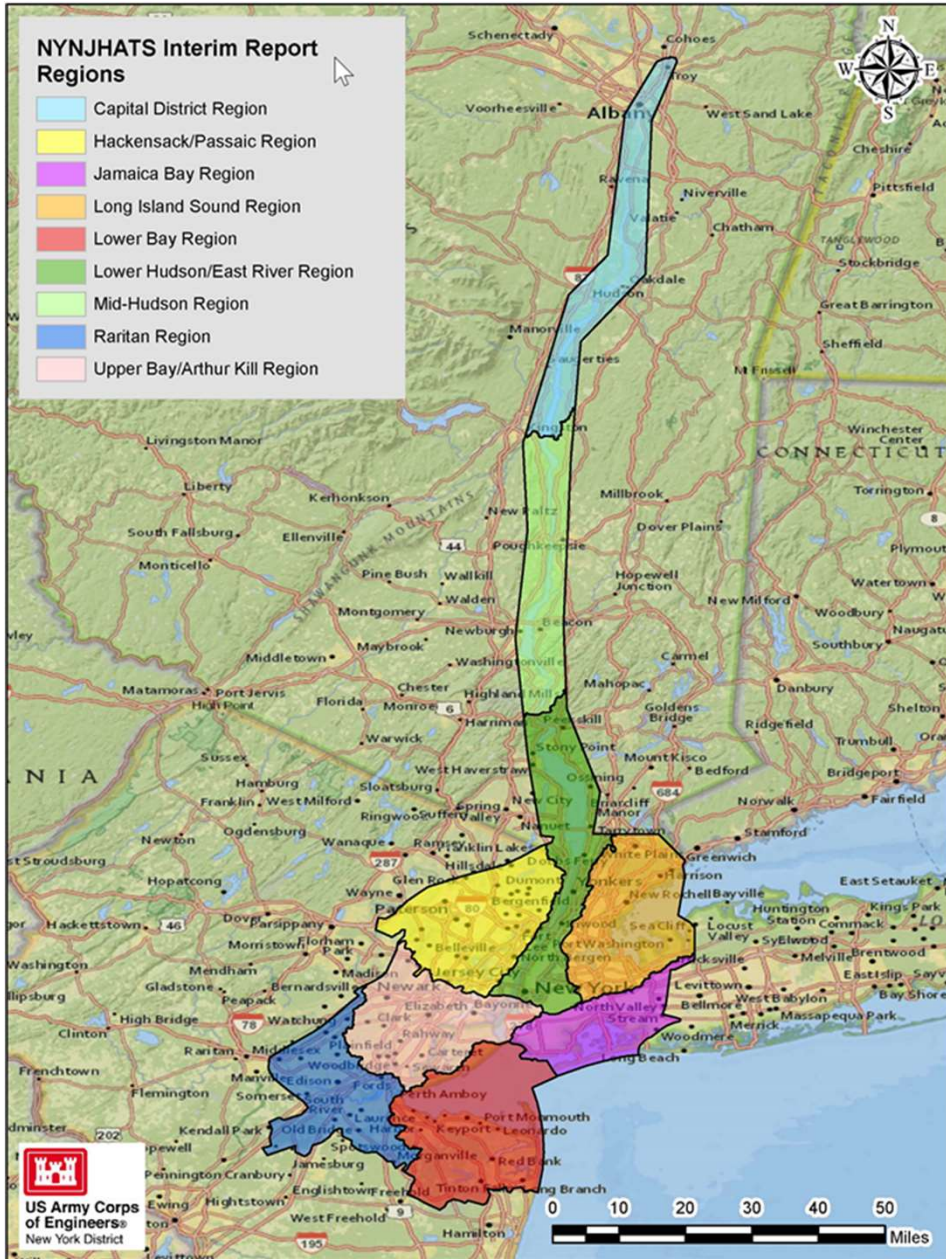


Department
of State

NYC Mayor's Office of Climate &
Environmental Justice



NEW YORK-NEW JERSEY HARBOR AND TRIBUTARIES COASTAL STORM RISK MANAGEMENT FEASIBILITY STUDY



STUDY AREA

- The largest and most densely populated of the 9 NACCS Focus Areas
- Area covers 2,150+ square miles and 900+ miles of affected shoreline
- 25 counties in New York & New Jersey
- Affected population of roughly 16 million people, including New York City and the six most populated cities in New Jersey

COASTAL STORM RISKS & DAMAGES

- Significant Life/Safety Risk and over 275,000 Structures in Potential Impact Area
- Incorporates Dozens of Other Ongoing and Planned CSRMs in Study Area
- Present Value Damages for 100-Year Storm Range from \$100+B for Intermediate Sea Level Rise to over \$350B for High Sea Level Rise Projection

STUDY SCOPE

- **Study Cost:** \$19.4M, cost-shared 50/50 with NYSDEC and NJDEP thru July 2022, and 100% federal thereafter.
- **Study Schedule:** Assistant Secretary of the Army for Civil Works Approved (7 Apr 21) Second Exemption for Study Extension to 2024 Completion
- **Funding:** Federal funding (\$1.45M) resumed in October 2021 following lapses in fiscal years 2020 and 2021. Study also received \$6,724,000 of DRSAAs (100% federal funding).
- **Study Scope:** WRDA 2020 includes study specific language

STUDY SCHEDULE

- Draft Feasibility Report and integrated Tier 1 Environmental Impact Statement Released for extended public day review with meetings planned throughout area (comment closing date January 6, 2023). Virtual meetings held October 24th, 27th and November 5th.
- See WWW.NAN.USACE.ARMY.MIL/NYNJHATS for dates, times and locations of public in-person meetings in December.
- Final Chief of Engineers Report Approved to be Completed in 2024



ALTERNATIVE PLANS – PROS & CONS WITH EACH



Alternative 1: No action

Alternative 2: Harbor-wide storm surge barrier + shore-based measures

Alternative 3A: Multi-basin storm surge barriers + shore-based measures

Alternative 3B: Multi-basin storm surge barriers + shore-based measures

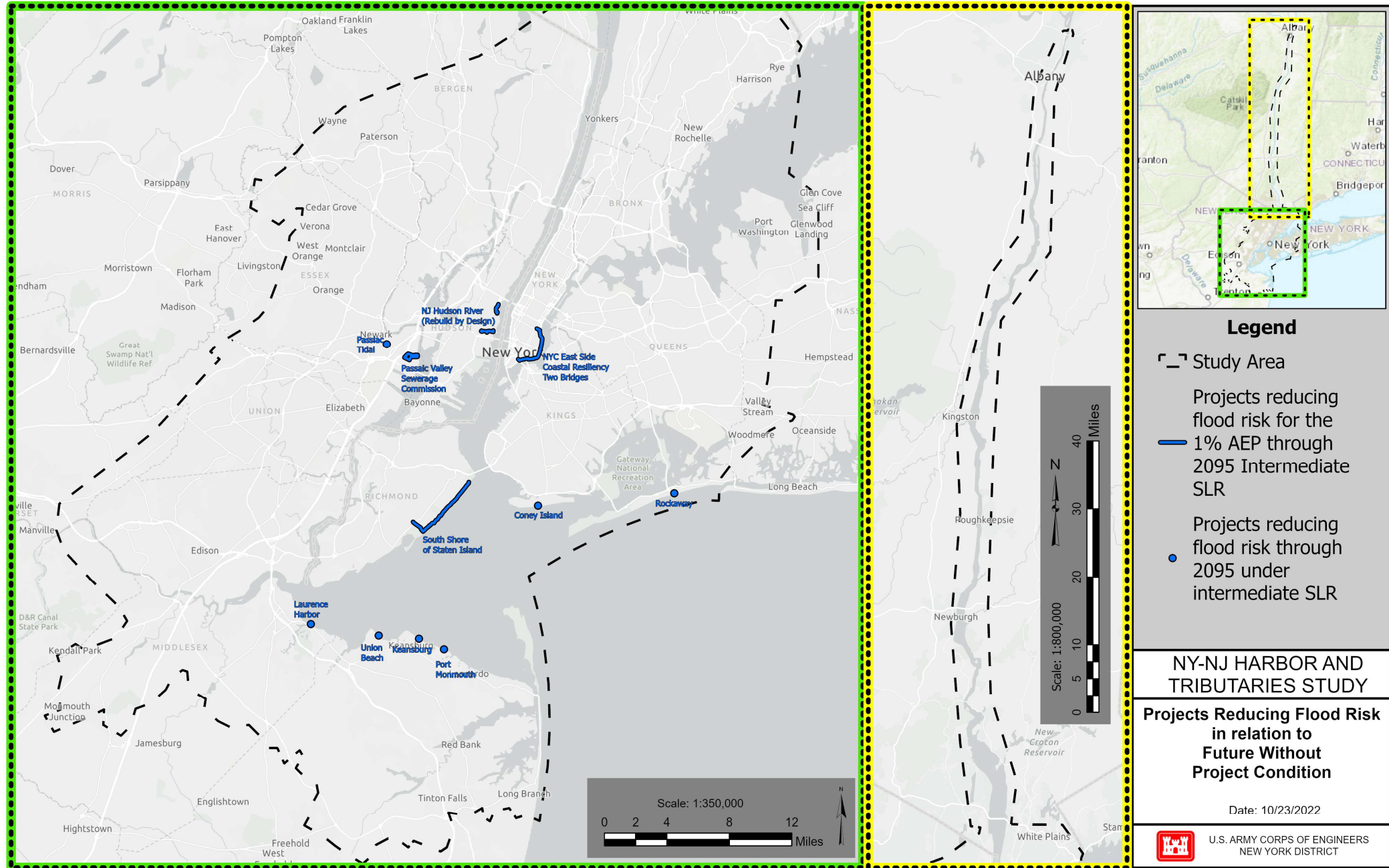
Alternative 4: Single-basin storm surge barriers + shore-based measures

