Draft Integrated Interim Response Feasibility Report and Environmental Assessment for Actionable Elements

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

July 2025

NEW YORK STATE Department of Environmental Conservation

NEW YORK STATE OF OPPORTUNITY. Department of State

NYC Environmental Protection

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

DRAFT INTEGRATED INTERIM RESPONSE FEASIBILITY REPORT AND ENVIRONMENTAL ASSESSMENT

This report summarizes work completed to date on the New York-New Jersey Harbor and Tributaries coastal storm risk management feasibility study. It was prepared by the New York District, North Atlantic Division of the U.S. Army Corps of Engineers, building on shared goals with our partners: the New Jersey Department of Environmental Protection, New York State Department of Environmental Conservation, New York State Department of State, and New York City Department of Environmental Protection, Bureau of Coastal Resiliency. Cooperating Agencies include the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Coast Guard, National Oceanic and Atmospheric Administration National Marine Fisheries Service, and the National Park Service. The Federal Emergency Management Agency is a Participating Agency.

This report details engineering, economic, and environmental analyses, and a Tentatively Selected Plan that could provide coastal storm risk management to the Actionable Element Sites, within the general Study Area. The General Study Area includes 25 counties in New Jersey and New York, including Bergen, Passaic, Morris, Essex, Hudson, Union, Somerset, Middlesex, and Monmouth Counties in New Jersey; and Rensselaer, Albany, Columbia, Greene, Dutchess, Ulster, Putnam, Orange, Westchester, Rockland, Bronx, New York, Queens, Kings, Richmond, and Nassau Counties in New York.

The public is invited to submit comments by August 25, 2025 to:

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Executive Summary

This Draft Integrated Interim Response Feasibility Report and Environmental Assessment for the New York-New Jersey Harbor and Tributaries Study (NYNJHATS) describes the U.S. Army Corps of Engineers (USACE) feasibility study planning process for coastal storm risk management (CSRM) and complies with the National Environmental Policy Act (NEPA), as incorporated into the planning process.

In 2012, Hurricane Sandy caused considerable loss of life, extensive damage to development, and massive disruption to the North Atlantic Coast. Twenty-six states were impacted by Hurricane Sandy, and disaster declarations were issued in 13 states. New York and New Jersey were the most severely impacted states, with the greatest damage and most fatalities in the New York Metropolitan Area. Flood depths due to the storm surge were as much as nine feet in Manhattan, Staten Island, and other low-lying areas within the New York Metropolitan Area. At the time, Hurricane Sandy was the second costliest hurricane in the nation's history and the largest storm of its kind to hit the U.S. east coast. The storm exposed vulnerabilities associated with inadequate CSRM measures and lack of defense to critical transportation and energy infrastructure.

On January 29, 2013, President Obama signed into law the Disaster Relief Appropriations Act of 2013 (Public Law 113-2), to assist in the recovery in the aftermath of Hurricane Sandy. The USACE North Atlantic Division was authorized by Public Law 113-2 to commence the North Atlantic Coast Comprehensive Study (NACCS) to investigate CSRM strategies for areas impacted by the storm. In January 2015, USACE completed the NAACS, which identified high-risk areas on the Atlantic Coast warranting further investigation for flood risk management solutions. The NYNJHATS focus area was one of the three focus areas identified. USACE is authorized under Public Law 84-71, June 15, 1955 (69 Stat. 132), as modified, to conduct an investigation into potential CSRM solutions within the NYNJHATS General Study Area. The study authority is provided by Public Law 84-71, approved June 15, 1955, which calls for:

> *"…an examination and survey to be made of the eastern and southern seaboard of the United States with respect to hurricanes, with particular reference to areas where severe damages have occurred… Such survey, to be made under the direction of the Chief of Engineers, shall include the securing of data on the behavior and frequency of hurricanes, and the determination of methods of forecasting their paths and improving warning services, and of possible means of preventing loss of human lives and damages to property, with due consideration of the economics of proposed breakwaters, seawalls, dikes, dams, and other structures, warning services, or other measures which might be required."*

The USACE New York District in partnership with the New York State Department of Environmental Conservation (NYSDEC) and the New Jersey Department of Environmental Protection (NJDEP) as the non-federal sponsors, as well as the New York State Department of State (NYSDOS) and New York City Department of Environmental Protection (NYCDEP) as non-federal partners, are undertaking the NYNJHATS. A Feasibility Cost Sharing Agreement was executed on July 15, 2016, between the New York District, the NYSDEC, and NJDEP.

The purpose of the current study is to determine the feasibility of constructing CSRM projects that will support the study area's economic and community resilience. This General Study Area encompasses tidally influenced areas within the New York metropolitan area, which includes New York City, the country's most populous and densely populated city, as well as the six largest cities in the State of New Jersey. The need for this study derives from the significant and widespread damage to communities, infrastructure, and the economy caused by coastal storms. Potential damages are expected to increase in the future due to an increase in the extent and depth of inundation, increase in wave heights, and increased erosion caused by higher water levels and wave heights associated with a projected relative increase in the region's sea level.

A September 2022 draft integrated feasibility report and Tier 1 Environmental Impact Statement presents the details of a $52.7 billion (FY22 price level) plan to comprehensively address the region's coastal storm risk. Feedback from the public, resource agencies, and USACE senior leaders clearly indicated the need for a new strategic direction for study completion. Much of this feedback highlighted the region's critical need for near-term localized actions to manage coastal storm flood risk, and concerns about the ability of the USACE Civil Works process to maximize responsiveness to Federal budgetary and legislative cycles, working as a complement – not replacement for – a comprehensive plan. Similar concerns were raised related to how current Federal law and USACE policy could support timely construction of a CSRM project. Understanding these concerns, the Office of the Assistant Secretary of the Army (Civil Works) (ASA(CW)), HQUSACE, and the USACE North Atlantic Division issued guidance in 2024 and 2025 that reshaped the study scope and the strategy for study completion.

A three-pronged study completion framework takes advantage of Federal legislative cycles to implement near-term localized actions that are informed by a comprehensive analysis.

1) Completion of an interim response to the study authority that will recommend the Congressional authorization of near-term constructible elements in a potential WRDA 2026.
2) Completion of a subsequent interim response to the study authority that will recommend the Congressional authorization of additional near-term constructible elements in a potential WRDA 2028, subject to the availability of funds. Other WRDAs beyond 2028 may also be included in this effort, or as separate efforts.
3) Completion of a final response to the study authority that will recommend a comprehensive project to manage the region's coastal storm risk and increase coastal resiliency, subject to the availability of funds. This study would continue the investigation of the plan documented in the September 2022 draft integrated feasibility report and Tier 1 Environmental Impact Statement. It would be a cost-shared study effort within the regular USACE General Investigations (GI) Program].

This report describes the consideration of a collection of CSRM elements, including the details of a Tentatively Selected Plan that includes near-term localized actions, called Actionable Elements, that could complete the first prong of this approach.

The Actionable Elements' study purpose is to determine the feasibility of constructing a technically feasible, environmentally acceptable, and economically justified near-term localized actions that will manage coastal storm risk, which is informed by the analyses to date, while supporting the overall

NYNJHATS General Study Area's economic and community resilience. The need for this study derives from the significant and widespread damage to communities, infrastructure, and the economy caused by coastal storms. Potential damages are expected to increase in the future due to an increase in the extent and depth of inundation, increase in wave heights, and increased erosion caused by higher water levels and wave heights associated with a projected relative increase in the region's sea level.

NEPA requires federal agencies, including USACE, to consider the potential environmental impacts of their proposed actions and any reasonable alternatives before undertaking a major federal action, as defined by 40 Code of Federal Regulations (CFR) 1508.18. To evaluate potential environmental impacts, New York District has prepared this report under the Department of Defense National Environmental Policy Act Implementing Procedures (June 30, 2025). An environmental assessment is a supporting document that is a thorough and comprehensive level of NEPA documentation used to assist in making a decision.

The study team recognizes the importance of sharing timely information with the public and agencies as an important key to the study's success. To support this, an Interim Report was released in February 2019 which summarized study activities completed through early 2019. The Interim Report presents a summary of existing information, technical analysis, interim planning activities, and conceptual alternative plans as of February 2019. It remains a resource for the study team and the public. The public and agencies were invited to provide comments. Feedback on the Interim Report was considered and incorporated into the analyses summarized in this report.

Utilizing the USACE Planning Process as specified in Engineer Regulation (ER) 1105-2-103 and the Planning Manual Part II: Risk-Informed Planning, plan formulation was conducted with a focus on achieving the federal objective of water and related land resources project planning, which is to contribute to the Nation's national economic development (NED) consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable Executive Orders, and other federal planning requirements. Plan formulation also considers all effects, beneficial or adverse, to each of the four evaluation accounts identified in the Principles and Guidelines (1983): NED, environmental quality, regional economic development, and other social effects.

The study team considered a range of nonstructural, structural, and natural and nature-based measures that have the potential to increase coastal resiliency. Alternative plans were developed from management measures to meet planning objectives and avoid the planning constraint while reasonably maximizing NED benefits.

Tentatively Selected Plan (Alternative C: Total Net Benefits Plan)

After careful evaluation of the alternatives and their tradeoffs, and consideration of the study schedule, the study team selected Alternative C as the Tentatively Selected Plan. The plan consists of three Actionable Element Sites: East Riser, NJ; Harlem River, NY; and Oakwood Beach, NY. The East Riser site is in the boroughs of Carlstadt and Moonachie. The two proposed Harlem River alignments are located at the intersection of Washington Heights and Northern Central Harlem, Manhattan, New York City. The Oakwood Beach site is located on Staten Island, New York City.

Alternative C is the Total Net Benefit Plan and reasonably maximizes total net benefits across all benefit categories. East Riser was included for its contributions to NED, Regional Economic Development (RED), and Other Social Effects (OSE) benefit categories; Harlem River was included for its contributions to RED and OSE; and Oakwood Beach was added for its contribution to EQ and OSE. It is preliminary estimated that the Tentatively Selected Plan has a first cost of $1.07 billion (2025Q3). The Total Project Cost is the constant dollar cost fully funded with escalation to the estimated midpoint of construction and is the cost estimate used in project partnership agreements; the Total Project Cost is estimated to be $1.27 billion. Over the 50-year period of analysis (2037-2086), under the future with-project condition, Average Annual Benefits are $19,134,000 (FY25 price level). Annual net economic benefits provided by the plan (Alternative C) are estimated to be -$22,315,000 (FY25 price level). The corresponding benefit-to-cost ratio is 0.5. Alternative C provides the greatest non-monetized benefits of all considered alternative plans to the EQ and OSE benefit categories, providing a broad range of benefits provided to the community and the environment.

The East Riser Actionable Element includes proposal of channel modifications, three culvert replacements, and a railroad bridge replacement on East Riser Ditch Channel in Carlstadt and Moonachie, New Jersey. Channel modifications more specifically include widening and deepening of the East Riser Ditch Channel, bank stabilization, and replanting of vegetation. The first cost is $249.1 million, and the Total Project Cost is $295.9 million (2025Q3). The East Riser Actionable Element is estimated to provide $15,494,000 in average annual flood risk management reduction benefits (FY25 price level).

The Harlem River Actionable Element Site has two potential alignment opportunities in Northern Manhattan, where Alternative A is the “Landward Alignment”, and Alternative B is the “Seaward Alignment”. While both Harlem River alignments are proposed as a CSRM floodwall feature with a number of deployable vehicular gates, the Landward Alignment has five gates, and the Seaward Alignment has two. Also varying between these two alignments, is the location with proximity to the waterfront on the Harlem River, length, and potentially the reveal height of the floodwall. The first cost of the Seaward Alignment is $761.9 million, and the Total Project Cost is $906.8 million (2025Q3). The Harlem River Actionable Element is estimated to provide $3,614,000 in average annual CSRM benefits (FY25 price level).

The Oakwood Beach Actionable Element is proposed as a CSRM-focused Nature-Based Solution wetland enhancement including three primary components: removal of non-native invasive plants, creation of a vegetative mosaic with native plants and tidal channels, and dune restoration. The first cost is $55.4 million, and the Total Project Cost is $65.6 million (2025Q3). The Oakwood Beach Actionable Element is estimated to provide $26,000 in average annual wildfire risk management benefits (FY25 price level).

In Section 1343 of WRDA 2024, Congress indicated that a focus on CSRM alone is not satisfying and modified the scope of the study through specific language to include within the scope investigations and recommendations to: “maximize net public benefits, including ecological and societal benefits, from the reduction of the comprehensive flood risk…as described in Section 8106(a) of the Water Resources Development Act of 2022” and also specified the inclusion of “natural and nature-based features.” The inclusion of the Oakwood Beach Actionable Element satisfies the condition of a natural and nature-based feature, and CSRM measures at Harlem River address the societal and net public

benefits per Section 1343 of WRDA 2024. The site of East Riser itself meets the condition of Section 8106(a) considerations through the confluence of coastal and riverine flood drivers. Each of the Actionable Elements manage coastal risk to people and structures to varying extents, and together they make up the Total Net Benefits Plan. Proceeding with the Total Net Benefit plan addresses the intent of Congress for the NYNJHATS, a condition that could not be met through the NED Plan (Alternative B) alone.

The study team, which includes the New York District, NJDEP, NYSDEC, NYCDEP, and NYSDOS has analyzed the best available information needed to develop the three Actionable Elements described in this report. During this analysis, it became clear that the Harlem River Actionable Element will not be sufficiently developed or detailed to support USACE design maturity requirements within the timeline for inclusion in a Chief of Engineer's Report, which could be considered by Congress for authorization in a potential Water Resources Development Act (WRDA) of 2026. In addition, the New York District, NYSDEC, and NYCDEP believe robust, meaningful public coordination and additional engineering and alternative analyses are needed to ensure broader efforts on the Harlem River are evaluated, and to thoroughly coordinate with other government agencies about their plans and the expectations of their communities for the Harlem River. Presently, NYSDEC, NYCDEP, and others are investing significant resources in water quality improvements and creating waterfront access for communities within the Harlem River watershed. The intent is to continue developing this site for inclusion in a future Interim Feasibility Report for potential authorization in a future WRDA, subject to future availability of funds. Inclusion in a future report allows New York District and its project sponsors the opportunity to take a broader look at the Harlem River and ensure the development of the Harlem River any Actionable Element supports and improves upon these efforts while integrating the added benefit of coastal storm management and flood risk reduction. The other Actionable Elements, East Riser and Oakwood Beach, are being further developed and have undergone previous public review and coordination and are projected to be ready for potential Congressional consideration to be authorized in WRDA 2026.

The Tentatively Selected Plan was designed to avoid and minimize environmental and cultural resource impacts while still reducing the risk of storm surge. This current effort advances portions of the identified TSP (and related opportunities) that have sufficient information to achieve a Chief's Report according to the existing study budget and schedule to complete in time for a potential WRDA 2026. This interim report is being advanced within the context of the comprehensive plan and will identify the synergies between these Actionable Elements and the larger comprehensive plan.

This report includes a conceptual level of design, which will be improved to at least 35% for the final report.

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"*" Indicate sections required by the National Environmental Policy Act

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Glossary of Acronyms and Terms

Acronym	Expanded
AEP	Annual Exceedance Probability
ASA(CW)	Assistant Secretary of the Army (Civil Works)
ASCE	American Society of Civil Engineers
BRIC	Building Resilient Infrastructure and Communities Grant
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CSO	Combined Sewer Overview
CSRM	Coastal Storm Risk Management
DRSAA	Disaster Relief Supplemental Appropriations Act
EA	Environmental Assessment
EIS	Environmental Impact Statement
ER	Engineering Regulation
EQ	Environmental Quality
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
FSCA	Feasibility Cost Sharing Agreement
FR	Feasibility Report
GIS	Geographic Information System
HEC-FDA	Hydraulic Engineering Center Flood Damage Reduction Analysis
HFFRRF	High Frequency Flooding Risk Reduction Feature
HTRW	Hazardous Toxic & Radioactive Waste
IWR	Institute of Water Resources
LEDPA	Least Environmentally Damaging Practicable Alternative
MG	Major General
MTA	Metropolitan Transit Authority
NACCS	North Atlantic Coast Comprehensive Study
NAVD88	North American Vertical Datum of 1988
NBS	Natural-Based Solution
NFS	Non-Federal Sponsors
NED	National Economic Development
NEPA	National Environmental Policy Act
NGVD29	National Geodetic Vertical Datum of 1929
NJ	New Jersey
NJDEP	New Jersey Department of Environmental Protection

NPS	National Park Service
NY	New York (State)
NYC	New York (City)
NYCDEP	New York State Department of Environmental Protection
NYCEDC	New York City Economic Development Corporation
NYNJHATS	New York – New Jersey Harbor and Tributaries Study
NYSDEC	New Jersey Department of Environmental Conservation
NYSDOS	New York State Department of State
NYCDOT	New York City Department of Transportation
NYSDOT	New York State Department of Transportation
OMRR&R	Operations, Maintenance, Repair, Rehabilitation & Replacement
OSE	Other Social Effects
P&G	1983 Economic and Environmental Principles and Guidelines for Water and Related Land Implementation Studies
PED	Preconstruction, Engineering, and Design
RECONS	Regional Economic System Model
RED	Regional Economic Development
RRF	Risk Reduction Feature
SBM	Shore-Based Measure
NYCSBS	New York City Small Business Services
RSLC	Relative Sea Level Change
SSB	Storm Surge Barrier
TSP	Tentatively Selected Plan
USC	United States Code
USACE	United States Army Corps of Engineers
WRDA	Water Resources Development Act
WWTP	Wastewater Treatment Plant
WRRF	Wastewater Resource Recovery Facilities

1. Introduction

1.1. Introduction to this Report

The U.S. Army Corps of Engineers (USACE) New York District prepared this Draft Integrated Interim Response Feasibility Report (FR) and Environmental Assessment (EA) for the New York-New Jersey Harbor and Tributaries Coastal Storm Risk Management (CSRM) Feasibility Study (NYNJHATS), as a supplemental Interim Response to the Draft Integrated Feasibility Report (FR) and Tier 1 (Programmatic) Environmental Impact Statement (EIS), that was released in September of 2022.

A September 2022 draft integrated feasibility report and Tier 1 Environmental Impact Statement presents the details of a $52.7 billion (FY22 price level) plan to comprehensively address the region's coastal storm risk. Feedback from the public, resource agencies, and USACE senior leaders clearly indicated the need for a new strategic direction for study completion. Much of this feedback highlighted the region's critical need for near-term localized actions to manage coastal storm flood risk, and concerns about the ability of the USACE Civil Works process to maximize responsiveness to Federal budgetary and legislative cycles, working as a complement – not replacement for – a comprehensive plan. Similar concerns were raised related to how current Federal law and USACE policy could support timely construction of a CSRM project. Understanding these concerns, the Office of the ASA(CW), HQUSACE, and the USACE North Atlantic Division issued guidance in 2024 and 2025 that reshaped the study scope and the strategy for study completion.

This report describes the consideration of a collection of CSRM elements, including the details of a Tentatively Selected Plan that includes near-term localized actions, called Actionable Elements. Sufficient site-specific information exists to potentially include some or all Actionable Elements in a Chief of Engineer's Report for consideration in a potential WRDA 2026 for project authorization.

It is a requirement of USACE planning policy and the National Environmental Policy Act (NEPA) of 1969 to make a report available for public review that describes analysis, risks, assumptions, and decision made by the Study team during the planning process.

Federal water and related land resources projects are formulated to alleviate problems and take advantage of opportunities in ways that contribute to this objective. Pursuant to this goal, this report: 1) summarizes the problems, needs, and opportunities for CSRM within specific geographic locations; 2) presents and discusses the results of the plan formulation for CSRM; 3) identifies specific details of a Tentatively Selected Plan (TSP), including inherent risks; and 4) will be used to assist in determining the extent of the federal interest and local support for the plan.

1.2. Report Outline

This report, including its appendices and supporting documentation, contains a vast amount of information to review. For this reason, the following products are available to readers who prefer to review different amounts of information.

Executive Summary. The Executive Summary presents a summary of the Main Report, including key concepts, analyses, and recommendations. This Section also presents a summary of the strategy to

completion for the NYNJHATS and provides insight on how USACE will take advantage of legislative cycles to advance Actionable Elements, informed by comprehensive analyses as near-term localized actions, now and in the future.

Main Report. This Main Report is an Integrated Interim Response Feasibility Report and EA for Actionable Elements. It presents a summary of the study background, risks, assumptions, technical analyses, and decision making that are important to the study.

- **Chapter 1: Introduction.** This Chapter provides an overview of the study scope, authority, purpose, and need. Additionally, it provides information about the public and agency engagement process, including ways in which the public can submit comments during this report's public review period.
- **Chapter 2: Plan Formulation Process.** This Chapter summarizes the planning strategy and process used to investigate, and ultimately recommend, Actionable Elements.
- **Chapter 3: Existing & Future Without-Project Conditions*.** This Chapter presents a summary of existing and Future Without-Project Conditions at the Actionable Element Sites. It is organized by four types of resources: 1) Natural Environment, 2) Physical Environment, 3) Built Environment (Infrastructure), and 4) Human Environment (Demographics and Socioeconomics). Resources within each Planning Region are described. This Future Without-Project Condition acts as the baseline for evaluating alternatives.
- **Chapter 4: Actionable Element Formulation and Evaluation.** This Chapter presents the analyses conducted to identify and evaluate the Actionable Elements. It presents the logic and analysis used in evaluation, comparison, and selection.
- **Chapter 5: Alternative Plans Formulation and Evaluation.** This Chapter summarizes the process to develop alternative plans from the Actionable Elements, evaluate and compare the plans, and ultimately identify a Tentatively Selected Plan. It presents the logic and analysis used in plan formulation, evaluation, comparison, and selection.
- **Chapter 6: Tentatively Selected Plan.** This Chapter describes the Tentatively Selected Plan, which is the proposed project, subject to refinement. It includes technical details, costs, benefits, risks, and uncertainties.
- **Chapter 7: Effects and Consequences*.** This Chapter presents a summary of projected future conditions at each Actionable Element Site and a comparison of an 'Action' (or multiple actions) and a 'No Action' alternative.
- **Chapter 8: Environmental Compliance*.** This Chapter summarizes consistency and compatibility with Federal and state environmental compliance laws and guidance.
- **Chapter 9: Next Steps.** This Chapter describes the scope of work and next steps, necessary to design the Actionable Elements to the appropriate level of design, as required by USACE, to complete a Chief's Report.
- **Chapter 10: Public Coordination and Reviews.** This Chapter presents a summary of public coordination activities and viewpoints. The final report will include a summary of comments received during the public review period for this report.
- **Chapter 11: Draft Recommendation.** This Chapter summarizes recommendations for the Tentatively Selected Plan and key considerations. It concludes with the official recommendation of the USACE New York District Commander.

- **Chapter 12: List of Preparers.** This Chapter presents a list of report preparers, their titles, and their contributions to this report.
- **Chapter 13: References.** This Chapter lists references used in the analyses presented in the main report.

Appendices. Multiple technical appendices present in-depth information about the environmental, engineering, economic, real estate, and social analyses. They also include all pertinent correspondence submitted by the public and agencies. Additionally, the following web-based tools supplement the information provided in this report.

Study Website. The previously listed resources can be found on the Study website, in addition to fact sheets, status updates, briefing material, and other content. The Study website is located on the New York District website at https://www.nan.usace.army.mil/NYNJHATS.

StoryMap. ArcGIS (Geographic Information System) StoryMaps is a web-based application that includes maps in the context of narrative text and other multimedia content. A Study-specific StoryMap provides an interactive experience for readers who may want to explore maps, photos, videos, and other content. The StoryMap can be accessed from the Study website.

New York District **social media accounts**, provide status updates and information about public meetings. Links to the accounts can be found on the New York District website at https://www.nan.usace.army.mil

1.3. Background and History

The comprehensive NYNJHATS is one of nine focus area studies, originally identified as part of the North Atlantic Coast Comprehensive Study (NACCS). The Focus Area encompasses metropolitan New York City, lower New York, Long Island, and northern New Jersey covering an area of more than 2,150 square miles, having a shoreline of approximately 900 miles, and a population of over 15 million people. As the most densely populated area within the United States, the New York/New Jersey metropolitan area is connected by the New York Harbor, tidally affecting the Hudson, Passaic, Hackensack, Rahway, Raritan, and Shrewsbury rivers – the harbor's primary tributaries – and numerous other tributary streams. The estuarine system is both geographically and hydrodynamically complex, with two major pathways that affect coastal storm risk (i.e., the New York Bight and the Long Island Sound) along with multiple tidal inputs. A Draft Integrated FR/Tier 1 (Programmatic) EIS was released in September of 2022 that detailed the TSP recommendation, Alternative 3B, as a comprehensive solution encapsulating the combination of shoreside and in-water features, at an estimated first cost of $52.7 Billion to construct.

The TSP studied as part of the comprehensive NYNJHATS plan would help manage coastal storm risk through suite of measures that are designed to function as a system including: primary structural components consisting of storm surge barriers at the entrance to Jamaica Bay, Arthur Kill, and Kill Van Kull to provide CSRM on a multi-basin basis, three primary structural components involving storm surge barriers (SSB) on the individual water bodies of Gowanus Canal, Newtown Creek and Flushing Creek located in Brooklyn and Queens, and three primary structural shore-based measures in Jersey City, the lower west side of Manhattan, and East Harlem. Portions of the General Study Area that would directly

benefit from that TSP, include portions of the Hackensack and Passaic River watersheds, Upper Bay and Arthur Kill, Lower Hudson River, East River, Long Island Sound, and Jamaica Bay.

In addition to the primary storm surge barriers and shore-based measures that are outlined above, land and water-based measures were included in the TSP to mitigate any anticipated induced flooding from the project (known as Induced Flooding Features) as well as, small scale measures located behind the storm surge barriers that can be implemented quickly to address high frequency flooding at the most vulnerable portions of the study area (known as Risk Reduction Features). Nonstructural measures and nature-based solutions, while included in the TSP, were featured through preliminary discussions and were expected to undergo further detailed analyses at subsequent phases of the study, including the current phase.

Release of the Draft FR/Tier 1 (Programmatic) EIS kickstarted an expansive public review period that was extended from 45 days to 175 days. Through outlets such as public meetings, both virtual and in-person, as well as email and mail, the New York District received feedback and comments that totaled about 2,800 in number. Through the overwhelming response from the public and other stakeholder groups, the study team was able to recognize common themes for consideration, including the need to prioritize nature-based solutions and expedite the process in order to begin managing risk from coastal storms in the NYNJHATS General Study Area. More about the common themes for consideration from past reports, can be found in Chapter 10. In an attempt to begin addressing comments and concerns received from the last public comment period and to maximize responsiveness to Federal budgetary and legislative cycles, the New York District is investigating near-term localized actions, referred to in this report as Actionable Elements. Comment themes that were relevant to the Actionable Element Sites and/or proposed measures can be found in Appendix F.

What are Actionable Elements?

Actionable Elements are near-term localized flood risk management solutions, with a potential to achieve accelerated construction authorization through the Water Resources Development Act (WRDA) of 2026. These measures are informed by the comprehensive analyses, their ability to reach the necessary design maturity, as required by USACE, and where applicable, agency and public comments; and will seek to manage near-term localized flood risk from coastal storms and other water resource flood drivers, as listed within Section 8106(a) of WRDA 2022. As part of this Interim Response Report, New York District is proposing projects, named Actionable Elements within locations of urgent need or otherwise behind recommended features from the Comprehensive TSP, outlined in the September 2022 Draft FR/Tier 1 (Programmatic) EIS.

1.4. Purpose and Need

In 2012, Hurricane Sandy caused considerable loss of life, extensive damage to development, and disruption to the North Atlantic Coast. The effects of this storm were particularly severe because of its tremendous size and the timing of its landfall during spring high tide. 26 states were impacted by Hurricane Sandy, and disaster declarations were issued in 13 states. New York and New Jersey were the most severely impacted states because of where the storm made landfall, with the greatest

damage and most fatalities in the New York Metropolitan Area. Flood depths due to the storm surge were as much as nine feet in Manhattan, Staten Island, and other low-lying areas within the New York Metropolitan Area. At the time, Hurricane Sandy was the second costliest hurricane in the nation's history and the largest storm of its kind to hit the U.S. east coast. The storm exposed vulnerabilities within the Study Area, associated with an inadequate amount of existing CSRM measures and lack of sufficient defense to critical infrastructure for transportation and energy.

On January 29, 2013, President Obama signed into law the Disaster Relief Appropriations Act (DRSAA) of 2013 (Public Law 113-2), to assist in the recovery in the aftermath of Hurricane Sandy. The USACE North Atlantic Division was authorized by Public Law 113-2 to commence the NACCS to investigate CSRM strategies for areas impacted by the storm. In January 2015, USACE completed the NAACS, which identified high-risk areas on the Atlantic Coast warranting further investigation for flood risk management solutions. The NYNJHATS focus area was one of the three focus areas identified, along with the Nassau County Back Bays and the New Jersey Back Bays studies. USACE was authorized under Public Law 84-71, June 15, 1955 (69 Stat. 132), as modified, to investigate potential CSRM solutions within the NYNJHATS General Study Area. A Draft Integrated FR/Tier 1 (Programmatic) EIS was released in September 2022, summarizing a Tentatively Selected Plan and comprehensive solution.

The Draft Integrated FR/Tier 1 (Programmatic) EIS summarized the investigation of several alternatives, and ultimately found a comprehensive solution that was selected as the TSP. After careful evaluation of the alternatives and their tradeoffs, the Study team selected Alternative 3B – Multi - basin Storm Surge Barriers with Shore-Based Measures as the TSP. Rather than awaiting an appropriate opportunity to request appropriations equal to a first cost of $52.7 Billion for construction of the proposed comprehensive plan, USACE has adjusted their strategy to meet the more immediate needs of the study area by advancing near-term localized actions through Interim Response Actions, with a potential to receive accelerated authorization for construction.

The New York District, in partnership with NYSDEC and NJDEP as the non-federal sponsors, are now undertaking this phase of the study, as an Interim Response Action to the overall comprehensive plan. In addition, NYSDOS and NYCDEP (Bureau of Coastal Resilience) are non-federal partners. The Feasibility Cost Sharing Agreement (FCSA) was first executed on July 15, 2016, between the New York District, NYSDEC, and NJDEP. An amended FCSA was executed between these parties on June 28, 2022.

The Draft Integrated FR/Tier 1 (Programmatic) EIS summarized the investigation of several alternatives, and ultimately found a comprehensive solution that was selected as the TSP. After careful evaluation of the alternatives and their tradeoffs, the Study team selected Alternative 3B – Multi - basin Storm Surge Barriers with Shore-Based Measures as the TSP. Rather than awaiting an appropriate opportunity to request appropriations equal to a first cost of $52.7 Billion for construction of the proposed comprehensive plan, USACE has adjusted their strategy to meet the more immediate needs of the study area by advancing near-term localized actions through Interim Response Actions, with a potential to receive accelerated authorization for construction.

Interim Response Actions often arise during the progress of a programmatic study, in this case, for the purpose to respond to an immediate CSRM need and to correspond with future legislative cycles (e.g., Water Resources Development Act (WRDA)), while the more complex measures of the larger

NYNJHATS require additional analyses, modeling, public engagement, and design maturity to complete. The purpose and need of this action is to manage risk to critical infrastructure in local areas of high susceptibility to storm surge and other flood risk. This Interim Response Action helps to address a critical need for CSRM measures at the three Actionable Element Sites, Harlem River, New York, East Riser, New Jersey, and Oakwood Beach, New York.

The need for the study has been recognized by the U.S. Congress, USACE, the states of New York and New Jersey, the City of New York, other municipal governments, federal and local agencies, non-governmental organizations, and the public at large.

1.5. Study Area

1.5.1. General Study Area

The General Study Area encompasses tidally influenced areas within the New York metropolitan area, which includes New York City, the country's most populous and densely populated city, as well as the six largest cities in the State of New Jersey. The Study area includes more than 2,150 square miles and comprises parts of 25 counties in New Jersey and New York, including Bergen, Passaic, Morris, Essex, Hudson, Union, Somerset, Middlesex, and Monmouth Counties in New Jersey; and Rensselaer, Albany, Columbia, Greene, Dutchess, Ulster, Putnam, Orange, Westchester, Rockland, Bronx, New York, Queens, Kings, Richmond, and Nassau Counties in New York. The Study Area is divided into nine Planning Regions. They include the Capital District Region, Hackensack/Passaic Region, Jamaica Bay Region, Long Island Sound Region, Lower Bay Region, Lower Hudson/East River Region, Mid-Hudson Region, Raritan Region, and Upper Bay/Arthur Kill Region (***Figure 1***).

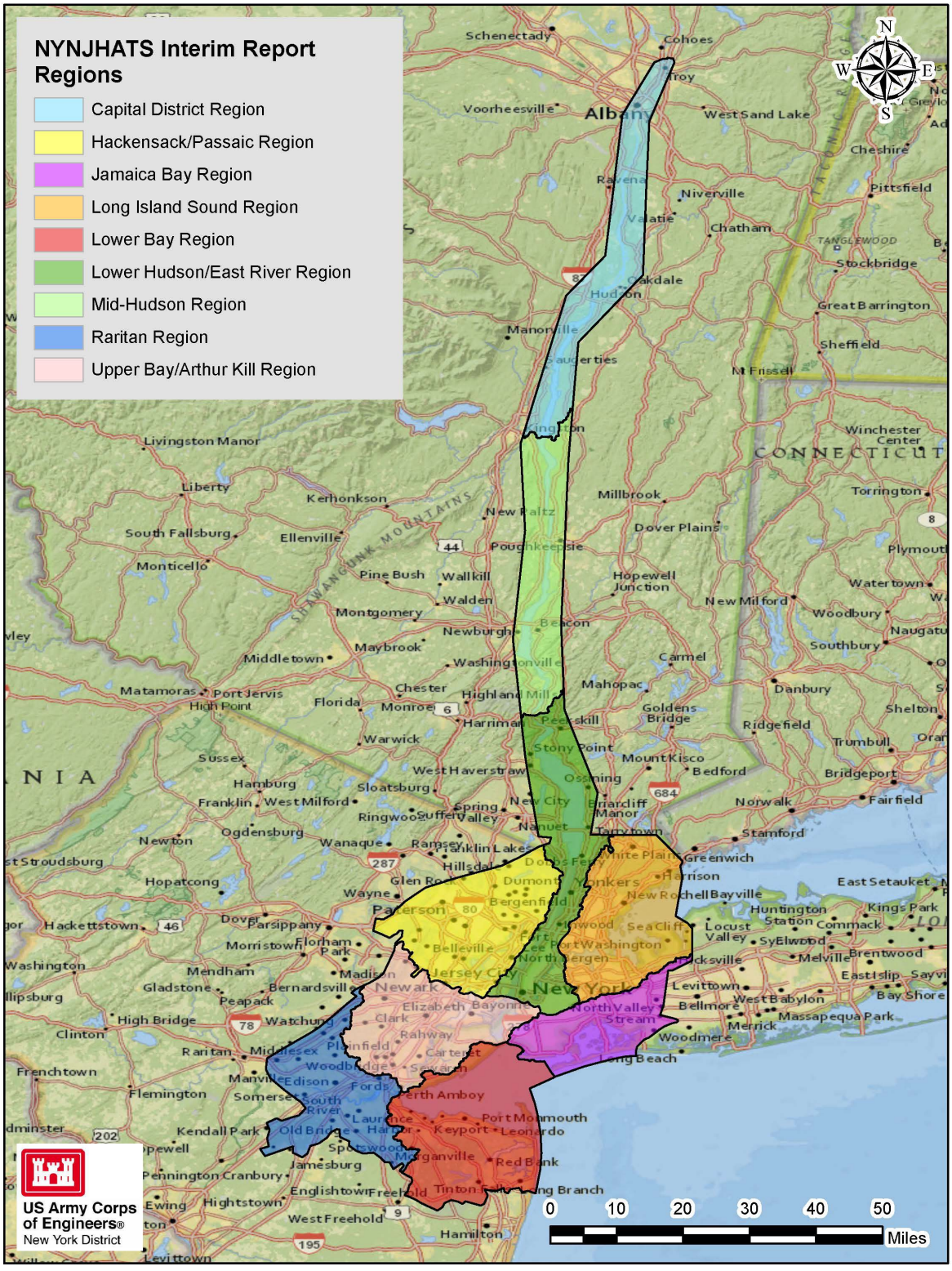

Figure 1: General Study Area

Capital District Region

The Capital District Region is the northern-most region of the Study Area, encompassing both the eastern and western sides of the Hudson River from Kingston, New York to Troy, New York. This region includes the state capital of New York, Albany.

Mid-Hudson Region

The Mid-Hudson Region falls just south of the Capital District Region and includes both the eastern and western sides of the Hudson River from Highland Falls, New York, up North to Kingston, New York.

Lower Hudson/East River Region

The Lower Hudson and East River Region includes the entire island of Manhattan and goes as far north as Bear Mountain, New York, encompassing both the eastern and western sides of the Hudson River and the East River until Randall's Island, New York. Included also in this area are the Brooklyn, Manhattan, Williamsburg, George Washington, and Governor Mario M. Cuomo Bridges.

Hackensack/Passaic Region

The Hackensack and Passaic Region is entirely located in New Jersey on the western side of the Hudson River from the area of Newark, New Jersey up North to Tappan, New Jersey. The region encompasses the Hackensack River, Passaic River, and portions of the Bergen, Passaic, Hudson, Essex, and Union Counties in New Jersey.

Upper Bay/Arthur Kill Region

The Upper Bay Region includes the Upper New York Bay, beginning at the mouth of the Hudson River and connects to the Newark Bay and the Arthur Kill via the Kill Van Kull Channel. It also connects to the East River and exchanges water with the Long Island Sound. This region encompasses the area just north of the Verrazzano Narrow Bridge and includes parts of Union and Essex Counties, New Jersey to the west and areas of Brooklyn to the east. Also in this region is the Statue of Liberty, Ellis Island, and Newark International Airport.

Lower Bay Region

The Lower Bay Region includes the Lower Bay of New York, Raritan Bay, and Sandy Hook Bay. This region starts to the north, at the Verrazzano Narrows Bridge, includes the eastern side of Staten Island, New York and hugs the western shoreline of Brooklyn, New York. It continues through New Jersey and covers as far south as Monmouth County, New Jersey and Rockaway Point, New York.

Raritan Region

The Raritan Region is the western-most region within the Study Area, encompassing the Raritan River before it joins the Raritan Bay at Perth Amboy. The region extends to parts of Union, Somerset, Middlesex, and Monmouth Counties, New Jersey.

Jamaica Bay Region

The Jamaica Bay Region is located on the southwestern shores of Long Island, enclosed by the Rockaway Peninsula. Portions of Brooklyn, Queens, and Nassau County, New York are included within the region, as well as the John F. Kennedy International Airport. Rockaway Inlet, on the western edge of the Bay, connects to New York's Lower Bay.

Long Island Sound Region

The Long Island Sound Region of the Study Area is located North of Manhattan where the East River and Long Island Sound meet. Portions of The Bronx, and Queens are within the limits of the region, along with a small portion of Nassau County, Long Island. The region includes LaGuardia Airport, the Whitestone Bridge, and the Throgs Neck Bridge, as well.

1.5.2. Actionable Element Sites

The Actionable Element Sites are defined for the study as the general location within the study area where a component or combination of measures has been identified for possible physical implementation or construction (***Figure 2***). This includes areas in which the effects of coastal storms would be managed due to proposed project features. Therefore, the Actionable Element Site is any area that may benefit from the construction of a potential project.

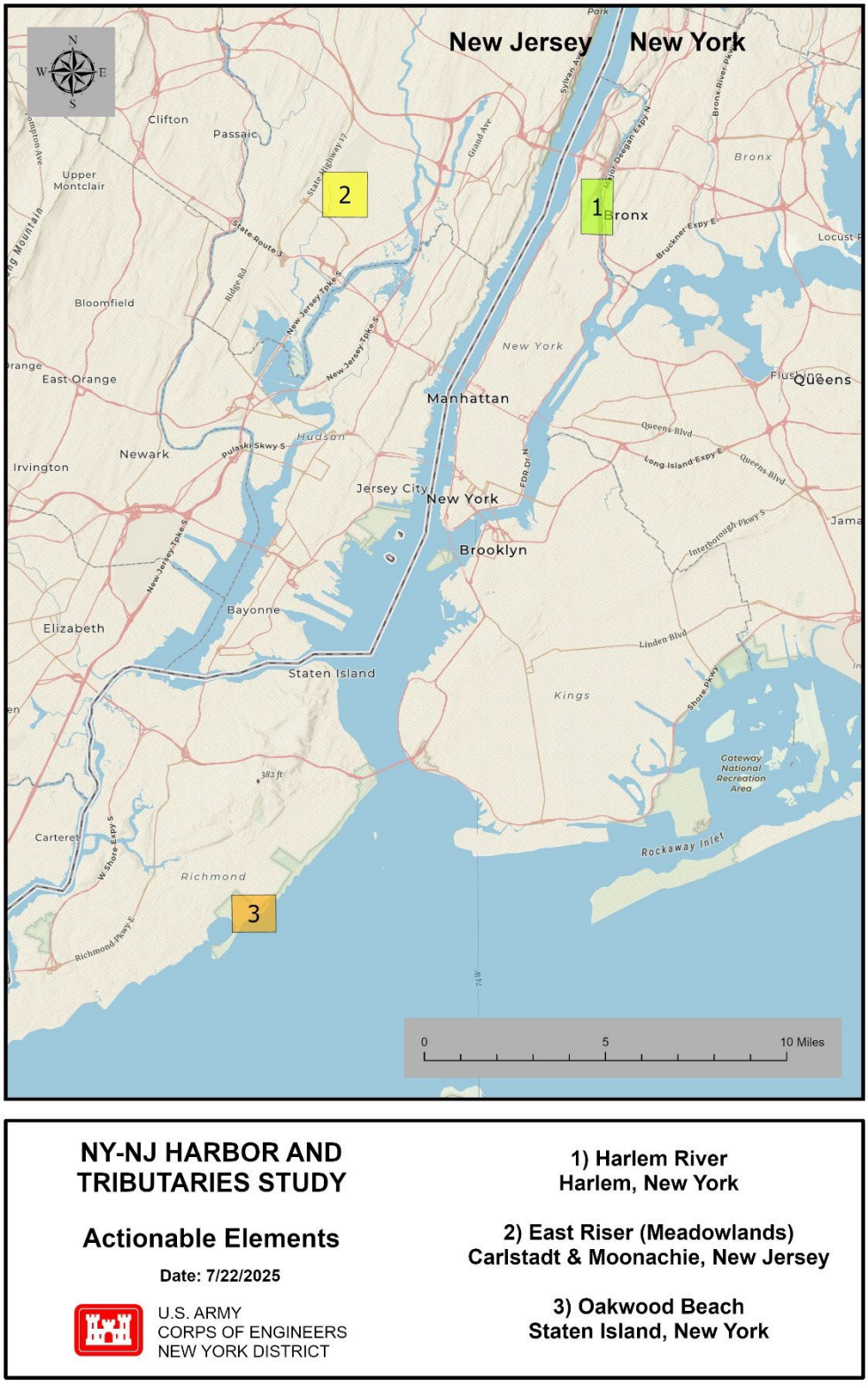

Figure 2: Actionable Element Site Locations

Harlem River, Manhattan (New York County), New York City, New York

The Harlem River Actionable Element Site is part of the wider Lower Hudson/East River Region. More specifically, the location of this site includes the northeastern side of Manhattan, at the intersection of Washington Heights and Northern Central Harlem, New York City. The Actionable Element is proposed to begin just south of the Macombs Dam Bridge and extends north to the Harlem River Drive Service Road West.

East Riser, Bergen County, Meadowlands, New Jersey

The East Riser Actionable Element Site is part of the Hackensack/Passaic Region. The location of this site is inclusive of the East Riser Ditch Channel and begins at the mouth of the channel, connected through Berry's Creek at Starke Road. The site follows the length of the East Riser Ditch Channel, up to Moonachie Avenue, just south of Teterboro Airport in Carlstadt and Moonachie, New Jersey.