Alternative 5: Shore-based measures only

- Alternatives span spectrum from large in-water storm surge gates to numerous shoreline-based structures. Alternatives also have (or will have) complementary non-structural and natural and nature-based features (where feasible).
- Best Solution Appears to Involve Multiple, Layered Features
- Possible Phased Implementation:
 - 1) Short-term: Construct Actionable Features,
 - 2) Mid-Term: Further Evaluate, Design and possibly Construct Complex Features,
 - 3) Long-Term: Adapt and expand features due to further sea level rise and climate change

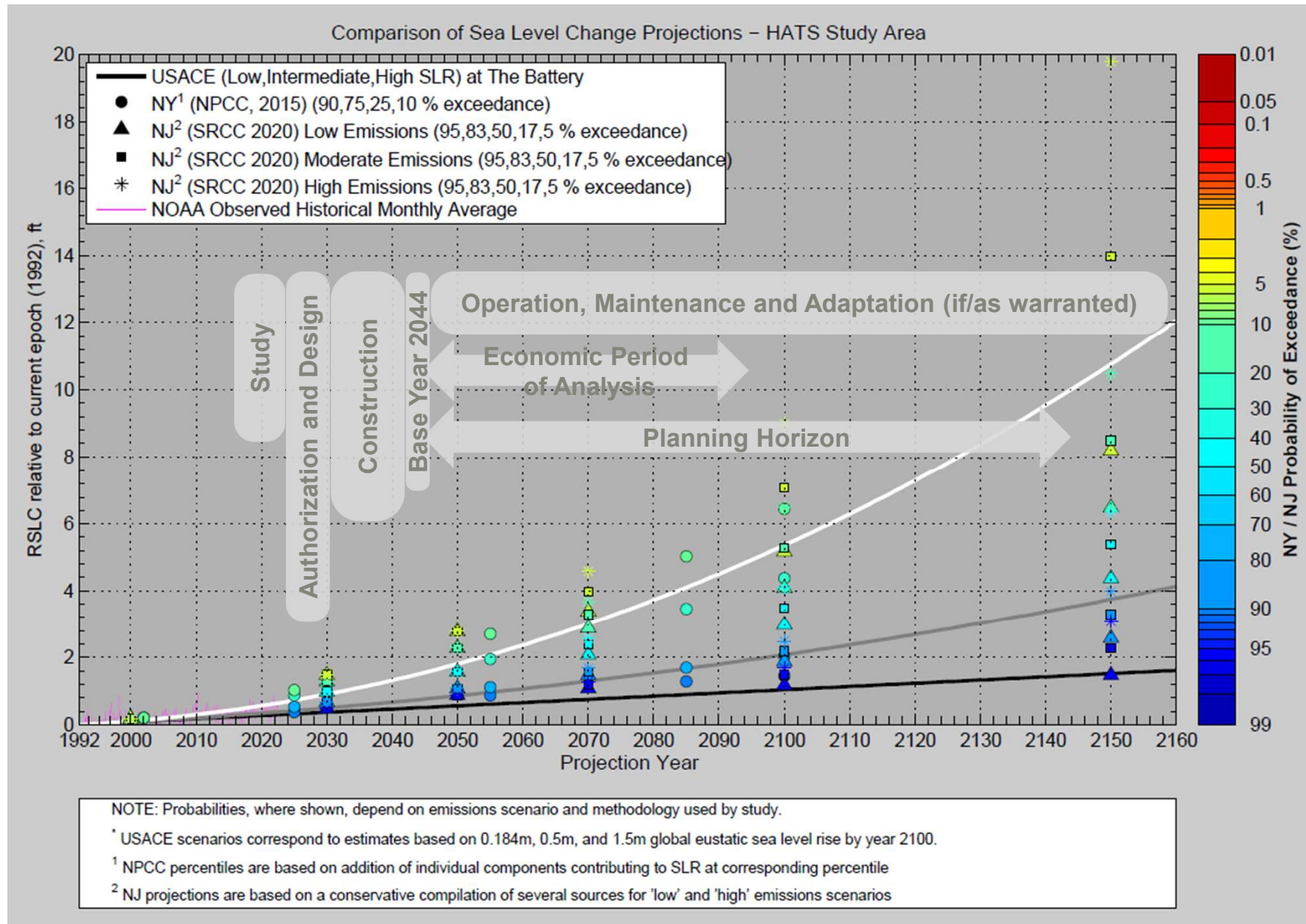


OTHER CONSTRUCTED AND ONGOING PROJECTS (BLUE) ASSUMED AS PART OF FUTURE BASELINE CONDITION



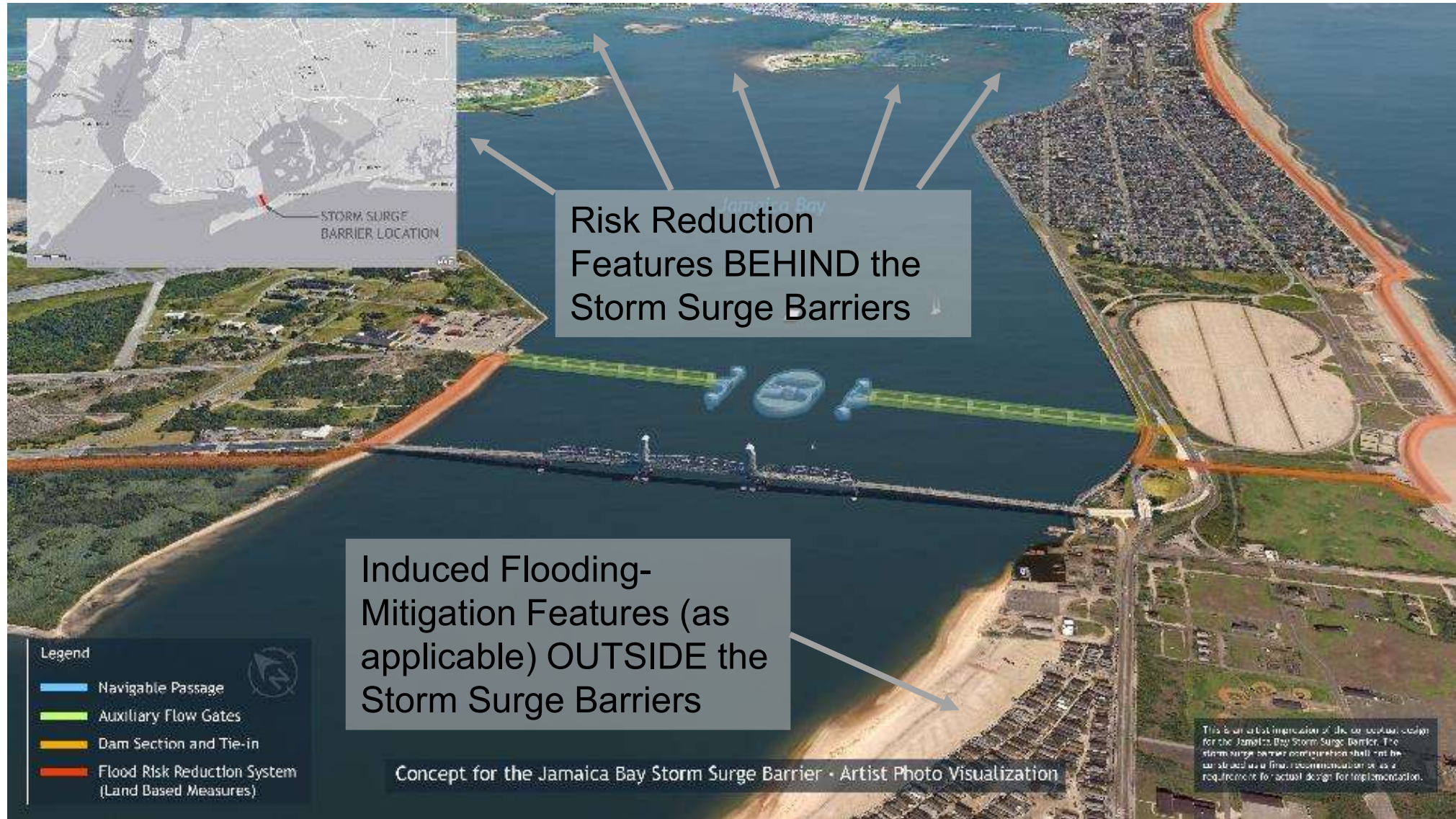


USACE RELATIVE SEA LEVEL CHANGE AT BATTERY COMPARED TO STATES AND CITY PROJECTIONS





ADDITIONAL CONSIDERATIONS WITH STORM-SURGE BARRIERS – RISK REDUCTION FEATURES AND INDUCED FLOODING-MITIGATION FEATURES



- Legend
- Navigable Passage
 - Auxiliary Flow Gates
 - Dam Section and Tie-in
 - Flood Risk Reduction System (Land Based Measures)

Concept for the Jamaica Bay Storm Surge Barrier - Artist Photo Visualization

This is an artist interpretation of the conceptual design for the Jamaica Bay Storm Surge Barrier. The storm surge barrier configuration shall not be used as a final recommendation or as a requirement for actual design for implementation.



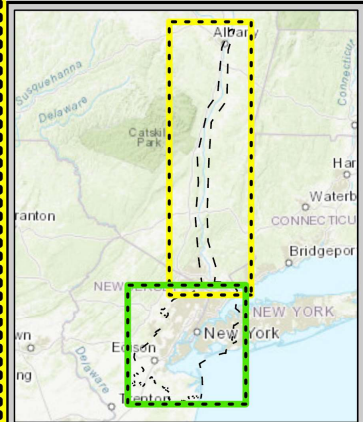
ALTERNATIVE 2



94.1% Study Area at Direct Risk Benefited

Feature Type	Approx. Miles
Storm Surge Barriers	7.4
Shoreline Based Measures	24.2
Induced Flooding-Mitigation Features	22.5
Risk Reduction Features (not shown)	36.2

Alternative	
First Cost (\$B):	\$ 112.3
Total Present Value Cost (\$B):	\$ 150.2
Estimated Construction Duration (years):	32



Legend

- Study Area
- Alternative 2 - CSRM Measures (SSB, SBM, IFF)
- CSRM Reduced Risk with Project Alt2 (area directly benefited)
- Residual Risk with Project Alt2 (area not benefited)

NY-NJ HARBOR AND TRIBUTARIES STUDY

Alternative 2
Future With Project
Reduced Risk & Residual Risk
(1% AEP with Intermediate
Sea Level Rise in 2095)
 Date: 10/21/2022



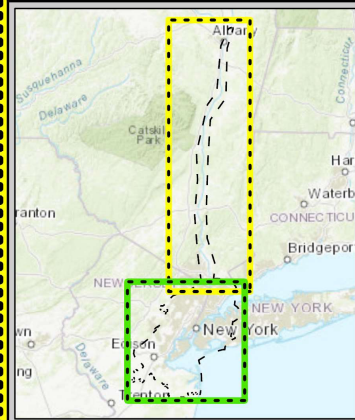
ALTERNATIVE 3A



73.7% Study Area at Direct Risk Benefited

Feature Type	Approx. Miles
Storm Surge Barriers	3.7
Shoreline Based Measures	22.7
Induced Flooding-Mitigation Features	51.5
Risk Reduction Features (not shown)	27.1

Alternative	
First Cost (\$B):	\$ 76.9
Total Present Value Cost (\$B):	\$ 95.7
Estimated Construction Duration (years):	24



Legend

- Study Area
- Alternative 3A - CSRM Measures (SSB, SBM, IFF)
- CSRM Reduced Risk with Project Alt3A (area directly benefited)
- Residual Risk with Project Alt3A (area not benefited)

NY-NJ HARBOR AND TRIBUTARIES STUDY

Alternative 3A Future With Project Reduced Risk & Residual Risk (1% AEP with Intermediate Sea Level Rise in 2095)
Date: 10/21/2022



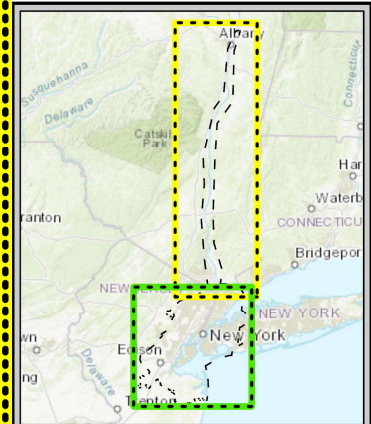
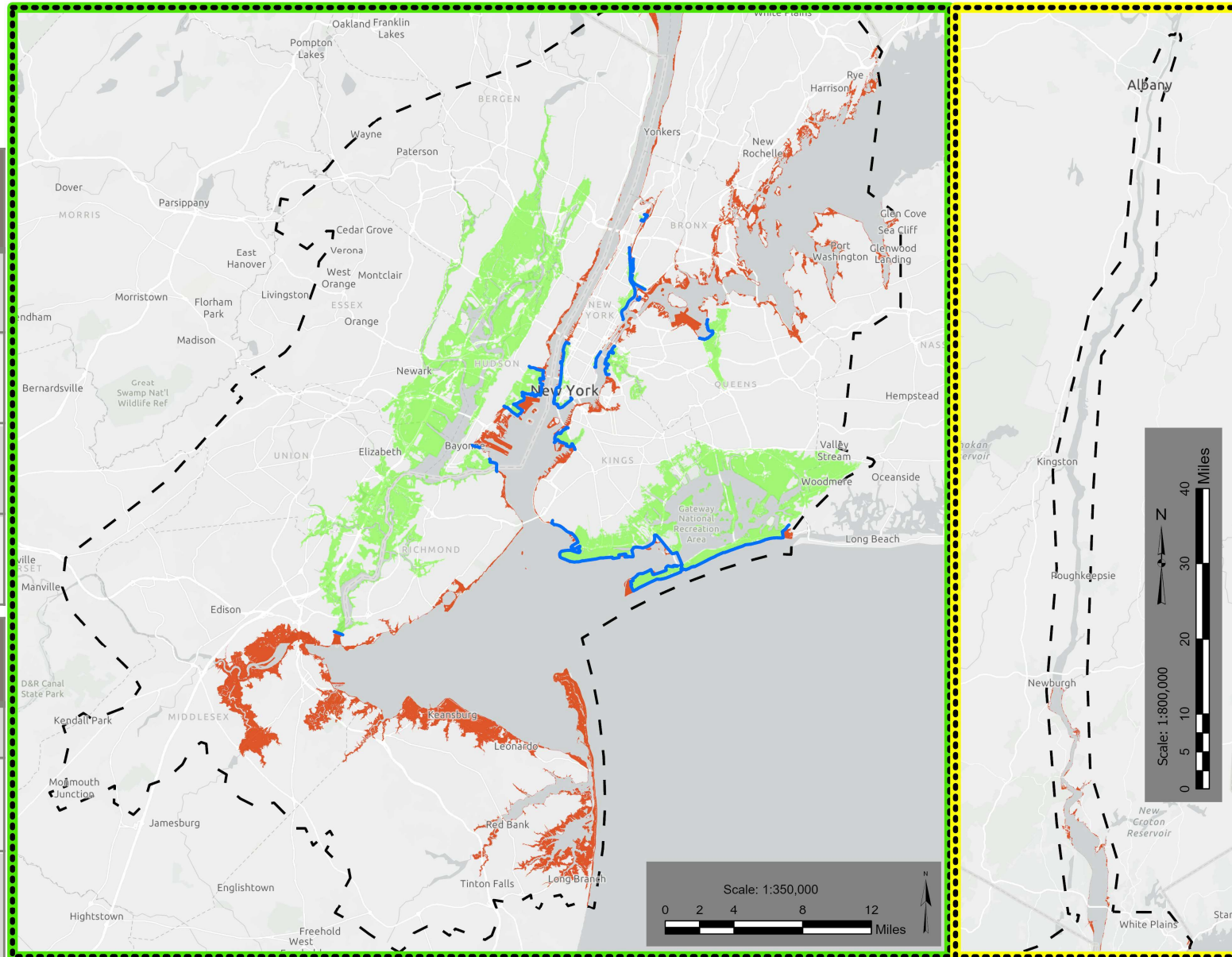
ALTERNATIVE 3B – THE TENTATIVELY SELECTED PLAN