Oakwood Beach, Staten Island (Richmond County), New York City, New York

The Oakwood Beach Actionable Element Site is part of the Lower Bay Region. The location of this site is part of the National Park Service's Gateway Recreation Area Great Kills Park. More specifically, the proposed project is between Buffalo Street and the Oakwood Beach Wastewater Resource Recovery Facility. The Oakwood Beach Actionable Element Site is under jurisdiction of the National Park Service.

1.6. Study Scope

The study scope is the extent and parameters of the feasibility study. The scope of USACE studies is generally related to two driving documents: 1) the Federal Objective for water resource planning, and 2) the Study Authority. Direction given by the ASA(CW) and HQUSACE, as well as non-Federal sponsor requests, further shaped the NYNJHATS scope, resulting in the creation of a Comprehensive Framework that guides current and future study efforts.

1.6.1. Federal Objective

The Federal Objective specifies the fundamental goal of Federal investments in water resources. It is specified in the Principles and Requirements for Federal Investments in Water Resources (or PR&G), which is a common framework for analyzing a diverse range of water resources projects, programs, activities, and related actions involving Federal investment as identified by the agencies in the context of their missions and authorities – including by USACE. The Federal Objective specifies that:

> *Federal water resources investments shall reflect national priorities, encourage economic development, and protect the environment by: 1) seeking to maximize sustainable economic development; 2) seeking to avoid the unwise use of floodplains and flood-prone areas and minimizing adverse impacts and vulnerabilities in any case in which a floodplain or flood-prone area must be used; and 3) protecting and restoring the functions of natural systems and mitigating any unavoidable damage to natural systems… In consideration of the many competing demands for limited Federal resources, it is intended that Federal investments in water resources as a whole should strive to maximize public benefits, with appropriate consideration of costs. Public benefits*

encompass environmental, economic, and social goals, include monetary and nonmonetary effects and allow for the consideration of both quantified and unquantified measure. (PR&G 2013)

1.6.2. Study Authority

The Study authority is provided by Public Law 84-71, approved June 15, 1955, which calls for:

"…an examination and survey to be made of the eastern and southern seaboard of the United States with respect to hurricanes, with particular reference to areas where severe damages have occurred… Such survey, to be made under the direction of the Chief of Engineers, shall include the securing of data on the behavior and frequency of hurricanes, and the determination of methods of forecasting their paths and improving warning services, and of possible means of preventing loss of human lives and damages to property, with due consideration of the economics of proposed breakwaters, seawalls, dikes, dams, and other structures, warning services, or other measures which might be required."

The study authority is broadly to investigate ways to manage coastal storm risk along the nation's eastern and southern seaboard. The NACCS identifies a more specific geographic scope to the study as the NYNJHATS Focus Area, as described in Section 1.5 The study authority manages coastal storm risk as the study's primary focus. Subsequent legislation including but not limited to Section 8016(a) of WRDA 2022 allows for the consideration of other flood drivers secondary to CSRM.

Several WRDA provisions provide general and study-specific authority that affect the study scope. They include Section 8106(a) of WRDA 2022 (general authority), as well as Section 203 of WRDA 2020 and Section 1343 of WRDA 2024 (study-specific authority) (Appendix G). Section 1343 of WRDA 2024 directs the Secretary, "*to require the Secretary, upon the request of the non-Federal interest for the project, to include within the scope of such study an investigation of, and recommendations relating to, projects and activities to maximize the net public benefits, including ecological benefits and societal benefits, from the reduction of the comprehensive flood risk within the geographic scope of the project from the isolated and compound effects of factors described in section 8106(a) of the Water Resources Development Act of 2022*.." It also states that, "*the Secretary is authorized to carry out projects and activities recommended... if such projects and activities otherwise meet the criteria for projects carried out under a continuing authority program (as defined in section 7001(c)) of [WRDA 2014]*."

Additionally, Section 1343 of WRDA 2024 requires "*any study recommended to be carried out in a report that the Chief of Engineers prepares for such study shall be considered a continuation of the [comprehensive] study... In developing recommendations... the Secretary shall 1) consider the use of natural and nature-based features; (2) consult with applicable Federal and State agencies and other stakeholders within the geographic scope of the project; and solicit public comments*."

Additional detail related to the study authority and legislative history can be found in Appendix G.

1.6.3. Subsequent Legislation and the Study Scope

The legislation from WRDAs 2020, 2022, and 2024 illustrates Congressional interest in several areas, including expanding the scope of the NYNJHATS to address the comprehensive coastal storm risk, and the effects of additional sources of flooding, including sea level rise and precipitation; ensuring the study considers the full range of project outputs as described in the USACE agency specific procedures;

ensuring extensive public involvement in the development of plans, and; authorizing the construction of features that are within the scope of a Continuing Authorities Program.

Section 8106(a) of WRDA 2022 provides an avenue for non-Federal sponsors to request study teams formulate alternative plans that maximize the benefits from the reduction of comprehensive flood risks. The non-Federal sponsors submitted a joint request to the Office of the ASA(CW) for such work to be completed. The Office provided a response on March 26, 2025, indicating that the New York District work together with the non-Federal sponsors to complete this analysis. The group agreed to complete this analysis of comprehensive flood risks in two parts, which reflects the challenges of expanding the current analysis to include comprehensive flood risks for an entire study region at this phase in the study:

1) in a limited capacity and as applicable during the development of Actionable Elements (first and second prong of the study completion framework), as appropriate under DRSAA 2020 guiding rules
2) during refinement of the Tentatively Selected Plan described in the September 2022 Draft Integrated Feasibility Report and Tier 1 Environmental Impact Statement (third prong of study completion framework)

Study-Specific Guiding Directives

The September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS presented the details of a $52.7 billion (FY22 price level) plan to comprehensively address the region's coastal storm risk. Feedback from the public, resource agencies, and senior leaders clearly indicated the need to more fully address the needs of communities in the study area on the course to comprehensive study completion. Much of this feedback highlighted the region's critical need for near-term localized actions to manage coastal storm flooding, and concerns about the ability of the USACE Civil Works process to maximize responsiveness to Federal budgetary and legislative cycles. Similar concerns were raised related to how current Federal law and USACE policy could support timely construction of a CSRM project. Understanding these concerns, the Office of the ASA(CW), HQUSACE, and the USACE North Atlantic Division issued guidance in 2024 and 2025 that reshaped the study scope and the strategy for study completion (Appendix G).

1.6.4. A Framework for Study Completion

The three-pronged study completion framework takes advantage of Federal legislative cycles, to allow for early implementation of flood risk management projects. The strategy reflects current funding and budgetary considerations, namely that current work to complete the first prong is being completed at 100% Federal expense through the Disaster Relief Supplemental Appropriations Act of 2022 (DRSAA 2022), and additional Federal funding is needed for future work.

1) Completion of an interim response to the study authority, informed by the comprehensive analyses conducted to date and where applicable, responding to agency and public comments received to date, that will recommend the Congressional authorization of near-term constructible elements in a potential WRDA 2026.
2) Completion of a subsequent interim response to the study authority that will recommend the Congressional authorization of additional near-term constructible elements in a potential WRDA

2028, subject to the availability of funds. Other WRDAs beyond 2028 may also be included in this effort, or as separate efforts.

3) Completion of a response to the study authority that will recommend a comprehensive project to manage the region's coastal storm risk and increase coastal resiliency. This study will continue the investigation of the plan documented in the September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS. It will be a cost-shared study effort within the regular USACE General Investigations (GI) Program, unless otherwise directed by Congress.

This report documents a plan that is a collection of near-term localized CSRM actions capable of being studied and recommended for construction in the near-term, called Actionable Elements, that is the first prong of this approach. The current effort advances portions of the September 2022 Tentatively Selected Plan for which there is existing information sufficient to achieve a Chief's Report according to the existing budget and schedule to complete in time for a potential WRDA 2026. The current work is being advanced within the context of the comprehensive plan and will identify the synergies between these Actionable Elements and the comprehensive plan.

1.6.5. Potential Future Study Efforts

New York District is advancing the current effort focused on Actionable Elements and a Chief of Engineer's Report for potential authorization in WRDA 2026, using DRSAA 2022 funding. USACE is currently scoping efforts, in conjunction with study partners for potential future work that could result in a plan described in a Chief of Engineer's Report for authorization in a potential WRDA 2028. The study team is scoping of potential future study efforts is pending the availability of funding.

1.7. NEPA Requirements and Tiering

NEPA requires federal agencies, including USACE, to consider the potential environmental effects of their proposed actions and any reasonable alternative plan before undertaking a major federal action, as defined by 40 Code of Federal Regulations (CFR) 1508.18. To evaluate potential environmental effects, New York District has prepared this Integrated Interim Response FR/EA. An EA is a supporting document utilized when the adverse effects of an action are anticipated to have none or be low enough with or without mitigation, to ultimately result in a Finding of No Significant Impact (FONSI) or mitigated FONSI. Below is a description of the NYNJHATS NEPA Requirements, Tiering, the Interim Response Action, and how each relate to one another:

The Comprehensive Plan Integrated FR/Tier 1 (Programmatic) EIS is being conducted in two stages or tiers. Tiering, which is previously defined in 40 CFR 1508.28 (2020) and presently in Parts 1.8 and 3.1 of the Department of Defense National Environmental Policy Act Implementing Procedures (June 30, 2025) , is a means of making the environmental review process more efficient by allowing parties to "eliminate repetitive discussions of the same issues and to focus on the actual issues suitable for decision at each level of environmental review" (40 CFR 1502.20, {2020}). Tier 1 is a broad level review that identifies and evaluates the overall plan, and any issues that can be fully addressed and resolved during a broad-level assessment, notwithstanding possible limited knowledge of the project. In addition, it establishes the standards, constraints, and processes to be followed in the specific detailed reviews. As proposed alternatives are developed and refined, incorporating a higher level of detail, the specific

detailed reviews evaluate the remaining issues based on the policies established in the broad-level review. Together, the broad-level review and the future specific detailed reviews (referred to as “Tier 2”) will collectively comprise a complete environmental review addressing all required elements. Tiering the EIS resolves the “big-picture” issues so that subsequent studies can focus on project-specific design changes and effects. A Tier 1 EIS involves technical analysis completed on a broad scale and is therefore an effective method for identifying existing and future conditions and understanding the comprehensive effects of the project on a large scale. It also supports the identification of reasonably foreseeable effects of the actions as the study progresses and the existing and future without project conditions change. It provides the groundwork for future project-level environmental and technical studies and modeling and agency consultation.

The Tier 2 NEPA documents will include one or more subsequent detailed reviews, in the form of an EA or EIS, depending on site-specific existing conditions and environmental effects anticipated), as the Recommended Plan identified in the Tier 1 design becomes more refined and is further assessed at a site-specific level during PED, inclusive of any reasonable alternatives at the site-specific level.

This report is not a “formal” Tier 2 NEPA document, but rather an Interim Response Action following a similar process to the Tier 2. Prior to changes to NEPA Implementing Regulations, Interim Actions in the context of NEPA, refer to actions subject to immediate environmental review before completing programmatic analyses, often arising from a need to address more immediate needs. These actions must adhere to specific limitations, primarily outlined in 40 CFR 1506.1 (2020) to ensure they don't prematurely commit resources or limit the choices discussed in the environmental review process. The need for an interim action often arises during the advancement of programmatic studies. 40 CFR Part 1506.1(c)* states that while work on a programmatic study is in progress interim actions may be pursued provided the action is:

- Justified independently of the program;
- Is itself accompanied by an adequate environmental review; and
- Will not bias the ultimate decision on the program.

Although the Council on Environmental Quality (CEQ) Implementing Regulations are no longer in effect as of April 11, 2025, the Interim Response Action has followed the Implementing Regulations in the identification of Actionable Elements prior to resending as a mechanism to ensure no segmentation, or perceptions of reduced environmental effects, occurs throughout this programmatic process. For this interim action and the subsequent interim actions, the NYNJHATS team will continue to follow the 2020 Implementing Regulations as it relates to Interim Actions, as they were in place in earlier study phases, to maintain consistency and continued risk-informed planning processes. The NEPA analysis will be in compliance with the CEQ guidance (https://ceq.doe.gov/docs/ceq-regulations-and-guidance/CEQ-Memo-Implementation-of-NEPA-02.19.2025.pdf) the recently published Department of Defense National Environmental Policy Act Implementing Procedures (June 20, 2025).

1.8. Standards and Processes of Related NEPA Documents

As the Study will be conducted in two Tiers, below is a list that includes but is not limited to the standards, processes, and/or constraints of each Tiered phase for the overall Comprehensive Plan and this Interim Response Action.

TIER 1

The revised Integrated FR/Tier 1 (Programmatic) EIS will continue during the Feasibility Phase and will include the following:

- The New York Bight Ecological Model (NYBEM) and Adaptive Hydraulics (AdH) modeling of closed Storm Surge Barrier gates resulting in a comparison of the open gate/closed gate impacts to the estuary and associated habitats;
- Review and analysis of nonstructural measures, with refined development of conceptual placement locations and measures proposed in each alternative plan;
- Review and analysis of nature-based solutions (formerly referred to as natural and nature-based features (NNBFs)) conceptual locations and measures proposed in each alternative plan;
- Identification of the Recommended Plan;
- Further refinement of the Recommended Plan construction, operations, and maintenance assumptions;
- Further refinement of conceptual compensatory mitigation and adaptive management to include additional analysis (e.g., NYBEM) and design refinements;
- Further refinement of the parametric mitigation costs;
- Consultations, including Section 7 consultations, will be ongoing, to support the current Tier 1 EIS, as well as any and all subsequent NEPA analyses, as required, to achieve compliance with The ESA for the NYNJHATS and project.
- Responses to comments received from stakeholders, agencies, and the public;
- Any other identified data gaps to be identified, and a determination for when those data gaps would be best addressed (in the Comprehensive Plan or subsequent site-specific reviews).

TIER 2

The overall Comprehensive Plan Tier 2 NEPA documents (Part 3.1 of Department of Defense National Environmental Policy Act Implementing Procedures {June 30, 2025}) will occur during the Preconstruction Engineering and Design phase and include the following:

- One or more subsequent detailed reviews, in the form of an EA or EIS, as the Recommended Plan design becomes more refined;
- Further refinement of the Recommended Plan construction, operations, and maintenance assumptions;
- NEPA compliance and formal consultation with the affected agencies;
- HTRW sampling and analysis, as work-in-kind by the nonfederal sponsor, to identify areas that may require remediation prior to construction;
- Further consideration of modeling and monitoring, including but not limited to terrestrial vegetation surveys, environmental window restrictions, threatened and endangered species monitoring, erosion controls, etc.;

- Further refinement of conceptual mitigation and compensatory mitigation and adaptive management plan to include any additional analysis completed;
- Further refinement of the parametric mitigation costs;
- Updated biological assessments to include additional analysis such as water quality modeling and/or noise modeling;
- Consultations, including Section 7 consultations, will be ongoing, to support the current Tier 1 EIS, as well as any and all subsequent NEPA analyses, as required, to achieve compliance with The ESA for the NYNJHATS and project;
- Any other identified data gaps to be identified and addressed as the project progresses from the Comprehensive broad level review to the site-specific level of review.

INTERIM RESPONSE ACTION

An Interim Response action follows all the same standards and processes of the Tier 1 and Tier 2 phase of the overall Comprehensive Plan, as outlined in the CEQ Implementing Regulations 2020 (40 CFR 1506.1). The Interim Response NEPA documents conducted prior to the completion of the overall programmatic Comprehensive Plan will be conducted in the Feasibility Phase and include the following:

- Same standards and processes as the Tier 2 phase; and,
- Description of the independent justification during the selection of Actionable Elements;
- Adequate environmental review (through the preparation of an Integrated Interim Response FR/EA)
- Description of the Interim Response relationship to the overall Comprehensive Plan; and vice versa in the Comprehensive Plan document;
- Documentation of the Interim Response becoming part of every Alternative evaluated in the Comprehensive Plan; and
- Reasonably foreseeable effects analyses further discussing the adverse effects associated with the Interim Response existence within the Comprehensive Plan.

1.9. Non-Federal Sponsors and Partners

This study is a joint effort of New York District and two non-federal sponsors, the NJDEP and NYSDEC. The NYCDEP and NYSDOS are study partners.

1.9.1. Cooperating and Participating Agencies

NEPA (2020) and Department of Defense regulations define three types of formal roles for federal agencies. A Lead Agency is the federal agency preparing or having taken primary responsibility for preparing a NEPA document. A Cooperating Agency is any federal agency other than a lead agency which has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposal (or a reasonable alternative) for legislation or other major federal action significantly affecting the quality of the human environment. A Participating Agency is a federal agency that has an interest in the proposal. The following is a list of formal federal agency roles for this Study:

Lead Agency: USACE New York District
Cooperating Agencies:

- U.S. Environmental Protection Agency (EPA),
- U.S. Fish and Wildlife Service (USFWS),
- U.S. Coast Guard (USCG),
- National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS), and
- National Park Service (NPS)

Participating Agency: Federal Emergency Management Agency (FEMA)

1.10. Public and Agency Participation

Public and agency involvement remains central to the USACE planning process and NEPA. The Study team is committed to continued proactive engagement with stakeholders to refine the understanding of concerns and solicit feedback, specifically regarding the proposed Actionable Elements. The study team continues to use a variety of forums and tools for outreach, including the Study website (https://www.nan.usace.army.mil/nynjhats), an interactive online ArcGIS StoryMap, and a combination of upcoming virtual and in-person meetings. Public and agency feedback can be hared at meetings, through the Study email address (NYNJHarbor.TribStudy@usace.army.mil), mail comments, and phone calls. This Draft Integrated Interim Response Report for Actionable Elements is a key opportunity for feedback, and public and agency participation is encouraged throughout the remainder of the NYNJHATS.

Key Tenets

The Study team uses three Key Tenets of Public Agency Participation to guide its stakeholder engagement activities.

Tenet 1: Public Input Is Important

Public and agency participation is important because it contributes to better decisions. The study team relies on input to understand different perspectives, needs, and concerns, as well as information about technical and social issues, in order to develop better solutions. Decision makers take the needs and interests of all stakeholders into account when forming decisions and recommendations. For this reason, it is critical that public and agencies participate in the planning process.

Tenet 2: Information Will Be Shared Widely

To any extent possible, the study team commits to sharing information widely and in a timely manner. Study updates, reports, and other products are posted to the Study website. Press releases, emails, and social media postings announce the availability of information as soon as it is shared. The study team relies on agencies and stakeholder groups to share information through their respective channels, especially with stakeholders who may not or do not have access to the internet and a device to get onto it.

Tenet 3: Proposed Project Details Will Change Based on Feedback

The level of detail for USACE feasibility studies is generally conceptual and subject to change as more information is gathered throughout the study process. Feedback and supplemental information can inform changes to plan details. Comments received during the public comment period for this Draft Report will be considered as the plan is refined. A greater level of detail will be presented in subsequent reports, including the Final IR/EA. Final project designs will not be known until the Preconstruction, Engineering, and Design or Construction project phases, which is dependent upon action by the U.S. Congress for authorization and appropriation as well as non-federal sponsor partnering agreements.

1.10.1. NEPA Scoping Process

The NEPA process is integrated into the feasibility study and is being documented in this Draft Integrated Interim FR/EA. The initial scoping process (detailed in the September 2022 Draft Integrated FR and Tier 1 (Programmatic) EIS) established a broad framework (USACE, 2022). This Draft Integrated Interim FR/EA presents an analysis of potential environmental impacts associated with the proposed Actionable Elements. The purpose of this draft document is to solicit public and agency feedback on the analysis and proposed actions. This Draft Integrated Interim Response FR/EA will support a determination of whether the proposed actions may result in significant environmental effects. If the analysis concludes that impacts are not significant, a Draft Finding of No Significant Impact (FONSI) will be issued for public and agency review, followed by a Final FONSI as appropriate. If significant impacts are identified, further analysis and mitigation measures will be developed, potentially requiring a more detailed Environmental Impact Statement (EIS).

1.10.2. Agency Coordination

The NYNHAT study team continues to coordinate with federal, state, and local governmental agencies in support of interagency coordination and environmental compliance. Coordination with these agencies has included attendance at meetings hosted by New York District and other agencies. The NYNJHATS team will continue to engage with agencies throughout the planning process, and specifically to support environmental compliance activities described in Chapter 8. NEPA and DOD regulations and processes define three types of formal roles for federal agencies: Lead Agencies, Cooperating Agencies, and Participating Agencies (for more information see Section 1.9.1). Cooperating and Participating Agencies must provide comments within their special expertise or jurisdiction and use the NEPA process to address any environmental issues of concern to its agency.

2. Plan Formulation Process

This Chapter describes the planning process used in identifying and evaluating Actionable Elements. It includes a summary of problems and opportunities as well as an inventory and forecast. It describes each step of the planning process, including data sources, considerations, and assumptions that informed identification of the three Actionable Element Sites.

2.1. USACE Planning Process

The USACE Civil Works planning process follows a standard approach to identifying and evaluating potential water resource solutions in order to ensure potential federal projects comply with applicable laws and guidance. The 1983 Economic and Environmental Principles and Guidelines for Water and Related Land Implementation Studies (Principles and Guidelines, or P&G) provide guiding principles for the USACE planning process. The 2013 PR&G supersedes the 1983 P&G, though both are currently used to guide the planning process. On December 19, 2024, USACE issued the final rule for implementing the 2013 PR&G via its Agency Specific Procedures (ASPs), as there is no current implementation guidance for the ASP's, both are being utilized to guide the planning process. ER 1105-2-103 Policy for Conducting Civil Works Planning Studies and the Planning Manual Part II: Risk-Informed Planning lay out an iterative planning process used for all USACE Civil Works studies in developing and evaluating alternative plans (IWR 2017).

The six steps of the iterative planning process are denoted in ***Figure 3*** and include identifying water resource problems and opportunities (Step 1), inventory and forecast of existing and future conditions (Step 2), plan formulation (Step 3), plan evaluation (Step 4) and comparison (Step 5), and finally plan selection (Step 6), with evidence gathering, risk management, and stakeholder involvement as taking place throughout the process. This chapter describes the completion of each of these steps.

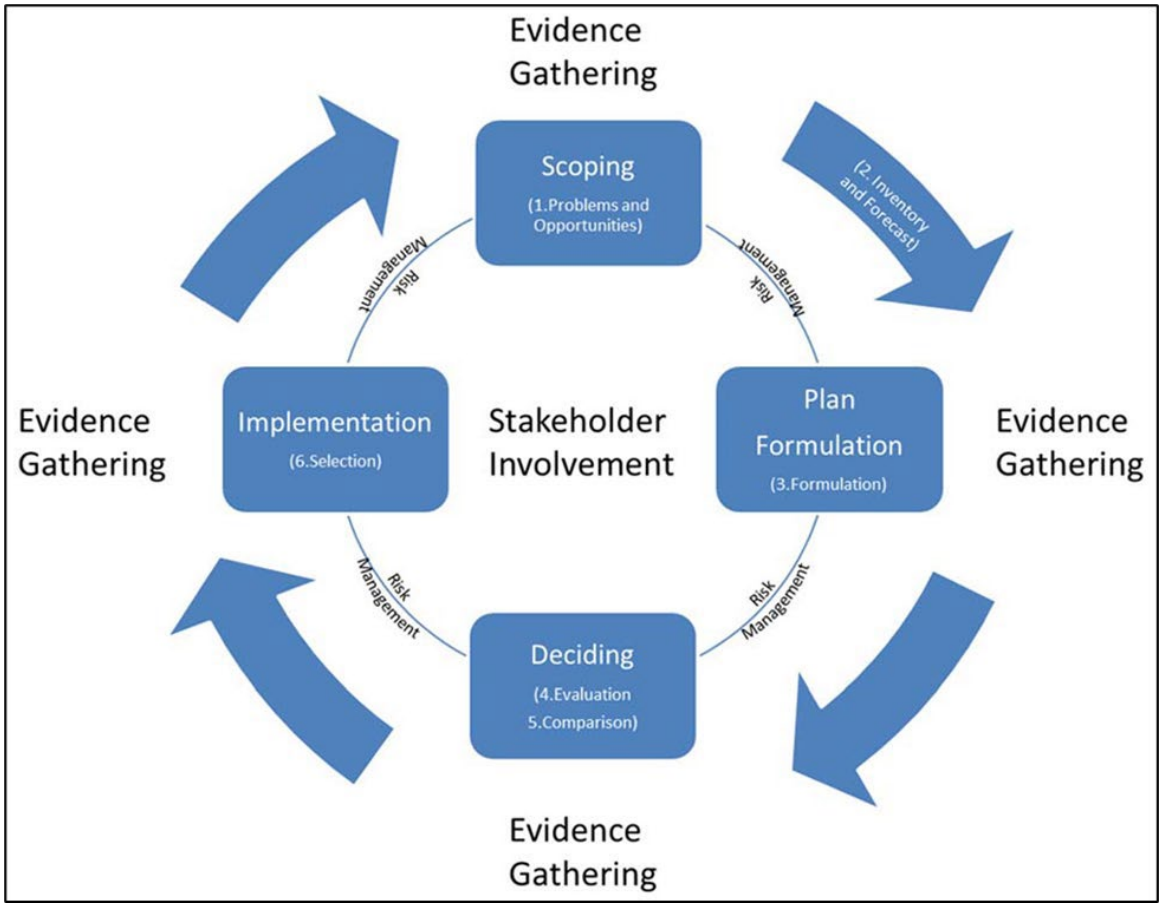

Figure 3: USACE Risk-Informed Planning Process (from IWR 2017)

2.2. Plan Formulation Strategy

Following development of the TSP Milestone and release of a Draft Integrated FR/Tier 1 (Programmatic) EIS in September of 2022, a change of direction for the study strategy was confirmed within the receipt and approval of a request for additional time and funding, granted to New York District by the acting ASA(CW) in January 2025. New York District will complete formulation for Actionable Elements with a Chief of Engineer's report for potential inclusion into a Water Resources Development Act (WRDA) 2026 and a framework for the comprehensive regional plan, that would outline the completion strategy for the remainder of the NYNJHATS.

Efforts outlined in this Interim Response Report focus on investigating CSRM measures within the NYNJHATS General Study Area informed by the comprehensive analyses, consistent with the Study Authority, which will be put forward to Congress for potential inclusion in a WRDA. Such opportunities include investigation of Actionable Elements, which are near-term localized actions with a potential to receive accelerated authorization for construction, in advance of the overall comprehensive plan. These measures will seek to manage risk to critical infrastructure in local areas susceptible to storm surge, with the understanding that remaining at-risk areas will be studied and addressed through future Interim Response Actions, or through completion of the comprehensive plan, pending the availability of funding.

2.3. Period of Economic Analysis and Planning Horizon

The period of analysis is the length of time which alternative plans' benefits, costs, and impacts should be considered. To determine the period of analysis, the study team considered the time needed to further design the plan, obtain construction prerequisites, and the estimated construction duration itself. For the September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS, a 50-year period of analysis between 2044 and 2093 was used to assess the potential benefits and costs of the various alternatives. Since the team is focusing on advancing near-term localized coastal storm and flood risk management action recommendations with a potential for accelerated construction authorization, the period of analysis for these Actionable Elements and alternatives is earlier, 2037 through 2086. The planning horizon, which is a 100-year period to account for the effects of relative sea level change (RSLC), has been identified as 2037 through 2136 (extending 50 years after the end of the period of analysis).

2.4. Problems & Opportunities

The problems, opportunities, goals, and objectives used for this Draft Integrated Interim Response FR/EA are the same used for the September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS.

Problems: A problem statement is the detailed description of a problem that helps guide the planning process. It informs the identification of the study's goals and objectives, and ultimately plan formulation, comparison, and selection. The problems can be summarized as follows:

- Coastal storm flooding, impacting nationally important areas/facilities, critical infrastructure, societal resources, communities, and the environment
- Threats to life safety

Opportunities: Opportunities are instances in which the implementation of a plan has the potential to create a desirable future condition and provides ways to address the specific problems within the study area. The primary opportunities identified for the study area are:

- Manage coastal storm flood risk
- Better communicate coastal storm risk to communities
- Recruit natural ecosystems into the coastal risk management framework
- Contribute to community resilience
- Contribute to resilience of infrastructure and the economy

Planning Goals: Planning goals describe the overarching intent of the project and helped in creating and evaluating alternative plans. The planning goals are to:

- Manage the risk of coastal storm flood damage in the study area
- Contribute to National Economic Development by managing coastal flood risk, consistent with protecting the Nation's environment, pursuant to applicable laws, guidance, and requirements

Objectives: Planning objectives describe the desired results of the planning process. Objectives are based on problems and opportunities. The planning objectives are to:

- Manage the risk of coastal storm damage for communities, public infrastructure, important societal resources, and the environment

  Metric: dollars economic damages reduced as calculated by the HEC-FDA model

- Improve the community's ability to recover from damages caused by storm surge by reducing the duration of interruption in services provided by man-made and natural systems

  Metric: qualitative analysis of how a project would aid the community in recovery from storms by reducing damages

- Enhance human health and safety by improving the performance of critical infrastructure and natural features during and after storm surge events

  Metric: qualitative analysis of how a project would aid the community in recovery from storms by reducing damages

2.5. Planning Constraints and Considerations

Unlike planning objectives that represent desired positive changes, planning constraints and considerations represent restrictions that should not be violated or avoided, if possible. The formulation and evaluation of alternative plans are constrained by technical, environmental, economic, regional, social, and institutional considerations. The constraints and considerations used for this Draft Integrated Interim Response FR/EA are the same used for the September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS.

Constraints: Constraints are restrictions that limit the extent of the planning process. Constraints are designed to avoid undesirable changes between the with- and without-project conditions. They can be divided into universal constraints and study-specific constraints. Universal planning constraints are the legal and policy constraints to be included in every planning study. Study-specific planning constraints are statements of things unique to a specific planning study that alternative plans should avoid. Study-specific constraints include:

- Minimize impacts to ongoing recovery, ecosystem restoration, and risk management efforts by others
- Minimize impacts to resources within the Gateway National Recreation Area (by statute must be mutually acceptable to the Department of the Interior and the Department of the Army).
- Minimize impacts to access for Federal navigation channels
- Minimize induced flooding in areas not currently vulnerable to flooding and minimize induced additional flooding in flood-prone areas
- Minimize impacts to community access and egress during emergencies
- Minimize impacts to operations at international airports
- Minimize negative effects to plants, animals, or critical habitat of species that are listed under the federal Endangered Species Act or a New York State Endangered Species Act

Considerations: Considerations are important values and things that are folded into the planning process but do not limit it. Study constraints include:

- Local sensitivity to certain measures (e.g., acquisition, unintended adverse impacts to communities and/or the environment)
- Enhancing sustainability by incorporating resilient features
- Complement other post-Hurricane Sandy resilience projects and planning efforts (avoid duplication of effort)
- The effect of relative sea level change in the study area

2.6. Actionable Element Identification

2.6.1. Screening Criteria

Four iterations of system-wide screening have been completed by the NYNJHATS team, resulting in Actionable Elements for further evaluation and recommendation, as outlined in this report. The study team has received information including site specific data and draft plans, shared from the local NFS, that were reviewed and modified to meet requirements for Federal participation in those plans. To meet this WRDA 2026 deadline for Actionable Elements, the NYNJHATS team, in conjunction with the NAD, established a few prioritizing criteria. The following criteria were selected for reasoning, to ensure timely delivery of a Chief's Report for a potential WRDA 2026, as well as to guarantee environmental compliance through NEPA:

- Must avoid HTRW;
- Must not require implementation of Comprehensive Plan to be functional;
- Must be able to achieve full NEPA compliance;
- Will not predispose the decision on the Comprehensive Pan;
- Must not require field investigations to achieve appropriate design maturity required for a Class 3 cost estimate;
- Will seek to address critical infrastructure.

ER1110-2-1302 requires USACE study teams to classify cost estimates that are generally based on the maturity or confidence level of design. ER1110-2-1302 also requires that, at the time a final recommendation is made in a Chief of Engineer's Report, the design maturity and associated cost estimate are more detailed than at the time of alternative comparison (i.e., Draft Report). When New York District was screening through lists of potential Actionable Elements, it was important to consider the time limitations and the investigations needed to reach the design maturity necessary to reach the required cost classification, for this stage of the study. Sites with existing technical information (i.e., survey data, geotechnical information, etc.) were prioritized throughout the iterative planning process. More information on each of these criteria and the screening process can be found in Appendix H.

2.6.2. Iterative Planning & Analyses

Through four different iterations of planning, over one-hundred different site locations and several types of measures were evaluated as part of this NYNJHATS effort, as further outlined in this section. During this study phase, the New York District explored all potential opportunities to look not only at the

recommendations from the TSP, as reflected in the Draft FR/Tier 1 (Programmatic) EIS, but also at nonstructural recommendations and nature-based solutions.

Structural

To feasibly recommend one or several structural measures with the given screening criteria, the New York District study team sought out opportunities to utilize existing site data (i.e., geotechnical borings, utility data, and survey data) to achieve the design maturity necessary for a Class 3 cost estimate, as required by USACE engineering standards. Due to the elevated risk associated with time and the associated funding necessary to perform the site investigations – in advance of the deadlines required to complete a Chief of Engineer's Report for Actionable Elements – the study team relied on any existing site data within the urbanized study area, to find potential sites for recommending Actionable Elements. The study NFS and partners were heavily involved throughout this process, assisting in the search and acquisition of existing data through past studies or local construction. Within the first iteration of planning 91 sites were investigated, with 83 of them considered for a structural measure implementation and the remaining eight sites considered for nonstructural measures, further discussed below. One site that was investigated for structural measure implementation during the first iteration – the Harlem River Actionable Element Site, or formerly the 'East Harlem Shore-Based Measure' – was advanced as part of this Interim Response. Later, in the fourth and final iteration of planning, existing site data was shared by the NJDEP which allowed the New York District to add a new site for consideration of structural measure implementation, which has been included in this Interim Response Report as the East Riser Actionable Element Site.

Nonstructural

When studying sites to consider nonstructural recommendations, the study team began by reviewing the nonstructural components of the Comprehensive TSP described in the September 2022 Draft FR/Tier 1 (Programmatic) EIS (USACE 2022, Appendix B5). Nonstructural measures differ from structural measures in that they focus on managing the consequences of flooding as it occurs instead of focusing on managing the risk of flooding from happening. The nonstructural features were further evaluated using the criteria above and then screened to meet the FEMA and American Society of Civil Engineers (ASCE) guidance (adopted by USACE) for flood depth requirements, which is a maximum of 3 feet at the 1% Annual Exceedance Probability (AEP) event, for dry floodproofing solutions. Additional critical infrastructure sites were also identified within this floodplain and the 2% AEP using GIS databases and aerial imagery, where the study team focused these efforts on identifying structures associated with Emergency Medical, Police, or Fire stations, to include such structures in any adopted risk reduction plan due to their critical nature. Thirty-seven sites were identified for initial consideration in this second iteration and a final screening resulted in deferral of all of these sites from consideration for a WRDA 2026 recommendation, as sites from this iteration of screening could also be investigated for implementation via USACE's Continuing Authorities Program, Section 103 for small CSRM projects, at the request of a non-federal sponsor. Four more potential site locations for nonstructural consideration were added in the final iteration, and further screened as well.

Nature-Based Solutions

The study team continued to search for opportunities to recommend sand-based projects and other nature-based solutions within the study area. Utilizing interagency team experience and NFS knowledge from past studies within USACE, the study team investigated a few locations where sand placement was previously investigated as well, including sites that were also part of the Comprehensive TSP for the NYNJHATS. Four sites total were further investigated for sand-based projects and later screened, using the same criteria. Three nature-based solutions were also considered within the fourth iteration of this iterative planning process, with two being further screened. Nature-Based Solutions were labeled as a priority through the public comment period, as well as through legislation provided in WRDA 2024, for the Study. These projects, unlike the structural measures mentioned prior in this section, do not necessarily require geotechnical investigations to reach the appropriate design maturity, making them a good candidate to meet the critical deadlines for their inclusion into a potential WRDA 2026, while also helping to meet critical need through Engineering With Nature (EWN). Through these additional rounds of investigation and further discussions, the District received existing plans and data from a number of ecosystem and marsh restoration projects, shared by the NFS, that allowed the opportunity to advance the Oakwood Beach Actionable Element Site within this Interim Response.

2.6.3 Identification of Sites

Ultimately, three Actionable Element Sites were selected for advancement and are included within this Interim Response Report: Harlem River, East Riser, and Oakwood Beach Actionable Elements (***Figure 4***). Subsequent sections of this report will detail existing and future conditions within each of these Actionable Element Sites and outline the specific measure recommendations in each.

- Harlem River, NY: The Harlem River Actionable Element includes the northeastern side of Manhattan, beginning just south of the Macombs Dam Bridge and extending north to the Harlem River Drive Service Road West. The proposed project would advance a portion of the seawall/floodwall proposed as part of the comprehensive TSP along Harlem River.
- East Riser, Meadowlands, NJ: The East Riser Actionable Element follows the length of the East Riser Channel, up to Moonachie Avenue, just south of Teterboro Airport. The proposed project seeks to address coastal storm flooding from tidal events and flooding from fluvial events, by increasing conveyance and channel capacity.
- Oakwood Beach, Staten Island, NY: The Oakwood Beach Actionable Element is southeast of Great Kills Park in the Oakwood Beach area of Staten Island between Buffalo Street and the Oakwood Beach Wastewater Treatment Plant. The proposed project includes reestablishing salt marsh and sand dune features to allow the site to be more resilient to future flood and storm surge damage.

Subsequent sections of this report will detail existing and future conditions within each of these Actionable Element Sites and outline the specific measure recommendations in each.

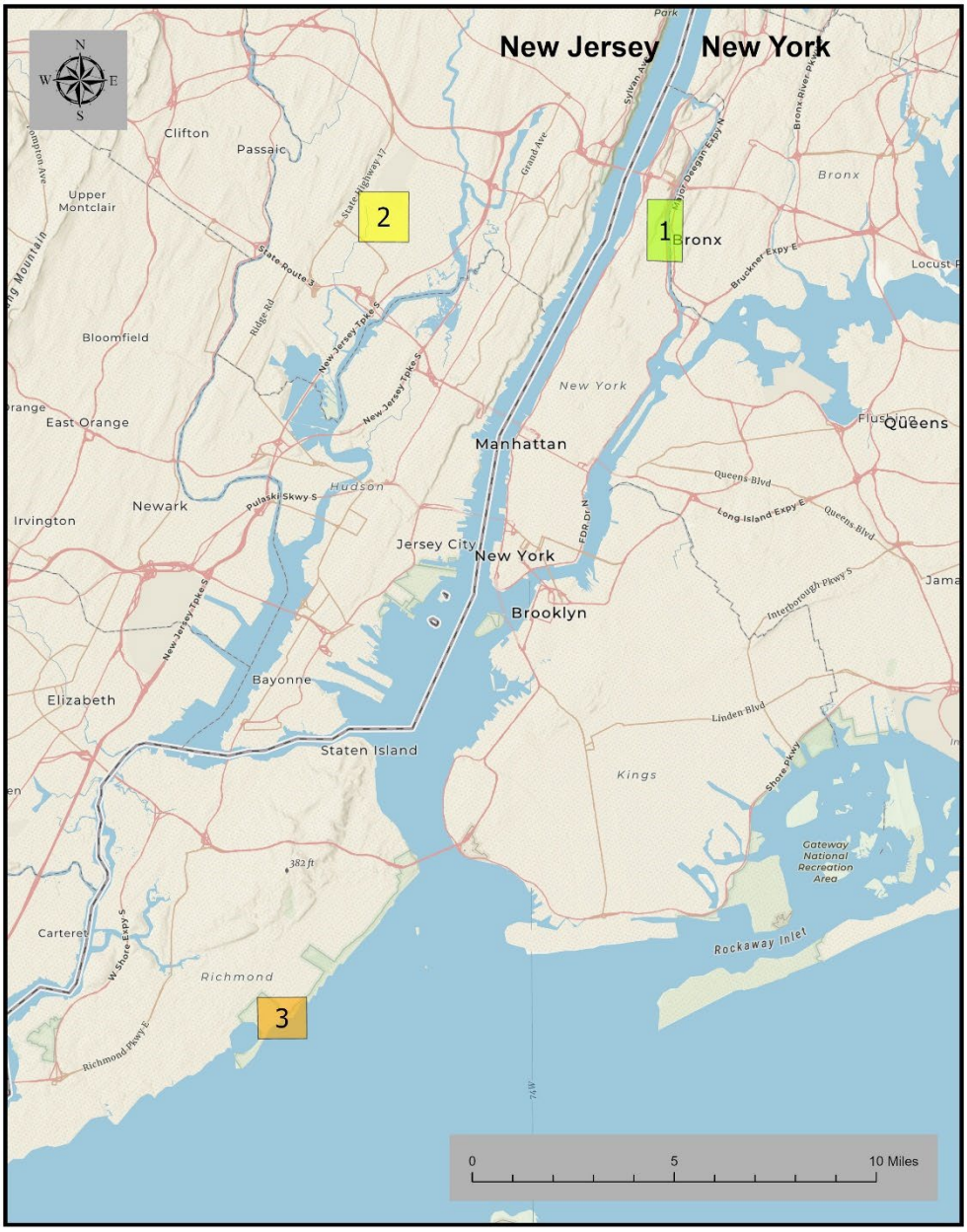

Figure 4: Actionable Element Site Locations

3. Existing & Future Without-Project Conditions*

3.1. Harlem River Actionable Element Site

3.1.1. General Setting

The Harlem River, located in New York County (Manhattan) and Bronx County, is surrounded by a high-density urban environment. The neighborhoods surrounding Harlem River such as Harlem, Washington Heights, and the South Bronx are densely populated urban areas. Harlem alone has seen significant growth, with its population increasing over 20,000 residents since 2010. The Bronx, which borders the Harlem River, has a population of approximately 1.47 million people. The area is highly developed, featuring major rail infrastructure and highways, including Metro-North Railroad, Harlem Line Subway, and the Harlem River Drive Parkway, which are critical for commuter traffic and emergency response. Despite its industrial nature, the Harlem River area includes residential properties, particularly NYCHA, which provides affordable housing to low- and moderate-income, for thousands of New York residents (***Figure 5***).