62.75% Study Area at Direct Risk Benefited

Feature Type	Approx. Miles
Storm Surge Barriers	2.2
Shoreline Based Measures	50.6
Induced Flooding-Mitigation Features	11.8
Risk Reduction Features (not shown)	18.7

Alternative	
First Cost (\$B):	\$ 52.7
Total Present Value Cost (\$B):	\$ 76.2
Estimated Construction Duration (years):	14

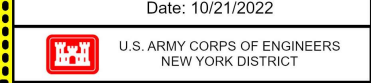


Legend

- Study Area
- Alternative 3B - CSRM Measures (SSB, SBM, IFF)
- CSRM Reduced Risk with Project 3B (area directly benefited)
- Residual Risk with Project Alt3B (area not benefited)

NY-NJ HARBOR AND TRIBUTARIES STUDY

**Alternative 3B
Future With Project
Reduced Risk & Residual Risk
(1% AEP with Intermediate
Sea Level Rise in 2095)**
Date: 10/21/2022





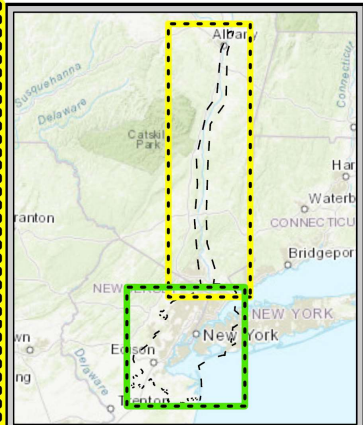
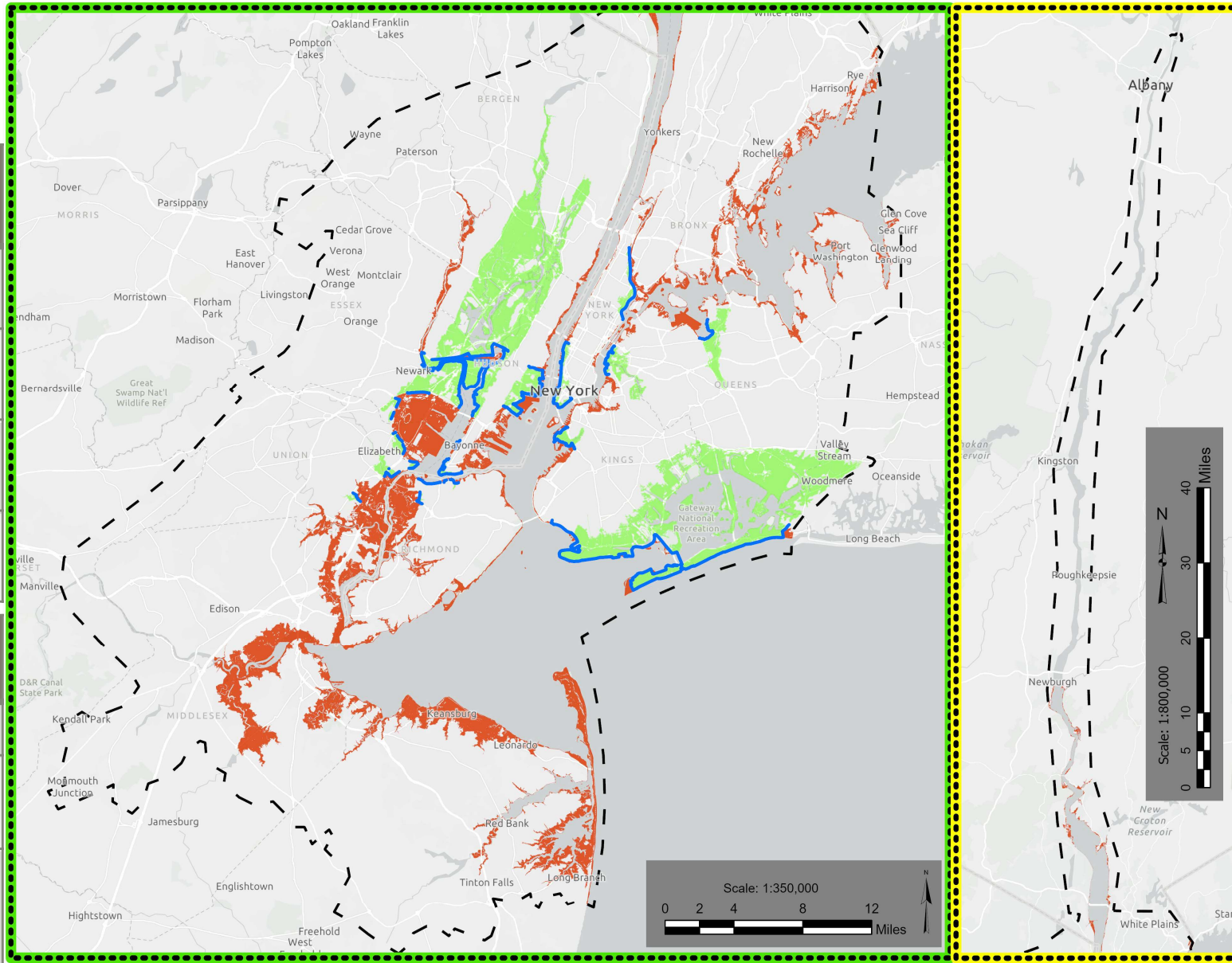
ALTERNATIVE 4



33.1% Study Area at Direct Risk Benefited

Feature Type	Approx. Miles
Storm Surge Barriers	1.4
Shoreline Based Measures	54.7
Induced Flooding-Mitigation Features	41.4
Risk Reduction Features (not shown)	8.5

Alternative	
First Cost (\$B):	\$ 43.0
Total Present Value Cost (\$B):	\$ 62.5
Estimated Construction Duration (years):	14



Legend

- Study Area
- Alternative 4 - CSRM Measures (SSB, SBM, IFF)
- CSRM Reduced Risk with Project Alt4 (area directly benefited)
- Residual Risk with Project Alt4 (area not benefited)

NY-NJ HARBOR AND TRIBUTARIES STUDY

Alternative 4
Future With Project
Reduced Risk & Residual Risk
(1% AEP with Intermediate Sea Level Rise in 2095)
 Date: 10/21/2022



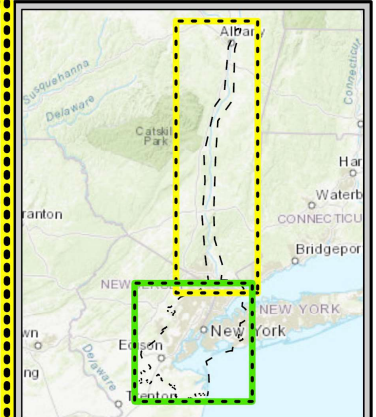
ALTERNATIVE 5



2.6% Study Area at Direct Risk Benefited

Feature Type	Approx. Miles
Storm Surge Barriers	0
Shoreline Based Measures	31.1
Induced Flooding-Mitigation Features	0
Risk Reduction Features (N/A)	0

Alternative	
First Cost (\$B):	\$ 16.0
Total Present Value Cost (\$B):	\$ 25.8
Estimated Construction Duration (years):	5



Legend

- Study Area
- Alternative 5 - CSRM Measures (SBM)
- CSRM Reduced Risk with Project Alt5 (area directly benefited)
- Residual Risk with Project Alt5 (area not benefited)

NY-NJ HARBOR AND TRIBUTARIES STUDY

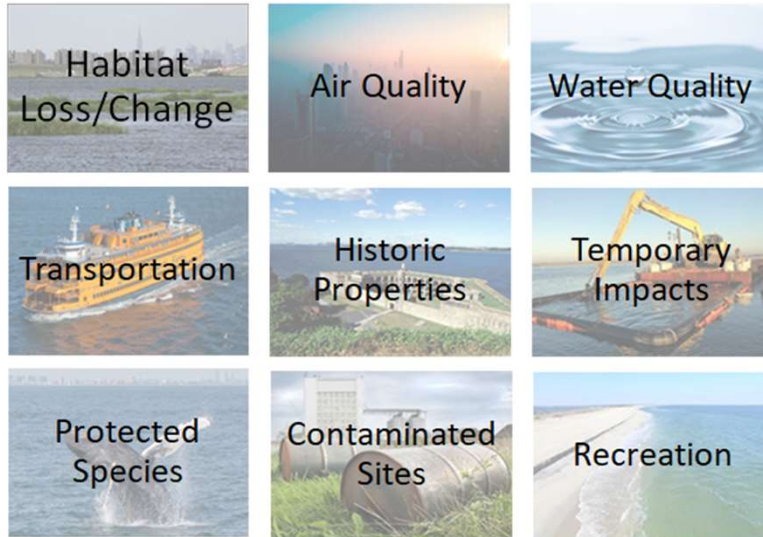
Alternative 5 Future With Project Reduced Risk & Residual Risk (1% AEP with Intermediate Sea Level Rise in 2095)
Date: 10/21/2022



DRAFT TIER 1 EIS: REPORT ORGANIZATION



EXISTING CONDITIONS Chapter 2



- 50 environmental resources assessed
- Organized by Planning Region

ENVIRONMENTAL CONSEQUENCES Potential for Adverse Impacts by Measure Type Chapter 6

RESOURCE	STORM SURGE BARRIERS	TIDE GATES	FLOODWALL	FLOODWALLS WITH PARK	LEVEES	ELEVATED PROMENADES	BURIED SEAWALL/SAND DUNES	SEAWALLS	RETEMENTS	SEAWALLS WITH REVETMENTS	DEPLOYABLE FLOOD BARRIERS	BERMS	BULKHEADS	PEDESTRIAN/VEHICULAR GATES	NAVIGABLE GATES	ROAD RAISING
Wildlife	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Fish	Y+	Y+	Y+	Y+	N	Y+	Y+	Y+	Y+	Y+	Y+	N	Y+	N	Y+	N
Migratory Fish	Y	Y	Y	Y	N	Y	Y	Y	N	N	Y	Y	Y	N	Y	N
Terrestrial Vegetation	Y+	Y+	Y+	Y+	Y+	Y+	Y+	Y+	Y+	Y+	Y+	Y+	Y+	Y+	Y+	Y
Submerged Aquatic Vegetation	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Invasive and Aquatic Nuisance Species	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	N
Threatened and Endangered Species Terrestrial	Y+	Y+	Y+	Y+	Y+	Y+	Y+	Y+	Y+	Y+	Y+	Y+	Y+	Y+	Y+	Y

- Draft Tier 1 assesses Structural Measures only
- Final Tier 1 will also assess ringwalls, nonstructural, and Natural and Nature-Based Features

ENVIRONMENTAL CONSEQUENCES Applied Scoring Methodology Chapter 6

Impact Rating Definitions	
Impact Rating and Numerical Score	Description
High (5)	Effects to the resource would have substantial consequences, locally and/or regionally. Impacts would exceed regulatory standards. Mitigation measures to offset the adverse effects would not be enough to reduce the significance of effect and therefore, effects to the resource would not be environmentally acceptable.
Moderate to High (4)	Effects to the resource would be locally and/or regionally significant. Impacts would be within regulatory standards; however, existing resource conditions are expected to be affected in the near-term, but not necessarily in the long term. Mitigation measures to reduce any potential adverse impacts would be necessary.
Moderate (3)	Effects to the resource are expected to be moderate in the near-term and localized. Impacts would be within or below regulatory standards, as applicable, and the use of mitigation measures would reduce potential adverse impacts, if applicable.
Low (2)	Effects to the resource would either be negligible or, if detectable, have minor temporary impacts locally to the resource. The impacts would be well below regulatory standards, as applicable, and mitigation measures may be implemented to sustain low to no impact to the resource.
No Impact (1)	There would be no impacts to the resource because the resource would not be affected.

- Defining Tier 1 Scope of Direct, Indirect, and Cumulative Impacts - BROADLY
- Estimating Beneficial Environmental Effects (“+”)
- Incorporating Cooperating Agency and Stakeholder Input
- Estimating In-Kind Mitigated Impacts
- Identifying Out-Of-Kind Mitigated Impacts

Review Aid: StoryMap <https://hats-cenan.hub.arcgis.com/>



PROJECT COSTS



Alternative	Construction Duration (years)	Years of Full Benefits*	First Costs (not including contingency)	Contingency	OMRR&R and IDC (PV)	Total (Present Value)**
2	32	32	\$70.6B	\$41.7B	\$37.3B	\$150.2B
3A	24	40	\$48.9B	\$28.0B	\$18.7B	\$95.7B
3B	14	50	\$35.6B	\$17.1B	\$23.5B	\$76.2B
4	14	50	\$28.8B	\$14.2B	\$19.4B	\$62.5B
5	5	50	\$10.1B	\$5.9B	\$9.8B	\$25.8B

* - USACE policy only allows a maximum of 50 years of benefits in the economic evaluation, but the alternatives and measures are planned for permanent implementation with an at least one-hundred-year planning horizon

** - Adaptation costs for higher sea level rise projections are under refinement and have not been included in the total cost estimates at this time

Costs shown under intermediate RSLC scenario



COSTS, BENEFITS, AND PLAN SELECTION



Alternative	Average Annual Cost	Average Annual Benefits*	Net Benefits*	Benefit to Cost Ratio
2	\$5.0B	\$4.6B	-\$0.5B	0.91
3A	\$3.2B	\$6.4B	\$3.2B	1.99
3B	\$2.6B	\$6.3B	\$3.7B	2.45
4	\$2.1B	\$5.0B	\$2.9B	2.39
5	\$0.9B	\$1.9B	\$1.0B	2.21

* Benefits currently based on estimated damages avoided to structures in study area. Critical infrastructure and other possible benefits under refinement and have not been included in the net benefit calculations at this time.