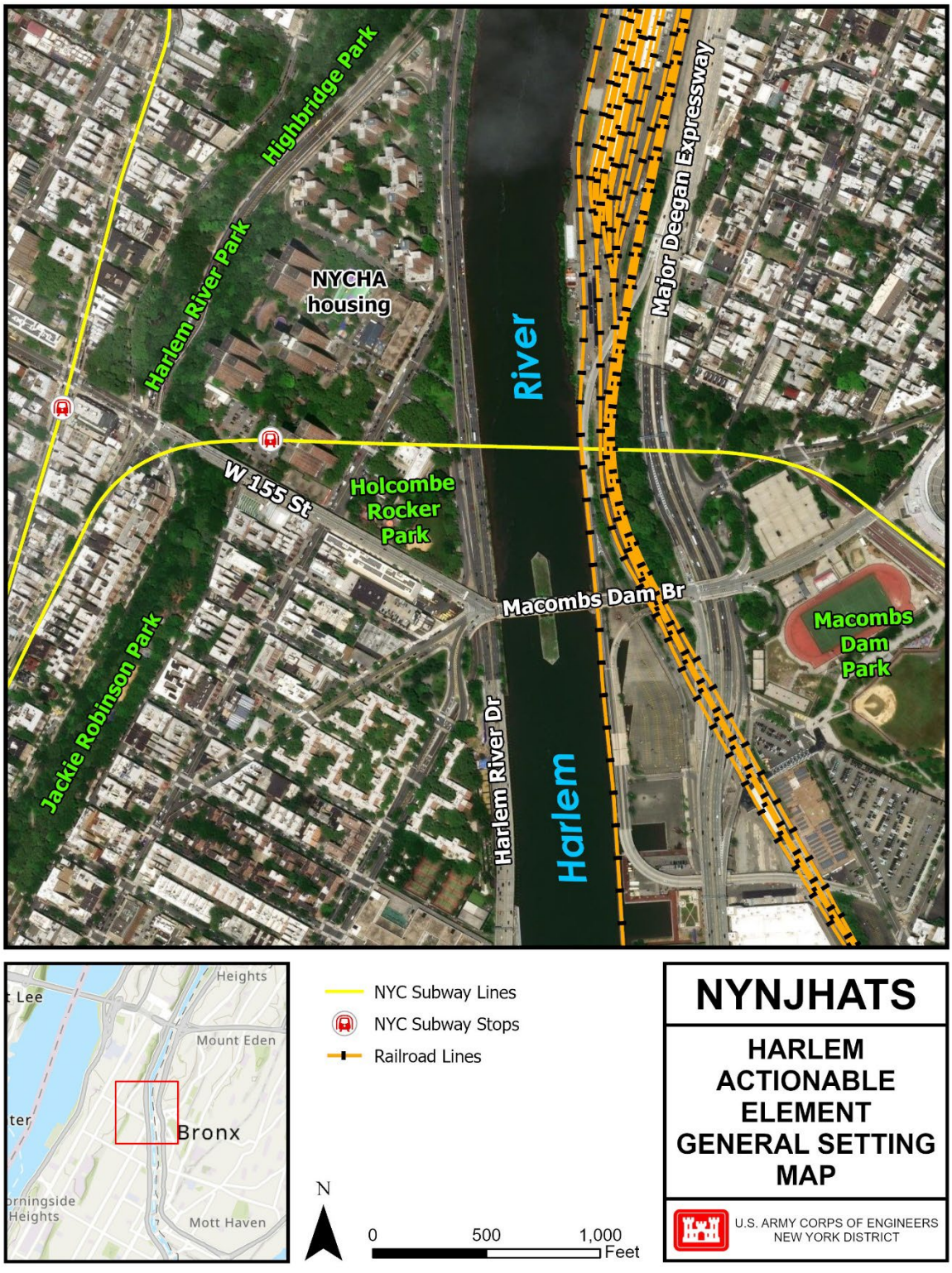

Figure 5: Harlem River Actionable Element General Setting

3.1.2. Natural Environment

Below is a high-level summary of the Natural Environment existing conditions for this Actionable Element Site. The details from which this information is derived, is presented in an Appendix to this Main Text. Refer to Appendix A for additional detail and an in-depth discussion for each individual resource present.

Wildlife and Vegetation

The Harlem River Actionable Element Site is urbanized, and wildlife is limited. The majority of the Harlem River Actionable Element Site is developed with existing, roads, parks, and pedestrian and bicycle paths, limiting the type and amount of wildlife present. Some areas of vegetative habitat are present, although it is also indicative of a urbanizes environment comprised of non-native invasive species and litter/debris. Mammals potentially present are primarily comprised of species tolerant of urban development, such as the eastern gray squirrel (*Sciurus carolinensis*), eastern cottontail (*Sylvilagus floridanus*), eastern chipmunk (*Tamias striatus*), raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), muskrat (*Ondatra zibethicus*), white-footed mouse (*Peromyscus leucopus*), and introduced species such as the house mouse (*Mus musculus*) and Norway rat (*Rattus norvegicus*). The Harlem River Actionable Element Site, as well as the NYNJHATS General Study Area Planning Regions, is part of the Atlantic Flyway, one of the four major avian migratory routes in North America. Only a few reptiles and amphibian could be expected to be found at the project are such as American bullfrog (*Lithobates catesbeianus*), American Toad (*Anaxyrus americanus*), Common Garter Snake (*Thamnophis sirtalis*).

Pollinator species, particularly insects, are likely to be present throughout the project site, including wasps, bees, butterflies, and moths. Habitat for these species exists mostly in the city park and the urban vegetative overgrowth within the Actionable Element Site.

Vegetation is mostly constrained to parks, gardens, and some degraded, inaccessible greenspace. As noted, the Harlem River project site is highly urbanized, and vegetation is mostly constrained to parks and gardens. New York City Parks maintains a tree map (NYC Parks, 2025) of most of the trees within the city. Below is a list of trees identified within the Actionable Element Site.

Table 1: Trees in Harlem River Actionable Element Site

Common Name	Scientific Name
London planetree	*Platanus x acerfolia*
Tree of heaven	*Ailanthus altissima*
Siberian elm	*Ulmus pumila*
Black oak	*Quercus velutina*
Northern red oak	*Quercus rubra*
Swamp white oak	*Quercus bicolor*
Hawthorn	*Crataegus*
Goldenrain tree	*Koelreuteria paniculata*
Willow oak	*Quercus phellos*
American elm	*Ulmus americana*
Japanese pagoda tree	*Styphnolobium japonicum*

Bur oak	*Quercus macrocarpa*
Ginkgo	*Ginkgo biloba*
River birch	*Betula nigra*
Thornless honey locust	*Gleditsia triacanthos var. inermis*
Japanese zelkova	*Zelkova serrata*
Eastern redbud	*Cercis canadensis*
Japanese flowering cherry	*Prunus serrulata*
American basswood	*Tilia americana*
thornless honey locust	*Gleditsia triacanthos var. inermis*
Cornelian cherry dogwood	*Cornus mas*
Eastern redcedar	*Juniperus virginiana*

Other vegetation that may be found is turf grass in the parks, as well as bushes and flowering plants. The river is mostly devoid of vegetation within the Actionable Element Site except there are about 12 trees located along the Harlem River Dr within the river. There are three areas between Frederick Douglas Blvd and the Harlem River Dr entrance and that contain unmanaged vegetation. A survey of the area was not conducted; however, it is likely non-native vegetative species can be found here. Non-native trees can be found as noted above however many were planted by New York City as shade trees.

Special Status Species

Special status species in the area is not anticipated due to the highly urban nature of the Actionable Element Site vicinity and lack of suitable habitat. A review of the September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS and USFWS IPaC database indicates the potential presence of Federally listed Indiana bat (*Myotis sodalis*), Northern long-eared bat (*Myotis septentrionalis*), Tricolored bat (*Perimyotis subflavus*), and pollinator species like the Rusty-patched bumble bee (*Bombas affinis*) Yellow-banded bumble bee (*Bombas terracola*; proposed), and monarch butterfly (*Danaus plexippus*; proposed). State listed species may also be present. During an April 2025 site visit, a Bald Eagle was observed flying over the northernmost extent of the Actionable Element Site. The NOAA NMFS Section 7 Mapper indicates the Harlem River may have potential presence of Atlantic Sturgeon and Shortnose Sturgeon, although it is likely as a pass through due to the anticipated lack of suitable habitat.

Special Status Areas

The Actionable Element Site does not have any identifiable wetlands aside from the Harlem River itself which is classified as an Estuarine and Marine Deepwater habitat (EiUBL). It is within a 100-year floodplain (Zone AE), and a Coastal Zone Management boundary for both the State and City Waterfront Revitalization Program.

3.1.3. Physical Environment

Below is a high-level summary of the Physical Environment existing conditions for this Actionable Element Site. The details from which this information is derived, is presented in an Appendix to this Main Text. Refer to Appendix A for additional detail and an in-depth discussion for each individual resource present.

Physical Resources

The topography of the Actionable Element Site ranges from -28 feet NAVD88 in the Harlem River to 62 feet NAVD88 in the Ralph J. Rangel Houses and Polo Grounds Towers Housing. Roads, bridges, parks housing, and commercial and government businesses dominate the landscape.

The Harlem River watershed lies within the Highlands Province, a geologic region characterized by mountains consisting of metamorphic and igneous rocks. The rocky hills and valleys created by the underlying bedrock helped shape the watershed's topography. The Harlem River watershed primarily consists of metamorphic bedrock such as Fordham Gneiss, Inwood Marble, Manhattan Formation, and Yonkers Gneiss. Retreating glaciers during the Pleistocene era had a profound impact on the region's geology and soils. The New York County Soil Survey maps several urban land soil types within the Actionable Element Site. The Harlem River serves as a tidal strait connecting the East River and Long Island Sound to the Hudson River.

Cultural Resources

As a federal agency, USACE has certain responsibilities for the identification, protection and preservation of cultural resources that may be located within the Area of Potential Effect (APE) associated with the proposed project. Present statutes and regulations governing the identification, protection and preservation of these resources include the National Historic Preservation Act of 1966, as amended; the National Environmental Policy Act of 1969; Executive Order 11593; and the regulations implementing Section 106 of the National Historic Preservation Act of 1966 (36 Code of Federal Regulations Part 800, Protection of Historic Properties, August 2004). A historic property is defined as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on, the National Register of Historic Places (NRHP), including artifacts, record, and material remains related to such a property or resource.

Cultural resources include historic properties as well as other cultural aspects of the human environment. This work is done in coordination with the State Historic Preservation Offices of New Jersey and New York, federally recognized Tribes, and interested parties. The New York District carried out a review of existing surveys and historical documentation as part of both the Tier I EIS as well as the current EA, to identify cultural resources within the Planning Region. This analysis included previously recorded historic properties and properties with the potential to be eligible for the National Register of Historic Places to inform an initial assessment of potential impacts that the proposed undertaking may have on cultural resources within the APE. For further discussion of the General Study Area, please see the Cultural Resource Sub-Appendix.

Native American Land

Native American Lands, or Indian Land, is typically either fee land purchased by tribes or land held in trust by the U.S. government. Federally Recognized Tribes whose ancestral lands include all or a portion of the Study Area include the Delaware Nation, the Delaware Tribe of Indians, and the Stockbridge Munsee Community Band of Mohican Indians. The Delaware Nation is based today in Anadarko, Oklahoma, the Stockbridge Munsee Community Band of Mohican Indians is situated in Shawano County, North central Wisconsin, and the Delaware Tribe of Indians in Bartlesville, Oklahoma. At present a list of properties of traditional religious and cultural importance (Traditional Cultural Properties) has not been quantified for the Study Area. The Stockbridge Munsee consider Papscanee

Island, located on the Hudson River just two miles south of Albany and within the Capital District Region, to be a traditional historic property of religious and cultural significance and the New York State Office of Parks, Recreation and Historic Preservation has, under those criteria, determined the site eligible for the National Register of Historic Places. There are no Native American lands within or near the Actionable Element Site; therefore, an effects analysis is not applicable.

Hazardous, Toxic, and Radioactive Waste

The Study Area exists in a heavily urbanized portion of the New York Metropolitan Area that has been subject to a history of anthropogenic activity and other uses with the potential to affect the subsurface or otherwise impact the project. Accordingly, an HTRW Report was prepared by: 1) reviewing existing and readily available Federal and State records of contaminated sites within or near the Study Area; 2) identifying contaminated sites that are collocated within or near the areas of the proposed project; and 3) determining if collocated or nearby contaminated sites may affect or be affected by the project. The HTRW Report was prepared in accordance with USACE Engineering Regulation (ER) 1165-2-132 and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) 42 United States Code (USC) 9601 et seq. and is included in the HTRW Subappendix.

The HTRW Report documented several collocated environmental listings and concerns that are typical of the New York Metropolitan area, particularly along the waterfront where industrial activities historically took place. While encountering HTRW is always a risk in any Study, particularly in the New York Metropolitan Area, these potentially collocated/nearby sites are not anticipated to constitute HTRW risks that will preclude USACE involvement in project implementation at this time. As the proposed project progresses into the Preconstruction Engineering and Design phase, a subsurface planning investigation will take place to further characterize the subsurface conditions. This investigation will inform any potential HTRW risks associated with construction and implementation of the proposed project.

Should HTRW be identified during any phase of the project, it is USACE policy to avoid it as practicable. However, if HTRW avoidance is not possible it will be the responsibility of the NFS to provide a clean site for the project, using 100% non-federal non-project funds, in accordance with ER 1165-2-132.

3.1.4. Built Environment

The built environment is defined broadly as man-made resources and infrastructure that define the urban fabric support communities and enable economic activity. This definition includes transportation infrastructure (i.e., roads, bridges and tunnels, transit, freight rail, ports and waterways, aviation), storm and wastewater infrastructure, energy infrastructure, communications infrastructure, public spaces, schools, and aesthetics.

Roads, Bridges, and Tunnels

Roads, bridges, and vehicular tunnels connect communities to critical facilities, such as emergency response, and provide access to opportunity by allowing for commutes to and from work. They are an important piece of infrastructure within the Actionable Element Site and are the backbone of modern supply chains. Particularly in the heavily urbanized regions of the General Study Area, high density road networks define the urban fabric with the coastal zone. While infrequent road flooding can temporarily disrupt travel and delay deliveries, more frequent flooding of roadways can cause

chronic access issues for adjacent communities and businesses. Coastal flooding can also cause significant physical damage to roads and supporting infrastructure, with salt water-related damage capable of significantly decreasing the useful life of supporting infrastructure (e.g., damage to structural components, supporting electrical infrastructure, mechanical equipment). While there are both direct and indirect benefits of managing flood risk for roads, bridges and tunnels, these benefits are not considered in the economic analysis at present.

Roads and Highways

There are a significant number of highways that are located within the Actionable Element Site, while not labeled an official evacuation route, is adjacent to Harlem River Drive, which is a public transit route for the M98 bus and anticipated to be utilized for evacuation prior to large storms. For this reason, the Harlem River Drive Parkway is considered highly vulnerable to coastal flooding, particularly in the proximity east of Hamilton Heights, New York.

Bridges

The Macomb's Dam Bridge is a significant part of Harlem River Actionable Element Site built environment, serving as a vital transportation link between Manhattan and the Bronx. It is a swing bridge that spans the width of the Harlem River, allowing both vehicular and pedestrian traffic to cross while accommodating river navigation.

Transit

Compared to the rest of the U.S., residents of the greater New York City metropolitan area are heavily reliant on transit service. Serving as a vital conduit of economic development and opportunity, 58% of workers in the greater NYC area commuted by transit in 2019, as opposed to 5% of workers nationally (NYC Planning 2019). These transits are supported by a robust network of transit infrastructure that spans the Planning Region, much of which lies adjacent to or below coastal waterways.

Rapid Transit

The New York City Transit (NYCT) Department of Subways, a Metropolitan Transit Authority (MTA) subsidiary, is primarily responsible for the operation and maintenance of New York City's subway system, which serves four of five boroughs. With many underground stations, ventilation shafts, tunnel portals, rail yards, and maintenance facilities located within the coastal zone, the NYCT subways sustained heavy damage during Hurricane Sandy, with all but one subway river tunnel flooded during the storm and flooding at several critical rail yards (MTA 2019). The Harlem River Actionable Element Site includes the 155th Street Station, along with the subway tunnel for the B and D Train, which traverses the Harlem River east of the Actionable Element Site, connecting Manhattan to the Bronx.

After Hurricane Sandy, the MTA and NYCT have steadily invested in flood risk management measures throughout the system, including a series of deployable flood control devices at the 155th Street Station ventilation shafts and entrance. These flood control devices are designed to manage flood risk from coastal flood events with a maximum water surface elevation of +18 ft NAVD88.

Based on conversations with NYCT and MTA personnel, these assets are likely to be deployed during a coastal flood event, even if such deployment would be redundant under the with-project condition. Given the criticality of these rapid transit assets to the city and broader regional economy, this study includes these NYCT assets, as this with-project redundancy still provides value to the MTA and NYCT. For additional details on how these assets were considered in the structure inventory, see Appendix D.

Commuter and Regional Rail

Commuter and Regional Rails were resources reviewed and assessed in the September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS, due to the size of the Study Area. During review, it was determined that no commuter and regional rails were present within the Actionable Element Site. As this report is an Interim Response to the Comprehensive Plan, the same resources were reviewed for applicability to the Actionable Elements Interim Response sites and determined to not apply to this specific Actionable Element Site. Therefore, an analysis is not applicable.

Freight Rail

Freight Rail was a resource that was reviewed and assessed in the September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS, due to the size of the Study Area. During review, it was determined that no freight rails were present within the Actionable Element Site. As this report is an Interim Response to the Comprehensive Plan, the same resources were reviewed for applicability to the Actionable Elements Interim Response sites and determined to not apply to this specific Actionable Element Site. Therefore, an analysis is not applicable.

Ports and Waterways

Waterways and canals of the New York City metropolitan area continue to play a vital role in the economic and social development of the General Study Area. The Harlem River Actionable Element Site runs adjacent to the Harlem River, which has an authorized Federal navigation channel from bank-to-bank. The Harlem River route is primarily used for tourism purposes, with brief tours ran by companies such as Circle Line Sightseeing Cruises. New York City has been known as a hub for global tourism with a record high of 66.6 million visitors in 2019, prior to the COVID-19 pandemic (Office of the New York State Comptroller, 2025). The Harlem River waterway is known for its limited depth, ranging from roughly 12 feet to 29 feet, and numerous swing bridges (i.e., the Macombs Dam Bridge), which otherwise limits commercial boating traffic through the channel.

Stormwater and Wastewater Infrastructure

Aqueducts deliver one billion gallons of freshwater daily, from reservoirs in the Catskill Mountains, where it is distributed through water lines and used amongst the Metropolitan area. In New York City alone, there are fourteen WRRFs, servicing around 7.7 million of the population by treating 1.3 billion gallons of wastewater daily to be released into the surrounding bodies of water (nyc.gov). With a population in New York City of 8,467,513 people in 2021, the daily average of water consumption for the city was 979 million Gallons per day (NYCDEP). One of the main byproducts to come out of the cleaning process in WRRF is a thick “sludge” of what’s leftover of the human waste, toilet paper, and food particles that go into the sewer system. The first “sludge vessels” were built during The Great Depression, this sludge would be dumped into the surrounding waters of New York until it became a health emergency as the

area became more densely populated and it wasn't until 1992 that this practice was banned all together. As a result of the Ocean Dumping Ban Act of 1988, this sludge is now sent by ship to one of the eight WRRF that can fully "dewater" sewage, loaded onto tractor trailer trucks, and shipped away to be properly disposed of in landfills. These ships are commissioned by the NYCDEP and can transport about four-hundred thousand gallons, or more of sludge at a time.

Stormwater encompasses all precipitation that runs into the drains from streets and sidewalks, including melted snow during the winter months and excess water remaining after a flooding event. 60% New York City has a combined system, where storm water is combined with sewage in Combined Sewer Overflows (CSOs). CSOs are characterized by tiers as well as by the percentage of the total CSO volume of discharge they release. Tier 1 CSOs discharge 50% of the total CSO volume in NYC, Tier 2 facilities discharge 20% of total CSO volume, and Tier 3 facilities discharge only 10% of the total CSO volume (NYCDEP). In the combined sewer system, there is a single pipe that carries the mixture of stormwater and sewage through the wastewater treatment facilities before it is treated and discharged in large bodies of water. Any influx of stormwater from heavy precipitation or flooding events that moves through wastewater treatment facilities prevents proper treatment of stormwater flowing back into the surrounding bodies of water.

CSOs are known to cause variation in water quality after large rainfall or storm events and measures have since been implemented to mitigate this. Aquatic pollution is likely with any abundance of stormwater within the system, as it has been proven to carry an excess of nutrients, such as phosphorus and nitrogen, bacteria from animal and human wastes, oil and grease, sediments from construction, pesticides, herbicides, fertilizers, and trash debris into the waterways within the Planning Region. To both help with absorption and protecting water quality, the NYCDEP has implemented the Green Infrastructure Program to collect stormwater from streets, sidewalks, and other hard surfaces before it can enter the sewer system or cause local flooding. Additionally, the NYCDEP is working to develop 10 waterbody-specific Long Term Control Plans, as well as a city-wide plan, with a goal to reduce CSOs and improve water quality (NYC.gov). By reducing the amount of stormwater that flows into the sewer system, green infrastructure helps prevent sewer overflows and improves the health of local waterways.

There are several stormwater and wastewater drainage infrastructure locations within the Harlem River Actionable Element Site.

Energy Infrastructure

After Hurricane Sandy, approximately 8.5 million people were left without power (USACE, 2019). Not only were residents left without power, but critical infrastructure, such as WRRFs, were unable to operate due to the loss of power causing hazardous waste to be discharged into surrounding water bodies. The Long Island Power Authority Long Island's largest public energy system experienced over $200 million in damages after Hurricane Sandy (2012) and Hurricane Irene (2011). With help from both FEMA Public Assistance funding, the Long Island Power Authority was able to make more resilient elements of the power grid most effected by coastal storm damage. The State of New York has built or plans to build more than 300 community reconstruction projects that includes addressing vulnerabilities in New York energy infrastructure to coastal storm and flood damage. The Governor's Office of Storm Recovery also has a "Fuel NY" initiative which required downstate gas stations located within a half mile of hurricane evacuation routes to have a transfer switch as of 2014 and to

have a generator running within 24 hours of losing power during a fuel supply or energy emergency. Furthermore, gas station chains were required to install transfer switches in an additional 30% of stations by 2015. These measures were installed under state law to allow people mobility during and after a major storm event.

Communications Infrastructure

The 155th Street Station, serving the B and D subways, is located just 300 feet from the Harlem River, making it highly vulnerable to flooding, particularly during storm surges. The subway tunnel and the station rely on critical communications infrastructure, including radio systems for train coordination, emergency alert systems, and digital monitoring tools that help manage subway operations. Flooding at the station and within the subway tunnel can have severe consequences. Water intrusion can disable communications systems, preventing real-time coordination between trains and control centers, leading to service delays or shutdowns. Electrical components, including signaling systems, can short-circuit, increasing the risk of accidents. Additionally, prolonged flooding can cause structural damage to the tunnel, requiring costly repairs and extended service disruptions. Without effective mitigation, flooding could leave the station inoperable, impacting commuters and exacerbating transit delays across the city.

Public Spaces

Within the generally urbanized Actionable Element Site, there is an emphasis on creating and maintaining access to public space for leisure and recreation. These spaces include, but are not limited to parks, playgrounds, community pools, greenways, athletic fields, and biking and walking paths. These spaces are utilized for a myriad of activities.

The Polo Grounds was once a legendary sports venue home to many sports teams from 1880 to 1963. Today, the site is occupied by the Polo Grounds Towers, a public housing complex at 2997 Frederick Douglass Boulevard. It consists of high-rise residential buildings, community spaces, and historical markers, including the Polo Grounds Home Plate, which serves as a tribute to the stadium's legacy. The Polo Grounds sits within a coastal flood zone, making it highly susceptible to flooding during extreme weather events. Its proximity to the Harlem River puts it at risk for storm surges and rising water levels from RSLC, particularly during hurricanes and heavy rainfall. Flooding in the Actionable Element Site could lead to property damage, displacement of residents, and disruptions to essential services, creating long-term challenges for the community. Infrastructure vulnerabilities may necessitate costly repairs, while prolonged flooding could affect public transit, local businesses, and overall neighborhood stability.

Parks

Holcombe Rucker Park is a historic urban recreation space in Harlem, renowned for its basketball courts, community events, and cultural significance. Situated at 155th Street and Frederick Douglass Boulevard, the park offers playgrounds, seating areas, and ongoing development efforts by NYC Parks. Due to its proximity to the Harlem River, the park lies within a coastal flood zone, making it vulnerable to flooding during extreme weather events.

Highbridge Park is a unique mix of urban infrastructure and natural landscapes, spanning the western bank of the Harlem River. Home to the historic High Bridge, the city's oldest standing bridge, and the High Bridge Water Tower, the park is rich in architectural and historical significance. It also features wooded areas, scenic overlooks, and extensive trails, providing both ecological value and recreational opportunities. Due to its location along the Harlem River, parts of the park lie within a coastal flood zone, making it vulnerable to flooding during extreme weather events. Despite this, it remains a vital green space for outdoor activities and community engagement.

Jackie Robinson Park is a historic 12.77-acre green space in Harlem, Manhattan, known for its steep terrain, sports facilities, playgrounds, and community pool. Designated as a New York City Landmark, the park serves as a vital recreational and cultural hub for Upper Manhattan. Due to its proximity to the Harlem River, parts of the park lie within a coastal flood zone, making it susceptible to flooding during extreme weather events. Despite this, it remains a cherished community space, offering residents a place for sports, leisure, and cultural gatherings.

Bill "Bojangles" Robinson Playground is a historic recreational space in Harlem, New York, established in 1934. Featuring basketball courts and play areas, the playground underwent a $1.5 million renovation in 2020, enhancing its facilities while preserving its cultural significance. Due to its proximity to the Harlem River, the playground lies within a coastal flood zone, making it susceptible to flooding during extreme weather events. Despite this, it remains a cherished community landmark, offering a vibrant space for sports, recreation, and neighborhood gatherings.

Schools

P.S. 046 Arthur Tappan is a middle school in Manhattan, New York, located at 2987 Frederick Douglass Blvd. Serving grades Pre-K through 8, the school is part of District 5 and has a student population of approximately 428. It fosters academic growth, social development, and community engagement. Due to its proximity to the Harlem River, the school lies within a coastal flood zone, making it vulnerable to flooding during extreme weather events. Despite this, it remains a pillar of education in the neighborhood, providing students with a supportive learning environment.

Thurgood Marshall Academy Lower School is an elementary school in Harlem, New York, located at 276 W 151st St. Named after Thurgood Marshall, the first African American Supreme Court Justice, the school honors his legacy by promoting academic excellence, cultural awareness, and leadership. It encourages students to develop confidence, accountability, and identity, shaping them into engaged learners and future leaders. Due to its location within a coastal flood zone, the school is susceptible to flooding during extreme weather conditions. However, it continues to serve as a cornerstone of education, providing a nurturing and inclusive environment for young learners.

If these schools were to close due to flooding, the consequences would be significant. Students would face disruptions in their education, forcing families to seek alternative schools, which could lead to overcrowding in nearby institutions. The loss of these schools would impact community, programs, mental health resources, and free meal services, which many students rely on. Additionally, the economic and social fabric of Harlem would be affected, as schools serve as anchors for local engagement and development.

3.1.5. Economic Environment

Economic activities that characterize an area generally include the businesses or institutions operating there and the employment associated with them. Depending on the project in question, those people who are served by the businesses may also be considered in the assessment.

The East Harlem Actionable Element Site in Central Harlem lies entirely within District 10 from West 163rd Street to West 145th Street. The Actionable Element Site is characterized by mixed residential/commercial uses and open space. Notable land uses within the area are Highbridge Park, Holcombe Rucker Park, NYCHA's Ralph J. Rangel Houses, Polo Grounds Towers and the Macombs Dam Bridge.

The area has a history as a center for arts, culture and social and political activism and is well known throughout the world as one of New York City's top tourist attractions. However, the Actionable Element Site faces challenges related to maximizing its economic potential, with concerns about vacant storefronts, limited public investment, and difficulty for local businesses to thrive. Select economic statistics from the US Census are presented in Table 2 at the New York City district level for Community District 10 using US Census 5-year Estimates American Community Survey for 2021.

Table 2: Harlem River Economic Setting

	Population	Median Income	Unemployment	Poverty
Manhattan Community District 10	112,671	$54,746	9.1%	22.8%

2021: ACS 5-Year Estimates, Median Income in the Past 12 Months; Unemployment rate for Population 16 and over, Population for whom poverty status is determined.

3.1.6. Future Without-Project Condition

New York City's coastlines, including the Harlem River Actionable Element Site, are currently vulnerable to surge-driven coastal inundation, which has the potential to damage structures and critical infrastructure within coastal communities. The NYCHA Rangel Houses and Polo Ground Towers are located within the Actionable Element Site and house over 2,000 residents. These structures will likely continue to function as public housing for the foreseeable future and will remain at-risk of coastal flood damage in the future-without project condition. The City's low-lying areas, under existing conditions, are exposed to coastal surge flooding by hurricanes, tropical storms, and cold season nor'easters. Coastal flood risk in the future will continue to be exacerbated by relative sea level change (RSLC), which is expected to increase the frequency and severity of flood events within the Actionable Element Site. Since 1900, mean sea level in New York City has risen by about 1.16 feet. By the end of the period of analysis in 2086, sea level is projected to increase an additional 1.69 feet (USACE Intermediate RSLC) and as much as an additional 4.18 feet (USACE high RSLC), as shown below in ***Figure 6***. There is an estimated $93 million in coastal flood risk over the full period of analysis within the Harlem River Actionable Element Site under the future without-project condition assuming the USACE intermediate RSLC; this equates to an estimated $3,616,000 in annualized coastal flood risk.

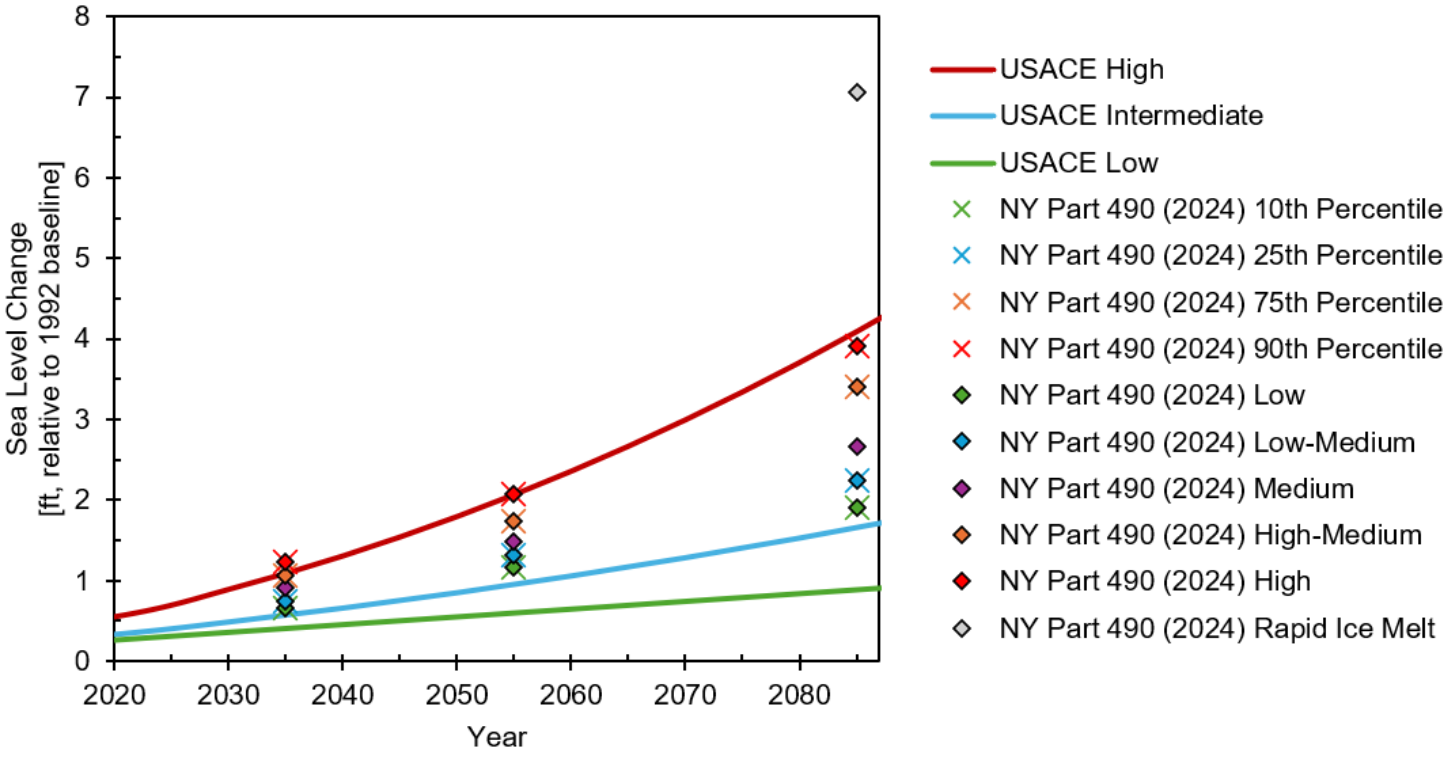

Figure 6: Sea level Change Projections at the Battery Tide Guage

With changing conditions, there have been a number of projects either completed or planned within the vicinity of the Harlem River Actionable Element Site. Within the immediate vicinity of the proposed Harlem River Actionable Element Site, there are a number of existing studies and completed projects that the New York District study team has taken into account as part of the Future Without-Project Conditions. Adjacent to the southern tie-in for the Seaward Alignment is the MTA 148th Street Station/Lenox Avenue Rail Yard which has recently completed construction on a Flood Mitigation and protection project. This project, as part of the Emergency Relief Program through the Federal Transit Administration, involved the construction of 3,000 linear feet sea wall and includes deployable flood barrier gates (*148th Street Station,* Nucor Skyline) and was completed as of November 2021. Also at this location, the MTA has implemented a deployable flooding barrier at the 148th Street Portal, that can be deployed within hours of an oncoming storm and mitigates flooding by a system of flood logs (*MTA Climate Adaption Task Force Resiliency Report*, 2019). The New York District study team sees an opportunity for the proposed Actionable Element to be complementary and work as an integrated system with the existing MTA Projects, within the Actionable Element Site.

3.2. East Riser Actionable Element Site

3.2.1. General Setting

The East Riser Meadowlands area in Bergen County, New Jersey, is a low-lying flood-prone region with a mix of industrial, commercial, and residential properties. This area is characterized by a heavily

urbanized landscape, with a dense concentration of critical infrastructure that plays a vital role in regional transportation and industrial operations. It contains an extensive network of railroad tracks transporting freight for commercial use, as well as major highways that serve essential for both local and interstate travel. Despite its commercial and industrial nature, there are residential properties, including several mobile home communities (***Figure 7***).

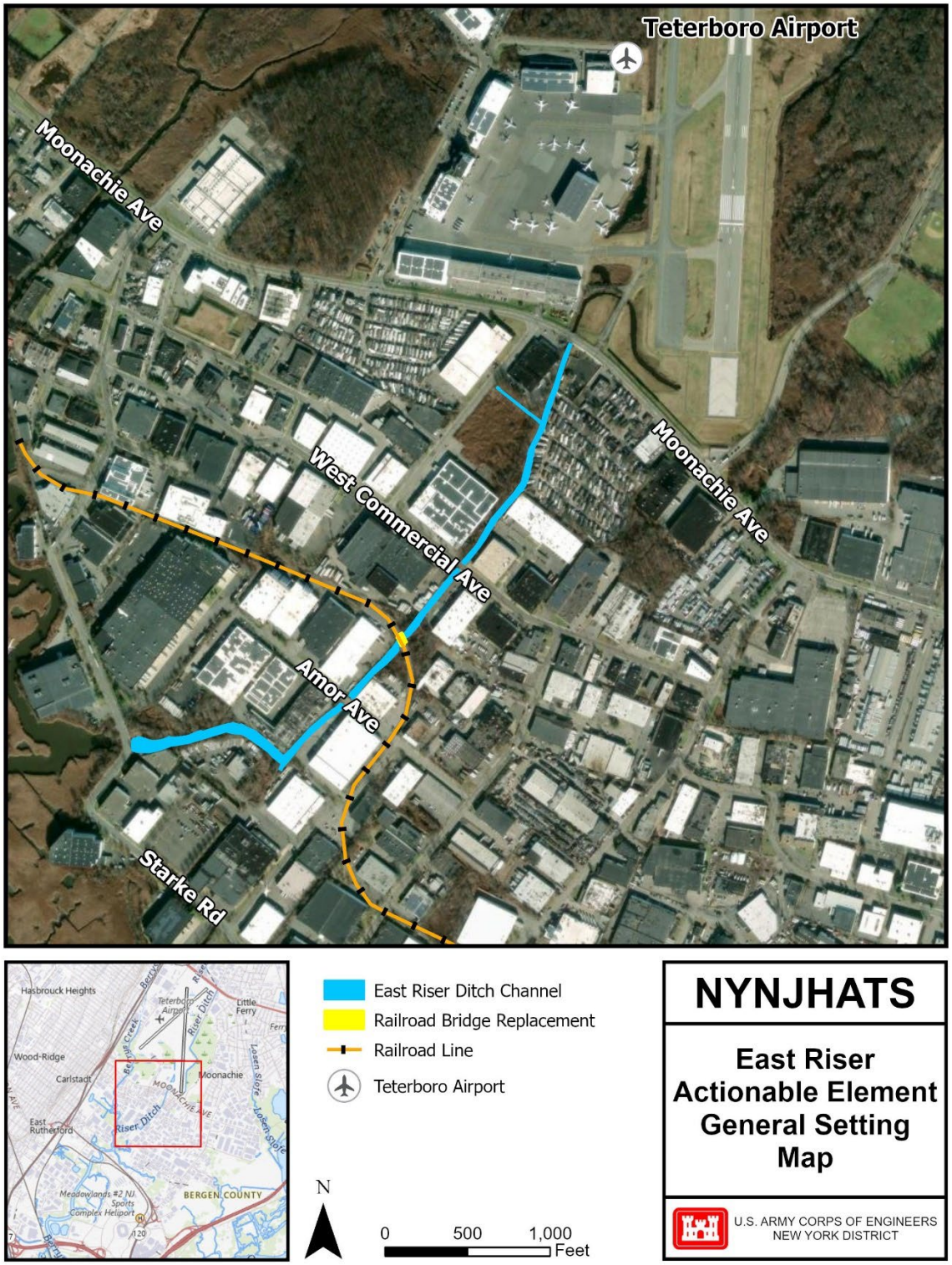

Figure 7: East Riser Actionable Element General Setting Map

3.2.2. Natural Environment

Below is a high-level summary of the Natural Environment existing conditions for this Actionable Element Site. The details from which this information is derived, is presented in an Appendix to this Main Text. Refer to Appendix A for additional detail and an in-depth discussion for each individual resource present.

Wildlife and Vegetation

As excerpted from the September 2022 New Jersey Meadowlands East Riser Ditch Pumping Station and Channel Improvements project:

"The project area includes both terrestrial and aquatic habitats that support a variety of species, as described below.

Terrestrial Species

As described in Section 5.8, the project area is predominantly urbanized. Terrestrial habitats are present along the ERD and include riparian forest, shrublands, and herbaceous habitats (NJDEP 2018b). Terrestrial wildlife present in the project area include many species of migratory birds that use the ERD and associated riparian and shrubland habitats, as described in Section 5.11.

Mammals present in the project area include species common to suburban and/or disturbed environments, including eastern gray squirrel (Sciurus carolinensis), eastern cottontail rabbit (Sylvilagus floridanus), raccoon (Procyon lotor), red fox (Vulpes vulpes), and Virginia opossum (Didelphis virginiana). In addition, little brown bat (Myotis lucifugus) was observed in the project area during biological surveys conducted in 2016 and 2017 (NJDEP 2018b).

Aquatic Species

Within the project's vicinity there are several surface waterways that include the Hackensack River, Berry's Creek, and smaller waterways that support a large complex of marshes and other aquatic habitats. The ERD itself is channelized with steep banks and the substrates are silt and mud. The water in the channel is typically approximately 1-foot deep with occasional small pools associated with culverts and a large pool of unknown depth at the tide gate at the south end. As a result, the ERD provides limited aquatic habitat. No aquatic vegetation was observed in the ERD during the biological surveys (NJDEP 2018b).

Wildlife associated with the limited aquatic habitat provided by the ERD include common amphibians and reptiles. Common amphibian species present in the project area include the American bullfrog (Lithobates catesbeianus), American toad (Anaxyrus americanus), gray treefrog (Hyla versicolor), green frog (Lithobates clamitans melanota), and Atlantic Coast leopard frog (Lithobates sphenocephalus). Reptiles include painted turtle (Chrysemys picta), red-eared slider (Trachemys scripta elegans), common snapping turtle (Chelydra serpentine), and garter snake (Thamnophis sirtalis). The tide gate located at the confluence of the ERD and Berry's Creek limits fish access to the ERD. Fish present in the ERD are limited to those species tolerant of disturbances from flooding, sedimentation, and lack of natural vegetated cover, such as western mosquitofish (Gambusia affinis)."

Special Status Species

As excerpted from the September 2022 New Jersey Meadowlands East Riser Ditch Pumping Station and Channel Improvements project:

"Information on the presence of threatened and endangered species was obtained from the USFWS Information for Planning and Consultation (IPaC) system, accessed May 5, 2022, and the findings of biological surveys conducted in the project area (NJDEP 2018b). The IPaC system reported one federal candidate species, the monarch butterfly (Danaus plexippus), as potentially present in the general area. The species may be found in a variety of habitats but requires milkweed (Asclepias sp.) as a host plant for larval development. Critical habitat has not been designated for any species in the project area. According to the RBDM EIS (NJDEP 2018b), coordination with NMFS confirmed that no listed species under their jurisdiction are present in the Hackensack River or its tributaries. No federally listed species were observed during biological surveys in the project area (NJDEP 2018b).

While not identified on IPaC, two federally listed bat species—the northern long-eared bat (Myotis septentrionalis), a federally threatened species, and the Indiana bat (Myotis sodalis), a federally endangered species—have a low potential to occur in the project area. The nearest known winter hibernaculum is located approximately 22 miles west at Hibernia Mine (Conserve Wildlife Foundation of New Jersey 2022). In spring and summer, these species may be found roosting underneath tree bark, in cavities, or within crevices of trees. Breeding occurs in late spring and summer, with maternity colonies typically located in large snags having abundant exfoliating bark and high solar exposure within a mature forested wetland complex. The forested wetlands along the ERD may provide a low potential for roosting habitat for northern long-eared bats or Indiana bats, but it is unlikely that any tree along the ERD in the project area would support a maternity colony of bats.

During biological surveys conducted in 2016 and 2017 (NJDEP 2018b), no recordings of either bat species were tentatively identified. In addition, the consultation conducted with the USFWS for the RBDM EIS did not identify any bat species of concern (NJDEP 2018b).

A number of state-listed threatened and endangered species also have the potential to occur in the project area (NJDEP 2018b). Because of the urbanized nature of the project area, and the channelized and disturbed nature of the ERD, habitat for state-listed threatened and endangered species is limited to the narrow riparian forest and shrublands located along the ERD. During biological surveys conducted for the RBDM EIS, several state-listed, bird species were observed, including American kestrel (Falco sparverius), bald eagle (Haliaeetus leucocephalus), black-crowned night-heron (Nycticorax nycticorax), northern harrier (Circus cyaneus), osprey (Pandion haliaetus), black skimmer (Rynchops niger), peregrine falcon (Falco peregrinus), pied-billed grebe (Podilymbus podiceps), and Savannah sparrow (Passerculus sandwichensis) (NJDEP 2018b)."

The USFWS IPaC database and NMFS Section 7 Mapper was reviewed again in preparation of this Appendix, accessed June 24, 2025. Two federally-listed species were identified as the tricolored bat (*Perimyotis subflavus – Proposed Endangered*) and the monarch butterfly (*Danaus plexippus – Proposed Threatened*). No critical habitats were identified at this location. No aquatic threatened and endangered species was identified as potentially present. Additional species of concern may be identified during coordination of the Draft Integrated Response FR/EA with USFWS, NMFS, and NJDEP.

As excerpted from the September 2022 New Jersey Meadowlands East Riser Ditch Pumping Station and Channel Improvements project, the neighboring:

"Berry's Creek is designated EFH for Winter Flounder, Little Skate, Atlantic Herring, Red Hake, Windowpane Flounder, Winter Skate, Clearnose Skate, Longfin Inshore Squid, Bluefish, Atlantic Butterfish, and Summer Flounder. The tide gate at the confluence of the ERD and Berry's Creek prevents semi-diurnal tidal fluctuation in the ERD; therefore, the ERD is not designated as EFH."

Special Status Areas

As excerpted from the September 2022 New Jersey Meadowlands East Riser Ditch Pumping Station and Channel Improvements project:

*"The project area lies within the Meadowlands District, which includes a portion of one of the largest tidal wetland complexes within the Hudson-Raritan Estuary, encompassing approximately 5,800 acres of estuarine wetlands (USFWS 2007). According to the USFWS National Wetland Inventory (USFWS 2022b) maps, there are 5.35 acres of wetlands in or immediately adjacent to the project area (**Appendix A, Figure 5**). Furthermore, these wetland features are broken into three distinct wetland types (**Table 5.3**).*

Table 5.3. National Wetland Inventory (NWI) Wetland Classifications Within and Adjacent to the Project Area Wetland Type

Wetland Type	*NWI Code*	*Area (Acres)*
Palustrine Forested Seasonally Flooded	*PF01E*	*3.19*
Palustrine Emergent Seasonally Flooded – Tidal	*PEM5R*	*0.87*
Estuarine Subtidal Unconsolidated Bottom	*E1UBLx6*	*1.31*
Total Federal Wetlands	*–*	***5.37***

"Field investigations performed for the RBDM project were completed in 2016 and 2017 to characterize wetland habitats throughout the project area. A 0.4-acre freshwater emergent wetland, not mapped on the NWI, was identified adjacent to the ERD, just east of Grand Street. The wetlands present in the project area are all located in an area of commercial and industrial use and are considered habitats of moderate ecological value owing to anthropogenic perturbation and the presence of invasive and nuisance species. A large estuarine and marine complex, with wetlands (48.41 acres) and deep water habitat (12.76 acres) is located west of Grand Street and receives hydrological input from the ERD. Field investigations in 2016 and 2017 indicated that this is a habitat of moderate ecological value because it is largely dominated by a monoculture of common reed."

State-listed wetlands in the project area include the following:

Wetland Type	**Area (Acres)**
Deciduous Scrub/Shrub	0.47
Phragmites Dominate Interior	0.55
Deciduous Scrub/Shrub	0.49
Deciduous Wooded	0.14
Total State Wetlands	**1.65**

"The project area is in FEMA Flood Zone AE, an area with a 1-percent chance of being inundated within any given year… as shown on FIRM map panel 34003C0254H, effective August 28, 2019 (FEMA 2021). Major sources that contribute to flooding in the area include tidal backflows from Berry's Creek and stormwater runoff from the high proportion of impervious cover in the majority of the project area coupled with the shallow groundwater that prevents rainfall infiltration. Current flood protection measures include a tide gate at the confluence of the ERD and Berry's Creek that is currently in disrepair."

3.2.3. Physical Environment

Below is a high-level summary of the Physical Environment existing conditions for this Actionable Element Site. The details from which this information is derived, is presented in an Appendix to this Main Text. Refer to Appendix A for additional detail and an in-depth discussion for each individual resource present.

Physical Resources

As excerpted from the September 2022 New Jersey Meadowlands East Riser Ditch Pumping Station and Channel Improvements project:

"The project area is within a subdivision of the Newark Basin, which was formed during the initial Pangaea rifting stages of the late Triassic. Erosion of older rocks from the Paleozoic and Precambrian ages formed sediments and created consolidated rocks that include red siltstones, sandstones, and conglomerates. Sedimentary rocks in the Passaic Formation comprise the bedrock that underlies the Meadowlands District at a depth of approximately 100 feet.

The project area is nestled in a valley with typical elevations from 1 to 6 feet above sea level. The areas immediately surrounding the valley are characterized by much greater variations in elevation, whereas the topography within the valley is relatively flat. The United States Department of Agriculture Natural Resources Conservation Service (NRCS) Web Soil Survey classifies the soil in the project area as urban land... The project area is largely composed of urban soil types, which are characterized by disturbed and natural soil materials that are covered by pavement, concrete, buildings, and other structures."

"Within the project's vicinity there are several surface waterways that include the Hackensack River, Berry's Creek, and smaller waterways that support a large complex of marshes and other aquatic habitats. The ERD itself is channelized with steep banks and the substrates are silt and mud. The water in the channel is typically approximately 1-foot deep with occasional small pools associated with culverts and a large pool of unknown depth at the tide gate at the south end. As a result, the ERD provides limited aquatic habitat. No aquatic vegetation was observed in the ERD during the biological surveys."

Cultural Resources

As a federal agency, USACE has certain responsibilities for the identification, protection and preservation of cultural resources that may be located within the Area of Potential Effect (APE) associated with the proposed project. Present statutes and regulations governing the identification, protection and preservation of these resources include the National Historic Preservation Act of 1966, as amended; the National Environmental Policy Act of 1969; Executive Order 11593; and the regulations implementing Section 106 of the National Historic Preservation Act of 1966 (36 Code of Federal Regulations Part 800, Protection of Historic Properties, August 2004). A historic property is defined as

any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on, the National Register of Historic Places (NRHP), including artifacts, record, and material remains related to such a property or resource.

Cultural resources include historic properties as well as other cultural aspects of the human environment. This work is done in coordination with the State Historic Preservation Offices of New Jersey and New York, federally recognized Tribes, and interested parties. The New York District carried out a review of existing surveys and historical documentation as part of both the Tier I EIS as well as the current EA, to identify cultural resources within the Planning Region including previously recorded historic properties and properties with the potential to be eligible for the National Register of Historic Places to inform an initial assessment of potential impacts that the proposed undertaking may have on cultural resources within the APE. For further discussion of the Actionable Element Site, please see the Cultural Resource Subappendix.

Native American Land

Native American Lands, or Indian Land, is typically either fee land purchased by tribes or land held in trust by the U.S. government. Federally Recognized Tribes whose ancestral lands include all or a portion of the Actionable Element Site include the Delaware Nation, the Delaware Tribe of Indians, and the Stockbridge Munsee Community Band of Mohican Indians. The Delaware Nation is based today in Anadarko, Oklahoma, the Stockbridge Munsee Community Band of Mohican Indians is situated in Shawano County, North central Wisconsin, and the Delaware Tribe of Indians in Bartlesville, Oklahoma. At present a list of properties of traditional religious and cultural importance (Traditional Cultural Properties) has not been quantified for the Actionable Element Site. The Stockbridge Munsee consider Papscanee Island, located on the Hudson River just two miles south of Albany and within the Capital District Region, to be a traditional historic property of religious and cultural significance and the New York State Office of Parks, Recreation and Historic Preservation has, under those criteria, determined the site eligible for the National Register of Historic Places. There are no Native American lands within or near the Actionable Element Site; therefore, an effects analysis is not applicable.

Hazardous, Toxic, and Radioactive Waste

The Actionable Element Site exists in a heavily urbanized portion of the New York Metropolitan Area that has been subject to a history of anthropogenic activity and other uses with the potential to affect the subsurface or otherwise impact the project. Accordingly, an HTRW Report was prepared by: 1) reviewing existing and readily available Federal and State records of contaminated sites within or near the Actionable Element Site; 2) identifying contaminated sites that are collocated within or near the areas of the proposed project; and 3) determining if collocated or nearby contaminated sites may affect or be affected by the project. The HTRW Report was prepared in accordance with USACE ER 1165-2-132 and the CERCLA 42 United USC 9601 et seq. and is included as the HTRW Subappendix.

The HTRW Report documented several collocated environmental listings and concerns that are typical of the New York Metropolitan area. While encountering HTRW is always a risk in any Study, particularly in the New York Metropolitan Area, these potentially collocated/nearby sites are not anticipated to constitute HTRW risks that will preclude USACE involvement in project implementation at this time. As the proposed project progresses into the Preconstruction Engineering and Design phase, a subsurface planning investigation will take place to further characterize the subsurface conditions. This investigation

will inform any potential HTRW risks associated with construction and implementation of the proposed project.

Should HTRW be identified during any phase of the project, it is USACE policy to avoid it as practicable. However, if HTRW avoidance is not possible it will be the responsibility of the NFS to provide a clean site for the project, using 100% non-federal non-project funds, in accordance with ER 1165-2-132.

3.2.4. Built Environment

The built environment is defined broadly as man-made resources and infrastructure that define the urban fabric support communities and enable economic activity. This definition includes transportation infrastructure (i.e., roads, bridges and tunnels, transit, freight rail, ports and waterways, aviation), storm and wastewater infrastructure, energy infrastructure, communications infrastructure, public spaces, schools, and aesthetics.

Roads, Bridges, and Tunnels

Roads, bridges, and vehicular tunnels connect communities and provide access to opportunity by allowing for the commute to and from work. They are an important piece of infrastructure within the Actionable Element Site and are the backbone of modern supply chains. Particularly in the heavily urbanized regions of the Actionable Element Site, high density road networks define the urban fabric with the coastal zone. While infrequent road flooding can temporarily disrupt travel and delay deliveries, more frequent flooding of roadways can cause chronic access issues for adjacent communities and businesses. Coastal flooding can also cause significant physical damage to roads and supporting infrastructure, with salt water-related damage capable of significantly decreasing the useful life of supporting infrastructure (e.g., damage to structural components, supporting electrical infrastructure, mechanical equipment). While there are both direct and indirect benefits of managing flood risk for roads, bridges and tunnels, these benefits are not considered in the economic analysis at present.

Roads and Highways

There are a significant number of roads and highways that are located within the Actionable Element Site that are vulnerable to coastal flood risk. Within the East Riser Actionable Element Site, Moonachie Avenue, West Commercial Avenue and Amor Avenue are vulnerable to coastal flooding, particularly in the proximity of the municipalities of Moonachie and Carlstadt, New Jersey. These roadways are frequently used within the commercial area, by trucks making deliveries of goods and therefore, aiding in economic vitality in the Actionable Element Site. Moonachie Avenue is a New Jersey State Road, identified as a potential evacuation route for coastal emergencies within the East Riser Actionable Element Site.

Bridges

The railroad bridge carrying the Norfolk Southern spur line just west of the actionable element spans the East Riser Ditch Channel. Due to the generally low-lying topography, this section is especially prone to flooding. Any overflow at this crossing could disrupt rail operations and pose structural risk to the bridge itself. Several vehicular bridges/culverts span the East Riser Ditch in the Meadowlands region of New Jersey, particularly within Carlstadt and Moonachie. These crossings, often low-clearance and integrated into local road networks, are essential for maintaining transportation links in residential and industrial areas. Due to the flat terrain and limited elevation these bridges are vulnerable during high-

water events. Inundated bridges may also compromise emergency access, district local traffic, pose serious risks to public safety.

Tunnels

Tunnels was a resource that was reviewed and assessed in the September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS due to the size of the General Study Area. During review, it was determined that no tunnels were present within the East Riser Actionable Element Site. As this report is an interim response to the Comprehensive Plan, the same resources were reviewed for applicability to the Actionable Elements Interim Response sites and determined to not apply to this specific Actionable Element Site. Therefore, an effects analysis is not applicable.

Transit

Within the East Riser Actionable Element Site, there is an active Fright Rail spur line that is periodically used for commercial use. More details can be found below, within the 'Freight Rail' section.

Rapid Transit

Rapid Transit was a resource that was reviewed and assessed in the September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS due to the size of the General Study Area. During review, it was determined that no rapid transit was present within the Actionable Element Site. As this report is an Interim Response to the Comprehensive Plan, the same resources were reviewed for applicability to the Actionable Elements Interim Response sites and determined to not apply to this specific Actionable Element Site. Therefore, an effects analysis is not applicable.

Commuter and Regional Rail

Commuter and Regional Rails was a resource that was reviewed and assessed in the September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS due to the size of the General Study Area. During review, it was determined that no commuter and regional rails were present within the Actionable Element Site. As this report is an Interim Response to the Comprehensive Plan, the same resources were reviewed for applicability to the Actionable Elements Interim Response sites and determined to not apply to this specific Actionable Element Site. Therefore, an effects analysis is not applicable.

Freight Rail

The East Riser Actionable Element site includes a freight rail spur line, serving adjacent industrial and commercial facilities. This spur line connects to a Norfolk Southern Railway line to the west of the Actionable Element Site. This spur line is generally low-lying and vulnerable to flooding. Additional this spur line is crosses the East Riser Ditch via a railroad bridge within the study area.

Ports and Waterways

Ports and Waterways were a resource that was reviewed and assessed in the September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS due to the size of the General Study Area. During review, it was determined that no ports and waterways were present within the Actionable Element Site. As this report is an Interim Response to the Comprehensive Plan, the same resources were reviewed for applicability to the Actionable Elements Interim Response sites and determined to not apply to this specific Actionable Element Site. Therefore, an effects analysis is not applicable.

Stormwater and Wastewater Infrastructure

Stormwater and Wastewater Infrastructure was a resource that was reviewed and assessed in the September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS due to the size of the General Study Area. During review, it was determined that no stormwater and wastewater infrastructure were present within the Actionable Element Site. As this report is an Interim Response to the Comprehensive Plan, the same resources were reviewed for applicability to the Actionable Elements Interim Response sites and determined to not apply to this specific Actionable Element Site. Therefore, an effects analysis is not applicable.

Energy Infrastructure

In New Jersey, after Hurricane Sandy, the Bureau of Climate Change and Clean Energy focused on energy resilience efforts, primarily on petroleum sector terminals and retail fuel stations. The Bureau of Climate Change and Clean Energy developed the “petroleum emergency toolkit” which is a tool is a confidential tool used to support planning and response personnel during emergencies that will affect the petroleum supply chain. The petroleum emergency toolkit lists in a database the location and details of each facility along with emergency contact information for all petroleum refineries, marine transfer facilities, storage facilities, major pipelines, petroleum distributors, heating fuel suppliers and retail gasoline stations within the state and relevant region. The state also announced $25 million in energy allocations to municipalities, counties, and critical infrastructure facilities. The funding is to be used to support alternative energy systems such as microgrids and emergency generators to allow facilities to operate if the power grid fails during an emergency. In addition to these measures, The Board of Public Utilities and the New Jersey Economic Development Authority partnered to commit $200 million in funding for the Energy Resilience Bank (ERB) to finance the design, acquisition, construction, and installation of energy resources to improve and increase the energy resiliency at certain New Jersey critical facilities. This effort is focused primarily on preventing hospitals and WWTPs from losing power in the event of a disaster. With these measures combined, New Jersey may be better prepared for another major storm event.

Communications Infrastructure

Teterboro Airport in New Jersey relies on a robust communication infrastructure, including an upgraded air traffic control tower, multiple radio frequencies for ground and air coordination, satellite services for digital messaging between pilots and controllers, and advanced weather monitoring systems. Flooding in the area can severely disrupt this infrastructure. Water damage to electrical systems in the control tower could impair air traffic management, leading to flight delays or cancellations. Flooded radio and satellite equipment may hinder communication between pilots and controllers, increasing safety risks. Additionally, compromised weather monitoring systems could reduce the accuracy of real-time data, making flight planning more hazardous. Nearby aviation businesses and logistics centers could also suffer operational setbacks, affecting cargo transport and regional air services. Without proper mitigation, flooding could lead to prolonged disruptions, economic losses, and heightened safety concerns for flights operating in and out of Teterboro Airport.

Public Spaces

Public Spaces were a resource that was reviewed and assessed in the September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS due to the size of the General Study Area. During review, it was

determined that no public spaces were present within the Actionable Element Site. As this report is an Interim Response to the Comprehensive Plan, the same resources were reviewed for applicability to the Actionable Elements Interim Response sites and determined to not apply to this specific Actionable Element Site. Therefore, an effects analysis is not applicable.

Aviation

Teterboro Airport is a general aviation airport in Teterboro, New Jersey, serving as a critical hub for private and corporate aircraft. Just 12 miles from Midtown Manhattan, it offers convenient access to the New York metropolitan area. Due to its location in the Meadowlands, the airport is highly vulnerable to flooding, particularly during storms and heavy rainfall. Sitting between 3 to 8 feet above sea level, it faces significant risk from storm surges and rising water levels, which could disrupt operations. The East Riser Ditch, which runs adjacent to the airport, plays an important role in conveying stormwater runoff away from the airfield during rain events. The consequences of a flooding-induced closure would be widespread. Business aviation would be severely impacted, forcing corporate flights and private charters to divert to larger airports like JFK, LaGuardia, and Newark, increasing congestion and causing delays. The airport plays a vital role in regional commerce.

Schools

Schools were a resource that was reviewed and assessed in the September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS due to the size of the General Study Area. During review, it was determined that no schools were present within the Actionable Element Site. As this report is an Interim Response to the Comprehensive Plan, the same resources were reviewed for applicability to the Actionable Elements Interim Response sites and determined to not apply to this specific Actionable Element Site. Therefore, an effects analysis is not applicable.

3.2.5. Economic Environment

Economic activities that characterize an area generally include the businesses or institutions operating there and the employment associated with them. Depending on the project in question, those people who are served by the businesses may also be considered in the assessment. Also, if there are groups of businesses that depend on the goods and services of businesses that are likely to be affected by the project, it may be appropriate to consider the effects on those businesses as well.

The East Riser economic environment lies within Bergen County and two municipalities within the county, Moonachie and Carlstadt Boroughs. Select economic statistics from the US Census are presented in Table 3 at the municipal level for East Riser communities using US Census 5-year Estimates American Community Survey for 2023.

Table 3: East Riser Economic Setting

	Population	Median Income	Unemployment	Poverty
Carlstadt	6,370	$94,900	5.4%	10.5%
Moonachie	3,110	$108,400	4.1%	4.0%

2023: ACS 5-Year Estimates, Median Income in the Past 12 Months (in 2023 Inflation-Adjusted Dollars), Unemployment rate for Population 16 and over, Population for whom poverty status is determined.

The businesses may be classified as commercial (office-based services, retailing, transient hotels, and other business activities typically found in urban commercial districts), industrial (manufacturing, construction, wholesale trade, warehousing, transportation, communications, and public utilities—activities typically found in manufacturing districts), or institutions (schools, hospitals, community centers, government centers, and other like facilities with a charitable, governmental, public health, or educational purpose). The assessments consider whether a proposed project results in displacement of residents or business and or the effect of the project on land use.

The East Riser Actionable Element Site is highly industrialized with over three-hundred structures categorized as industrial or commercial that serve as employers and community support within the structure inventory. Among the industries is a meat processing center, warehouse automation facility, wholesalers, delivery services, hotels, and other shops and services. Construction activities may cause displacement of certain populations which may be a significant economic loss to the community. This study area lies just south of Teterboro Airport which may source a portion of its labor supply in the study area. Also, information from the Rebuild by Design Meadowlands Study suggests that existing land use extend to the edges of the adjacent channel which may indicate that current occupants may be displaced in the event of a flood which would cause economic disruptions.

3.2.6. Future Without-Project Condition

In the future without-project condition, structures within the East Riser Actionable Element Site will likely remain vulnerable to frequent severe fluvial flood events. Given the high concentration of low-lying residential structures and high-value commercial and industrial structures within the Actionable Element Site, situated just south of Teterboro Airport, it is expected that the Actionable Element Site will continue to experience repetitive and significant flood damages in the without-project condition. The high frequency of flood events causing substantial damage yields a correspondingly high overall flood risk within the study area. Over the 50-year period of analysis, structures in the study area are expected to experience $33,664,000 in expected annualized damages. Structures expected to experience damages include residences located within two mobile home communities in the Actionable Element Site. Given the high density and commercial land use in the area, residents of these communities have limited availability for relocation if displaced. Damage to commercial and industrial facilities and their contents is likely to induce significant downstream regional economic impacts.

The East Riser Actionable Element Site will also remain vulnerable to coastal flooding in future with sea level change projections projected to increase an additional 1.69 feet (USACE Intermediate RSLC) and as much as an additional 4.18 feet (USACE high RSLC), by the end of the period of analysis in 2086. An existing tide gate, trash rack, and berm system spans Starke Road and is maintained by Bergen County (NJMC, 2022). This system currently prevents inundation from abnormally high tides and storm surge events less than +5 feet NAVD88. Though this tide gate system is reportedly in good condition (AECOM, 2021, P.107-108) storm surge events are likely to overtop this system and inundate the Actionable Element Site in future. When such inundation occurs, given the comparatively flat terrain and the presence of these berms, coastal inundation will linger in the study area for a significant period. The severity of damage during such long duration inundation events is likely to be greater than under a flood event of similar magnitude but shorter duration. Such overtopping events are likely to become more frequent in future with RSLC.

Additionally, in the future without-project condition, it is unlikely that the existing East Riser Ditch channel will be capable of providing sufficient conveyance for the Rebuild by Design Meadowlands Study project pump station to operate at its full potential (AECOM, 2018), currently out for construction bid at the time of writing and included in the future without-project condition. Consequently, in the future without-project condition, it is likely that any reduction in water levels during a flood event would be limited. More information about the East Riser Actionable Element site and what features are included for evaluation as part of NYNJHATS, can be found in Section 4.2.

3.3. Oakwood Beach Actionable Element Site

3.3.1. General Setting

Oakwood Beach, located in Richmond County, Staten Island, is an urban coastal neighborhood. The neighborhood maintains a semi-urban environment, where pockets of housing coexist alongside extensive wetlands, parkland and essential infrastructure. The Oakwood Beach Actionable Element Site is under jurisdiction of the National Park Service. One of the key infrastructural elements within Oakwood Beach is the Oakwood Beach WRRF, a facility that plays a critical role in wastewater management for Staten Island. This plant helps process and filter wastewater, contributing to the overall environmental health of the region by maintaining water quality and reducing pollution runoff into nearby waterways. Just a short distance away, Great Kills Park serves as a vital recreational space for both residents and visitors. Featuring scenic beaches, tidal wetlands, and walking trails, the park provides opportunities for outdoor activities while also functioning as natural storm barrier. The wetlands within Great Kills Park contribute a significant role in mitigating coastal erosion and managing floodwaters, helping to manage risk to surrounding neighborhoods from severe weather events.

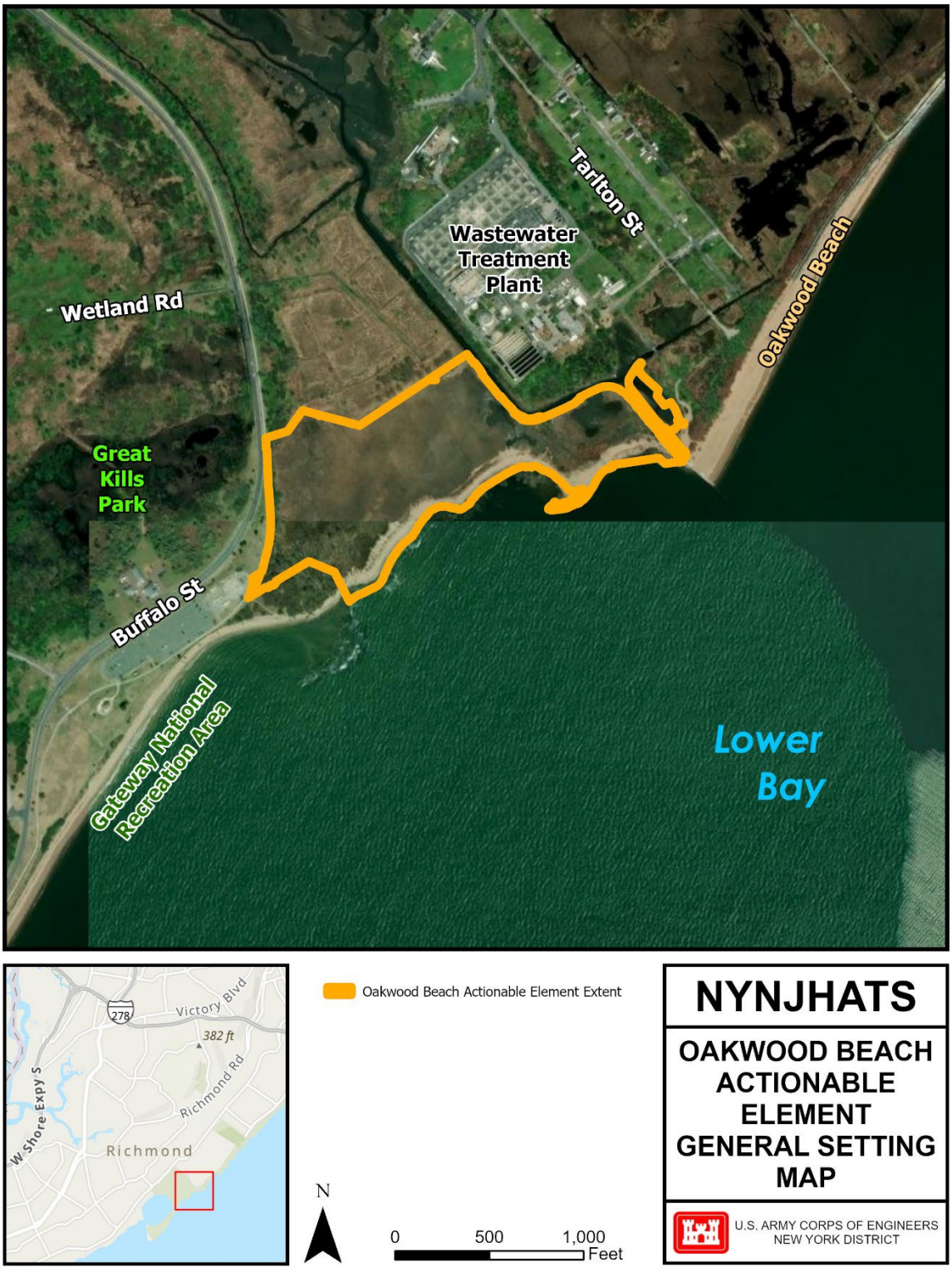

Figure 8: Oakwood Beach Actionable Element General Setting

3.3.2. Natural Environment

Wildlife and Vegetation, Special Status Species, Special Status Areas

The Oakwood Beach Actionable Element Site is identified as a Federal and State listed wetland, with classification codes of Estuarine (E), Intertidal (2), Emergent, Phragmites austrailis [dominated], and Irregularly Flooded (P), as well as classification (NA-10) Class I, respectively. Vegetative communities present onsite includes non-native invasive common reed (Phragmites austrailis) dominance (approximately 22-acres) as well as some smaller vegetative communities of coastal shoals, bars and mudflats, maritime beach and maritime dune, successional maritime shrubland/forest, low salt marsh, and others in various quantities presented on the following table:

Table 4: Vegetative Communities

Vegetative Community	Acreage (total, non-contiguous)
Low Salt Marsh	1.43
Coastal Shoals, Bars, and Mudflats	6.07
Vegetated Coastal Shoals, Bars, and Mudflats	0.11
Salt Panne	0.09
Maritime Shrubland	1.06
Maritime Beach and Maritime Dune	5.98
Successional Maritime Shrubland/Forest	2.37
Common Reed/Non-Native Community	22.38
Total Vegetative Community Acreage	**39.49**

This Actionable Element Site is within a 100-year floodplain, Zone AE defined as an area with 1% chance of annual flood.

Existing habitat, although largely comprised of non-native invasive common reed, is anticipated to provide cover, shelter, foraging, and hunting for wildlife. New York District biologists have performed yearly bird monitoring along the Oakwood Beach shore since approximately 2017, noting observed presence of wildlife including wading, migratory, and predator birds, racoons, fox, and small fish and crabs in the existing tidal channel along the eastern border of the Site. Special status species potentially occurring in the vicinity of the Oakwood Beach Actionable Element Site include both Federal and State listed terrestrial species, such as piping plover, red knot, roseate tern, and monarch butterfly (proposed). Aquatic special status species are present throughout the Comprehensive Plan Study Area, including the Lower Bay Planning Region where this Actionable Element Site is located; however, no aquatic threatened or endangered species are anticipated within the Actionable Element Site.

Four Marine Protected Areas (MPAs) are present within the Lower Bay Planning Region, one of which is collocated within this Actionable Element Site. This MPAs classification is zoned as “Multiple Use”, and is managed by the NPS. Commercial and recreational fishing is restricted. This Actionable Element Site is also present within a Coastal Zone Management Act boundary and NPS Great Kills Park portion of the Gateway National Recreation Area.

The details for the existing conditions of the Natural Environment is presented in Appendix format. Refer to Appendix A for additional detail and an in-depth discussion on the existing conditions of this Actionable Element Site.

3.3.3. Physical Environment

Physical Resources

Physical resources within the Oakwood Beach Actionable Element Site include topography, geology, surface waters, sediment and sediment transport, land use, water quality, air quality, cultural resources, and hazardous, toxic, radioactive wastes. The portions of Staten Island within the Lower Bay Planning Region are comprised of igneous, metamorphic, and sedimentary bedrock ranging from Upper Proterozoic to Lower Jurassic age overlain by unconsolidated Upper Cretaceous Raritan Formation or upper Pleistocene Wisconsinan glacial drift deposits. Holocene shore and salt marsh deposits overlying upper Pleistocene deposits are present along the shore and low-lying areas of western Staten Island. Oakwood Beach geology is characterized as predominantly flat, with gentle grade slopes (primarily 0-3%) towards the Lower Bay of the New York Bight. Soils are classified as Beaches (Be), Water (W), Barren sand (BaA), Bigapple fine sand (BiA), Fortress sand (FoA), Gravesend and Oldmiss coarse sands (GOB), Hooksan-Dune land complex (HAD), Ipswich-Pawcatuck complex (IPA), Jamaica sand (JaA), Sandyhook muchy fine sand (SaA), and Urban land-Verrazano complex (UVAl) (Hazen and Sawyer 2019). A topographic survey was completed in 2017 shows the site ranging from its lowest elevation at 0 feet above mean sea level (amsl) up to its highest elevation observed at approximately 13 feet amsl; however, much the site is observed to range between 2-3 feet amsl. Mud flats are present along the shoreline exposed during low tide and saturated during high tide.

Surface waters at the Site and in the vicinity include a tidal channel (sometimes referred to as the Main Tidal Channel) on the easternmost edge of the Site that drains via an outfall into the Lower Bay, which is the predominant surface water feature in the vicinity of the Actionable Element Site. The tidal channel and Lower Bay are tidally influenced, experiencing the effects of two high and two low tides per every 24-hours. Sediments are present within the tidal channel, observed collecting around the outfall to the Lower Bay. General land use in the vicinity is comprised of recreation along the beach fronts and nearby Great Kills Bay, vacant land, and residential to the north of Great Kills Park and the adjacent Wastewater Treatment Plant.

Cultural Resources

As a federal agency, USACE has certain responsibilities for the identification, protection and preservation of cultural resources that may be located within the Area of Potential Effect (APE) associated with the proposed project. Present statutes and regulations governing the identification, protection and preservation of these resources include the National Historic Preservation Act of 1966, as amended; the National Environmental Policy Act of 1969; Executive Order 11593; and the regulations implementing Section 106 of the National Historic Preservation Act of 1966 (36 Code of Federal Regulations Part 800, Protection of Historic Properties, August 2004). A historic property is defined as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on, the National Register of Historic Places (NRHP), including artifacts, record, and

material remains related to such a property or resource.

Cultural resources include historic properties as well as other cultural aspects of the human environment. This work is done in coordination with the State Historic Preservation Offices of New Jersey and New York, federally recognized Tribes, and interested parties. The New York District carried out a review of existing surveys and historical documentation as part of both the Tier I EIS as well as the current EA, to identify cultural resources within the Planning Region including previously recorded historic properties and properties with the potential to be eligible for the National Register of Historic Places to inform an initial assessment of potential impacts that the proposed undertaking may have on cultural resources within the APE. For further discussion of the study area, please see the Cultural Resource Subappendix.

Native American Land

Native American Lands, or Indian Land, is typically either fee land purchased by tribes or land held in trust by the U.S. government. Federally Recognized Tribes whose ancestral lands include all or a portion of the Study Area include the Delaware Nation, the Delaware Tribe of Indians, and the Stockbridge Munsee Community Band of Mohican Indians. The Delaware Nation is based today in Anadarko, Oklahoma, the Stockbridge Munsee Community Band of Mohican Indians is situated in Shawano County, North central Wisconsin, and the Delaware Tribe of Indians in Bartlesville, Oklahoma. At present a list of properties of traditional religious and cultural importance (Traditional Cultural Properties) has not been quantified for the Study Area. The Stockbridge Munsee consider Papscanee Island, located on the Hudson River just two miles south of Albany and within the Capital District Region, to be a traditional historic property of religious and cultural significance and the New York State Office of Parks, Recreation and Historic Preservation has, under those criteria, determined the site eligible for the National Register of Historic Places. There are no Native American lands within or near the Actionable Element Site; therefore, an effects analysis is not applicable.

Hazardous, Toxic, and Radioactive Waste

The Study Area exists in an urbanized portion of the New York Metropolitan Area that has been subject to a history of anthropogenic activity and other uses with the potential to affect the subsurface or otherwise impact the project. Accordingly, an HTRW Report was prepared by: 1) reviewing existing and readily available Federal and State records of contaminated sites within or near the Study Area and other existing reports; 2) identifying contaminated sites that are collocated within or near the areas of the proposed project; and 3) determining if collocated or nearby contaminated sites may affect or be affected by the project. The HTRW Report was prepared in accordance with USACE ER 1165-2-132 and the Comprehensive Environmental Response, CERCLA 42 USC 9601 et seq. and is included as the HTRW Subappendix.

The HTRW Report documented several environmental listings and concerns mainly associated with the Great Kills Park (within the Gateway National Recreation Area) Superfund Enterprise Management System (SEMS) Site (ID# NYN000200666) and the Oakwood Beach WRRF. According to discussions with the Great Kills Park study team and a review of the USEPA ECHO database, these listings are not anticipated to be affecting this Actionable Element Site at this time. As the

proposed project progresses into the Preconstruction Engineering and Design phase, a subsurface planning investigation will take place to further characterize the subsurface conditions. This investigation will inform any potential HTRW risks associated with construction and implementation of the proposed project.

Should HTRW be identified during any phase of the project, it is USACE policy to avoid it as practicable. However, if HTRW avoidance is not possible it will be the responsibility of the NFS to provide a clean site for the project, using 100% non-federal non-project funds, in accordance with ER 1165-2-132.

3.3.4. Built Environment

The built environment is defined broadly as man-made resources and infrastructure that define the urban fabric support communities and enable economic activity. This definition includes transportation infrastructure (i.e., roads, bridges and tunnels, transit, freight rail, ports and waterways, aviation), storm and wastewater infrastructure, energy infrastructure, communications infrastructure, public spaces, schools, and aesthetics.

Roads, Bridges, and Tunnels

Roads, bridges, and vehicular tunnels connect communities and provide access to opportunity by allowing for the commute to and from work. They are an important piece of infrastructure within the Study Area and are the backbone of modern supply chains. Particularly in the heavily urbanized regions of the Study Area, high density road networks define the urban fabric with the coastal zone. While infrequent road flooding can temporarily disrupt travel and delay deliveries, more frequent flooding of roadways can cause chronic access issues for adjacent communities and businesses. Coastal flooding can also cause significant physical damage to roads and supporting infrastructure, with salt water-related damage capable of significantly decreasing the useful life of supporting infrastructure (e.g., damage to structural components, supporting electrical infrastructure, mechanical equipment). While there are both direct and indirect benefits of managing flood risk for roads, bridges and tunnels, these benefits are not considered in the economic analysis at present.

Roads and Highways

Roads and Highways was a resource that was reviewed and assessed in the September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS due to the size of the Study Area. During review, it was determined that no roads or highways were present within the Study Area. As this report is an Interim Response to the Comprehensive Plan, the same resources were reviewed for applicability to the Actionable Elements Interim Response sites and determined to not apply to this specific Actionable Element Site. Therefore, an effects analysis is not applicable.

Bridges

Bridges were a resource that was reviewed and assessed in the September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS due to the size of the Study Area. During review, it was determined that no bridges were present within the General Study Area. As this report is an Interim Response to the Comprehensive Plan, the same resources were reviewed for applicability to the Actionable

Elements Interim Response sites and determined to not apply to this specific Actionable Element Site. Therefore, an effects analysis is not applicable.

Tunnels

Tunnels were a resource that was reviewed and assessed in the September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS due to the size of the General Study Area. During review, it was determined that no tunnels were present within the Actionable Element Site. As this report is an Interim Response to the Comprehensive Plan, the same resources were reviewed for applicability to the Actionable Elements Interim Response sites and determined to not apply to this specific Actionable Element Site. Therefore, an effects analysis is not applicable.

Transit

Transit was a resource that was reviewed and assessed in the September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS due to the size of the General Study Area. During review, it was determined that no transit was present within the Actionable Element Site. As this report is an Interim Response to the Comprehensive Plan, the same resources were reviewed for applicability to the Actionable Elements Interim Response sites and determined to not apply to this specific Actionable Element Site. Therefore, an effects analysis is not applicable.

Rapid Transit

Rapid Transit was a resource that was reviewed and assessed in the September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS due to the size of the General Study Area. During review, it was determined that no rapid transit was present within the Actionable Element Site. As this report is an Interim Response to the Comprehensive Plan, the same resources were reviewed for applicability to the Actionable Elements Interim Response sites and determined to not apply to this specific Actionable Element Site. Therefore, an effects analysis is not applicable.

Commuter and Regional Rail

Commuter and Regional Rails was a resource that was reviewed and assessed in the September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS due to the size of the General Study Area. During review, it was determined that no commuter and regional rails were present within the Actionable Element Site. As this report is an Interim Response to the Comprehensive Plan, the same resources were reviewed for applicability to the Actionable Elements Interim Response sites and determined to not apply to this specific Actionable Element Site. Therefore, an effects analysis is not applicable.

Freight Rail

Freight rail was a resource that was reviewed and assessed in the September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS due to the size of the General Study Area. During review, it was determined that no freight rails were present within the Actionable Element Site. As this report is an Interim Response to the Comprehensive Plan, the same resources were reviewed for applicability to the Actionable Elements Interim Response sites and determined to not apply to this specific Actionable Element Site. Therefore, an effects analysis is not applicable.

Ports and Waterways

Ports and Waterways were a resource that was reviewed and assessed in the September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS due to the size of the General Study Area. During review, it was determined that no ports and waterways were present within the Actionable Element Site. As this report is an Interim Response to the Comprehensive Plan, the same resources were reviewed for applicability to the Actionable Elements Interim Response sites and determined to not apply to this specific Actionable Element Site. Therefore, an effects analysis is not applicable.

Stormwater and Wastewater Infrastructure

The Oakwood Beach WRRF is a facility in Staten Island that serves over 240,000 residents in the southern part of the borough. It was significantly impacted by Hurricane Sandy, with storm surge reaching 12 feet, causing flooding and infrastructure damage. To prevent future failures the plant was elevated to 19 feet and underwent extensive hazard mitigation efforts. The facility has a design capacity of 39.9 million gallons per day, and discharges treated wastewater into Lower New York Bay.

Energy Infrastructure

Energy Infrastructure was a resource that was reviewed and assessed in the September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS due to the size of the General Study Area. During review, it was determined that no energy infrastructure was present within the Actionable Element Site. As this report is an Interim Response to the Comprehensive Plan, the same resources were reviewed for applicability to the Actionable Elements Interim Response sites and determined to not apply to this specific Actionable Element Site. Therefore, an effects analysis is not applicable.

Communications Infrastructure

Communications Infrastructure was a resource that was reviewed and assessed in the September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS due to the size of the General Study Area. During review, it was determined that no communication infrastructure was present within the Actionable Element Site. As this report is an Interim Response to the Comprehensive Plan, the same resources were reviewed for applicability to the Actionable Elements Interim Response sites and determined to not apply to this specific Actionable Element Site. Therefore, an effects analysis is not applicable.

Public Spaces

Great Kills Park is a 523-acre recreational area on Staten Island’s south shore, offering beaches, hiking and biking trails, fishing areas, a marina and a boat launch. As part of the Gateway National Recreation Area, the park provides vital habitats for wildlife within salt marshes, woodlands, and wetlands. If the park were to flood, the consequences could be severe. The environmental impacts would be substantial, as flooding could disrupt wetlands and marshes, harming local wildlife and vegetation. Contamination risks are also a concern due to the park’s history of radioactive and hazardous material contamination, which could spread to nearby communities and waterways.

Aviation

Aviation was a resource that was reviewed and assessed in the September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS due to the size of the General Study Area. During review, it was determined that no aviation centers were present within the Actionable Element Site. As this report is an Interim Response to the Comprehensive Plan, the same resources were reviewed for applicability to the Actionable Elements Interim Response sites and determined to not apply to this specific Actionable Element Site. Therefore, an effects analysis is not applicable.

Schools

Schools were a resource that was reviewed and assessed in the September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS due to the size of the General Study Area. During review, it was determined that no schools were present within the Actionable Element Site. As this report is an Interim Response to the Comprehensive Plan, the same resources were reviewed for applicability to the Actionable Elements Interim Response sites and determined to not apply to this specific Actionable Element Site. Therefore, an effects analysis is not applicable.

3.3.5. Economic Environment

Economic activities that characterize an area generally include the businesses or institutions operating there and the employment associated with them. Depending on the project in question, those people who are served by the businesses may also be considered in the assessment. Also, if there are groups of businesses that depend on the goods and services of businesses that are likely to be affected by the project, it may be appropriate to consider the effects on those businesses as well. Select economic statistics from the US Census are presented in ***Table 5*** at the New York City district level for Staten Island Community District 3, where Oakwood Beach is located, using US Census 5-year Estimates American Community Survey for 2023.

Table 5: Oakwood Beach Economic Setting

	Population	Median Income	Unemployment	Poverty
Staten Island Community District 3	136,704	$117,785	4.60%	6.00%

2023: ACS 5-Year Estimates; Median Income in the Past 12 Months (in 2023 Inflation-Adjusted Dollars); Unemployment rate for Population 16 and over; Population for whom poverty status is determined.

The Oakwood Beach Actionable Element Site has few structures for economic activity, however, there is a large riparian footprint whose disruption would have secondary economic effects on the surrounding communities. On the edges of the riparian zone are several residential structures and some commercial and light industrial activity. There are schools, a fishing club and a fitness center in the immediate fringe of the wetlands. It is not expected that construction activities would cause displacement of any of the surrounding communities because the proposed project would be along the shoreline and away from residential and commercial occupants.

3.3.6. Future Without-Project Condition

Given the area's coastal exposure and low-lying topography, the most significant risk to the Oakwood Beach area is the potential increase in the impacts from coastal storms due to sea level change, including both an increase in the extent and depth of flooding as well an increase in wave heights and the resulting erosion. This risk will likely be exacerbated by sea level change. Based on a vegetation survey completed in 2016, the Oakwood Beach Actionable Element Site is comprised of limited vegetative communities of Low Salt Marsh, vegetated coastal shoals, bars, and mudflats, salt panne, maritime shrubland, maritime beach and maritime dune, and successional maritime shrubland/forest. The site is dominated by common reed/non-native-dominated (22.4-acres of the approximate 39-acre area), which pose a wildfire risk to the Oakwood Beach neighborhood of Staten Island.

Figure 9: Oakwood Beach Actionable Element Site Pre- and Post-Hurricane Sandy

Notable coastal storm-driven erosion has occurred along the shoreline of Great Kills Park over the last several decades and is expected to continue (***Figure 9***). Though more noticeable along the shoreline immediately southwest of the Actionable Element Site, this erosion is steadily encroaching upon the existing maritime dune fronting the tidal wetlands (***Figure 10***). In the future, absent additional shoreline stabilization measures, it is likely that wave action from coastal storms will continue to erode the existing dune. Additionally, absent shoreline stabilization measures at the outfall of the existing tidal channel, it is likely that its outflows will continue to accelerate shoreline erosion.

Figure 10: Oakwood Beach Actionable Element Site as of June 2025

Over time, further erosion of the existing dune will expose the wetland to greater wave action and coastal forcings, which is likely to accelerate degradation of the condition of the shoreline and wetland areas. These impacts are likely exasperated by SLC and expected to continue into the future. Since 1900 mean sea level in New York City has risen by about 1.16 feet. By the end of the period of analysis in 2086, sea level is projected to increase an additional 1.87 feet (USACE Intermediate SLC) and as much as an additional 4.36 feet (USACE high SLC), as shown below in ***Figure 11***.