Costs and benefits shown under intermediate RSLC scenario



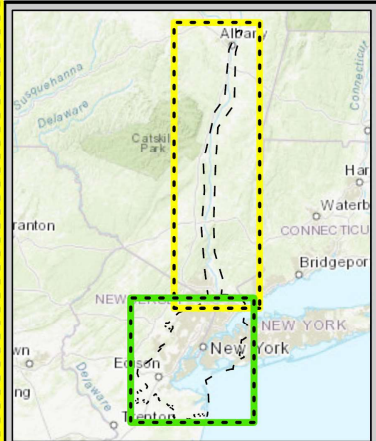
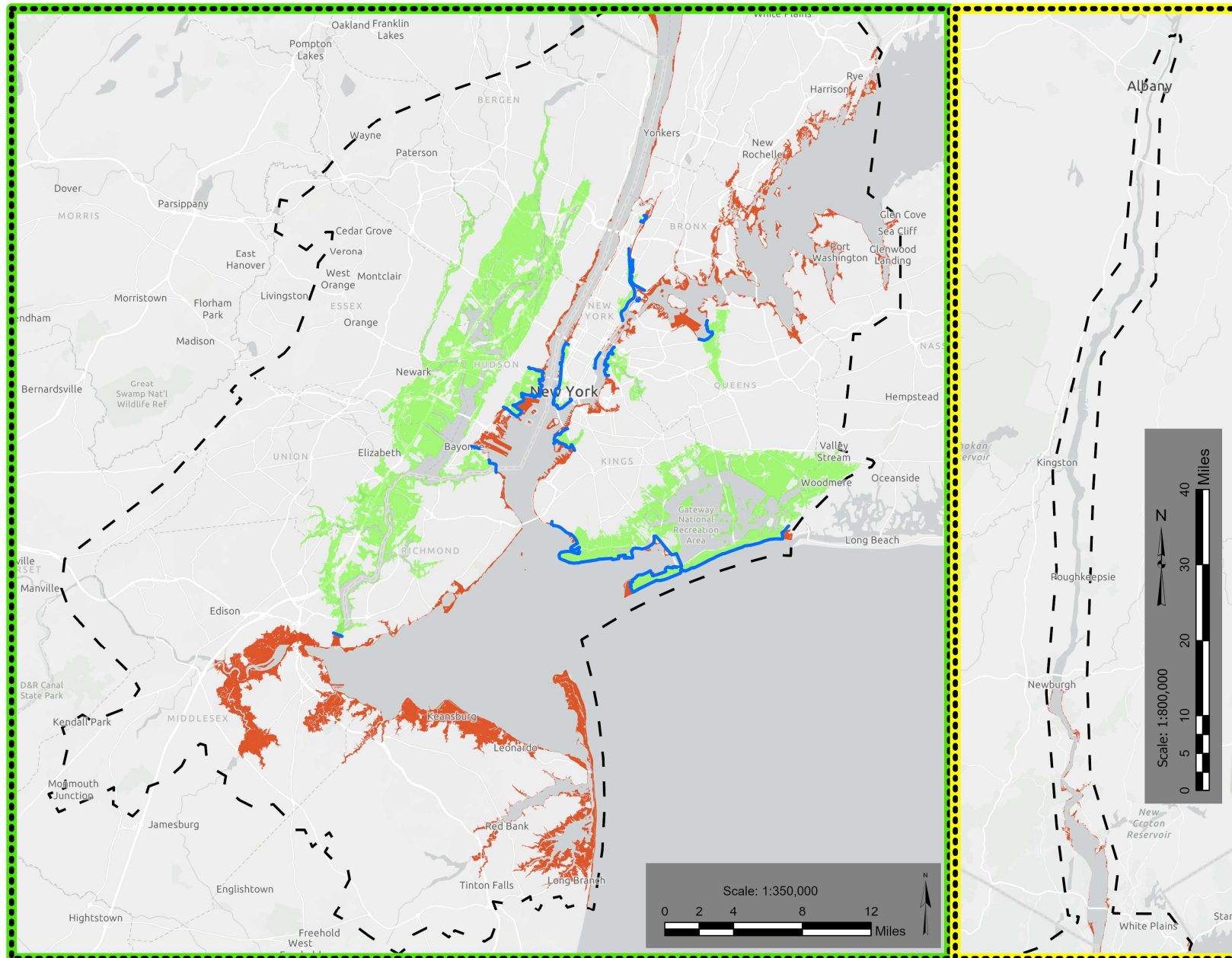
ALTERNATIVE 3B – TENTATIVELY SELECTED PLAN



62.75% Study Area at Direct Risk Benefited

Alternative 3B includes:

- Jamaica Bay and Southern Brooklyn Storm Surge Gate and Shoreline-based Measures
- Kill Van Kull and Arthur Kill Storm Surge Gates with Shoreline-based tie-ins
- Storm Surge Gates and Shoreline-based tie-ins for Gowanus, Newtown and Flushing Creeks
- Shoreline-based measures for Lower Manhattan, East Harlem, and Jersey City
- Numerous other complementary structural, non-structural, and NNBFs (not shown here) to complement measures listed above and better manage remaining residual risk (many under development & evaluation)



Legend

- Study Area
- Alternative 3B - CSRM Measures (SSB, SBM, IFF)
- CSRM Reduced Risk with Project 3B (area directly benefited)
- Residual Risk with Project Alt3B (area not benefited)

NY-NJ HARBOR AND TRIBUTARIES STUDY

Alternative 3B
Future With Project
Reduced Risk & Residual Risk
(1% AEP with Intermediate Sea Level Rise in 2095)
 Date: 10/21/2022



TENTATIVELY SELECTED PLAN FEATURES IN DETAIL

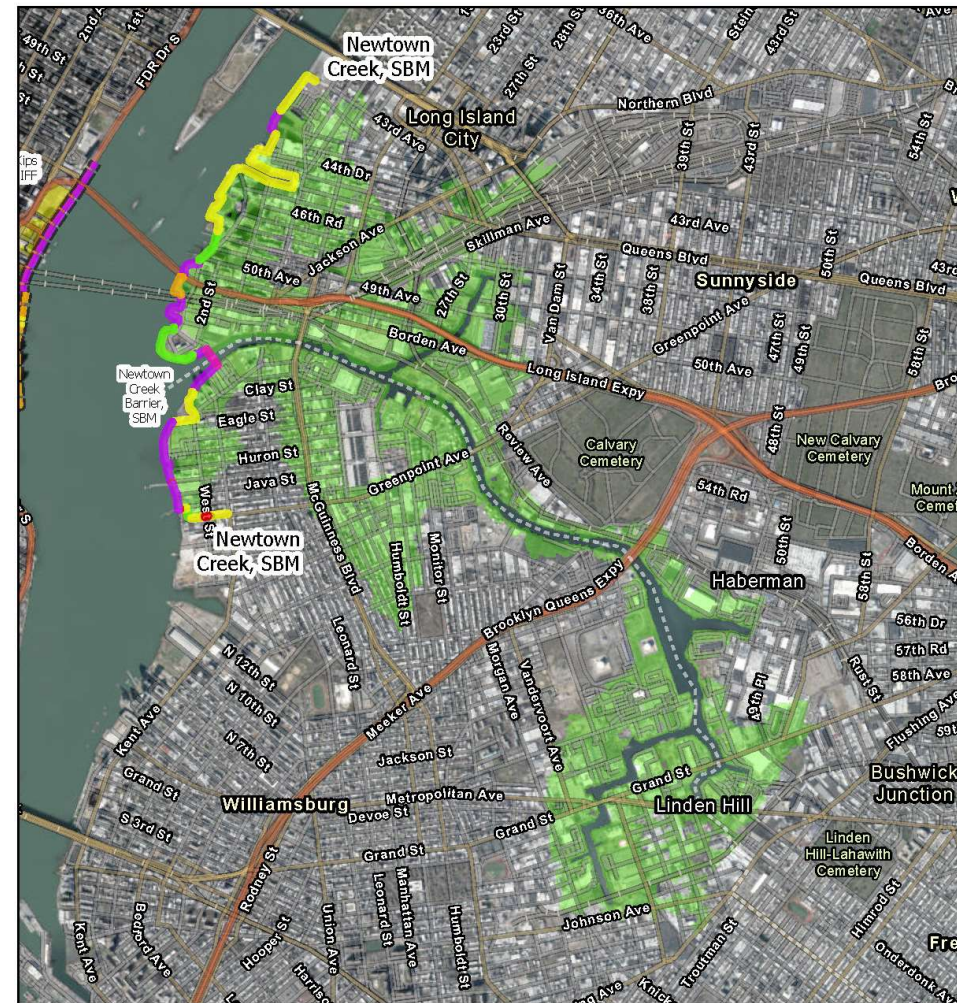


Storm surge barrier with shoreline based tie-ins

Newtown Creek Storm Surge Barrier

- 130 ft. wide Sector Gate
- 17 foot crest elevation (NAVD88) for currently selected design storm event
- Shoreline-based Tie-ins
- 15,000+ ft. of measures including floodwalls, levees, pedestrian & vehicle gates, elevated promenades, and seawalls
- Other considerations:
 - May need extension of NYCDEP Wastewater Treatment Plant discharge to outside Storm Surge Barrier
 - Known contamination issues

Newtown Creek Area



	Legend Alt3b Features/Measures SBM, Deployable Flood Barrier SBM, Elevated Promenade SBM, Floodwall SBM, Levee SBM, Seawall SBM, Storm Surge Barrier IFF, Elevated Promenade IFF, Floodwall IFF, Seawall Alt3b Reduced Risk Areas SSB/SBM Reduced Risk Areas IFF Reduced Risk Areas	NEW YORK - NEW JERSEY HARBOR & TRIBUTARIES STUDY Alternative 3B - SSB/SBMs Feature Name: Newtown Creek Page 8 of 8 0 2000 Feet