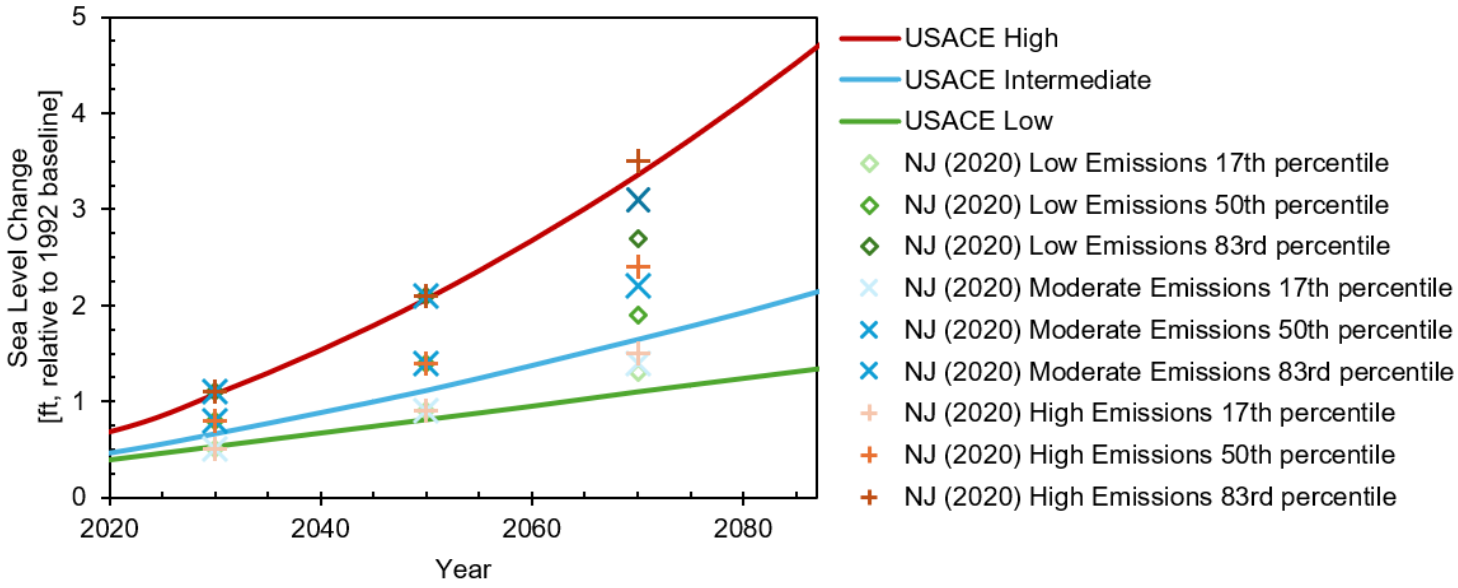

Figure 11: Sea Level Change Projections at the Sandy Hook Guage

Within the Oakwood Beach Actionable Element Site, there are a few existing projects that were considered as part of the Future- Without-Project Conditions for this effort. New York District has an existing study, as mentioned in Section 4.3.1, named the South Shore of Staten Island CSRM that includes a proposed floodwall to wrap around the south and east sides of the Oakwood Beach WRRF. The final Feasibility Study for this project was completed in 2016 and in 2024 a Validation Report and Chief's Report documented design refinements; the project is now in the Pre-Construction, Engineering, and Design phase. Additionally, there is a historic Flood Risk Management Project consisting of 720 feet of levee connecting the Lower New York Bay dune line with high ground associated with the Oakwood Beach WWRF, completed in May 2000 (USACE, 1999), as well as an existing FEMA project at the Oakwood Beach WRRF, consisting of a pump station that will pump chlorinated plant effluent over for the planned SSSI floodwall that was described in previous sections of this report.

In addition to coastal storm risk, the Oakwood Beach Actionable Element Site is also vulnerable to wildfire risk, as invasive phragmites, which currently dominates the Actionable Element Site, is prone to wildfires. Given its proximity to the proposed South Shore of Staten Island floodwall, wildfires in the Actionable Element Site also pose a risk to the floodwall. Under the future-without project condition, there is an estimated $26,000 in expected annual wildfire damages in the Actionable Element Site.

4. Actionable Element Formulation and Evaluation

4.1. Actionable Element Site: Harlem River

4.1.1. Existing Data / Process

The NYC Small Business Services (SBS), acting as Lead Agency through the NYC Economic Development Corporation (NYCEDC), and in partnership with the NYC Department of Parks & Recreation (NYC Parks) and the NYC Department of Transportation (NYCDOT), proposed development and improvement of the Manhattan Greenway along the Harlem River in 2022. Plans and engineering investigations for Sub-project 2 and Sub-project 3 of the Manhattan Greenway – Harlem River were shared with NY District from the study partners, NYCDEP and NYSDEC. These plans outline the repair and replacement of bulkhead along a total length of 2.74 miles of shoreline, 0.66 miles in Sub-project 2 (132nd to 145th Street) and 2.08 miles in Sub-project 3 (155th Street to Swindler's Cove/Dyckman Street). The crest elevations of the proposed bulkheads typically meet existing grade at the site. Referring back to the Draft Feasibility Report and Tier 1 (Programmatic) EIS (Draft FR/EIS) that was released by the study team in September of 2022, the proposed elevation for a Shore-Based Measure (SBM) within the same footprint, was +17.5 feet NAVD88 for the 1% AEP. Discussions ensued with the NFS to reflect on opportunities for this site, giving the study team the permission and approval to utilize the existing data to further investigate the measure that was originally recommended as part of the TSP, rather than studying the Manhattan Greenway bulkhead replacement project as was shared. This would allow the study team to investigate and recommend a plan that was sufficiently focused on the CSRM mission of the original NYNJHATS, while also protecting an area of NYC that remains vulnerable to coastal storm risk.

As previously stated, the accelerated timeline to accomplish the completion of a Chief's Report for a potential WRDA focused the study team on features that had enough existing data to support design maturity requirements in the specified time frame. Given USACE engineering requirements for appropriate design maturity, Actionable Elements were initially screened for consideration in this Interim Response by the availability of existing site data to prevent the uncertainty in time and money required for field investigations necessary to achieve a Class 3 cost estimate, as required by USACE. Within the existing documents from the proposal mentioned above, geotechnical boring data was provided that allowed the team an opportunity to revisit consideration of a structural solution within the footprint of the Manhattan Greenway Sub-Project 3 location, where data was initially obtained.

4.1.2. Plan Formulation

The geotechnical data was reviewed by members of the study team to investigate the initial feasibility of measures and confirm whether they were appropriate for the Actionable Element Site. In studying this site, the study team considered floodwalls and seawalls, both part of the alignments as presented below, but eliminated nature-based solutions as primary features, whereas to maximize the level of performance. While nature-based solutions were not considered as independent components, the study team investigated them to work collaboratively with both the Seaward and Landward Alignment at this Actionable Element Site. Additionally, the study team reviewed the locations within the Actionable Element Site where the existing geotechnical data received overlapped with the TSP feature that was being considered, in order to investigate their independent functionality. Anything being considered for

this Interim Response, needed to be hydrologically independent for construction in advance of the rest of the shore-based measure that was proposed from the NYNJHATS Comprehensive TSP.

Shore-based measures from the Draft Integrated FR/Tier 1 (Programmatic) EIS, were proposed in East Harlem, Manhattan between approximately East 88th Street and West 165th Street in Manhattan to manage coastal storm risk for the low-lying and flood prone areas along the Harlem River (***Figure 12***). These shore-based measures were originally proposed to potentially include a combination of elevated promenades, floodwalls, deployable flood barriers, and seawalls. In reviewing feasibility and separability for this effort, tie-in locations with available high-ground and existing site data were crucial for advancement and recommendation.

Currently, as part of this Interim Response, the study team is proposing two potential alignments for evaluation, between West 153rd Street and Harlem River Driveway (***Figure 13***). A site visit to the footprints of the proposed alignments took place to confirm the viability of the solutions, that are highlighted below. The summary of this investigation and the differences between the alignments can be found in subsequent sections of this chapter. A detailed cost estimate was prepared for only the Seaward Alignment for this Draft Report, as it was assumed to be the more complex engineering design and therefore, the more expensive option. These first costs considered the 01, 02, 11, 30, and 31 accounts, and is currently estimated at $762 million at the FY25 price levels, with a 52.47% contingency included to account for risk and uncertainty. More information on the costs projected for this alignment can be found in Appendix C.

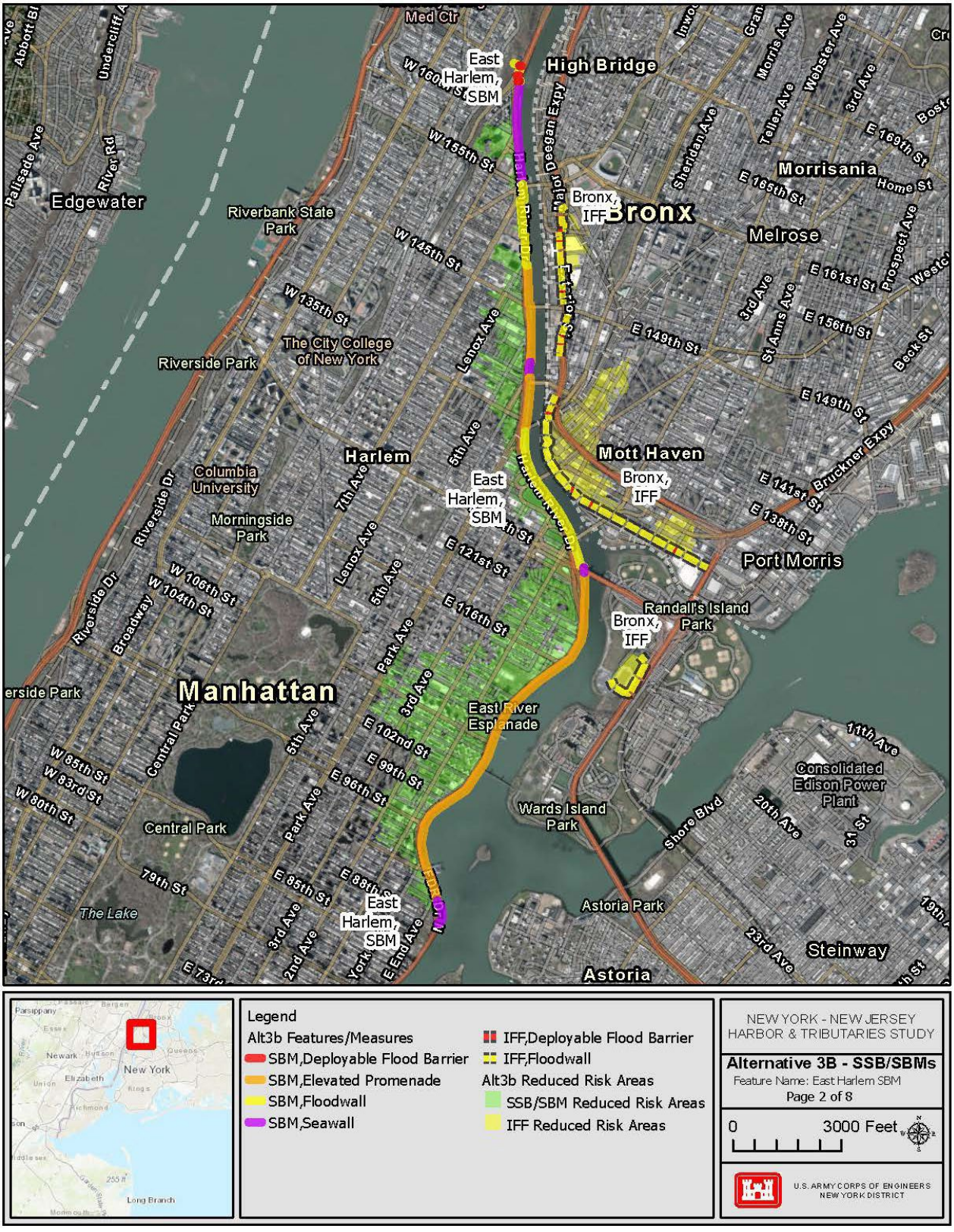

Figure 12: September 2022 Draft FR/Tier 1 (Programmatic) EIS, Tentatively Selected Plan Components Along Harlem River

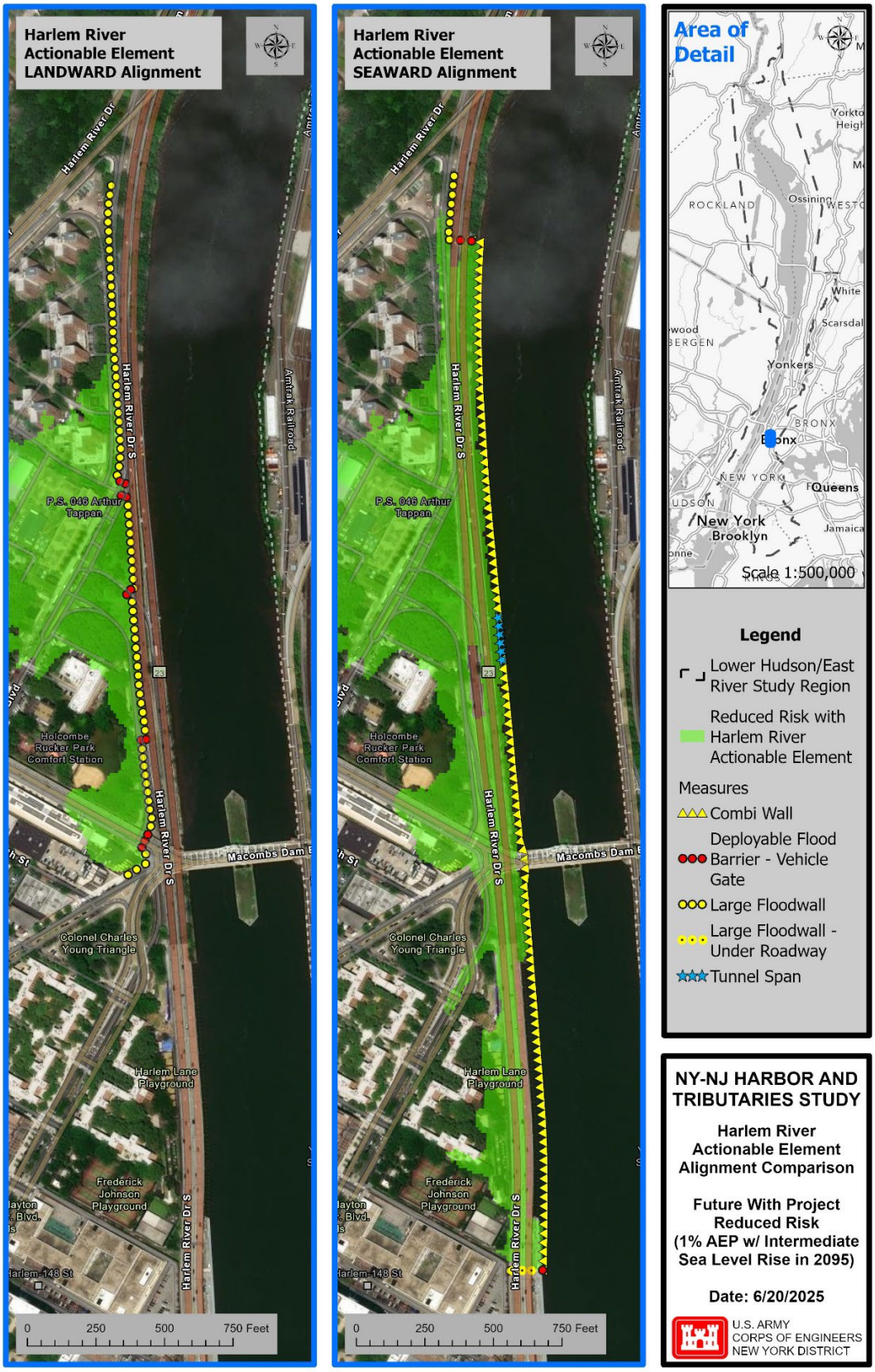

Figure 13: Harlem River Actionable Element Potential Alignments

Alternatives and Alternative Evaluation

Two alignments, the Seaward and Landward (***Figure 13***), are described below for further evaluation and public feedback. In subsequent phases of this study effort the study team will calculate detailed cost estimates for the Landward Alignment, similar to which is provided in this report for the Seaward Alignment. At the time of release of this report, New York District has not chosen a preferred alternative and seeks public and stakeholder comment with comparison of the full environmental analysis attached within Appendix A. Either of the two alignments can be advanced, and the rationale for the decision will be documented in the Final Integrated Interim Response and EA for Actionable Elements, explaining how the study team incorporated feedback received on the draft report.

The Seaward alignment (***Figure 14***) is proposed to extend from the MTA's 148th Street Rail Yard to the northern end of NYCHA's Rangel Houses property, tying into high ground at +15.6 feet NAVD88 or greater, with the top of the wall elevation at +17.5 feet NAVD88. The alignment utilizes four combined CSRM measures to work as a system, which include a floodwall, anchored combination seawall, deployable vehicular gates, and tunnel span structure for the existing MTA tunnel for the BD line, located within the Actionable Element Site. The southernmost portion of the alignment follows the existing CSRM feature at the MTA's 148th Street rail yard, which is part of the Future Without-Project Conditions described in Section 3.1.6. A floodwall and deployable vehicular roller gate underneath Harlem River Drive, connect the combination wall to inland high ground. The combination wall continues north parallel to Harlem River Drive (***Figure 15***) until the 155th Street BD line Harlem River tunnel crossing. To ensure no additional load is added to the existing MTA structure, a 155-foot tunnel span is proposed to cross the MTA tunnel. The combination wall alignment then continues, transitioning inland at the northern boundary of NYCHA's Rangel Houses property.

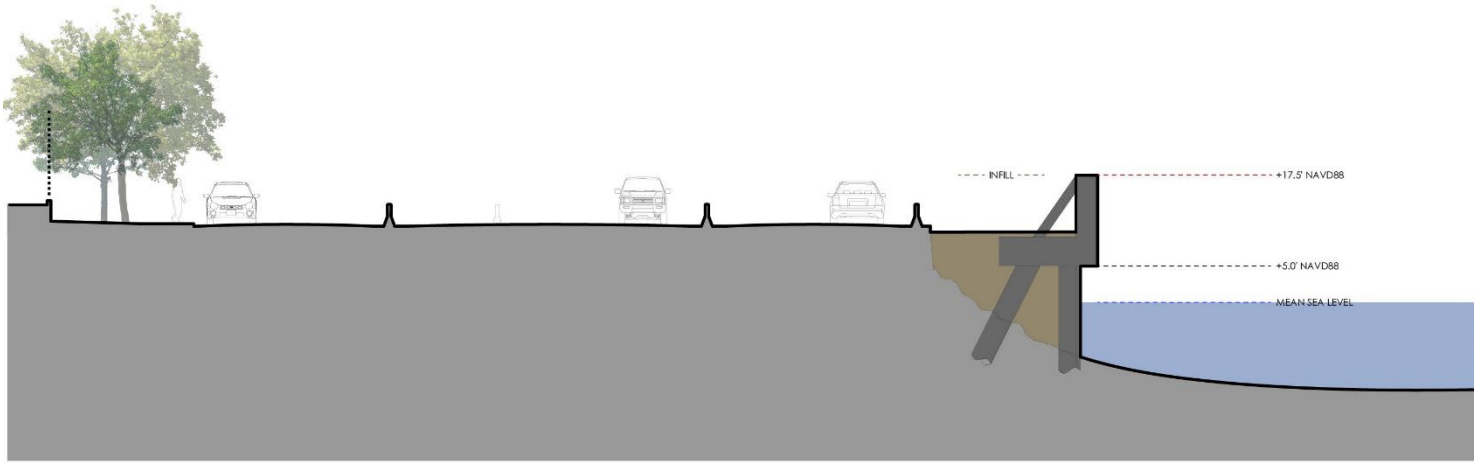

Figure 14: Harlem River Actionable Element, Seaward Alignment Cross Section

The northern tie-in is proposed as a deployable road closure gate, that will cross the northbound lanes of the Harlem River Drive and tie into the abutment of southbound lanes of Harlem River Drive, but no structure is proposed to cross the southbound lanes. A floodwall on the western side of the southbound lanes of Harlem River Drive will be used to tie into the highway abutment and existing high ground 240

feet north to end the alignment. More information about this alignment, including preliminary designs, can be found in the Appendix B.

Figure 15: Seaward Alignment Rendering along northbound lane of Harlem River Drive

The Landward alignment (***Figure 17***) is conceptualized as a combination of floodwalls and deployable road closure gates, similar to what is described above. The alignment would begin at the bridge abutment of The Macombs Dam Bridge, with a floodwall following the perimeter of the lot at 204 155th Street. To cross 155th Street, the alignment would transition to a deployable vehicular roller gate which will tie into a floodwall at the concrete median separating the Harlem River Drive service road and 155th Street, from the on-ramp of the southbound lanes of Harlem River Drive. The floodwall is currently proposed to follow the existing concrete median to its end, before transitioning to a deployable swing gate across the on-ramp to the southbound lanes of Harlem River Drive. The alignment then continues to transition back to a floodwall along the southbound lanes of Harlem River Drive until the northbound exit-ramp of the highway. A deployable swing gate would cross the off-ramp and connect with the floodwall along the southbound lanes of Harlem River Drive. Continuing north, the alignment is expected to cross Frederick Douglass Boulevard with two deployable swing gates across the northbound and southbound lanes of traffic. The two gates are spaced approximately 45 feet apart and would tie into a floodwall, centered along the median of Frederick Douglass Boulevard. The remainder of the alignment would consist of a floodwall along the western side of the service road from Harlem River Drive to Frederick Douglass Boulevard (***Figure 16***), which would then tie into existing high ground along the retaining wall of the NYCHA Rangel property. The landward alignment is proposed to consist of 180 feet of deployable road closure gates and 2,470 feet of floodwall, for a total length of 2,650 feet, with a top of wall elevation of +17.5 feet NAVD88. In consideration of potential impacts to existing greenspace during

construction of the Landward Alignment, the New York District has preliminarily discussed mitigation measures, to include creation of alternative greenspace, planting of trees, and recreational pathways, that would work as complementary Nature-Based Solutions to the overall measure. More information about environmental consequences and potential impacts can be found in Appendix A.

Figure 16: Landward Alignment Rendering along the Harlem River Drive service road

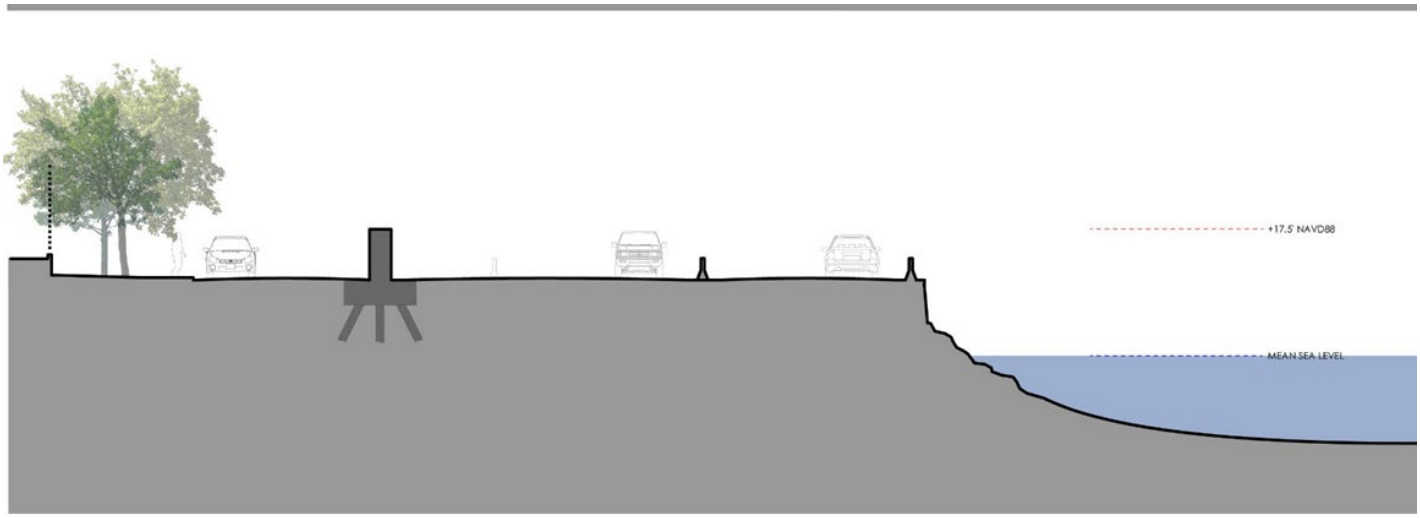

Figure 17: Harlem River Actionable Element, Landward Alignment Cross Section

Both alignments consist of primary structural CSRM features with secondary, complementary nature-based solutions and nonstructural measures. At the time of the publication of this report, only the structural measures have been included for preliminary design, as those would provide the primary CSRM function, and any complementary nature-based solutions and nonstructural would be identified for inclusion into both alignments at a future date, in advance of study completion. Reveal heights of both proposed alignments would vary, based on existing ground elevation and range from 0 to 10 feet high.

4.2. Actionable Element Site: East Riser

4.2.1. Existing Data / Process

The NJDEP, with funding acquired from the U.S. Department of Housing and Urban Development's Community Development Block Grant – Disaster Recovery (CDBG-DR) Funding and the Federal Emergency Management Agency (FEMA) through the New Jersey Office of Emergency Management with a Building Resilient Infrastructure and Communities (BRIC) grant, proposed the East Riser Project as a subset to the larger Rebuild by Design Meadowlands project. When studied, a full suite of alternatives was considered for The East Riser project, to include a "No Action" Alternative and Alternative 2, which ultimately became the recommended plan. As a result of that study, the recommended plan included construction of a pump station, channel modifications to the lower reach of the East Riser Ditch Channel (about 4,150 feet), removal and replacement of two bridge culverts and an upgrade for a railroad bridge in the area. Channel modifications more specifically included widening and deepening, bank stabilization, and replanting of vegetation. The proposed project and all supporting documentation and modeling were shared with New York District from the study partners, the NJDEP, for use in the investigation of Actionable Elements. The NYNJHATS team reviewed the provided HEC-HMS and HEC-RAS models to determine if (1) hydrologic and hydraulic processes were accurately captured and if (2) the existing modeling followed USACE policies and guidance for use in a feasibility study.

Collaboratively, the New York District team and NJDEP discussed ways to continue studying this site, as it met the NFS request to invoke Section 8106(a) of WRDA 2022, to "Formulate the project elements of Alternative 3b so as to maximize the net benefits from the reduction of the comprehensive flood risks within the geographic scope of the study from isolated or compound effects of: (i) riverine flooding; (ii) coastal storms; (iii) tidally induced flooding…" (Request Pursuant to WRDA 2022 section 8106(a), 08 January 2024), in which this site sees compound effects from all three. The Actionable Element Site is vulnerable to both coastal flooding from storm surge and systemic inland flooding from large rainfall events. Coastal inundation results from higher-than-normal high tides that have historically overtopped and/or flanked the Berry's Creek tide gate and prevent gravity flow of water down the East Riser Ditch Channel, through that same gate. Since 1999, the area has been severely impacted by three major storms, that have caused flooding in the Actionable Element Site, including Hurricane Floyd (1999), Hurricane Irene (2011), and Hurricane Sandy (2012). 3,500 residents were evacuated in advance of Hurricane Sandy and, as a result of the storm that brought a recorded 9.5 feet of storm surge, roadways and both electrical and natural gas services were closed for one week, and schools were closed for two weeks.

In the NYNJHATS Draft FR/Tier 1 (Programmatic) EIS released in September 2022, Alternatives 2, 3A, and 3B recommended a series of risk management features. A navigable gate was tentatively recommended across the Hackensack River with associated tie-ins around Marion Reach and a berm along the northern bank, adjacent to the Conrail and continuing across Penhorn Creek. Whereas, in Alternative 4, the Hackensack River Storm Surge Barrier (SSB) was recommended as a primary structural component that includes a SSB in the southern portion of the river with associated shore-based measure tie-ins. In investigating Actionable Elements for recommendation within this Draft Feasibility Report and EA, the study team considered the existing recommendations from the TSP, Alternative 3B, and whether construction of the projects outlined above would make implementation of the features, redundant. Ultimately, project elements from the TSP would help to manage risk from low-frequency and high-damaging storms, such as Hurricane Sandy, while the elements as outlined from the East Riser project would help to address the high-frequency inundation events from coastal storms and increased rainfall from changing conditions.

While similar to the original recommendations from the East Riser project from the NJDEP, the Actionable Element recommended alternative as considered in this report, seeks to advance the channel modifications, removal and replacement of two bridge culverts, and an upgrade for a railroad bridge (***Figure 18***). The pump station that was mentioned earlier within this section, has been put out for construction bid by the NJDEP and will therefore be included within this study's Future Without-Project Conditions. At the time of the report release by the NJDEP in 2019, the cost estimate for Alternative 2 was around $128 Million for all project features, to include the pump station, and $118 Million without the pump station included, as USACE is currently recommending. This cost was escalated by USACE to reflect the FY25 price levels and is now estimated at $249 million, with a 52.47% contingency included to account for risk and uncertainty. More information on the costs projected for this Actionable Element can be found in Appendix C.

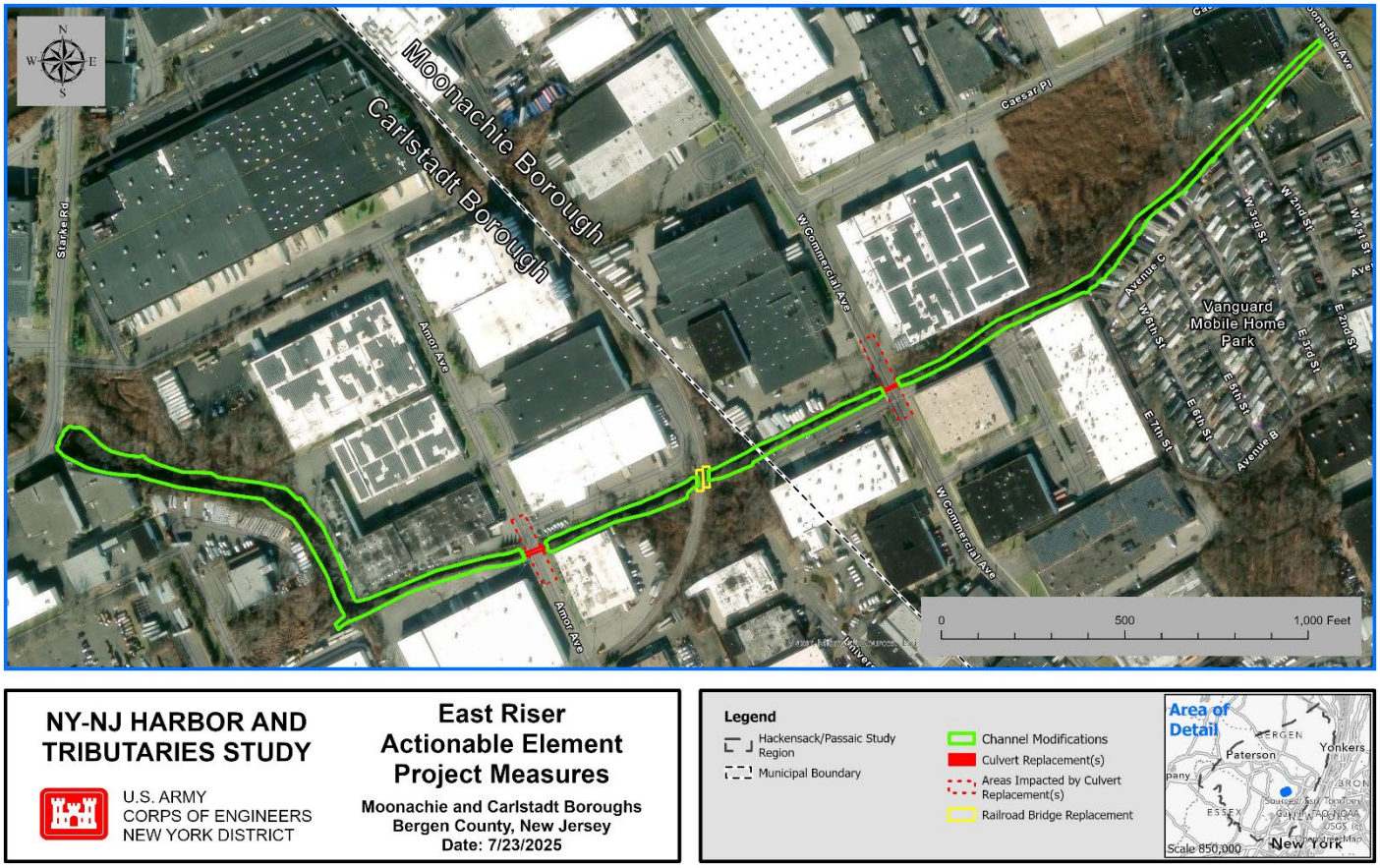

Figure 18: East Riser Actionable Element Proposed Measures

4.2.2. Plan Verification

NJDEP Alternatives and Alternative Evaluation

As part of the East Riser Ditch project, originally done by the NJDEP, four different alternatives were considered. The following are descriptions of each of the alternatives. More information can be found within the Environmental Assessment for New Jersey Meadowlands East Riser Ditch Pumping Station and Channel Improvements (September 2022).

“Alternative 1: No Action Alternative”, assumes that no Federal funding would be appropriated for use to construct a project. This alternative is defined by the present and future conditions in the study area that are reasonably anticipated to exist should there be no action as an outcome of the study. It is also known as the FWOP condition. Modeling done as part of the East Riser project shows that changing conditions are anticipated, to include more-frequent storm surge and rainfall events, compounded by sea level rise. This alternative would not meet the overall purpose and need of the NYNJHATS and would otherwise leave the community and local structures at risk of inundation.

“Alternative 2: Proposed Action”, is the proposed action as described in the previous section of this chapter (4.2.1 Existing Data / Process). This alternative seeks to address compound flooding effects from both coastal storm risk and rainfall events within the Actionable Element Site by proposing channel

modifications, removal and replacement of two bridge culverts, and an upgrade for a railroad bridge, which seeks to minimize obstructions and therefore, increase conveyance within the East Riser Ditch Channel. The railroad bridge for replacement is only used for commercial freight use, periodically.

Alternative 3: “Structural Flood Protection”, was considered but otherwise dismissed from further analysis, as it was found to be not technically feasible. This alternative seeks to address primarily coastal storm risk in the Actionable Element Site, by consideration of a series of structural flood risk management. Included within this alternative was a variety of floodwalls, levees/berms, a tide gate, closure gates, a storm surge barrier, and a pump station. These features were all originally studied with a potential elevation of +7 feet NAVD88 but were found to only minimize risk storm surge from coastal flooding and not address the risk of inland flooding from heavy rainfall events.

Alternative 4: “Stormwater Drainage Improvements”, was the last alternative considered and dismissed from further analysis as part of the original study done by the NJDEP. Whereas Alternative 3 sought out ways to address primarily coastal storm risk, Alternative 4 focused on drainage improvements to address the flood risk from heavy rainfall. This alternative looked at an array of new green infrastructure, to include parks, bioswales, storage/tree trenches, rain gardens, improved open spaces, and stormwater infrastructure improvements, to increase stormwater retention capacity to manage the risk of inland flooding up to approximately the 1% AEP. These features unfortunately, did not sufficiently manage risk from current or anticipated coastal flooding and therefore, were eliminated for not meeting the purpose and need within the Actionable Element Site.

To summarize, the Actionable Element Site is known to experience compound effects from multiple flood drivers and a comprehensive flood risk management alternative is necessary to address the current and future concerns, adequately. New York District USACE seeks to further evaluate what the NJDEP referred to as “Alternative 2: Proposed Action,” above, in subsequent phases of this interim study. Within the Actionable Element Site, the study team sees an opportunity to address the known local hazards and to advance a project that fits within the scope of Section 8106(a) of WRDA 2022.

Based on the information evaluated within the documentation from the existing East Riser Ditch Study, existing site conditions for the primarily industrial area, and the known water resource problems and opportunities, the New York District study team has determined that the project, as designed, is appropriate for the Actionable Element Site. Within the area, there are a number of space constraints given local assets and features of the built environment, such as a local Manufactured Housing Community, Mobile Home Park, and numerous commercial structures. Given these limitations, an array of other measures (i.e., berm modification, floodwalls, seawalls, and levees) were screened out from further consideration, that would not be viable or appropriate. The combination plan described above would manage risk from both coastal storm inundation and heavy rainfall, making it a good comprehensive solution for the problems and opportunities within the Actionable Element Site.

4.3. Actionable Element Site: Oakwood Beach

4.3.1. Existing Data / Process

After receiving grant funding from the NYSDOS in 2015, the NYCDEP developed plans to restore a salt marsh and sand dune habitat, to manage risk of coastal storm damages and wildfires in the Oakwood

Beach neighborhood of Staten Island. The Oakwood Beach Actionable Element Site is under jurisdiction of the National Park Service. The proposed project and all supporting documents were shared with New York District from the study partners, NYCDEP and NYSDEC, outlining plans and specifications for twenty-eight acres of tidal wetland restoration and phragmites removal. These designs, completed in 2020, chose specific design elements that were coordinated with Gateway National Recreation Area and would likely be mutually acceptable by the NPS, to restore the wetland and make the area more resilient to future storm surge damages and manage the risk of wildfires.

The NYNJHATS team saw an opportunity to investigate and recommend the elements that were previously proposed here, but lacked funding required to complete construction by the NYCDEP. After receiving several-hundred public, Agency, and stakeholder comments following release of the Draft FR/Tier 1 (Programmatic) EIS and continued discussions with the NFS, more consideration of Nature-Based Solutions was highlighted as a highly desirable priority. The NYNJHATS General Study Area is extremely urban with space limitations for many nature-based solutions of substantial size; however, the Oakwood Beach Actionable Element Site gave the study team a unique opportunity to recommend one within the Actionable Element Site. At the time of preparation for the original study by the NYCDEP in 2020, the cost estimate for this proposed work at Oakwood Beach was approximately $25 Million for all project features. This cost was escalated by USACE to reflect FY25 price levels and is now estimated at $55 million, with a 52.47% contingency included to account for risk and uncertainty. More information on the costs projected for this Actionable Element can be found in Appendix C.

Additionally, the proposed Oakwood Beach Actionable Element happens to be located adjacent to an existing USACE, South Shore of Staten Island (SSSI) Project that is currently in the Pre-Construction, Engineering, and Design Phase of implementation. Together at New York District, the two study teams are communicating to ensure that the projects, when built would complement one another. The SSSI Project in this location consists of a floodwall, 2,112 feet in length and extends along the western and southern sides of the Oakwood Beach Resource Recovery Facility. The floodwall consists of 1,569 feet of steel H-pile supported T-shaped concrete floodwall with an integrated steel sheet pile seepage wall at a crest elevation of +19.4 feet NAVD88 [or +20.5 feet NGVD29]. The Oakwood Beach Actionable Element tentatively seeks to address coastal storm risk across the inlet, by minimizing wave attenuation to the floodwall and additionally seeks to minimize potential hazard of wildfire risk, by removing the dry phragmites within the area. More information on this site can be found in subsequent sections of this chapter.

4.3.2. Plan Verification

The Oakwood Beach Actionable Element Site is a CSRM nature-based feature of the NYNJHATS overall Comprehensive Plan, managing high-frequency flood risk by serving as a natural buffer and also working complementary to the adjacent South Shore of Staten Island Project (presently in the Pre-Construction, Engineering, and Design Phase) and to Great Kills Park. The proposed Actionable Element will also reduce wildfire risk for the impacted area. This CSRM-focused Nature-Based Solution wetland enhancement includes three primary components: removal of non-native invasive plants, creation of a vegetative mosaic with native plants and tidal channels, and dune restoration described in more detail below.

The project proposes the removal of approximately 22.38-acres of non-native invasive plants, more specifically Common Reed (*Phragmites australis*) and replacement with a vegetative mosaic of Low Salt Marsh (11.5 acres), High Salt Marsh (4.5 acres), Maritime Grassland (4.5 acres), Maritime Dune (5.5 acres), with upland buffers of Maritime Shrubland (3 acres) and Maritime Woodland (1 acre). A network of tidal channels and/or pools with three main branches will be created within the vegetative mosaic supporting the created habitat, referred to as the North Channel, Middle Channel, and South Channel, totaling approximately 1.30-acres (***Figure 19*** and ***Figure 20***)

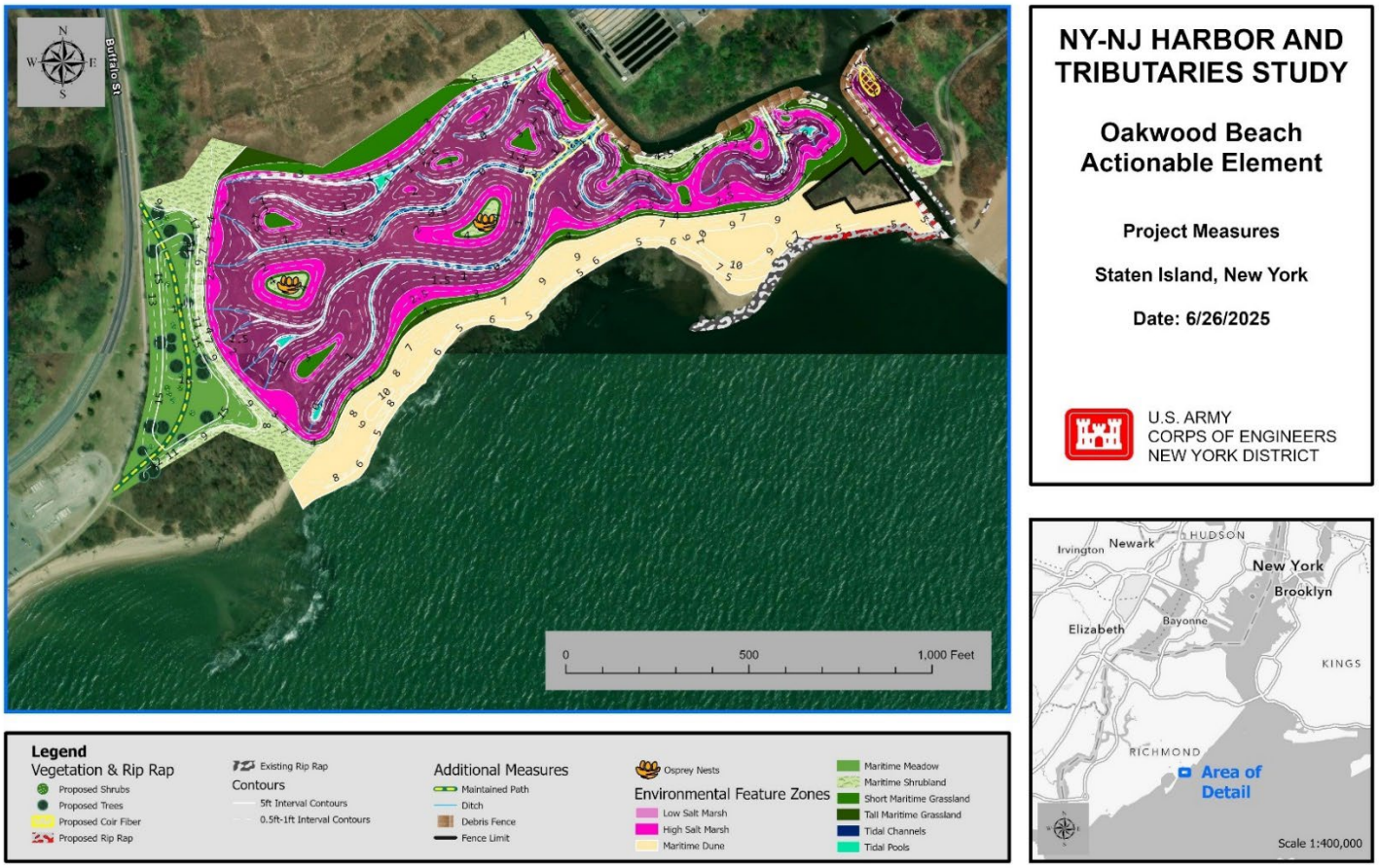

Figure 19: Oakwood Beach Actionable Element Proposed Measures

*Rendering pictured is conceptual and not to scale

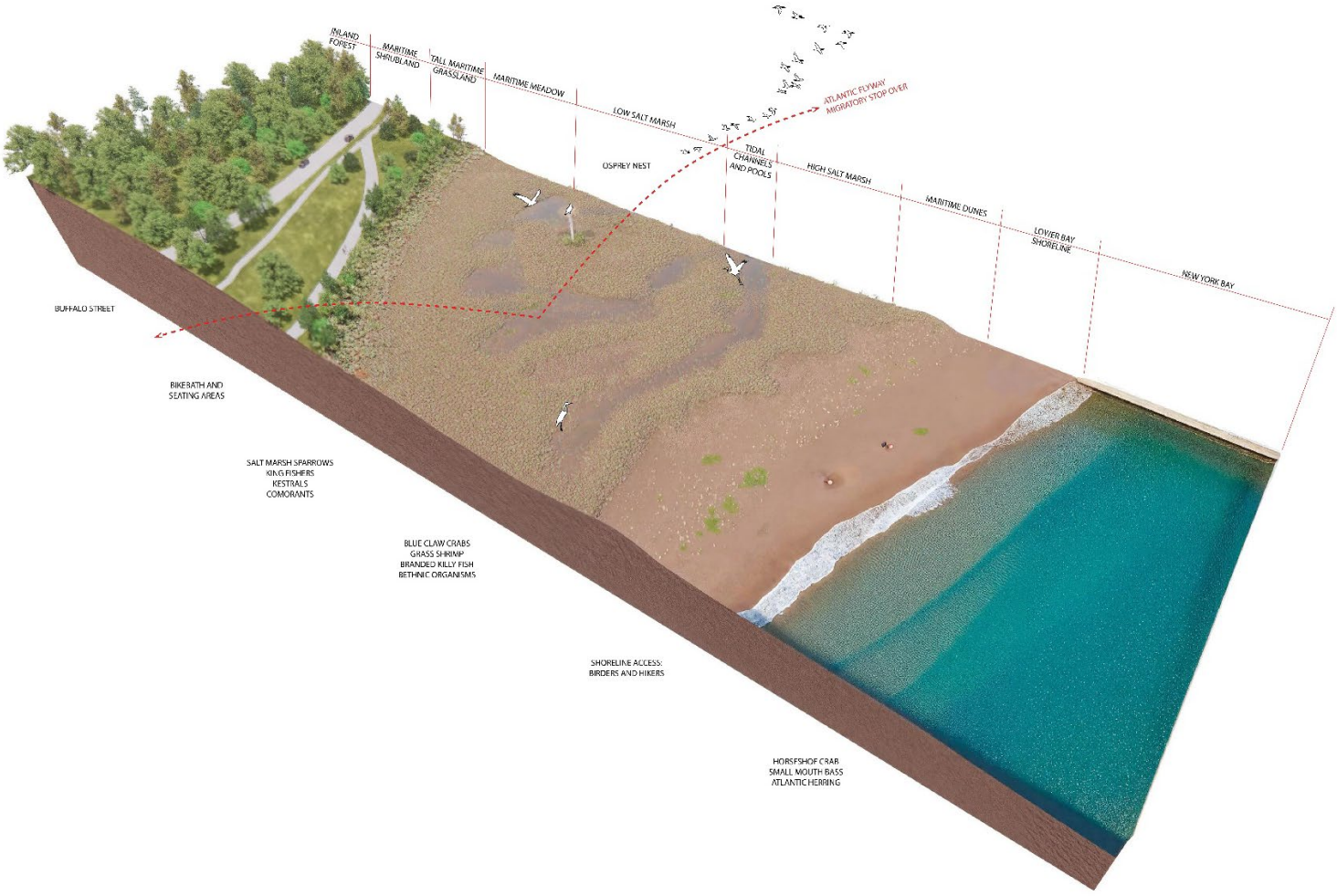

Figure 20: Rendering of the Oakwood Beach Actionable Element Proposed Measures

Along the shoreline in front of and to the south of the created vegetative mosaic, adjacent to the mudflats and Lower Bay, a dune restoration measure is proposed for shoreline stabilization integral to maintaining the essential function of the restored wetland. The dune will consist of approximately 5.5 acres of clean sand with an elevation range up to 10-feet NAVD88.

Additional Plan features include riprap placement, a maintained lawn trail, and the addition of two new osprey nests. Riprap will be placed at several locations at the site to support erosion control and channel protection, including an approximate 1,115 cubic yards (CY) area to the east of the restored dune at the southeastern border adjacent to the Lower Bay between the existing riprap and main tidal channel (where a deteriorated wooden seawall is currently), 55-CY along the southwestern banks of the main tidal channel where existing riprap has eroded, 600-CY on the southeastern bank of the main tidal channel convergence with an eastern branching tidal channel where existing riprap is placed, and 700-

CY. at the inlets of the created tidal channels (along with coir fiber mats). A maintained lawn trail will be developed on the westernmost edge of the site through the proposed maritime meadow, connecting an existing adjacent concrete bike/walking path to the parking lot for Great Kills Park to be utilized for operations & maintenance and public access. Two osprey nests are also proposed in the created maritime shrublands located within central the tidal channel network.

Based on the Actionable Element Site and its current natural uses, as well as problems and opportunities, this project as designed would be appropriate for the area. This is a natural environment within close proximity of Gateway National Recreation Area and while within NYC ownership, it is within NPS jurisdiction, meaning mutual acceptability would be required for advancement. Through evaluation, all structural measures (i.e., floodwalls and seawalls) were deemed inappropriate, as they would have significant impact to NPS lands.

The features of the plan as outlined above within this section, would help to manage flood risk from coastal storm inundation, with emphasis on acting as a natural buffer for wave attenuation, as well as manage wildfire risk in an area deemed a “High Fire Threat Zone” within the Community Wildfire Protection Plan for the East Shore of Staten Island (NYC Parks, August 2012, P.16, P. 28). Specifically, the document shares that the NYCDEP Oakwood Beach Wastewater Resource Recovery Facility (WRRF) is “bordered on the south and west by sizable strands of phragmites. As such, the plant itself is at risk for periodic fire”.

4.4. Actionable Element Evaluation

The Actionable Elements were evaluated through a series of criteria to identify the best performing plans. The criteria include performance against the study objectives and constraints, the four planning criteria (completeness, effectiveness, efficiency, and acceptability), and the four benefits accounts (National Economic Development (NED), Regional Economic Development (RED), Environmental Quality (EQ), and Other Social Effects (OSE) from the 1983 Principles & Guidelines (P&G)). Actionable Elements are evaluated for their performance against these criteria within the Period of Analysis, which begins when the project construction is anticipated to be complete and project benefits are realized, for a period of 50 years (2037 through 2086).

4.4.1. Actionable Element Contributions to Planning Objectives and Constraints

Actionable Elements were evaluated on whether they make significant contributions to the planning objectives and sufficiently avoid planning constraints. The study objectives, below, were used to evaluate the Actionable Elements:

- Manage the risk of coastal storm flood damage to communities, public infrastructure, important societal resources, and the environment
- Improve the community’s ability to recover from damages caused by storm surges by reducing the duration of interruption in services provided by man-made and natural systems
- Enhance human health and safety by improving the performance of critical infrastructure and natural features during and after storm surge events

- Recruit natural ecosystems into the coastal risk management framework for communities and ecosystems

Table 6 shows the relative contribution of each Actionable Element to the study objectives. A relative comparison of alternative plans was undertaken and ranked using a "low" (red), "medium" (yellow), "high" (green) system. Note that the contribution of No Action is “None” for all objectives. The Harlem River Actionable Element provides the most contribution to the study objectives and the Oakwood Beach Actionable Element contributes a “high” amount to the objective to restore natural coastal features.

Table 6: Actionable Elements’ Contribution to Objectives

Federal Objectives	Guiding Principles	Objectives	No Action	Harlem River	East Riser	Oakwood Beach
Maximize Economic Development	Sustainable Economic Development	Reduce coastal storm risk	N/A	+3	+2	+2
Avoid Unwise Use of Floodplains and Flood Prone Areas	Floodplains	Support community resilience	N/A	+3	+3	+2
	Public Safety	Support critical infrastructure	N/A	+3	+2	+3
Protect and Restore the Function of Natural Systems	Healthy and Resilient Ecosystems	Restore natural coastal features	N/A	+1	+1	+3

The Actionable Elements were evaluated for their ability to avoid planning constraints, listed below. None of the Actionable Elements interfered with the constraints.

- Minimize impacts to ongoing recovery, ecosystem restoration, and risk management efforts by others.
- Minimize impacts to resources within the Gateway National Recreation Area
- Minimize impacts to access for federal navigation channels
- Minimize induced flooding in areas not currently vulnerable to flooding and minimize induced additional flooding in flood-prone areas.
- Minimize impacts to community access and egress during emergencies
- Minimize impacts to operations at international airports
- Minimize negative effects to plants, animals, or critical habitat of species that are listed under the Endangered Species Act or a state statute

4.4.2. Actionable Element Contributions to P&G Criteria

The 1983 P&G requires that plans are formulated and compared in consideration of four criteria: completeness, effectiveness, efficiency, and acceptability. The study team carefully analyzed each alternative in the focused array, refining an alternative where necessary to satisfy each of these four criteria, as summarized in ***Table 7***.

Completeness is the extent to which the alternative plans provide and account for all necessary investments or other actions to ensure the realization of the planned efforts, including actions by other federal and non-federal entities. Project performance of the alternative plans is not dependent upon the completion or function of a project by another government agency or private investment. All Actionable Elements are complete in that they do not rely upon actions by other federal and non-federal entities to be implemented. The planning process has factored in projects that would be constructed in the absence of any action, which constitute the No Action, also known as the future without-project condition for each respective site.

Effectiveness is the extent to which a plan alleviates the specified problems and achieves the opportunities. The Actionable Elements all achieve the planning opportunities to:

- Manage the risk of coastal storm damage to communities, public infrastructure, important societal resources, and the environment
- Improve the community's ability to recover from damages caused by storm surges by reducing the duration of interruption in services provided by man-made and natural systems
- Enhance human health and safety by improving the performance of critical infrastructure and natural features during and after storm surge events
- Recruit natural ecosystems into the coastal risk management framework

The Actionable Elements were evaluated upon whether they make significant contributions to these opportunities or not; some do so more efficiently than others. The most effective Actionable Elements are Harlem River and East Riser, as they manage risk to the largest area and population.

Efficiency is the extent to which a plan is the most cost-effective means of achieving the study objectives. The benefits and costs of these Actionable Elements will be refined as more analyses are conducted for the final integrated report. As of the release of this Draft Interim Response Report, efficiency was measured through a comparison of benefit-cost ratios and improved resilience. While all of the Actionable Elements contribute to meeting the study objectives, the East Riser Actionable Element has the highest benefit-cost ratio of 1.6.

Acceptability is the extent to which a plan is acceptable in terms of applicable laws, regulations, and public policies. The Actionable Elements were developed in accordance with applicable laws, regulations, and policies. The Actionable Elements are equal in that there are no known issues with laws, regulations, and policies that would preclude their implementation.

Table 7: Actionable Elements Contributions to P&G Criteria

	No Action	Harlem River	East Riser	Oakwood Beach
Complete	✓ Yes	✓ Yes	✓ Yes	✓ Yes
Effective	× No	✓ Yes	✓ Yes	✓ Yes
Efficient	× No	✓ Yes	✓ Yes	✓ Yes
Acceptable	× No	✓ Yes	✓ Yes	✓ Yes

4.4.3. Actionable Element Contributions to Accounts

USACE considers the four accounts established in the P&G 1983 in the evaluation of Actionable Elements:

- **NED (National Economic Development)**: changes in the economic value of the national output of goods and services
- **RED (Regional Economic Development)**: changes in the distribution of regional economic activity that result from each alternative plan
- **EQ (Environmental Quality)**: non-monetary effects on significant natural and cultural resources
- **OSE (Other Social Effects)**: non-monetary effects from perspectives that are relevant to the planning process, but are not reflected in the other three accounts

This section summarizes the contributions of the alternative plans to each P&G account. USACE is required to identify the plan with the highest net NED benefits, and the plan that maximizes benefits across all four accounts, known as the Total Net Benefits plan. They may or may not be the same plan.

For this report, the study team refined the GIS analysis that was completed for the NACCS and subsequent NYNJHATS Focus Area Report. The intent of the refinement was to improve the analysis by incorporating new data (e.g., FEMA HAZUS and ADCIRC modeling), updating existing data, and ensuring that the non-federal sponsors' priorities were captured in the weighting of resources that are at risk from coastal storm impacts as a proxy for capturing all four P&G accounts. Such resources include population (especially socially vulnerable populations), property, critical infrastructure, and environmental and cultural resources. The values for each Actionable Element were generated by primarily calculating reductions in coastal storm damages to structures and their contents within the Actionable Element Site. This method generated outputs that generally aligned with the highest performing alternative identified using the NED account only. Below is a description of how the alternative plans contribute to each P&G account.

For the analysis of all Actionable Elements, construction was assumed to start in 2030 and a base year of 2037 was used for all economic calculations. All economic analyses associated with the evaluation of these plans used the FY2025 federal discount rate of 3% and were based on FY25 price levels. More detail can be found in Appendix D.

National Economic Development (NED)

The Actionable Elements were evaluated for their contributions to the NED account are derived from a comparison between risk (expected annualized damage) under the with- and without-project conditions. Managing risk was estimated using two USACE-certified models, HEC-FDA and RMC-TotalRisk. HEC-FDA quantifies expected annualized damages to structures and their contents due to flooding in a study area, relying on a range of geographic, hydrologic, and economic inputs. RMC-TotalRisk is a highly flexible model that relies on user-specified hazard, transform, and consequence functions, to quantify hazard-specific risk; RMC-TotalRisk was used to quantify wildfire risk management benefits for the Oakwood Beach Actionable Element. This Section will briefly summarize the economic contributions to the NED account for each Actionable Element Site. More information on methodology and associated economic analysis can be found in Appendix D.

Both the Landward Alignment and Seaward Alignment of the Harlem River Actionable Element contribute CSRM to the NED account. CSRM benefits for the Harlem River Actionable Element Site were evaluated under all the USACE low, intermediate, and high SLC scenarios; these values are reported in Appendix D. Under the intermediate SLC scenario, the Harlem River Actionable Element is estimated to contribute $3,614,000 in average annual CSRM benefits.

The East Riser Actionable Element also contributes both coastal storm and flood risk management benefits to the NED account. The majority of the risk management provided under the with-project condition benefits industrial and commercial facilities within the Actionable Element Site, though the project also significantly manages risk for residential structures within the study area. Based on these results, the proposed actionable element is expected to provide $15,494,000 FY25 in annualized flood risk management benefit to the Actionable Element Site.

The Oakwood Beach Actionable Element contributes wildfire risk management benefits to the NED account. Given the expected rapidity and severity of a phragmites-fueled wildfire under even moderate fire conditions, it is possible that a wildfire event within the Actionable Element Site would spread to the vegetated area in front of the proposed SSSI floodwall. Given the expected intensity of such a wildfire, dependent on fire conditions and duration, it is possible, though unlikely, that this wildfire exposure could damage the floodwall. Under the with-project condition, the proposed wetland would be dominated by spartina and other native plantings, which are less likely to support wildfire conditions that could damage the floodwall. Consequently, the Oakwood Beach Actionable Element is estimated to contribute $26,000 in average annual wildfire risk management benefits.

The benefits for Actionable Elements are summarized in ***Table 8***.

Table 8: Actionable Elements' NED Benefits

		Harlem River	East Riser	Oakwood Beach
First Cost		$761,984,000	$249,146,000	$55,355,000
AAEQ Cost		$29,615,000	$9,683,000	$2,151,000
AAEQ Benefit	RSLC Low	$2,474,000	TBD	TBD
	RSLC Int.	$3,614,000	$15,494,000	$26,000
	RSLC High	$8,560,000	TBD	TBD
AAEQ Net Benefit	RSLC Low	-$27,141,000	--	--
	RSLC Int.	-$26,001,000	$5,811,000	-$2,125,000
	RSLC High	-$21,055,000	--	--
BCR	RSLC Low	0.1	--	--
	RSLC Int.	0.1	1.6	<0.1
	RSLC High	0.3	--	--
FY25, 3% federal discount rate				

Regional Economic Development (RED)

The regional benefit associated with construction is the indirect and induced economic output that would be produced for an assumed construction cost. This analysis uses the USACE RECONS 2.0 input/output (I/O) model, developed by the Institute for Water Resources (IWR), to estimate the regional economic impacts of proposed construction work activities.

Regional economic impacts and contributions are measured as economic output, jobs, income, and value added for three levels of geographic impact area: local, state, and national. Estimates are based on the specific work activity associated with a project. The tool estimates the regional economic impacts and contributions of project expenditures and assesses impacts and contributions associated with project-related spending by systematically mapping expenditures to production and consumption sectors within a particular economy through a series of linkages among industries, households, and government. Changes to purchases of goods and services for final consumption (final demand change) drive I/O models. Each industry that produces goods and services generates demands for other goods and services. For example, when construction firms pay their workers and purchase supplies or services, such as electricians, plumbers, lumber, concrete, etc., economic activity is generated in the local or regional economy through salaries and business and household spending.

The multiplier for construction activity for a highway will differ from the multiplier for sand placement, therefore, the work activity for each project is carefully selected influenced by the type of structure being proposed. The more resource intense the work activity the more the contribution to the regional development account. The following tables present the output for each site.

Harlem River

A 2028 year of expenditure is assumed for this site, at a cost of $762 million. The work activity for the East Harlem Actionable Element site in New York County is Construction and Major Rehabilitation of Earth Levees and Floodways within the Flood Risk Management business line.

Table 9: Overall Summary – East Harlem

Area	Local Capture	Output	Jobs FTE	Labor Income	Value Added
Local					
Direct Impact		$591,380,000	4,484.9	$568,450,000	$442,920,000
Secondary Impact		$298,010,000	1,239.9	$128,660,000	$199,920,000
Total Impact	$591,380,000	$889,380,000	5,724.7	$697,110,000	$642,840,000
State					
Direct Impact		$649,590,000	5,587.9	$609,500,000	$482,860,000

Area	Local Capture	Output	Jobs FTE	Labor Income	Value Added
Secondary Impact		$627,790,000	2,810.6	$235,220,000	$395,310,000
Total Impact	$649,590,000	$1,277,380,000	8,398.5	$844,720,000	$878,170,000
U.S.					
Direct Impact		$731,490,000	6,117.9	$638,320,000	$519,610,000
Secondary Impact		$1,369,360,000	5,859.1	$437,030,000	$744,460,000
Total Impact	$731,490,000	$2,100,850,000	11,977.0	$1,075,350,000	$1,264,070,000

East Riser

A 2028 year of expenditure is assumed for this site, at a cost of $249 million. The work activity for the East Riser Ditch Actionable Element site is Construction and Major Rehabilitation of Earth Levees and Floodways within the Flood Risk Management business line.

Table 10: Overall Summary – East Riser

Area	Local Capture	Output	Jobs FTE	Labor Income	Value Added
Local					
Direct Impact		$224,930,000	2,004.9	$178,890,000	$170,580,000
Secondary Impact		$189,240,000	914.9	$72,260,000	$116,430,000
Total Impact	$224,930,000	$414,160,000	2,919.9	$251,150,000	$287,010,000
State					
Direct Impact		$238,930,000	2,245.1	$188,400,000	$180,310,000
Secondary Impact		$238,290,000	1,116.8	$86,560,000	$143,300,000
Total Impact	$238,930,000	$477,220,000	3,361.9	$274,960,000	$323,610,000
U.S.					

Area	Local Capture	Output	Jobs FTE	Labor Income	Value Added
Direct Impact		$246,360,000	2,465.3	$190,060,000	$183,250,000
Secondary Impact		$447,980,000	1,944.7	$143,750,000	$245,120,000
Total Impact	$246,360,000	$694,340,000	4,410.0	$333,810,000	$428,370,000

Oakwood Beach

A 2028 year of expenditure is assumed for the Oakwood Beach Actionable Element site in Richmond County, at a cost of $55 million. The work activity within the Flood Risk Management business line is Beach Nourishment On-Shore Sand.

Table 11: Overall Summary – Oakwood Beach

Area	Local Capture	Output	Jobs	Labor Income	Value Added
Local					
Direct Impact		$33,140,000	236.7	$21,850,000	$17,260,000
Secondary Impact		$19,550,000	100.1	$6,250,000	$11,520,000
Total Impact	$33,140,000	$52,690,000	336.8	$28,100,000	$28,780,000
State					
Direct Impact		$43,210,000	297.4	$28,090,000	$23,360,000
Secondary Impact		$41,420,000	171.5	$15,450,000	$26,370,000
Total Impact	$43,210,000	$84,640,000	468.9	$43,540,000	$49,730,000
U.S.					
Direct Impact		$54,280,000	360.4	$33,150,000	$29,360,000
Secondary Impact		$106,220,000	431	$32,940,000	$57,360,000
Total Impact	$54,280,000	$160,500,000	791.4	$66,090,000	$86,720,000

Economic environment tables are reproduced here to include state comparisons to the respective study areas. In New York State, the East Harlem Actionable Element site is located in New York County and Oakwood Beach Actionable Element is in Richmond County (in New York City, boroughs are also counties). In New Jersey, the East Riser Actionable Element Site has portions of the Carlstadt and Moonachie borough within Bergen County. The East Harlem Actionable Element location has higher unemployment and poverty compared to the state. East Riser municipalities have lower unemployment compared to its state figure. New York County has a higher population than Bergen and will have higher number of unemployed in absolute terms. The East Harlem Actionable Element Site has the highest rate of poverty and faces challenges related to maximizing its economic potential, with concerns about vacant storefronts, limited public investment, and difficulty for local businesses to thrive. Moonachie Borough in the East Riser Actionable Element Site also faces high rate of poverty, and a damaging storm will further depress economic activity if local employers have to close down or move shop.

Table 12: Economic Environment

	New York State	New York County	Richmond County	New Jersey State	Bergen County	Carlstadt Borough	Moonachie Borough
Population	19,872,319	1,694,251	492,734	9,267,014	955,732	6,372	3,106
Households	7,668,956	775,376	170,047	3,478,355	353,307	2,639	937
Poverty	14.2%	15.8%	10.9%	9.7%	6.6%	10.5%	4.0%
Median Income	84,578	104,553	98,290	101,050	123,715	94,854	108,359
Unemployment Rate	6.2%	7.0%	5.5%	6.2%	4.1%	5.4%	4.1%

Highlights: Green indicates better than state; red indicates worse than state.

Value Added Summary

East Riser

The expenditures associated with All Work Activities, with Ability to Customize Impact Area and Work Activity at Bergen (NJ) are estimated to be $249,000,000. Of this total expenditure, $224,928,789 will be captured within the local impact area. The remainder of the expenditures will be captured within the state impact area and the nation. These direct expenditures generate additional economic activity, often called secondary or multiplier effects. The direct and secondary impacts are measured in output, jobs, labor income, and gross regional product (value added) as summarized in the following tables. The regional economic effects are shown for the local, state, and national impact areas. In summary, the expenditures $249,000,000 support a total of 2,919.9 full-time equivalent jobs, $251,154,588 in labor income, $287,010,623 in the gross regional product, and $414,164,486 in economic output in the local impact area. More broadly, these expenditures support 4,410.0 full-time equivalent jobs, $333,811,256 in labor income, $428,372,143 in the gross regional product, and $694,342,987 in economic output in the nation.

East Harlem

The expenditures associated with All Work Activities, with Ability to Customize Impact Area and Work Activity at New York (NY) are estimated to be $762,000,000. Of this total expenditure, $591,379,615 will be captured within the local impact area. The remainder of the expenditures will be captured within the state impact area and the nation. These direct expenditures generate additional economic activity, often called secondary or multiplier effects. The direct and secondary impacts are measured in output, jobs, labor income, and gross regional product (value added) as summarized in the following tables. The regional economic effects are shown for the local, state, and national impact areas. In summary, the expenditures $762,000,000 support a total of 5,724.7 full-time equivalent jobs, $697,112,542 in labor income, $642,844,880 in the gross regional product, and $889,384,660 in economic output in the local impact area. More broadly, these expenditures support 11,977.0 full-time equivalent jobs, $1,075,346,157 in labor income, $1,264,066,996 in the gross regional product, and $2,100,851,817 in economic output in the nation.

Oakwood Beach

The expenditures associated with All Work Activities, with Ability to Customize Impact Area and Work Activity at Richmond (NY) are estimated to be $54,450,000. Of this total expenditure, $33,140,054 will be captured within the local impact area. The remainder of the expenditures will be captured within the state impact area and the nation. These direct expenditures generate additional economic activity, often called secondary or multiplier effects. The direct and secondary impacts are measured in output, jobs, labor income, and gross regional product (value added) as summarized in the following tables. The regional economic effects are shown for the local, state, and national impact areas. In summary, the expenditures $54,450,000 support a total of 336.8 full-time equivalent jobs, $28,100,945 in labor income, $28,778,958 in the gross regional product, and $52,694,682 in economic output in the local impact area. More broadly, these expenditures support 791.4 full-time equivalent jobs, $66,087,201 in labor income, $86,718,618 in the gross regional product, and $160,500,403 in economic output in the nation.

Environmental Quality (EQ)*

To review and compare the Actionable Elements Alternatives for environmental acceptability, the individual resource impact assessment rating scores generated and presented in Appendix A were combined into broader resource categories and reviewed in two ways: first the resources were averaged together to identify the mean of adverse and beneficial effects, and second, the highest adverse and beneficial effect were escalated for each category to establish the upper limit of anticipated effects.

The results of those calculations are considered in three forms: an impact rating showing the “initial” or “unmitigated” impact of the construction and footprint, the operations and maintenance assumptions ratings, and the mitigated impact rating.

Potential adverse effects were rated on a scale of “0” to “5” with “0” representing No Adverse Effect and “5” representing High (significant) Adverse Effects that would be environmentally unacceptable. Likewise, potential beneficial effects were rated on a scale of “0” to “5” with “0” representing No Beneficial Effect, and “5” representing High (significant) Beneficial Effects that would be regionally and nationally significant.

The following general findings are based on the environmental analysis conducted and presented in the Environmental Appendix A for each of the Actionable Element Sites. General findings of the Interim

Response Alternative comparison are presented below for each Actionable Element Site, inclusive of the Natural and Physical Environment resources, and associated effects related to construction, operations and maintenance, and mitigation (if applicable). Where noted, resources were combined into overarching resource categories of which they relate, such as Wildlife and Vegetation which includes the averaged scores of Wildlife, Fish, Terrestrial Vegetation, Submerged Aquatic Vegetation (if applicable), and Invasive and Aquatic Nuisance Species. This was done in order to provide a high-level comparison of the Actionable Element Alternatives for Environmental Acceptability. Additional tables were generated for the highest escalated adverse effect and the highest escalated beneficial effect, which is comprised not of the resource score card totals but rather, the highest score observed raw impact of construction or operations and maintenance. Refer to Table 7 for the definitions to support impact rating tables to identify which resources were combined into one overarching resource category, and each individual resource section score cards for additional information.

Table 13: Definitions of Resource Categories to Support Effects Rating Tables

A	Wildlife and Vegetation Category	=	Wildlife, Fish, Migratory Fish, Terrestrial Vegetation, Submerged Aquatic Vegetation, Invasive and Aquatic Nuisance Species
B	Special Status Species (Terrestrial)	=	Threatened and Endangered Species (terrestrial), Migratory Bird Treaty Act and Bald and Golden Eagle Act Species
C	Special Status Species (Aquatic)	=	Threatened and Endangered Species (aquatic), Marine Mammal Protection Act Species, Sea Turtles, Essential Fish Habitat, Migratory Fish, Special Status Fisheries
D	Special Status Areas	=	Wetlands, Floodplains, Wild and Scenic Rivers, Designated Critical Habitat, Critical Environmental Areas (State), Marine Protected Areas, Coastal Zone Management Act Areas, Coastal Barrier Resources System Areas, NPS Land, Wildlife Refuge Land
E	Physical Resources	=	Topography and Geology, Surface Waters, Sediment, Land Use
F	Hydrological Resources	=	Bathymetry; Inland Hydrology; Coastal Hydrology, Currents, and Circulation; Tides, Tidal Exchange, and Tidal Range; Sediment Transport
G	Cultural Resources	=	Historic Structures, Viewshed/Historic Setting, Terrestrial Archaeological Resources, Submerged Archaeological Resources

Table 14: Applied EQ Scoring Methodology for Adverse Effects

Adverse Effect Rating Criteria	
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 to Moderate (-2)	Effects to the resource are expected to be low to 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 (-1)	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 are not necessary to sustain low to no impact to the resource.
No Impact (0)	There would be no adverse effects to the resource because the resource would not be affected.

Table 15: EQ Scoring Methodology for Beneficial Effects

Beneficial Effect Rating Criteria

Impact Rating and Numerical Score	Description
High (+5)	Effects to the resource would have substantial beneficial effects, locally and regionally in the near-term and long-term, that are measurable and quantifiable in some manner of significance (e.g. manage coastal storm risk for communities and ecosystems and significantly improve area above and beyond existing conditions that is quantifiable and measurable beyond qualitative existing condition.
Moderate to High (+4)	Effects to the resource would have substantial beneficial effects either locally and/or regionally in the near-term or long term, that is noticeably greater and may be quantifiable in some matter (e.g. manage coastal storm risk to communities and ecosystems, additional benefit(s) to the resource that is quantifiable or measurable beyond qualitative existing condition, or that is qualitatively beneficial to a number of related resources).
Moderate (+3)	Effects to the resources would have more substantial beneficial effects, that are localized to the resource, or multiple resources, that is noticeably greater and may be quantifiable in some manner (e.g. managed coastal storm risk for communities and ecosystems and additional benefits to the resource that is measurable beyond existing condition).
Low to Moderate (+2)	Effects to the resources would have additional beneficial effects beyond the prior rating criteria, that are localized to the resource (e.g. manage coastal storm risk for communities and ecosystems and an additional benefit to the resource).
Low (+1)	Effects to the resource would have some beneficial effects, that are localized to the resource, and improves beyond existing condition (e.g. manage coastal storm risk for communities and ecosystems).
No Impact (0)	There would be no anticipated beneficial effects to the resource because the resource would not be affected beyond that of existing condition.

Harlem River

The following tables present the averaged, or mean, adverse and beneficial effects, followed by tables of the highest, upper limit of adverse and beneficial effects for the Natural and Physical Environment resources construction/footprint and operations and maintenance assumptions assessed in Appendix A.

Table 16: Average Adverse and Beneficial Effect Scores of Resource Categories

HARLEM RIVER Qualitative Rating Total Scores (calculated, with mitigation if applicable)	NO ACTION SCORE	SEAWARD SCORE	LANDWARD SCORE
NATURAL AND PHYSICAL ENVIRONMENT			
Wildlife and Vegetation[A]	**-0.20**	**+1.8**	**-0.2**
Special Status Species (Terrestrial)[B]	**0**	**+1**	**+1**
Special Status Species (Aquatic)[C]	**-0.5**	**+0.5**	**0**
Special Status Areas[D]	**-0.66**	**+1.33**	**0.33**
Commercial and Recreational Fishing	**0**	**+1**	**0**
Physical Resources[E]	**-0.50**	**+0.25**	**-0.25**
Hydrological Resources[F]	**0**	**0**	**0**
Water Quality	**-1**	**0**	**0**
Air Quality	**0**	**0**	**0**
Climate and Relative Sea Level Change	**0**	**0**	**0**
Cultural Resources[G]	**-1**	**+2**	**-1**
Native American Land	**NA**	**NA**	**NA**
Hazardous, Toxic, and Radioactive Waste	**-1**	**0**	**0**
Navigation	**0**	**+2**	**0**
Noise and Vibration	**0**	**0**	**+1**
Socioeconomics and Demographics	**NS**	**NS**	**NS**
Subtotal Scores (additive for calculation)	*-4.86*	*9.88*	*0.88*
TOTAL SCORE AVERAGED (calculated, additive and averaged):	**-0.37**	**+0.7**	**+0.06**

Table 17: Harlem River -- Highest Adverse Effect Scores, Escalated

HARLEM RIVER Qualitative Rating Total Scores (calculated, with mitigation if applicable)	NO ACTION SCORE	SEAWARD SCORE	LANDWARD SCORE
NATURAL AND PHYSICAL ENVIRONMENT			
Wildlife and Vegetation[A]	-1	-1	-2
Special Status Species (Terrestrial)[B]	0	-1	-1
Special Status Species (Aquatic)[C]	-1	-1	0
Special Status Areas[D]	-2	-1	-2
Commercial and Recreational Fishing	-1	-1	0
Physical Resources[E]	-1	-1	-1
Hydrological Resources[F]	0	0	0
Water Quality	-1	-1	0
Air Quality	0	0	0
Climate and Relative Sea Level Change	0	0	0
Cultural Resources[G]	-1	-1	-4
Native American Land	NA	NA	NA
Hazardous, Toxic, and Radioactive Waste	-1	-1	-1
Navigation	0	-1	-2
Noise and Vibration	0	-1	-1
Socioeconomics and Demographics	NS	NS	NS
Subtotal Scores (additive for comparison)	*-9*	*-11*	*-14*
TOTAL SCORE HIGHEST ESCALATED:	**-2**	**-1**	**-4**

Table 18: Harlem River -- Highest Beneficial Effect Scores, Escalated

HARLEM RIVER Qualitative Rating Total Scores (calculated, with mitigation if applicable)	NO ACTION SCORE	SEAWARD ACTION	LANDWARD ACTION
NATURAL AND PHYSICAL ENVIRONMENT			
Wildlife and Vegetation[A]	**0**	**+3**	**+1**
Special Status Species (Terrestrial)[B]	**0**	**+1**	**+1**
Special Status Species (Aquatic)[C]	**0**	**+2**	**0**
Special Status Areas[D]	**0**	**+3**	**+3**
Commercial and Recreational Fishing	**0**	**+1**	**0**
Physical Resources[E]	**0**	**+1**	**+1**
Hydrological Resources[F]	**0**	**0**	**0**
Water Quality	**0**	**+1**	**0**
Air Quality	**0**	**0**	**0**
Climate and Relative Sea Level Change	**0**	**0**	**0**
Cultural Resources[G]	**0**	**+4**	**+3**
Native American Land	**NA**	**NA**	**NA**
Hazardous, Toxic, and Radioactive Waste	**0**	**+1**	**+1**
Navigation	**0**	**+2**	**+1**
Noise and Vibration	**0**	**+1**	**+2**
Socioeconomics and Demographics	**NS**	**NS**	**NS**
Subtotal Scores (additive for comparison)	*0*	*+20*	*+13*
TOTAL SCORE HIGHEST ESCALATED:	**0**	**+4**	**+3**

Qualitatively, the No Action and Action Alternative are anticipated to have potential adverse effects, while the Action Alternative also anticipates potential beneficial effects, depending on resource and existing conditions present at this Actionable Element Site. As gathered from the Individual Resource scorecards presented in Appendix A that have been combined into Resource Categories and presented on the tables above, adverse effects range from no to low (“0” to “-1”) for the vast majority of resources present, and beneficial effects range from no to moderate (“0” to “+3”). There is; however, a more adverse effect anticipated to Cultural Resources, Viewshed/Historic Setting from the Landward Alignment, anticipated to be moderate-high, with a corresponding adverse effect score of -4, that would

need to be addressed under a Programmatic Agreement. On the contrary, there is a more beneficial effect anticipated to Cultural Resources, Viewshed/Historic Properties from the Seaward Alignment, anticipated to be moderate-high beneficial effect, with a corresponding score of +4. Refer to the Cultural Resource sections of the Harlem River Appendix, and Cultural Resources SubAppendix for additional detail. The majority, if not all, of the adverse effects are derived from construction related effects and anticipated to be temporary and manageable thorough avoidance and best management practices. Some operations and maintenance adverse effects are also anticipated, depending on resource and alignment; however, those are also anticipated to be temporary and manageable. The beneficial effects are qualitatively derivative from the conversion from low-quality degraded non-native habitat to native habitat and managing coastal storm risk to the areas behind each alignment that provides additional access, foraging, and sheltering to wildlife, as well as additional greenspace access and noise reduction from the landward alignment, or aquatic habitat creation for the seaward alignments' complementary nature-based solutions.

All Alternatives exhibit beneficial impacts either from the construction and/or placement of the structural measures, the operations and maintenance assumptions, and/or associated mitigated outcome (including best management practices). Those beneficial effects, depending on resource, measure, and existing conditions include the placement of in-water hard structures creating a "reef effect" for numerous species of algae, shellfish, and other invertebrates, the in-water and shore- based measures providing reduced risk of coastal flood damages to resources including cultural sites of significance, parks, habitat, and HTRW sites, reduced storm related erosion, social vulnerability and effects to communities, and health and safety.

This comparative assessment, informed by the individual resource scorecards presented in this Appendix A, and the Natural and Physical Environment scorecards presented in the Effects and Consequences Section, support the decision making process for the EQ account by presenting a qualitative side by side comparison of the Alternatives net average score, highest adverse effect score, and highest benefit score to further understand the nuances of the Action versus the No Action, as well as determine the environmentally preferred alternative, which would largely be considered as the alternative with the greatest benefits, lowest tolerable adverse effects, and net positive outcome that is more favorable than the other alternatives considered.

In this instance, the Action Seaward Alignment presents both the most favorable average score, as well as the highest escalated benefit score, with adverse effects that are no greater than -1, or low adverse effect.

East Riser

The following tables present the averaged, or mean, adverse and beneficial effects, followed by tables of the highest, upper limit of adverse and beneficial effects for the Natural and Physical Environment resources construction/footprint and operations and maintenance assumptions assessed in Appendix A.

Table 19: East Riser - Average Adverse and Beneficial Effect Scores of Resource Categories

EAST RISER Qualitative Rating Total Scores (calculated, with mitigation if applicable)	NO ACTION SCORE	ACTION SCORE
NATURAL AND PHYSICAL ENVIRONMENT		
Wildlife and Vegetation[A]	**-1**	**-0.25**
Special Status Species (Terrestrial)[B]	**-1**	**0**
Special Status Species (Aquatic)[C]	**-1**	**0**
Special Status Areas[D]	**-1**	**+1.66**
Commercial and Recreational Fishing	**N/A**	**N/A**
Physical Resources[E]	**-1.5**	**+0.75**
Hydrological Resources[F]	**-0.5**	**+1**
Water Quality	**-3**	**+2**
Air Quality	**-1**	**0**
Climate and Relative Sea Level Change	**-2**	**0**
Cultural Resources[G]	**-0.5**	**0.5**
Native American Land	**N/A**	**N/A**
Hazardous, Toxic, and Radioactive Waste	**-1**	**+1**
Navigation	**N/A**	**N/A**
Noise and Vibration	**-1**	**0**
Socioeconomics and Demographics	**NS**	**NS**
Subtotal Scores (additive for calculation)	*-14.5*	*6.66*
TOTAL SCORE AVERAGED (calculated, additive and averaged):	**-1.20**	**+0.55**

Table 20: East Riser - Highest Adverse Effect Scores, Escalated

EAST RISER Qualitative Rating Total Scores (calculated, with mitigation if applicable)	NO ACTION SCORE	ACTION SCORE
NATURAL AND PHYSICAL ENVIRONMENT		
Wildlife and Vegetation[A]	**-1**	**-1**
Special Status Species (Terrestrial)[B]	**-1**	**-1**
Special Status Species (Aquatic)[C]	**-1**	**-1**
Special Status Areas[D]	**-1**	**-1**
Commercial and Recreational Fishing	**N/A**	**N/A**
Physical Resources[E]	**-3**	**-1**
Hydrological Resources[F]	**-1**	**-1**
Water Quality	**-3**	**-1**
Air Quality	**-1**	**-1**
Climate and Relative Sea Level Change	**-2**	**-1**
Cultural Resources[G]	**-1**	**-1**
Native American Land	**N/A**	**N/A**
Hazardous, Toxic, and Radioactive Waste	**-1**	**-1**
Navigation	**N/A**	**N/A**
Noise and Vibration	**-1**	**-1**
Socioeconomics and Demographics	**NS**	**NS**
Subtotal Scores (additive for comparison purposes)	*-17*	*-12*
TOTAL SCORE HIGHEST ESCALATED:	**-3**	**-1**

Table 21: East Riser -- Highest Beneficial Effect Scores, Escalated

EAST RISER Qualitative Rating Total Scores (calculated, with mitigation if applicable)	NO ACTION SCORE	ACTION SCORE
NATURAL AND PHYSICAL ENVIRONMENT		
Wildlife and Vegetation[A]	**0**	**+1**
Special Status Species (Terrestrial)[B]	**0**	**+1**
Special Status Species (Aquatic)[C]	**0**	**+1**
Special Status Areas[D]	**0**	**+3**
Commercial and Recreational Fishing	**N/A**	**N/A**
Physical Resources[E]	**0**	**+3**
Hydrological Resources[F]	**0**	**+3**
Water Quality	**0**	**+3**
Air Quality	**0**	**+1**
Climate and Relative Sea Level Change	**0**	**+1**
Cultural Resources[G]	**0**	**+1**
Native American Land	**N/A**	**N/A**
Hazardous, Toxic, and Radioactive Waste	**0**	**+2**
Navigation	**N/A**	**N/A**
Noise and Vibration	**0**	**+1**
Socioeconomics and Demographics	**NS**	**NS**
Subtotal Scores (additive for comparison purposes)	*0*	*21*
TOTAL SCORE HIGHEST ESCALATED:	**0**	**+3**

Qualitatively, the No Action and Action Alternative are anticipated to have potential adverse effects, while the Action Alternative also anticipates potential beneficial effects, depending on resource and existing conditions present at this Actionable Element Site. As gathered from the Individual Resource scorecards presented in Appendix A that have been combined into Resource Categories and presented on the tables above, the Action Alternative adverse effects range from no to low ("0" to "-1") for the vast majority of resources present, and beneficial effects range from no to moderate ("0" to "+3"). As shown on the tables above, the net Average Adverse and Beneficial Effect score combined for the No Action exhibits an overall "-1.20" which would be equivalent by definition as "low" adverse effect when

considering all resources adverse effects and benefits equally, while the Action Alternative exhibits an overall “+0.55” which would be equivalent by definition as “low” beneficial effect when consideration all resources adverse and beneficial effects equally. In some instances, where noted, best management practices and/or mitigation is appropriate to maintain low adverse effects.

In further comparison, the No Action’s highest adverse impact anticipated is moderate or “-3” and its highest anticipated beneficial effect is no or “0”, while the Action’s highest adverse impact anticipated is low or “-1”, while its highest anticipated beneficial effect is moderate or “+3”. The majority, if not all, of the adverse effects are derived from construction related effects and anticipated to be temporary and manageable thorough avoidance and best management practices. The beneficial effects are qualitatively derivative from the flood reduction and relevant improved condition of the conveyance of storm water to the pump station, and reduced adverse effects of existing condition.

This comparative assessment, informed by the individual resource scorecards presented in this Appendix A, and the Natural and Physical Environment scorecards presented in the Effects and Consequences Section of the Main Report, support the decision making process for the EQ account by presenting a qualitative side by side comparison of the Alternatives net average score, highest adverse effect score, and highest benefit score to further understand the nuances of the Action versus the No Action, as well as determine the environmentally preferred alternative, which would largely be considered as the alternative with the greatest benefits, lowest tolerable adverse effects, and net positive outcome that is more favorable than the other alternatives considered.

In this instance, the Action Alternative presents both the most favorable average score, as well as the highest escalated benefit score, with adverse effects that are no greater than -1, or low adverse effect.