NEWTOWN CREEK STORM SURGE BARRIER AND SHORELINE BASED TIE-IN DETAILS



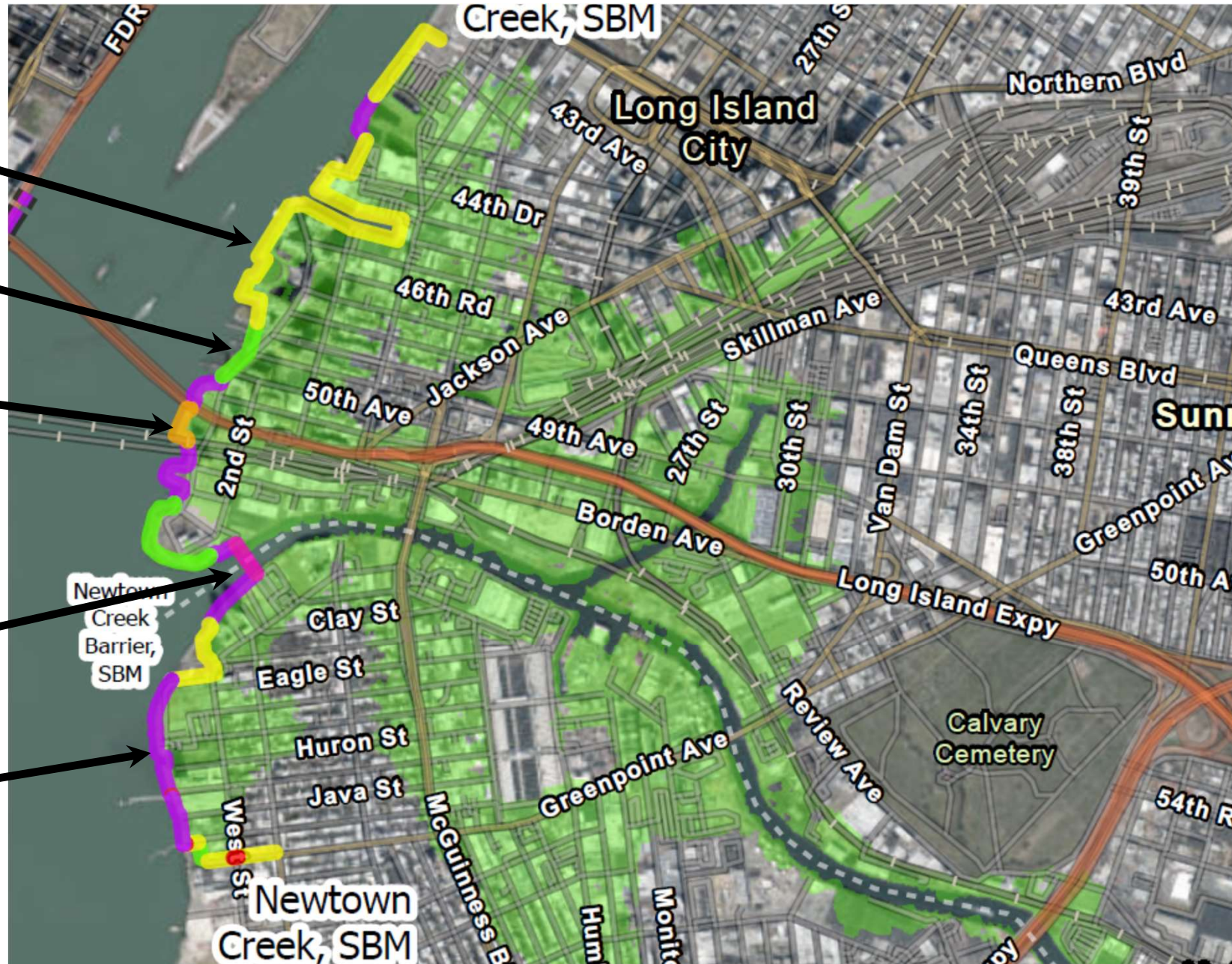
Floodwall

Levee

Elevated Promenade

Storm Surge Gate

Seawall





US Army Corps
of Engineers®
New York District

NY-NJ HATS – EAST RIVER @ HURON STREET (GREENPOINT) SEAWALL CONCEPT

EXISTING CONDITION (ACTUAL PHOTO)



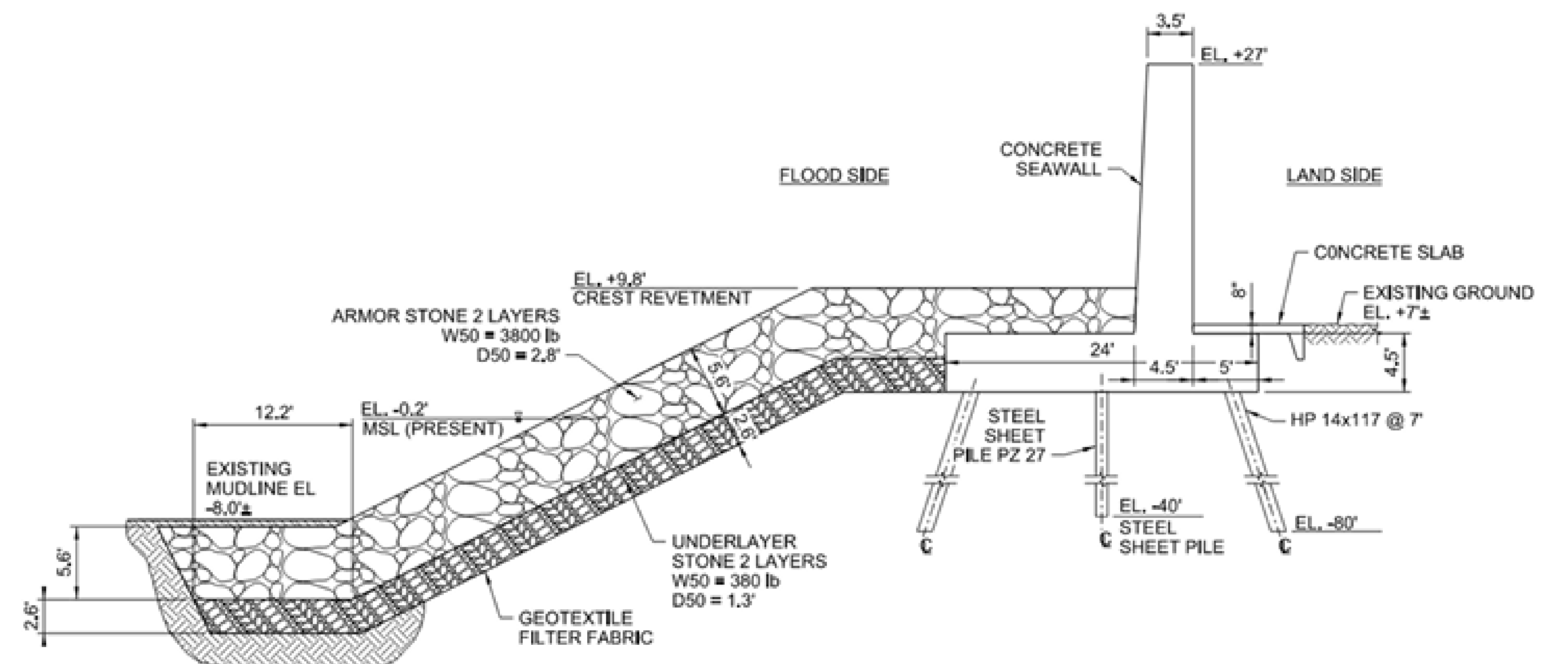
PROPOSED CONCEPT (DIGITAL RENDERING)