Oakwood Beach

The following tables present the averaged, or mean, adverse and beneficial effects, followed by tables of the highest, upper limit of adverse and highest, upper limit of beneficial effects for the Natural and Physical Environment Resource Categories. These tables are inclusive of each resource total score collectively, including the construction/footprint score, operations and maintenance assumptions score, and additional mitigation (if applicable) score that has been assessed in more detail in Appendix A. These simple qualitative calculations provide a high-level comparison of the Action and No Action Alternatives for this Actionable Element Site, utilizing the same rating methodology definitions as used for each resource on an individual basis, where “0” represents no adverse or beneficial effect, and “5” represents significant adverse or beneficial effects:

Table 22: Oakwood Beach -- Average Adverse and Beneficial Effect Scores of Resource Categories

OAKWOOD BEACH Qualitative Rating Total Scores (calculated, with mitigation if applicable)	NO ACTION SCORE	ACTION SCORE
NATURAL AND PHYSICAL ENVIRONMENT		
Wildlife and Vegetation[A]	**-1**	**+4**
Special Status Species (Terrestrial)[B]	**-1**	**+2.5**
Special Status Species (Aquatic)[C]	**-0.5**	**+2**
Special Status Areas[D]	**-0.8**	**+3.4**
Commercial and Recreational Fishing	**N/A**	**N/A**
Physical Resources[E]	**-0.75**	**+2.25**
Hydrological Resources[F]	**0**	**+1.2**
Water Quality	**-1**	**+1**
Air Quality	**0**	**+1**
Climate and Relative Sea Level Change	**-1**	**+1**
Cultural Resources[G]	**-0.5**	**0.5**
Native American Land	**N/A**	**N/A**
Hazardous, Toxic, and Radioactive Waste	**-1**	**0**
Navigation	**N/A**	**N/A**
Noise and Vibration	**0**	**0**
Socioeconomics and Demographics	**NS**	**NS**
Subtotal Scores (additive for calculation)	***-7.55***	***18.85***
TOTAL SCORE AVERAGED (calculated, additive and averaged):	**-0.62**	**1.57**

Table 23: Oakwood Beach -- Highest Adverse Effect Scores, Escalated

OAKWOOD BEACH Qualitative Rating Total Scores (calculated, with mitigation if applicable)	NO ACTION SCORE	ACTION SCORE
NATURAL AND PHYSICAL ENVIRONMENT		
Wildlife and Vegetation[A]	**-1**	**-1**
Special Status Species (Terrestrial)[B]	**-1**	**-1**
Special Status Species (Aquatic)[C]	**-1**	**-1**
Special Status Areas[D]	**-1**	**-1**
Commercial and Recreational Fishing	**N/A**	**N/A**
Physical Resources[E]	**-1**	**-2**
Hydrological Resources[F]	**0**	**-1**
Water Quality	**-1**	**-1**
Air Quality	**0**	**0**
Climate and Relative Sea Level Change	**-1**	**0**
Cultural Resources[G]	**-1**	**-1**
Native American Land	**N/A**	**N/A**
Hazardous, Toxic, and Radioactive Waste	**-1**	**-1**
Navigation	**N/A**	**N/A**
Noise and Vibration	**0**	**-1**
Socioeconomics and Demographics	**NS**	**NS**
Subtotal Scores (additive for calculation)	***N/A***	***N/A***
TOTAL SCORE HIGHEST ESCALATED:	**-1**	**-2**

Table 24: Oakwood Beach -- Highest Beneficial Effect Scores, Escalated

OAKWOOD BEACH Qualitative Rating Total Scores (calculated, with mitigation if applicable)	NO ACTION SCORE	ACTION SCORE
NATURAL AND PHYSICAL ENVIRONMENT		
Wildlife and Vegetation[A]	**0**	**+5**
Special Status Species (Terrestrial)[B]	**0**	**+5**
Special Status Species (Aquatic)[C]	**0**	**+3**
Special Status Areas[D]	**0**	**+5**
Commercial and Recreational Fishing	**N/A**	**N/A**
Physical Resources[E]	**0**	**+5**
Hydrological Resources[F]	**0**	**+2**
Water Quality	**0**	**+2**
Air Quality	**0**	**+1**
Climate and Relative Sea Level Change	**0**	**+1**
Cultural Resources[G]	**0**	**+3**
Native American Land	**N/A**	**N/A**
Hazardous, Toxic, and Radioactive Waste	**0**	**+1**
Navigation	**N/A**	**N/A**
Noise and Vibration	**0**	**+1**
Socioeconomics and Demographics	**NS**	**NS**
Subtotal Scores (additive for calculation)	***N/A***	***N/A***
TOTAL SCORE HIGHEST ESCALATED:	**0**	**+5**

Qualitatively, both the No Action and Action Alternative are anticipated to have potential adverse effects that are relatively minor ranging from no (0) to low (-1), while the Action Alternative anticipates potential substantial beneficial effects that are, in many cases, significant depending on resource and existing conditions present at this Actionable Element Site. The highest beneficial effects are anticipated to wildlife and vegetation, special status species (migratory birds), special status areas (wetlands, floodplains, marine protected areas, and National Park Service land), land use, and cultural resources (viewshed/historic setting).

As gathered from the Individual Resource scorecards presented in the Environmental Appendix A that have been combined into Resource Categories and presented on the tables above, the summary of adverse effects range from no to low ("0" to "-1") for the vast majority of resources present, and beneficial effects range from no to high ("0" to "+5").

The net Average Adverse and Beneficial Effect score combined for the No Action exhibits an overall "-0.62" which would be equivalent by definition as "no to low" adverse effect when considering all resources adverse effects and benefits equally and combined, while the Action Alternative exhibits an overall "+1.57" which would be equivalent by definition as "low to moderate" beneficial effect when consideration all resources adverse and beneficial effects equally and combined.

In comparison, the No Action's highest adverse effect anticipated is low, or "-1" and its highest anticipated beneficial effect is no or "0". The Action Alternative's highest adverse effect anticipated is low or "-1", while its highest anticipated beneficial effect is high or "+5".

The majority, if not all, of the adverse effects are derived from construction related disturbances that are anticipated to be temporary and manageable thorough avoidance and best management practices. The beneficial effects are qualitatively derivative from the conversion from low-quality degraded non-native and largely invasive habitat conversion to native habitat with a network of tidal channels that provide additional access, foraging, and sheltering to wildlife. As this site is part of the National Park Service, Gateway National Recreation Area (a Marine Protected Area) and New York Bight Estuary, as well as a State and Federally listed wetland, and floodplain, the benefits of this project would be of regional significance to multiple resources and communities throughout the area.

This comparative assessment, informed by the individual resource scorecards presented in this Appendix A, and the Natural and Physical Environment scorecards presented in the Effects and Consequences Section, support the decision making process for the EQ account by presenting a qualitative side by side comparison of the Alternatives net average score, highest adverse effect score, and highest benefit score to further understand the nuances of the Action versus the No Action, as well as determine the environmentally preferred alternative, which would largely be considered as the alternative with the greatest benefits, lowest tolerable adverse effects, and net positive outcome that is more favorable than the other alternatives considered. In this instance, the Action Alternative presents both the most favorable average score, as well as the highest escalated benefit score, with adverse effects that are no greater than -1, for low adverse effect.

EQ Summary of Actionable Elements

A summary of the Actionable Elements' adverse and beneficial effects are included in Table , below, including the net outcome:

Table 25: Actionable Elements' Average Adverse and Beneficial Effect Summary for EQ Account

	Harlem River (Seaward)	Harlem River (Landward)	East Riser	Oakwood Beach
No Action	-0.37	-0.37	-1.20	-0.62
Action	+0.7	+0.06	+0.55	+1.57
Net	**+1.07**	**+0.43**	**+1.75**	**+2.19**

Other Social Effects (OSE)

The P&G requires consideration of "Other Social Effects," such as health, safety, and social vulnerability and resilience, to guide identification and development of water resource projects. Accordingly, an analysis was carried out to determine how alternative measures will affect resident and community well-being, both directly and indirectly, by affecting factors that contribute to well-being such as the economy, infrastructure quality, community identity and cohesion, and public spaces. Although these impacts cannot easily be monetized for inclusion in a benefit-cost analysis, they were qualitatively assessed so that they could be considered in tandem with other information in guiding plan selection.

The OSE analysis of Actionable Elements used the similar metrics as the September 2022 NYNJHATS Draft FR/Tier 1 (Programmatic) EIS as well as one additional metric to ensure the distinguishable effects of the Actionable Elements are appropriately captured. These metrics were chosen in coordination with subject matter experts at NYSDEC, NJDEP, NYCDEP, and the New York City Department of Health and Mental Hygiene to ensure the selected metrics would best characterize the Study Area and for which judgment can be reasonably made about whether the information is indicative of negative or positive impact. The metrics serve to evaluate how Actionable Elements are expected to perform with respect to different aspects of community and individual well-being.

The assessment measures both positive and negative impacts of the Actionable Elements. In general, positive impacts are related to losses that will be avoided due to risk management measures. These positive impacts materialize during flooding conditions and non-flood conditions, such that feature design can maintain access to critical emergency services and prevent displacement of residents, supporting community cohesion and economic stability. The OSE analysis also examined "everyday effects," meaning the impacts that any structural flood barriers will have for the local community on days when there are no floods. The flood alternative features each change the landscape, with varying consequences for social effects, e.g., public space accessibility, viewsheds, and important community buildings that existed prior to flood measure construction. These impacts to the status quo tend to be negative or negatively perceived when experienced on non-flood days, at least initially (Rasmussen et al. 2021).

Table 26 reflects the Factors, Metrics, and Criteria evaluated for the NYNJHATS. While most of the Criteria were the same used in past evaluations for the Draft FR/Tier 1 (Programmatic) EIS, Life Safety Risk was added to evaluate the effects of each of the three Actionable Elements on whether risk was reduced, or if in any cases, risk was increased. The factors included within this table support overall community resilience. More details about each of the Criteria, including definitions, can be found in Appendix A12 Other Social Effects from the September 2022 Draft FR/Tier 1 (Programmatic) EIS.

Table 26: Other Social Effects Criteria Matrix

Factors	Metrics	Criteria
Physical and Mental Health and Safety	Safety	Residents of Risk-Managed Areas
		Access to Healthcare
		Population with Physical Vulnerabilities in Risk-Managed Areas
		Life safety risk*
	Health	Point Sources of Contamination in Risk-Managed Areas
Economic Vitality	Business Climate	Business Buildings in Risk-Managed Areas
Social Connectedness	Community Facilities	Community Buildings in Risk-Managed Areas
Identity	Identity	Community Monuments in Risk-Managed Areas
		Aesthetics of Features
Social Vulnerability and Resilience	Socially Vulnerable Groups	Socially Vulnerable Groups in Risk-Managed Areas
		Life Expectancy for Residents in Risk-Managed Areas
Participation	Public Participation	Reflection of Community Priorities
Leisure and Recreation	Recreational Activities	Change in Outdoor Recreation/Leisure/Nature Space
* Indicates new criteria		

Criteria could receive possible scores ranging from -3 to +3, where a score of -3 indicates the most negative impacts, a score of 0 indicates no impacts or neutral impacts, and +3 indicates the most positive impacts. Most criteria had scores covering only half that range, for example, the possible scores for residents in risk-reduced areas range from 0 to +3 because a negative score would indicate that an alternative increases the number of people exposed to coastal storm risk and flood risk. Similarly, the everyday effects usually range from negative to neutral (-3 to 0) because the flood infrastructure generally does not have positive impacts on days without flooding. ***Table 27*** serves as a legend of these scores and their corresponding colors.

Table 27: Contributions Legend

	-3	-2	-1	0	+1	+2	+3
Not Applicable	Most Negative	Some Negative	Little Negative	Neutral	Little Positive	Some Positive	Most Positive

Table 28: Other Social Effects Evaluation

Factor	Criteria	Harlem River	East Riser	Oakwood Beach
Physical and Mental Health and Safety	Residents of Risk-Managed Areas	+2	+1	0
	Access to Healthcare	+2	+1	0
	Population with Physical Vulnerabilities in Risk-Managed Areas	+3	+1	0
	Life safety risk *	+1	+2	0
	Point Sources of Contamination in Risk-Managed Areas	+1	+1	+2
Economic Vitality	Business Buildings in Risk-Managed Areas	+3	+3	+1
Social Connect-edness	Community Buildings in Risk-Managed Areas	+3	+1	0
Identity	Community Monuments in Risk-Managed Areas	-1	0	0
	Aesthetics of Feature	-1	+1	+2
Social Vulnera-bility and Resilience	Socially Vulnerable Groups in Risk-Managed Areas	+2	+2	0
	Life Expectancy for Residents in Risk-Managed Areas	+2	+1	0
Partici-pation	Reflection of Community Priorities	+1	+1	+1
Leisure and Recreation	Change in Outdoor Recreation/Leisure/Nature Space	0	0	+3

Physical and Mental Health and Safety

All three Actionable Elements manage risk to transportation assets, such as roads – Harlem River Drive for Harlem; W Commercial Avenue and Moonachie Avenue for East Riser; and Buffalo Street for Oakwood Beach – and transit. The Metropolitan Transit Authority (MTA) New York City Transit (NYCT) 155th St Station and the B and D Line tunnel were identified as additional critical infrastructure within the Harlem River Actionable Element Site. NYCT has already developed deployable flood barriers at the primary 155th St Station opening and ventilation grates within the Actionable Element Site. Per conversations with NYCT and MTA personnel, these assets are likely to be deployed in the future during a coastal flood event, regardless of whether a CSRM feature is constructed within the Actionable

Element Site, allowing the measures to work in collaboration for protection. By reducing coastal storm and flood risk to these assets, residents have better access to healthcare and emergency services and this, therefore, contributes to quicker recovery and community resilience.

The ability to recover after a flood event contributes to better mental health. Additionally, each Actionable Element further benefits physical and mental health and safety by reducing risk to known contamination sites in the adjacent or nearby area, which can manage risk of unintended contaminant releases into the environment or exposure, as well as reducing potential clean-up costs. Furthermore, the Oakwood Beach Actionable Element is directly adjacent to the Great Kills Park Superfund site (within the Gateway National Recreation Area) as well as the Oakwood Beach WRRF. The Oakwood Beach Actionable Element, as proposed, manages the risk from these sites and therefore, directly reduces the risk of the contaminants at Great Kills Park from being released into the environment, when flooded. Additionally, the Actionable Element may help manage risk of the release of raw sewage from the WRRF, due to overflow and discharge during storm events, by preventing any potential damages to the floodwall that will be built as part of the South Shore of Staten Island Project. These tertiary benefits were also considered as part of this OSE evaluation.

While all three Actionable Elements help manage risk to physical and mental health and safety, the Harlem River and East Riser Actionable Element Sites were given higher scores because they are expected to manage risk to a larger area and have a larger impact on the surrounding population.

The three Actionable Element Sites, while not all near evacuation routes, are within areas designated as Evacuation Zone 1 or B1, known to be most vulnerable and most likely to be evacuated first in the event of a projected coastal storm. These Actionable Element Sites, their evacuation zoning and the proximity to priority access routes, were evaluated when assigning a ranking for the Life Safety Criteria. Additionally for the Harlem River Actionable Element, the study team considered limited access to the Harlem River Drive during a storm event, as a benefit to prevent potential harm or death to members of the public who may attempt to evacuate on a road that’s impassable and dangerous. The Harlem River Actionable Element Site, while not labeled an official evacuation route, is adjacent to Harlem River Drive, which is a public transit route for the M98 bus and anticipated to be utilized for evacuation prior to large storms. The Harlem River Actionable Element Seaward Alignment, as proposed, is expected to manage the risk of flooding to segments of the Harlem River Drive, commonly used for potential evacuation, as well as temporarily prevent inbound and outbound traffic once the proposed roller gates are deployed, during storm events.

The Oakwood Beach Actionable Element Site is located adjacent to Buffalo Street and within Great Kills Park. Due to its proximity to parkland, the proposed Oakwood Beach Actionable Element has no known impacts to coastal evacuation route(s) access. The East Riser Actionable Element includes channel modifications along the East Riser Ditch Channel extending to the existing culvert at Moonachie Avenue; a New Jersey State Road, identified as a potential evacuation route for coastal emergencies. The increased conveyance and decreased water surface elevation within East Riser Ditch Channel reduces the risk of flooding at Moonachie Avenue and nearby roads that may be used to access evacuation routes.

Economic Vitality

Economic vitality and social connectedness are measured by the extent which businesses and community buildings benefiting from a proposed project. Businesses are a significant portion of the structures benefiting from the Harlem River and East Riser Actionable Element Sites.

The Harlem River Actionable Element, Seaward Alignment, is estimated result in a reduction of damages to commercial structures, contributing to $380k to $9.3M in average annual equivalent benefits depending on the RSLC scenario, or 36%-48% of the benefits. The East Riser Actionable Element is estimated to result in $15.5M worth of damages reduced and 70% of those benefits are to commercial and industrial buildings. These businesses are a significant source of jobs and economic security for the surrounding public, and local governments.

The Oakwood Beach Actionable Element, as mentioned earlier in this Section, is expected to provide tertiary benefit to the Oakwood Beach WRRF by reducing risk of shoreline erosion, as well as wave action and wildfire risk to the floodwall that will be built as part of the South Shore of Staten Island Project, designed to reduce coastal storm flood risk to the WRRF.

Social Connectedness

Social Connectedness refers to the patterns of social networks within which individuals interact, providing meaning and structure to life. It encompasses both horizontal associations – connections within a community and family – and vertical associations that bridge across different communities and levels of society. Robust civic infrastructure, with diverse opportunities for interaction, fosters strong social connectedness, leading to more satisfying, economically progressive, and resilient communities. It's closely linked to fundamental human needs for belonging and identity.

In general, temporary construction-related impacts could temporarily weaken existing social networks. However, Long-term improvements in flood resilience will likely contribute to increased social cohesion by reducing shared stress and vulnerability. The areas directly associated with Oakwood Beach and East Riser have limited formal community infrastructure (such as community centers and gathering spaces), relying more heavily on informal connections.

The proposed Harlem River risk management area includes the Arthur Tappan School (Public School 46), which serves pre-kindergarten to eighth, the Harlem Center for Opportunity, which offers transitional housing, and the NYCHA Rangel Houses, which also include the Rangel Community Center and the Rangel Pharmacy. These institutions are not simply service providers; they are cornerstones of the community, fostering social interaction, providing critical support, and contributing to a sense of place. Protecting these resources from flood risk is therefore not only about safeguarding physical assets, but also about preserving the social fabric and networks that are essential for community well-being and resilience. Ensuring the continued accessibility and functionality of these vital hubs will be key to maintaining and strengthening social connectedness in this neighborhood.

Identity

Each of the Actionable Element Sites seek to manage flood risk to preserve local Historic Districts and Properties on the National Register of Historic Places.

While there may be some temporary and permanent low-adverse impacts to monuments in the Harlem River Actionable Element Site, largely unavoidable, the Actionable Element once built will help prevent

flood risk and therefore protect the longevity of other community monuments within the Site, where otherwise No Action would leave existing aesthetic, visual, historical, and cultural resources vulnerable to damage. The Seaward Alignment presents several moderate long-term benefits that support the preservation of Harlem's historic character and resilience. The floodwall construction manages risk against storm-related flooding, thereby safeguarding adjacent historic structures and fabric. These benefits can be further enhanced through landscape improvements and thoughtful design interventions that mitigate visual impacts, ensuring the historic setting remains largely intact while enhancing resilience and accessibility. Alternatively, the Landward Alignment would differ by introducing a substantial permanent vertical floodwall barrier, ranging from 7 to 12 feet in height, within the historic street grid, thus causing moderate to high adverse impacts on the viewshed. This barrier would be expected to disrupt historic sightlines to the Harlem River, nearby parks, and surrounding architecture, creating a new physical and visual obstruction where none existed before. More on visual impacts can be found in Appendix A1. As a result of this evaluation, the Seaward Alignment was more positively scored and is expected to have less adverse effects on the community.

For the East Riser Actionable Element, while there are no known community monuments, there would be a general improvement for the aesthetics within the Site. The proposed channel modifications, as described earlier throughout this report, would be largely unseen, however there are associated plantings that are expected to improve aesthetics of the area. Additionally, culvert replacements are expected to allow more flow and therefore prevent trapped and floating debris, contributing to an improved aesthetic.

Similarly, the Oakwood Beach Actionable Element Site does not have any known local community monuments and therefore, remains neutral in rating. The proposed Actionable Element project is expected to greatly improve aesthetics within the Site by restoring the current wetland to introduce low- and high-salt marsh and tidal channels to allow for the wetland to be visually appealing and perform as a functional ecosystem. This restoration would additionally improve the natural aesthetics of the current site with the introduction of walking paths and Osprey nests, as well as assisting in managing erosion risk.

The three Actionable Elements have both positive and negative effects when considering Identity within the Sites, but ultimately seek to address coastal storm risk while minimizing adverse effects. The New York District USACE is additionally prepared to mitigate for any unavoidable impacts to local community monuments and/or feature aesthetics.

Social Vulnerability and Resilience

The communities surrounding the Harlem River and East Riser Actionable Elements experience heightened social vulnerability compared to national and state averages. Significantly higher percentages of residents have limited English proficiency, potentially creating barriers to accessing information, participating in public processes, and benefiting from project outcomes. Coupled with poverty rates substantially exceeding national and state levels, these factors contribute to increased susceptibility to adverse impacts from environmental changes and project-related disruptions. These socially vulnerable groups may experience disproportionate burdens during construction and require targeted outreach and mitigation strategies. Building resilience within these communities necessitates a proactive and equitable approach, prioritizing culturally and linguistically appropriate communication and accessible participation opportunities to ensure all residents can contribute to and benefit from a more

sustainable and resilient future. Recognizing the limitations of existing social vulnerability indices, life expectancy serves as a critical outcome indicator, reflecting the cumulative impact of a range of social, economic, and environmental stressors. It functions as a powerful proxy for vulnerabilities that are difficult to directly quantify, effectively summarizing the overall health and well-being of a population. Scores for this criterion are based on the proportion of residents living in census tracts with below-median life expectancies, highlighting areas where the burden of these underlying vulnerabilities is most acutely felt. Including life expectancy therefore provides a vital lens for understanding the potential for disproportionate impacts and informs strategies to promote equitable resilience within the study area.

Participation

The New York District remains committed to meaningful engagement, and a comprehensive engagement strategy has been implemented to ensure community knowledge informs project development, minimizes adverse impacts, and maximizes benefits for all residents.

Public outreach began during an initial scoping phase in July 2018 and has continued throughout the development of the Actionable Elements (see Chapter 10 Public Coordination and Reviews). All comments received, related to the general location of the Actionable Element Sites or the measure type considered, were carefully reviewed and considered, and a summary of these applicable comments and responses are available in Appendix F (Public Coordination).

Public engagement has been central to the development of the Draft Integrated Interim Response FR/EA. This process includes proactive outreach through multiple channels – including online platforms, virtual meetings, and in-person opportunities – to solicit feedback on proposed actions. A formal public comment period has been established to provide opportunity for input from stakeholders and the public, and all feedback received will be considered in the refinement of the Actionable Elements, contributing to a well-informed and sustainable solution. Detailed information regarding specific engagement activities and a comprehensive summary of comments received will be documented in the Final Integrated Interim Response FR/EA (see Section 10.3 and Appendix F).

The +1 score assigned to the Participation criterion across all Actionable Elements in ***Table 27*** highlights New York District's commitment to inclusive engagement and will be updated in the Final Integrated Interim Response FR/EA to reflect community priorities. The Team remains dedicated to strengthening these strategies, ensuring all voices contribute to resilient coastal communities. Participation is viewed not as a one-time event, but as an ongoing process of collaboration and learning.

Leisure and Recreation

The Harlem River and Oakwood Beach Actionable Elements benefit outdoor recreation. For Oakwood Beach, the creation of a Nature-Based Solution will convert current low-quality habitat to higher quality habitat, inclusive of a vegetative mosaic that will provide management of coastal storm risk, while also allowing for the natural environment to operate as a healthy wetland and habitat. Oakwood Beach is within a Marine Protected Area for cultural and natural heritage, and multi-use recreation, and the improved habitat would create additional and quantifiable recreational opportunities for birders and habitat enthusiasts.

The Harlem River Actionable Element currently scores a 0 for Leisure and Recreation, reflecting the removal of existing green space along the project alignment. While this area is currently inaccessible to the public and characterized by low-quality habitat dominated by non-native invasive species, its

removal still represents a lost opportunity for potential future community benefit. Though not currently utilized for recreation, the potential for transforming this space into accessible green infrastructure – such as a park, community garden, or restored natural area – is diminished. The project presents an opportunity to mitigate this loss by prioritizing the re-establishment of native vegetation and the creation of quantifiable park space or recreational areas designed to meet community needs. A revised score of 2-3 is anticipated should mitigation efforts focus on providing new, publicly accessible outdoor amenities, thereby offsetting the loss of potential future benefit and contributing to improved environmental quality and community well-being.

Table 29 summarizes the Actionable Elements' contributions to the OSE account by counting the amount of positive, neutral, and negative contributions and by averaging the ratings. By summing the raw scores, without applying weighting, and dividing by the number of criteria, the analysis calculated the following 'OSE Average' scores ranging from -3 to 3. Of the thirteen OSE criteria, the Harlem River, East Riser, and Oakwood Beach Actionable Elements have varying degrees of positive contributions to 11, 11, and five criteria, respectively. Comparatively, only the Harlem River Actionable Element contributes negatively to OSE criteria; these negative contributions are due to impacts to aesthetic and integrity of cultural settings. While the Harlem River Actionable Element contributes negatively to two criteria, it has the large OSE Average score because it benefits the largest population and number of community buildings. Comparatively, the Oakwood Beach Actionable Element has the lowest average OSE rating compared to the Harlem River and East Riser Actionable Elements, because it benefits a smaller population.

Table 29: Average OSE Rating for the Actionable Elements

	Harlem River	East Riser	Oakwood Beach
Positive Contributions Score	22	15	9
Negative Contributions Score	-2	0	0
OSE Score Average	1.5	1.15	0.7

4.4.4. Actionable Element Evaluation Summary

Table 30 provides a summary of how each Actionable Element contributes to each of the four accounts, comparatively where a score of -3 indicates the most negative impacts, a score of 0 indicates no impacts or neutral impacts, and +3 indicates the most positive impacts. Each Actionable Element contributes to storm risk management and provides benefits, however the East Riser Actionable Element is the only Actionable Element that's monetized benefits outweigh its monetized costs, and therefore receives a positive rating. All Actionable Elements positively contribute to RED and because the Harlem River and East Riser Actionable Elements are larger and more costly, they contribute comparatively more than the Oakwood Beach Actionable Element. Similar to RED, while all Actionable Elements contribute positively to OSE, the Harlem River and East Riser Actionable Elements contribute more to OSE because they provide risk management benefits to a larger area than Oakwood Beach Actionable Element.

Table 30: Summary of Actionable Elements' Contributions to P&G Accounts

Criteria	Harlem River	East Riser	Oakwood Beach
NED	-1	+3	-1
RED	+3	+3	+1
EQ	+1	+1	+3
OSE	+3	+3	+1

5. Alternative Plans Formulation and Evaluation

5.1. Plan Formulation

USACE guidance in ER 1105-2-103 requires the identification of six alternative plans to evaluate trade-offs among the four P&G accounts: NED, RED, OSE, EQ.

- The “no action” alternative.
- An NED plan.
- A plan that reasonably maximizes to total net benefits across all benefit categories including monetized and non-monetized benefits.
- A plan that reasonably maximizes net benefits including monetized and non-monetized benefits consistent with the study purpose only.
- The least environmentally damaging practicable alternative, as required by the Clean Water Act under Section 404 (Title 40, Part 230 of the Code of Federal Regulations [40 CFR Part 230]).
- A locally preferred plan, if requested by the non-federal partner and approved by the ASA(CW), if the LPP is not one of the plans identified above.

The Actionable Elements described in Chapter 4 can be recommended independently or in combination with each other. Based on the evaluation criteria detailed in Section 4.4 and summarized in ***Table*** 29, the Actionable Elements were combined to identify these alternative plans (Table 30). The non-federal partners have not requested investigation of a locally preferred plan.

Alternative A: No Action. The “no action” plan is Alternative A. It recommends none of the Actionable Elements be constructed.

Alternative B: NED Plan. The Actionable Element that had the largest contribution to NED net benefits – East Riser – was chosen as the NED Plan. No other Actionable Elements were included for this plan because the net NED benefits for the other Actionable Elements are negative. However, the NED Plan may change during optimization. The NED Plan has the same NED benefits as East Riser, contributing $15.5M FY25 price levels in annual benefits and $5.8M in annual net benefits, respectively, based upon a federal discount rate of 3.0%.

Alternative C: Total Net Benefits Plan. Alternative C is the plan that reasonably maximizes total net benefits across all benefit categories, called the Total Net Benefits Plan. The Actionable Elements that collectively contribute the most from each element were combined to develop the plan that reasonably maximizes total net benefits across all benefit categories. East Riser was included for its contributions to NED, RED, and OSE; Harlem River was included for its contributions to RED and OSE; and Oakwood Beach was added for its contribution to EQ and OSE. Therefore, the plan that reasonably maximizes total net benefits across all benefit categories is all three Actionable Element Sites.

Alternative D: Study Purpose Only Net Benefits Plan. The Actionable Elements that collectively contribute the most benefits, comparatively, were combined into Alternative D to develop the plan that reasonably maximizes net benefits consistent with the study purpose only. The Harlem River Actionable Element was included because it is formulated specifically to manage the risk of storm surge. The East Riser Actionable Element was included because, while not yet quantified, it assists in managing the risk of storm surge in the tidally influenced area of Carlstadt and Moonachie. The Oakwood Beach Actionable

Element was not included because, while it manages risk of erosion to the Oakwood Beach WRRF and Great Kills Park CERCLA site, comparatively contributes less monetary benefits.

Alternative E: Least Environmentally Damaging Practicable Alternative (LEDPA). The Actionable Elements with the collective largest positive contribution to the EQ account was included as Alternative E to develop the least environmentally damaging practicable alternative plan (LEDPA). The Oakwood Beach Actionable Element was identified as this alternative plan.

Table 31: Alternative Plans

Alternative Plans	Harlem River	East Riser	Oakwood Beach
A. No Action			
B. NED Plan		✓	
C. Total Net Benefits Plan	✓	✓	✓
D. Study Purpose Only Net Benefits Plan	✓	✓	
E. LEDPA			✓

5.2. Plan Evaluation

The alternative plans were evaluated through several criteria, including their contributions to the planning objectives and constraints, the four planning criteria (completeness, effectiveness, efficiency, and acceptability), and the four P&G benefit accounts (NED, RED, EQ, and OSE). Alternative plans were evaluated for their contributions to these criteria within a 50-year period of analysis, which begins when project construction is anticipated to be complete and project benefits are realized (2037 through 2086).

5.2.1. Evaluation of Contributions to the P&G Accounts

The 1983 P&G requires that alternative plans are formulated and compared in consideration of four accounts: NED, RED, EQ, and OSE. The contributions of each Actionable Element to these accounts described in Section 4.4.3 were used as the basis for analysis.

Economic Benefits: NED and RED Accounts

NED and RED are an estimate of the economic benefits of alternative plans. The NED and RED benefits provided by the alternative plans are presented in ***Table 32*** and ***Table 33***, respectively.

Table 32: NED Benefits

		Alt A: No Action	Alt B: NED Plan	Alt C: Total Net Benefits Plan[1]	Alt D: Study Purpose Only Net Benefits Plan[2]	Alt E: LEDPA[3]
Actionable Elements		N/A	East Riser	East Riser, Harlem River, Oakwood Beach	East Riser, Harlem River	Oakwood Beach
First Cost		--	$249,146,000	$1,066,485,000	$1,011,130,000	$55,355,000
AAEQ[4] Cost		--	$9,683,000	$41,449,000	$39,298,000	$2,151,000
AAEQ Benefit	**RSLC[6] Low**	--	TBD	$17,994,000	$17,968,000	TBD
	RSLC Int.	--	$15,494,000	$19,134,000	$19,108,000	$26,000
	RSLC High	--	TBD	$24,080,000	$24,054,000	TBD
AAEQ Net Benefit	**RSLC Low**	--	TBD	-$23,455,000	-$21,330,000	TBD
	RSLC Int.	--	$5,811,000	-$22,315,000	-$20,190,000	-$2,125,000
	RSLC High	--	TBD	-$17,369,000	-$15,244,000	TBD
BCR[5]	**RSLC Low**	--	TBD	0.4	0.5	TBD
	RSLC Int.	--	1.6	0.5	0.5	<0.1
	RSLC High	--	TBD	0.6	0.6	TBD

[1]reasonably maximizes total net benefits across all benefit categories; [2]reasonably maximizes net benefits consistent with the study purpose only; [3]least environmentally damaging plan; [4]average annual equivalent; [5]benefit cost ratio; [6]relative sea level change

Table 33: RED Benefits

	Alt A: No Action	Alt B: NED Plan	Alt C: Total Net Benefits Plan[1]	Alt D: Study Purpose Only Net Benefits Plan[2]	Alt E: LEDPA[3]
Actionable Elements	N/A	East Riser	East Riser, Harlem River, Oakwood Beach	East Riser, Harlem River	Oakwood Beach
Local Capture	--	$176,558,000	$349,445,000	$316,449,000	$32,996,000
Output	--	$352,644,000	$690,428,000	$625,798,000	$64,630,000
Jobs FTE[4]	--	2,424	4,714	4,356	358
Labor Income	--	$203,183,000	$418,481,000	$385,236,000	$33,245,000
Value Added	--	$239,136,000	$470,059,000	$432,083,000	$37,976,000

[1]reasonably maximizes total net benefits across all benefit categories; [2]reasonably maximizes net benefits consistent with the study purpose only; [3]least environmentally damaging plan; [4]full time equivalent

Based on benefits alone, Alternative C contributes the relative most of all plans to the NED and RED accounts. Alternative D ranks second, then Alternative B, and lastly Alternative E. However, Alternative B provides the greatest *net* NED benefits when considering project first cost; it is the only alternative that could provide net positive NED benefits.

Ecological Benefits: EQ Account

The Environmental Quality (EQ) account displays the non-monetary effects on ecological, cultural, and aesthetic resources including the beneficial and adverse effects of proposed project elements. The average EQ rating is taken from ***Table 24*** and represents the combined average of the scores for the individual project features comprising each Actionable Element Site Alternative.

	Alt A: No Action	Alt B: NED Plan	Alt C: Total Net Benefits Plan[1]	Alt D: Study Purpose Only Net Benefits Plan[2]	Alt E: LEDPA[3]
Actionable Elements	N/A	East Riser	East Riser, Harlem River, Oakwood Beach	East Riser, Harlem River	Oakwood Beach
EQ Rating Average	-0.73	0.58	0.94	0.62	1.57

While all Alternatives exhibit EQ benefits, Alternative E (Oakwood Beach) has the greatest EQ benefits, followed by Alternative C (combination of East Riser, Harlem River, and Oakwood Beach) of any of the Alternatives, corresponding directly to the Actionable Element Sites overall rating outcome, inclusive of the considered adverse and beneficial effects. For Alternative E, the function of Oakwood Beach as a complimentary CSRM NBS is a primary benefit producing factor for many resources in the Actionable Element Site vicinity, and those perceived benefits are further compounded by the benefits of managed fire risk, ecological enhancement, and cultural benefits of regional significance as the Site is part of the Atlantic Flyway, National Park Service, Gateway Recreation Area, Great Kills Park (a Marine Protected Area), and Federal and State listed wetland. Under Alternative C and D, the Harlem River Seaward Alignment includes complimentary NBS for a multiple line of defense, that provide CSRM benefits from managed flood risk and wave attenuation, as well as ecological benefits particularly to aquatic species and habitat where none existed before. As the NBS of Oakwood Beach and the Harlem River Seaward Alignment provide dual purpose, the benefits are maximized.

East Riser (within Alternatives B, C, and D) also has anticipated benefits of which are dual purpose, provided that there is a managed flood risk as well as emphasis on prioritizing areas of the alignment that are hard structure to remain hard structure, and areas that are natural to remain natural.

Social Benefits: OSE Account

OSE is an estimate of the social benefits of alternative plans. ***Table 34*** summarizes the contributions of the OSE ratings presented in Section 4.4.3. The individual scores of the positive and negative contributions of the corresponding elements and the sum are presented in as the positive and negative contribution scores in the table. The OSE average rating is the sum of all the positive and negative contribution scores divided by the number of criteria considered for each alternative plan. The green-yellow-red system used for the OSE ratings is shown in the table.

Table 34: Contributions to OSE (Average Rating)

	Alt A: No Action	Alt B: NED Plan	Alt C: Total Net Benefits Plan[1]	Alt D: Study Purpose Only Net Benefits Plan[2]	Alt E: LEDPA[3]
Actionable Elements	N/A	East Riser	East Riser, Harlem River, Oakwood Beach	East Riser, Harlem River	Oakwood Beach
Positive Contributions Score	N/A	15	46	37	9
Negative Contributions Score	N/A	0	-2	-2	0
OSE Rating Average	--	1.2	1.1	1.3	0.7

[1]reasonably maximizes total net benefits across all benefit categories; [2]reasonably maximizes net benefits consistent with the study purpose only; [3]least environmentally damaging plan

Alternatives B, C, and D all contribute a similar and significant amount to the OSE account, which reflects the alternative plans' benefits to people and community assets. The alternative plans all manage risk to life safety, population, and businesses. Alternative E contributes the least to the OSE account because it benefits the least amount of people and community assets. The alternative plan does manage the risk of contamination exposure and improves recreation and the environment.

Table 35 summarizes the contributions of the alternative plans to the P&G Accounts.

Table 35: Table of Effects

		Alt A: No Action	Alt B: NED Plan	Alt C: Total Net Benefits Plan[1]	Alt D: Study Purpose Only Net Benefits Plan[2]	Alt E: LEDPA[3]
Actionable Elements		N/A	East Riser	East Riser, Harlem River, Oakwood Beach	East Riser, Harlem River	Oakwood Beach
AAEQ[4] Cost		–	$9,682,000	$41,449,000	$39,298,000	$2,151,000
NED	**AAEQ Risk Management Benefits**	–	Low RSLC[5]: TBD Int. RSLC: $15,494,000 High RSLC: TBD	Low RSLC: $17,994,000 Int. RSLC: $19,134,000 High RSLC: $24,080,000	Low RSLC: $17,968,000 Int. RSLC: $19,108,000 High RSLC: $24,054,000	Low RSLC: TBD Int. RSLC: $26,000 High RSLC: TBD
	AAEQ Net Benefits	–	Low RSLC: TBD Int. RSLC: $5,811,000 High RSLC: TBD	Low RSLC: -$23,455,000 Int. RSLC: -$22,315,000 High RSLC: -$17,369,000	Low RSLC: -$21,330,000 Int. RSLC: -$20,190,000 High RSLC: -$15,244,000	Low RSLC: TBD Int. RSLC: -$2,130,000 High RSLC: TBD
RED		–	N/A	$22,500,000	$25,070,000	$2,570,000
EQ		–	Some Beneficial Effects to communities and natural resources through managed coastal storm risk	All projects combined provide a high Beneficial Effects to communities and natural and cultural resources through coastal storm risk, habitat creation and manages risk to contaminant exposure	Some Beneficial Effects, depending on alignment, to communities and natural and cultural resources through managed coastal storm risk	High Beneficial Effects from wave attenuation, erosion management, habitat creation and manages risk of contaminant exposure.
OSE		–	High: Manages risk to life safety, population and businesses	High: Manages risk to life safety and greatest population, businesses, and community buildings	High: Manages risk to life safety and critical roads	Medium: Manages risk of contamination exposure and improves recreation and environment

[1]reasonably maximizes total net benefits across all benefit categories; [2]reasonably maximizes net benefits consistent with the study purpose only; [3]least environmentally damaging plan; [4]average annual equivalent; [5]relative sea level change

5.2.2. Evaluation of Contributions to Planning Objectives and Constraints

The alternative plans were evaluated for their contributions to the planning objectives and avoidance of planning constraints. ***Table 36*** shows the relative contribution of each Alternative Plan to the study objectives. A relative comparison of alternative plans was undertaken and ranked using a "low" (red), "medium" (yellow), and "high" (green) system. The four study objectives were used to judge the alternatives. The alternative plans' contributions to the four P&G Accounts were used in the evaluation of their contributions to the planning objectives. Alternative plans that did not meet these objectives were marked as "low" (red) in the table, while those that partially met the objectives were marked as "medium" (yellow). Those that were fully successful at meeting the objectives were marked as "high" (green). Alternative A (No Action) does not contribute to the planning objectives, and so is marked as "None" for all alternative plans in the table.

Table 36: Contributions to Planning Objectives

				Alt A: No Action	Alt B: NED Plan	Alt C: Total Net Benefits Plan[1]	Alt D: Study Purpose Only Net Benefits Plan[2]	Alt E: LEDPA[3]
Federal Objectives[4]	**Guiding Principles[5]**	**Planning Objectives**	**Measured by**	N/A	East Riser	East Riser, Harlem River, Oakwood Beach	East Riser, Harlem River	Oakwood Beach
Maximize Economic Development	Sustainable Economic Development	Manage Coastal Storm Risk	NED, RED	N/A	+3	+3	+3	+1
Avoid Unwise Use of Floodplains and Flood Prone Areas	Floodplains	Support Community Resilience	OSE	N/A	+2	+3	+3	+1
	Public Safety	Support Critical Infrastructure	OSE	N/A	+2	+3	+3	+2
Protect and Restore the Function of Natural Systems	Healthy and Resilient Ecosystems	Restore Natural Coastal Features	EQ	N/A	+1	+3	+1	+3

[1]reasonably maximizes total net benefits across all benefit categories; [2]reasonably maximizes net benefits consistent with the study purpose only; [3]least environmentally damaging plan; [4]WRDA 2007 established a three-part federal objective for federal water resources investments. These investments reflect national priorities, encourage economic development, and protect the environment; [5]The CEQ 2014 Principles, Requirements, and Interagency Guidelines establishes six Guiding Principles for USACE water resource projects, including the four shown in this table that are applicable to the NYNJHATS.

Alternative C provides the greatest contributions to the planning objectives than any other alternative plan. The plan includes all three Actionable Elements, and so the plan's benefits include the combined contributions of the three sites.

Alternative C provides the greatest contributions to the planning objectives than any of the other alternative plans. The alternative plan includes all three Actionable Elements, and so the plan's benefits include the combined contributions from the three sites.

The East Riser Actionable Element provides the greatest economic (NED and RED) benefits and so contributes the most of the three sites to the planning objective related to managing coastal storm damages ("reduce coastal storm risk"). Alternative plans that include the East Riser Actionable Element (Alternative B, C, and D) are rated higher for contributions to this planning objective. Similarly, the alternative plan that does not include the East Riser Actionable Element (Alternative E) is rated lower for contributions to this planning objective.

Alternatives B, C, and D contribute a similar and significant amount of OSE benefits, which is reflected in two planning objectives ("support community resilience" and "support critical infrastructure"). The alternative plans all manage risk to life safety, population, and businesses. Alternative E contributes the least to the OSE account because it benefits the least amount of people and community assets, and so is ranked low in its contribution to these two planning objectives.

Alternative E (Oakwood Beach only) contributes the greatest environmental (EQ) benefits and so contributes the most to the planning objective related to environmental quality ("restore natural coastal features"). Alternative C also includes the Oakwood Beach Actionable Element and is similarly ranks high in its contribution to this planning objective. Alternatives B and D, which do not include the Oakwood Beach Actionable Element or any other Nature-Based Solution, rank relatively low in its contribution to this planning objective.

Alternative D, which includes two Actionable Elements, has the second-highest contributions to all planning objectives because it includes the combined contributions of two sites – the East Riser and Harlem River Actionable Element. Alternative B (East Riser Actionable Element only), which provides greater CSRM benefits to the community and economy, is ranked higher than Alternative E (Oakwood Beach only) that provides relatively low benefits.