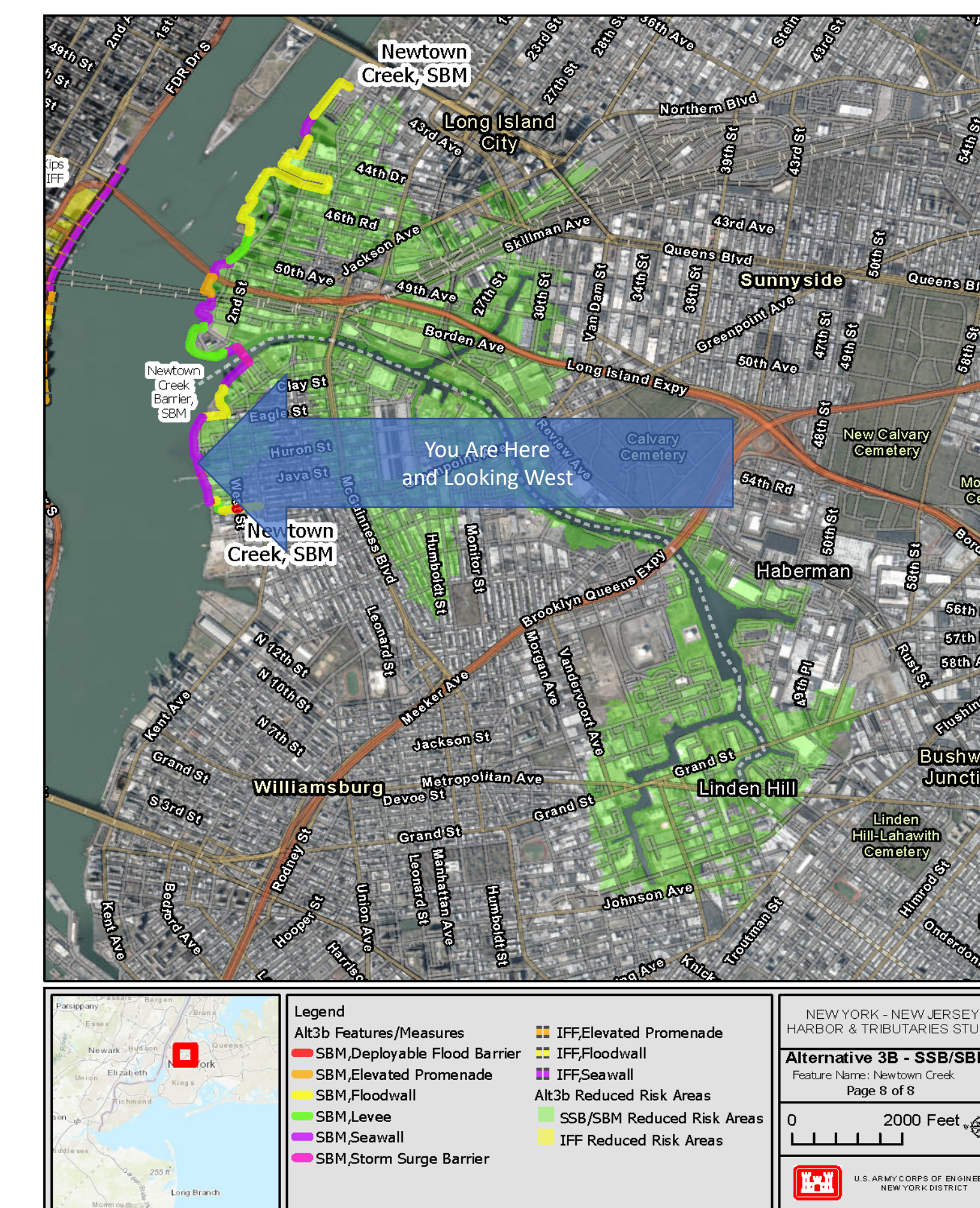
SEAWALL DESCRIPTION

The prototypical design for the seawall is composed of a rubble mound structure on the seaward side and a pile supported concrete floodwall on the landward side. For this study, it was assumed that a rubble mound with two layers of 2.8-foot diameter armor stone and two layers of 1.3-foot diameter underlayer stone with a slope of 2 (Horizontal):1 (Vertical) would provide sufficient stability. The underlayer would be on top of a geotextile; the geotextile would protect the underlying base material or soil from erosion by waves and currents. The toe has a width of 12.2 feet. The floodwall has an inverted T-shape reinforcement concrete structure with a base of 4.5 foot thick, battered H-piles and vertical steel sheet pile cut-off wall. The top of the floodwall is at El. 27' and the design existing ground elevation is at El. 7'. Actual elevations will vary across the study area, but for this conceptual phase of the analysis, it was considered a reasonable elevation representative of the conditions of application within the study area.

TYPICAL SEAWALL CROSS-SECTION



LOCATION MAP





DISCLAIMER: These renderings are artistic depictions of the features in NYNJHAT Study Tentatively Selected Plan (Alternative 3B) as of September 2022. They are *initial concepts used for illustrative purposes only and are subject to change*. The renderings are intended to promote a discussion of the study objectives and potential coastal storm risk management solutions. The selection of the final plan elements will be determined during the Pre-Construction, Engineering, and Design phase, and will incorporate stakeholder feedback that was obtained during the study's public comment period.




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**NYNJHATS Draft Report and EIS
Now Available Below**

Draft Report September 2022

The Draft Integrated Feasibility Report and Tier 1 Environmental Impact Statement is available for public review. The report summarizes the study planning process, technical analyses, and alternative plans - including the Tentatively Selected Plan.

The [NYNJHAT Study StoryMap](#) is an interactive platform with interactive web-based content, including interactive maps, animations, renderings, and summaries.

[Readers Guide](#)

[Draft Integrated Feasibility Report and Tier 1 Environmental Impact Statement](#)

Appendix A: Environmental

- [Sub-appendix A1: Endangered Species Act \(USFWS\)](#)
- [Sub-appendix A2: Endangered Species Act](#)

NY & NJ Harbor & Tributaries Focus Area Feasibility Study (HATS)



Coastal storms have severely impacted the North Atlantic Coast of the United States, including the New York-New Jersey Harbor region. In response to these storms, the US Army Corps of Engineers (Corps) is investigating measures to manage future flood risk in ways that support the long-term resilience and sustainability of the coastal ecosystem and surrounding communities, and reduce the economic costs and risks associated with flood and storm events. In support of this goal, the Corps completed the North Atlantic Coast Comprehensive Study, which identified nine high-risk, focus areas on the north Atlantic Coast for further in-depth analysis into potential coastal storm risk management measures. One of the nine areas identified was the New York-New Jersey Harbor and Tributaries study area.

Prior NY/NJ HATS Study Reports and Presentations

[Prior NY/NJ HATS Study Reports and Presentations](#)

Start Here





SCHEDULE



Action/Milestone	Date
Execute Feasibility Cost-Sharing Agreement (study start)	✓ 15 July 2016
Release Interim Report	✓ 19 February 2019
Public Meetings for Interim Report	✓ March - October 2019
Delay due to lack of Federal funding	✓ February 2020 – September 2021
Federal funding resumption	✓ October 2021
FCSA Amendment Execution	✓ 28 June 2022
Tentatively Selected Plan Milestone	✓ 26 July 2022
Release Draft Integrated Feasibility Report and Tier 1 EIS	✓ Late September 2022 (90+ day review period)
Public Meetings for Draft Report	October – December 2022 (virtual meetings held in October and early November, in person at locations TBD in December)
Public Comment Closing Date	January 6, 2023
Agency Decision Milestone	April 2023
Submit Final Integrated Feasibility Report and Tier 1 EIS	January 2024*
Chief of Engineer’s Report Approval	June 2024*

* Schedule may be revised due to actual federal funding resumption shift in 2022



IN SUMMARY



- Draft NY & NJ Harbor and Tributaries Coastal Storm Risk Management Feasibility Report and integrated Tier 1 Environmental Impact Statement has been released for public review
- **Tentatively Selected Plan is Alternative 3B**
- Study has EXTENDED Public and Agency Review Period through remainder of calendar year
- Public Meetings
 - Virtual meetings held in October & early November with more planned
 - In-Person Meetings at multiple locations around the vast study area in December (locations, dates and times will be posted on website listed below)
- Public Comment Period Closes ~~January 6, 2023~~ (but there will be future opportunities also for public engagement and comment) **March 7, 2023**
- The Draft Report and meeting updates are and will be posted to website: www.nan.usace.army.mil/nynjhats
- USACE has also posted an Interactive Story Map Portal for interactive viewing of Tentatively Selected Plan and the other alternatives (<https://hats-cenan.hub.arcgis.com/>)
- Considerable work remains to be done on the study
- Future study work will be informed and focused on issues raised by public and other agencies