The alternative plans were evaluated for their ability to avoid the seven planning constraints listed in Section 4.4.1. As described in Section 4.4.1, none of the Actionable Elements interfere with the planning constraints. The same is true of the alternative plans because they include the Actionable Elements.

5.2.3. Evaluation of Contributions to the P&G Criteria

The 1983 P&G requires that alternative plans are formulated and compared in consideration of four criteria: completeness, effectiveness, efficiency, and acceptability. The alternative plans' contributions to the P&C criteria are summarized in ***Table 37***.

Table 37: Contributions to P&G Criteria

	Alt A: No Action	Alt B: NED Plan	Alt C: Total Net Benefits Plan[1]	Alt D: Study Purpose Only Net Benefits Plan[2]	Alt E: LEDPA[3]
Actionable Elements	N/A	East Riser	East Riser, Harlem River, Oakwood Beach	East Riser, Harlem River	Oakwood Beach
Completeness	✓ Yes	✓ Yes	✓ Yes	✓ Yes	✓ Yes
Acceptability	× No	✓ Yes	✓ Yes	✓ Yes	✓ Yes
Effectiveness	× No	✓ Yes	✓ Yes	✓ Yes	✓ Yes
Efficiency	× No	✓ Yes	✓ Yes	✓ Yes	✓ Yes

[1]reasonably maximizes total net benefits across all benefit categories; [2]reasonably maximizes net benefits consistent with the study purpose only; [3]least environmentally damaging plan

As described in Section 5.1 all Actionable Elements are complete, acceptable, effective, and efficient. Alternatives C and D are the most effective because they manage flood risk to the largest areas, while Alternative B is the most efficient because it produces net positive economic benefits.

5.3. Alternative Plans Comparison and Selection of Tentatively Selection Plan

The performance of the alternative plans in relation to the selection criteria were compared. summarizes the relative performance relative to the selection criteria as they compare to each other.

Table 38: Ranking of Alternative Plans in Relation to Each Other

	Alt A: No Action	Alt B: NED Plan	Alt C: Total Net Benefits Plan[1]	Alt D: Study Purpose Only Net Benefits Plan[2]	Alt E: LEDPA[3]
Actionable Elements	N/A	East Riser	East Riser, Harlem River, Oakwood Beach	East Riser, Harlem River	Oakwood Beach
Objectives	N/A	+1	+3	+2	+1
Constraints	N/A	+3	+3	+3	+3
P&G Accounts	N/A	+1	+3	+2	+1
P&G Criteria	N/A	+3	+3	+3	+3

[1]reasonably maximizes total net benefits across all benefit categories; [2]reasonably maximizes net benefits consistent with the study purpose only; [3]least environmentally damaging plan

All estimated costs, benefits, impacts, and trade-offs for each alternative plan were considered. The study team, including the non-federal sponsors and partners, selected Alternative C – the plan that reasonably maximizes Total Net Benefits across all benefit categories including monetized and non-monetized benefits – as the Tentatively Selected Plan.

The study team selected Alternative C instead of Alternative B – the NED Plan – as the Tentatively Selected Plan because of the broad range of benefits it provides to the community, economy, and environment. Alternative B is responsive to the CSRM study authority provided through P.L. 84-71, which serves as the basis for the study's Feasibility Cost Sharing Agreement. In Section 1343 of WRDA 2024, Congress indicated that a focus on CSRM alone is not satisfying and modified the scope of the study through specific language to include within the scope investigations and recommendations to: "maximize net public benefits, including ecological and societal benefits, from the reduction of the comprehensive flood risk…as described in Section 8106(a) of the Water Resources Development Act of 2022" and also specified the inclusion of "natural and nature-based features." The inclusion of the Oakwood Beach Actionable Element satisfies the condition of a natural and nature-based feature, and CSRM measures at Harlem River address the societal and net public benefits per Section 1343 of WRDA 2024. The site of East Riser itself meets the condition of Section 8106(a) considerations through the confluence of coastal and riverine flood drivers. Each of the Actionable Elements manage coastal risk to people and structures to varying extents, and together they make up the Total Net Benefits Plan. Proceeding with the Total Net Benefit plan addresses the intent of Congress for the NYNJHATS, a condition that could not be met through the NED Plan alone.

5.4. Risk and Uncertainty

There remains risk and uncertainty in project planning, engineering design, and environmental compliance at this phase of the Study. Risk and uncertainty will be managed as more information is received and analyses are refined throughout subsequent phases of the Study, and into the Preconstruction, Engineering, and Design phase and construction. This Section presents major areas of risk and uncertainty known at this time.

5.4.1. Economic Risk and Uncertainty

Projections of future flood risk are inherently uncertain; there is inherent variability in the consequences of coastal or fluvial flood exposure. This inherent variability and uncertainty are considered within the economic analysis conducted in HEC-FDA 2.0. Uncertainty in engineering and economic inputs, more specifically, flood stage-frequency, structure and content values, and the relation between flood depth and damage (i.e., depth-damage functions) are all considered within the model. Appendix D provides further details on the data source and literature relied upon to characterize uncertainty in these input variables. HEC-FDA 2.0 considers the full range of uncertainty in each of these inputs and ultimately provides a range of expected annualized damages for each model scenario. Uncertainty in future sea level change (RSLC) was also considered when estimating the full range of coastal flood risk and projected economic benefits within the Harlem River study area, estimating without- and with-project risk under the USACE low, intermediate, and high RSLC projections, pursuant to ER 1100-2-8162. Additional details on this analysis can be found in Appendix D. While further refinements are likely to be made to the actionable elements and the economic analysis as new information becomes available, there is low risk that the projected economic benefits will significantly change from the values presented in this draft report. Given that each actionable element is formulated to maximize comprehensive net benefits, it is very unlikely that any future changes in projected economic benefits will influence plan selection.

Performance of the Harlem River actionable element was computed via HEC-FDA 2.0 pursuant to ER 1105-2-101. Performance was computed relative to the design still water level (+12.2 ft NAVD88). Given RSLC at the end of period of analysis, the expected annual exceedance probability of the actionable element is 1.6%; the recommended plan will pass the 3.0% AEP event with 90% assurance. Appendix D provides additional detailed description of project performance. The crest elevation of the Harlem River actionable element, +17.5 ft NAVD88 includes additional height to satisfy overtopping requirements given forecasted significant wave heights; Section 4.3 of Appendix B provides additional design details. The study team will further refine the crest elevation of the Harlem River actionable element in the next phase of study, depending upon the alternative developed for this area.

Similarly, performance of the East Riser actionable element was also computed via HEC-FDA 2.0 pursuant to ER 1105-2-101, though performance was assessed relative to a threshold elevation of +5 ft NAVD88. This threshold is the flood stage at which damages are expected to begin for residential structures within the mobile home communities in the study area. Under the without-project condition, the expected annual exceedance probability for this threshold is expected to be 60.9% (i.e., in a given year, on average, there is a 60.9% chance that this threshold will be exceeded). By contrast, under the with-project condition, the annual exceedance probability reduces to 14.8%. Given irreducible uncertainties, the AEP with 90% assurance at this threshold is 24.8%. This reduction in annual exceedance probability translates to a modest reduction in the 10-year long-term exceedance probability for this threshold. Appendix D provides additional detailed description of project performance for the East Riser actionable element.

5.4.2. Cost Estimating Risk and Uncertainty

At this preliminary stage of design there remains cost engineering risks to consider. Two of the cost estimates, East Riser and Oakwood Beach were created by the sponsors, with consideration of the designs and quantities of the shared existing project plans. These two cost estimates, at this stage of study, were escalated to current day pricing and therefore, not yet verified by USACE. This leaves risk that the design and thus the estimate is not up to USACE standards and that extra elements or a lack of essential elements in the design and cost estimate may exist. Additionally, there are cost uncertainties relating to the estimated quantities and price of materials. To minimize this risk, the study team has added a range of contingency to the necessary accounts and plans to further refine the cost estimates, prior to release of the final report.

This contingency itself also poses a risk. The contingency used, 52.47%, was derived from the original NYNJHATS, Alternative 3B, and lacks further refinement when it comes down to looking at site specific risks. In the next design phase, New York District will be performing a risk analysis specific to each Actionable Element Site in order to gauge a more personalized and refined contingency based on each site’s available data.

5.4.3. Engineering Risk and Uncertainty

Engineering risk and uncertainty pertains to the likelihood that the proposed design greatly changes as additional site information is obtained, as well as the potential that the designs will not meet the required USACE design maturity requirements from ER 1110-2-1302. At this stage of the study, engineering data for design was limited to existing information available to the public or shared by the NFS. The

magnitude and source of engineering risk and uncertainty varies by Actionable Element Site. Section 9.1 details the gaps in engineering information for each Actionable Element and associated risks at the time of this report and outlines next steps to further refine the designs at each Actionable Element Site, that will allow the New York District to reach the required design maturity needed to reach a Class 3 cost estimate.

5.4.4. Environmental Remediation Risk

Environmental remediation risk is related to the potential to encounter HTRW during any phase of the project. At this stage of the study, data related to environmental remediation risk was limited to publicly available information and other existing information/reports. The magnitude of environmental remediation risk varies by Actionable Element Site depending on available information and anticipated risk associated with identified concerns. Environmental remediation risk will be further characterized through subsurface planning investigations at each Actionable Element Site during the Pre-Construction Engineering and Design phase.

Should HTRW be identified during any phase of the project, it is USACE policy to avoid it as practicable. However, if HTRW avoidance is not possible it will be the responsibility of the NFS to provide a clean site for the project, using 100% non-federal non-project funds, in accordance with ER 1165-2-132.

6. Tentatively Selected Plan

6.1. Plan Overview

The Tentatively Selected Plan (TSP) is Alternative C, which consists of three Actionable Element Sites: East Riser, NJ; Harlem River, NY; and Oakwood Beach, NY (***Figure 21***). Features are proposed in New Jersey between the boroughs of Carlstadt and Moonachie (***Figure 22***), at the intersection of Washington Heights and Northern Central Harlem, New York City(***Figure 23***), and Oakwood Beach, Staten Island (***Figure 24***). Each Actionable Element Site was evaluated to compare a "Proposed Action Alternative" and a "No Action Alternative" within this study, where the TSP is a combination plan of the three Proposed Action Alternatives at each site.

The Harlem River Actionable Element Site has two potential alignment opportunities in Northern Manhattan, where Alternative A is the "Landward Alignment", and Alternative B is the "Seaward Alignment". While both Harlem River alignments are proposed as a CSRM floodwall feature with a number of deployable vehicular gates, the Landward Alignment has five gates, and the Seaward Alignment has two. Also varying between these two alignments, is the location with proximity to the waterfront on the Harlem River, length, and potentially the reveal height of the floodwall. While both floodwalls are proposed at +17.5 feet NAVD88, the height of the wall above the ground is dependent on the existing ground elevation at the site.

The East Riser Actionable Element Site includes proposal of channel modifications, three culvert replacements, and a railroad bridge replacement on East Riser Ditch Channel in Carlstadt and Moonachie, New Jersey. Channel modifications more specifically include widening and deepening of the East Riser Ditch Channel, bank stabilization, and replanting of vegetation.

The Oakwood Beach Actionable Element Site is proposed as a CSRM-focused Nature-Based Solution wetland enhancement including three primary components: removal of non-native invasive plants, creation of a vegetative mosaic with native plants and tidal channels, and dune restoration.

The study team, which includes the New York District, NJDEP, NYSDEC, NYCDEP, and NYSDOS has analyzed the best available information needed to develop the three Actionable Elements described in this report. During this analysis, it became clear that the Harlem River Actionable Element will not be sufficiently developed or detailed to support USACE design maturity requirements within the timeline for inclusion in a Chief of Engineer's Report, which could be considered by Congress for authorization in a potential Water Resources Development Act (WRDA) of 2026. In addition, the New York District, NYSDEC, and NYCDEP believe robust, meaningful public coordination and additional engineering and alternative analyses are needed to ensure broader efforts on the Harlem River are evaluated, and to thoroughly coordinate with other government agencies about their plans and the expectations of their communities for the Harlem River. Presently, NYSDEC, NYCDEP, and others are investing significant resources in water quality improvements and creating waterfront access for communities within the Harlem River watershed. The intent is to continue developing this site for inclusion in a future Interim Feasibility Report for potential authorization in a future WRDA, subject to future availability of funds. Inclusion in a future report allows New York District and its project sponsors the opportunity to take a broader look at the Harlem River and ensure the development of the Harlem River any Actionable Element supports and improves upon these efforts while integrating the added benefit of coastal storm management and flood risk reduction. The other Actionable Elements, East Riser and Oakwood Beach,

are being further developed and have undergone previous public review and coordination and are projected to be ready for potential Congressional consideration to be authorized in WRDA 2026.

In terms of adaptability, the base of the floodwall for the Harlem River Actionable Element is robust and would be able to support an increase in the wall height (up to three feet) in the future as adaptation for relative sea level change. At the Oakwood Beach and East Riser Actionable Element Sites, future adaptations could involve the expansion of marshes for high frequency events, as space permits. Future adaptation requirements and designs to incorporate adaptability will be assessed prior to finalizing the report.

More detail on each of these sites could be found within Chapter 4, “Actionable Element Formulation and Evaluation”.

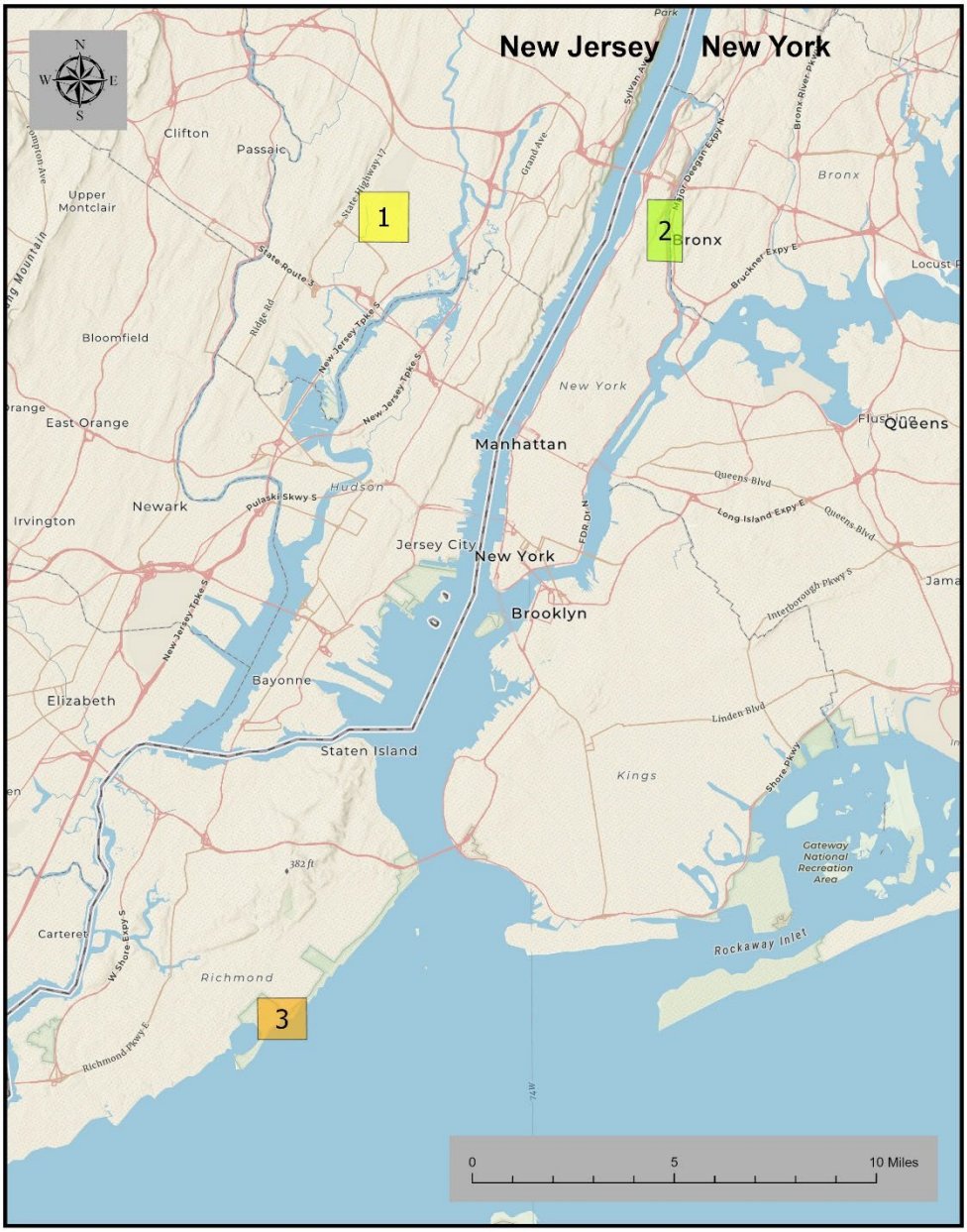

Figure 21: Tentatively Selected Plan, Alternative C, Actionable Element Site Locations

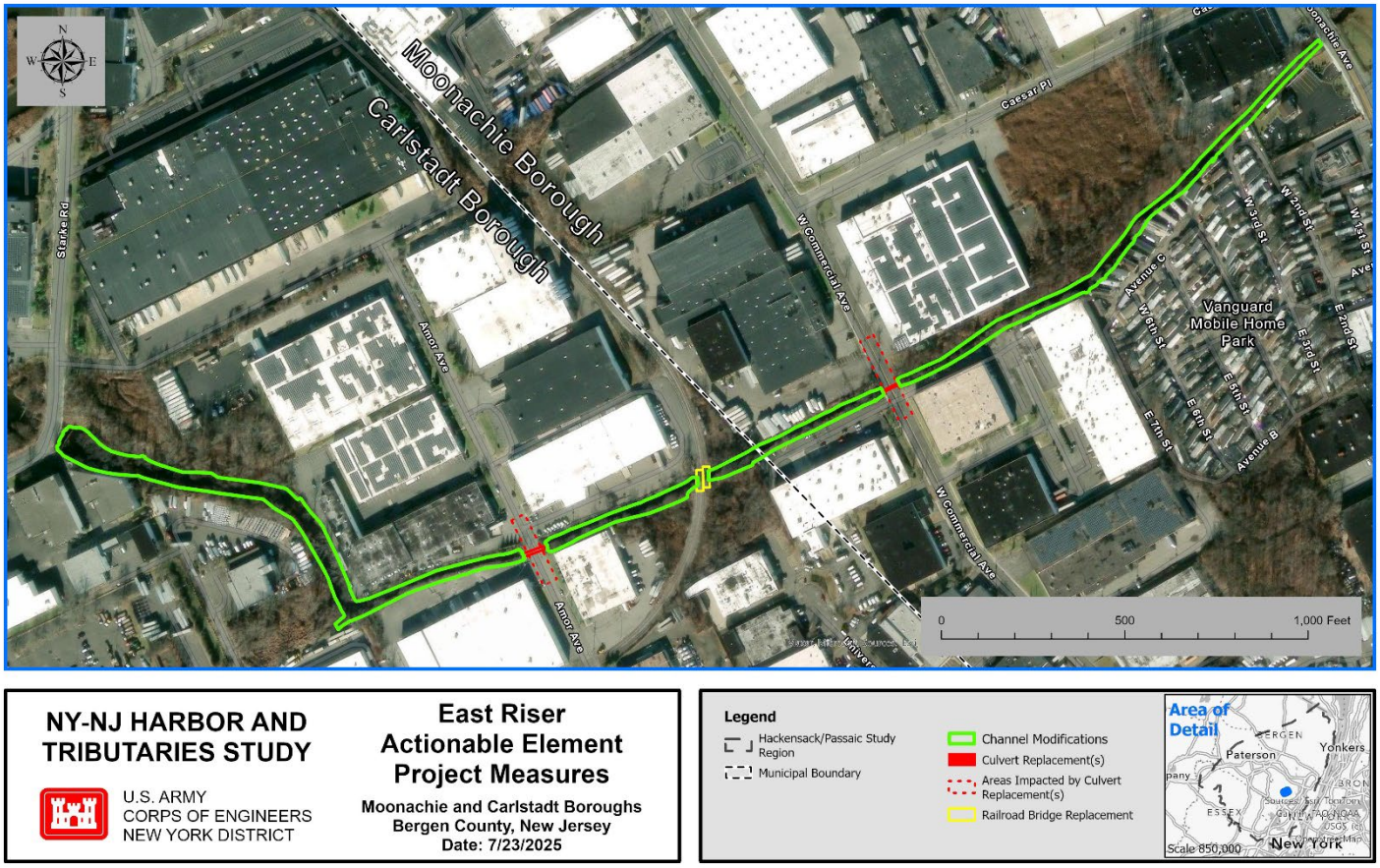

Figure 22: Tentatively Selected Plan, East Riser Actionable Element Proposed Measures

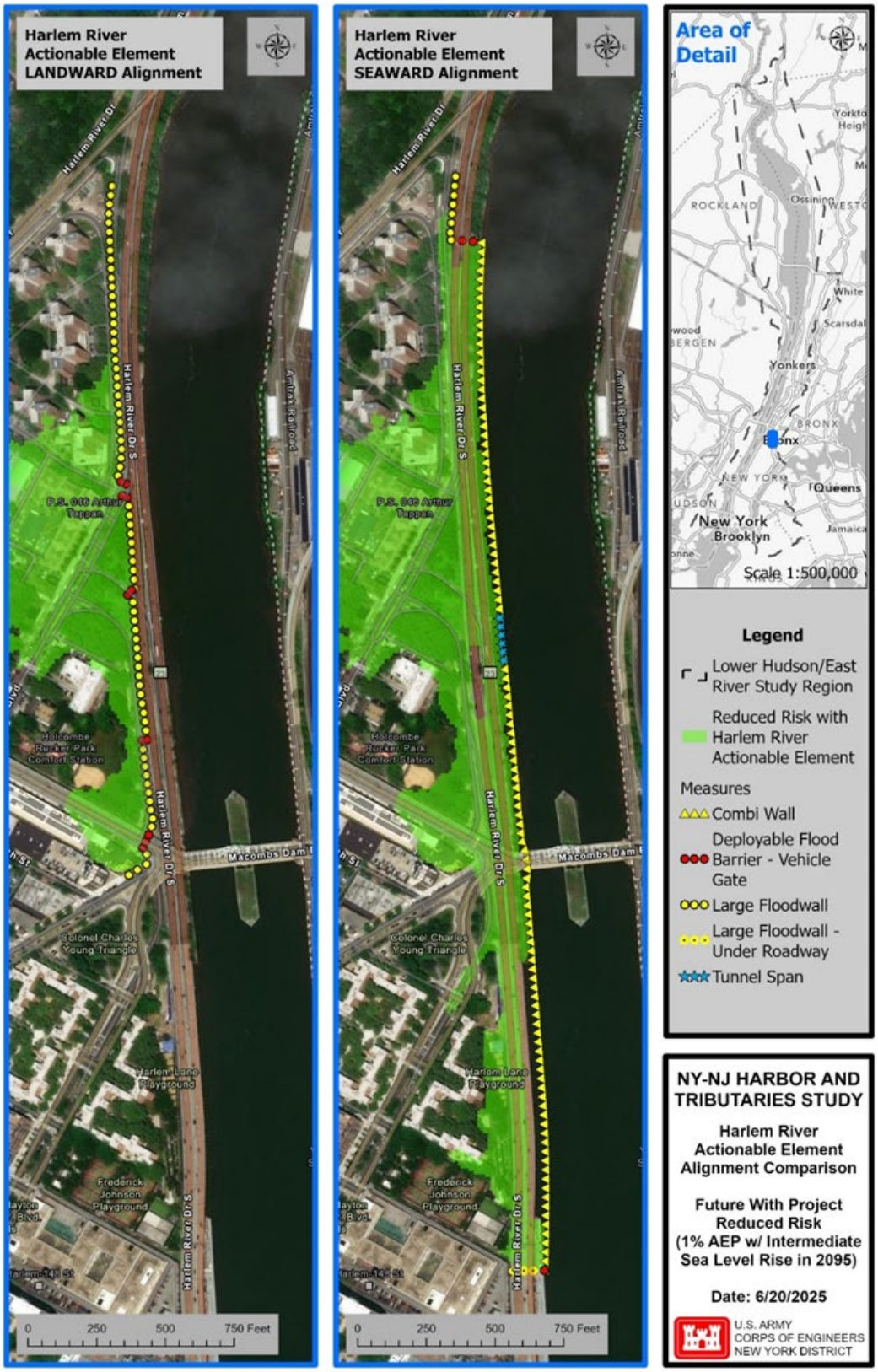

Figure 23: Tentatively Selected Plan, Harlem River Actionable Element Potential Alignments

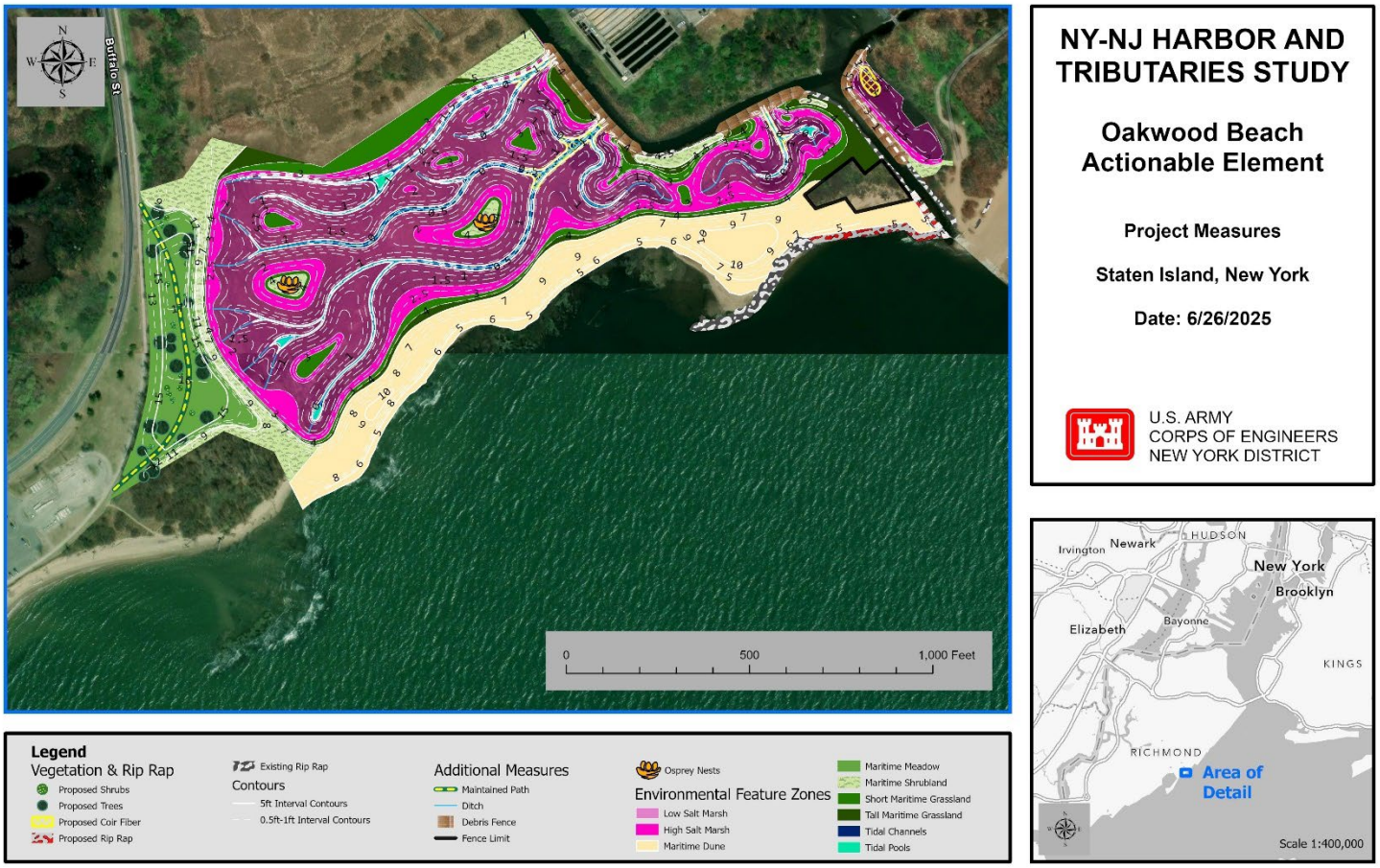

Figure 24: Tentatively Selected Plan, Oakwood Beach Actionable Element

6.2. Costs

Project first cost is the constant dollar cost at the current price level with added contingency and is the cost used in the authorizing document for a project. The contingency developed for each of the cost estimates is the 52.47% contingency from Alternative 3B from the September 2022 NYNJHATS Tentatively Selected Plan. This contingency is being used as a placeholder until further investigations and design work and analysis can be done on each specific actionable element to create a more refined contingency. The project costs have also been escalated to the midpoint of design to account for the foreseen increase in pricing over the length of the design phase and project.

The details of the Tentatively Selected Plan will be refined for the Final Integrated Report. It is preliminary estimated that the Tentatively Selected Plan has a first cost of $1.07 billion (2025Q3). The Total Project Cost is the constant dollar cost fully funded with escalation to the estimated midpoint of construction and is the cost estimate used in project partnership agreements; the Total Project Cost is estimated to be $1.27 billion.

Table 39: Tentatively Selected Plan First Costs and Total Project Costs

		EAST RISER		HARLEM RIVER		OAKWOOD	
	Contin-gency	Project First Cost	Total Project Cost	Project First Cost	Total Project Cost	Project First Cost	Total Project Cost
Account 01 Lands and Damages	30%	$15.6M	$17.9M	$41.5M	$46.9M	$3.5M	$4.1M
Account 02 Relocations	76.33%			$105.8M	$123.0M		
Account 06 Fish and Wildlife	52.47%					$41.7M	$49.3M
Account 08 Roads, Railroads, and Bridges	52.47%	$178.6M	$211.1M				
Account 11 Levees and Floodwalls	52.47%			$395.5M	$457.9M		
Account 30 Planning, Engineering, and Design	52.47%	$28.1M	$34.1M	$148.5M	$176.5M	$5.0M	$6.0M
Account 31 Construction Management		$26.8M	$32.8M	$70.6M	$84.8M	$5.1M	$6.2M
Sub Total		**$249.1M**	**$295.9M**	**$761.9M**	**$906.8M**	**$55.4M**	**$65.6M**
Total First Cost		**$1,066 B**					
Total Project Cost (Mid. 2031Q3)		**$1,268 B**					

*These estimates (East Riser and Oakwood Beach) were provided by the Sponsors and have not been created or fully verified by USACE. For the final report, the estimates will be created by the Architect/Engineer and will be fully reviewed and verified by USACE. The Sponsor estimates have been escalated from the time of creation to current date (FY2025Q3) using the CWCCIS composite index for ALL features, dated March 31, 2025.

At current price levels (FY25 price levels, the Actionable Elements have an estimated project first cost of $1.07 billion and an annualized cost of $41.4 million (based on 3% federal discount rate). The annualized cost includes planning, engineering and design, construction management, interest during construction, and operation and maintenance, including contingencies.

In accordance with the cost share provisions in Section 103 of the Water Resources Development Act (WRDA) of 1986, as amended (33 U.S.C. §2213), project design and implementation are cost shared 65% federal and 35% non-federal. Project costs, including the cost of lands, easements, rights-of-ways, relocations, and disposal/borrow areas will continue to be refined. The plan would be cost shared as 65 percent Federal (~$824million) and 35 percent Non-Federal (~$444million).

6.3. Economic Benefits

The recommended plan provides a range of economic benefits, primarily quantified via the Hydraulic Engineering Center Flood Damage Analysis (HEC-FDA; version 2.0.2) economic model, developed by the USACE Institute for Water Resources (IWR). HEC-FDA is a USACE-certified model that quantifies expected annualized damages to structures and their contents due to flooding in a study area. The model relies on a range of geographic, hydrologic, and economic inputs. Wildfire risk management benefits were also computed for the Oakwood Beach Actionable Element Site using Risk Management Center (RMC) TotalRisk version 1.0, also a USACE-certified model. RMC-TotalRisk is a highly flexible model that relies on user-specified hazard, transform, and consequence functions, to quantify hazard-specific risk. Additional details on the HEC-FDA and RMC-TotalRisk analyses and these inputs can be found in Appendix D.

The economic benefits of a plan are derived from a comparison between risk (expected annualized damage) under the with- and without-project conditions. The reduction in (flood and/or wildfire) risk under the with-project condition is the primary economic benefit of a project. Annual benefits were computed for the full economic life of the proposed actionable elements (50 years from the base year, 2037-2086). It is assumed that construction would begin in 2030 and end in 2037, over a 7-year construction duration. The plan's first year of fully realized economic benefits would be in 2037. These annual benefits were discounted to the base year and amortized over the same 50-year period of economic analysis. Flood risk and economic benefits were estimated at FY25 price levels and discounted using the FY25 federal discount rate of 3.0% (pursuant to EGM 25-01).

Future Without-Project Economic Damages. Economic damages caused by all hazards (coastal storms, fluvial flooding, and wildfires) were estimated as appropriate for each Actionable Element Site under a future without-project condition. Coastal storm risk was evaluated under the USACE intermediate RSLC scenarios (pursuant to ER 1110-2-8162). CSRM benefits for the Harlem River Actionable Element were also evaluated under the USACE low and high scenarios; these values are reported in Appendix D. Under the future without-project condition, average annual damages are $37,312,000 (FY25price level). Of this total, the Harlem River Actionable Element is estimated to contribute $3,616,000 in average annual CSRM damages. The East Riser Actionable Element is estimated to contribute $33,664,000 in average annual flood risk damages. The Oakwood Beach Actionable Element is estimated to contribute $32,000 in average annual wildfire damages.

Future With-Project Economic Benefits. Over the 50-year period of analysis (2037-2086), under the future with-project condition, Average Annual Benefits are $19,134,000 (FY25 price level). Of this total, the Harlem River Actionable Element is estimated to provide $3,614,000 in average annual CSRM benefits. The East Riser Actionable Element is estimated to provide $15,494,000 in average annual flood risk management reduction benefits. The Oakwood Beach Actionable Element is estimated to provide $26,000 in average annual wildfire risk management benefits.

Future With-Project Residual Damages. The recommended plan will not fully manage risk within the Actionable Element Sites. Over the 50-year period of analysis (2037-2086), under the future with-project scenario, the residual risk is $18,178,000 (FY25 price level) in estimated average annual damages. Of this total, the Harlem AE is estimated to retain $2,000 in average annual CSRM damages. The East

Riser Actionable Element is estimated to retain $18,170,000 in average annual flood risk damages. The Oakwood Beach Actionable Element is estimated to retain $6,000 in average annual wildfire damages.

Net Economic Benefits and Benefit-to-Cost Ratio. A comparison of the future with- and without-project economic benefits was completed to calculate the plan's net economic benefits. Annual net economic benefits provided by the plan (Alternative C) are estimated to be -$22,315,000 (FY25 price level). The corresponding benefit-to-cost ratio is 0.5.

6.4. Environmental and Social Benefits

The Tentatively Selected Plan would provide beneficial effects to communities and natural and cultural resources through reduction of damages from coastal storms resulting in long-term moderate beneficial impacts on surface water flow and water quality and sediment and contaminant transport downstream or within the risk-reduced areas. The TSP is also expected to provide benefits through replacement of nonnative with native plant species, creation of natural habitat, and improved water quality which would benefit fish and benthic fauna and other wildlife. The Oakwood Beach site is part of the National Park Service, Gateway National Recreation Area (a Marine Protected Area) and New York Bight Estuary, as well as a State and Federally listed wetland, the benefits of this project would be of regional significance to multiple resources and communities throughout the area.

6.5. Risk and Uncertainty Analysis

There remains risk and uncertainty in project planning, engineering design, and environmental compliance at this phase of the Study. Risk and uncertainty will be managed as more information is known and analyses are refined throughout the Study, and into the Preconstruction Engineering and Design phase and construction. This Section presents major areas of risk and uncertainty known at this time.

6.5.1. Implementation Risk

A potential project has not been authorized by the U.S. Congress, and funding has not yet been appropriated for design and construction by the Federal government nor non-Federal sponsors. The project schedule (Appendix C) assumes authorization and funding will be provided in a timely manner. The schedule was estimated for Study analysis purposes and is dependent on Congressional authorization, Federal and non-Federal budgeting, and the execution of legal agreements. There is a risk that implementation be delayed if authorization and funding are not provided within the construction schedule, or at all. Appendix C includes information about implementation risk.

6.5.2. Residual Risk

Flood risk is the function of flood hazard at a location, and exposure and vulnerability to the flood hazard. Residual risk is the flood risk that remains after a project is in place. It is the exposure to loss remaining after other known risks have been countered, factored in, or managed or addressed.

The proposed actions at East Riser, Harlem River, and Oakwood Beach will not eliminate all flood risk to life and property. Flood damages from coastal flooding will not be totally prevented, only managed. While there would still be properties and infrastructure that are vulnerable to coastal storm flood damages, this flood damage would be managed with the projects in place. However, the projects will not provide as many economic benefits for coastal storms that exceed project design criteria. Average annual damages under the future with-project condition are $18,178,000 (FY25 price level). This means the Actionable Element Site will experience $18,178,000 in annual economic damages with the projects in place.

The proposed projects complement other ongoing efforts in the Study Area to manage the risk of coastal storm damage, as described in the September 2022 draft Feasibility Report. Post-disaster assistance and aid for owners of these properties may come from other Federal agencies, such as FEMA and USHUD, or from programs run by the States of New Jersey and New York.

6.5.3. Risk to Life Safety

Life safety is the risk to individuals who may be affected by coastal storms and other events. Individual life risk is influenced by location, exposure, and vulnerability within a leveed area. Communities in the affected areas have always experienced flooding from coastal storms. Residents generally understand the severe implications of staying in harm's way when a coastal storm is forecasted to affect the area. Because there is typically two to seven days' notice prior to hurricanes and tropical storms, residents are typically given sufficient warning to evacuate. However, residents typically have only a few hours warning before the arrival of smaller storms and rain events that cause flash flooding. Residents should evacuate prior to storms to avoid being stranded, which could pose a danger to their welfare. Emergency vehicles may not be able to reach residents in distress due to the flooding of roads and homes. In addition, there is an increased risk of fire in communities due to the potential compromising of electrical and natural gas systems. The inherent erratic nature and unpredictability of a storm's path and intensity requires early and safe evacuation. A policy of early, total evacuation should be continued even with the projects in place.

In the case of Harlem River, the proposed floodwall will have tie-offs crossing the Harlem River Drive, which will discourage motorists from trying to use it during flood events. The closed Drive prevents a dangerous situation of motorists being stranded on flooded roads, or even worse, injured or killed in flash flooding situations. As for East Riser, the proposed channelization will bring floodwaters into the channel instead of pooling around businesses and residences, which will reduce life safety risk, as well as exposure to pollutants in the run-off.

Life Safety Risk Indicator (LSRI)

USACE has developed the LSRI tool which provides a screening-level, relative representation of the life risk that would be reduced if a flood damage reduction project was constructed. The LSRI incorporates not just consequence information, but also likelihood of the consequences to determine risk.

The tool applies an empirically derived fatality rate to the remaining population once floodplain occupants take protective action. Factored into that fatality rate is how well defined is the community's evacuation planning, residents' perception of flood risk and the effectiveness of emergency management procedures.

East Riser

To gage the life loss probability estimates for the East Riser Actionable Element Site in the LSRI, certain assumptions about people's responsiveness to the threat are made. A worst-case scenario is modeled where people don't evacuate even though there are official promptings for them to find shelter. The study area spans two municipalities, each municipality with its own flood emergency evacuation planning. Because of the differences in emergency planning for these communities, a general messaging approach is assumed as what is applied at the state level. New Jersey state has all hazards safety directions for residents to practice in the event of any event not specific to floods. Under this assumption, residents may not know what to do or where to go and when to take action. Community awareness of the risk to flooding will influence their perception of flood risk. In the study area, the population at risk generally understands that the risk exists because of historical events but they may not have the opportunity to respond to environmental cues of the flood's high consequence potential. Under these worst-case scenarios, i.e., no evacuation, mean life loss under a peak inundation scenario is 22 for day population and 14 for night, details are presented in the table below

Table 40: LSRI – East Riser

Parameter	Day	Night
PAR	3,262	2,136
Exposed Population	3,262	2,136
% of PAR Exposed	100%	100%
Median Life Loss	22	14
Fatality Rate	0.67%	0.66%
Mean Life Loss (Exposure Weighted)	18.41	
Mean Life Loss as % of PAR	0.71%	
Weighted Fatality Rate (% of Exposed PAR)	0.71%	
Property Damages	$523M	
# Structures Inundated	374	

Harlem River

To gage the life loss probability estimates for the Harlem River Actionable Element Site in the LSRI, certain assumptions about people's responsiveness to the threat are made. A worst-case scenario is modeled where people don't evacuate even though there are official promptings for them to take protective action. The study area in Community District 10 in Northern Manhattan does not have its own flood emergency evacuation planning. Instead, New York County emergency planning is assumed for the community which is a general messaging to follow safety directions in any hazard event. Under this assumption, residents may not know what to do or where to go and when to take action. Members of the community may have complications as far as taking protective action, for example, some shelters don't

allow pets, or they simply don't have the means to get out of the floodplain safely. Their response will depend on awareness of the risk to flooding. In the study area, the population at risk generally understands that the risk exists because the Sandy storm caused damages throughout the city, but they may not have the opportunity to respond to environmental cues of an event's high consequence potential. The worst case of no evacuation is modeled in the LSRI, and results show that median life loss under a peak inundation scenario is low (***Table 40***). However, the tool only accounts for populations within the delineated boundary and not for through traffic. The East Harlem site has the major Harlem River Drive which motorists use to go north and south in the city. The Harlem River Drive at the Harlem River Actionable Element Site also connects to major conduits such as Interstate 87, Interstate 278 and the FDR Drive. According to state traffic records, Harlem River Drive from East 135th Street and Madison Avenue north to Routes 1 and 95I George Washington Bridge, actual average daily traffic (AADT) counts was 87,420 in 2024. The highest recorded AADT was over 96,000 in 2009. At any moment with this amount of volume the Harlem River Drive can become the site of significant flooding during an event leaving sections of the road impassable and even relatively shallow flooding can lead to a vehicle being upended or swept away. Motorists will continue to be at risk and may not get the warning in time and may not have the time to respond or know how to respond in the case of a flood event. The life loss risk to motorists is an important consideration but is left unaccounted for in the modeling.

Table 41: LSRI – Harlem River

Parameter	Day	Night
PAR	3,122	3,941
Exposed Population	370	472
% of PAR Exposed	11.85%	11.96%
Median Life Loss	0	0
Fatality Rate	0.00%	0.00%
Mean Life Loss (Exposure Weighted)	0.01	
Mean Life Loss as % of PAR	0%	
Weighted Fatality Rate (% of Exposed PAR)	0%	
Property Damages	$33M	
# Structures Inundated	35	

Oakwood Beach

Life loss is not considered for the Oakwood Beach Actionable Element Site where there is zero PAR, and road access is well off site.

6.5.4. Induced Flooding

Induced flooding, which can occur during a coastal, fluvial, or pluvial event, is defined as the increase in flood levels or expansion of flooded areas due to a USACE project or action. Induced flooding may

increase water surface elevations on the interior of a CSRM project due to run-off and drainage area restrictions or increase water surface elevations on the exterior of a CSRM project due to reduction in floodplain. USACE guidance requires attention be paid to induced flooding caused by proposed projects. When a project plan would result in induced flooding, guidance requires that mitigation measures be investigated and implemented when economically justified, when there are overriding reasons of safety or economic or social concerns, or when it is determined that the induced flooding is significant enough to be considered a real estate "takings".

Induced flooding is not anticipated as a result of project implementation at Harlem River, East Riser, or Oakwood Beach; however, further analysis may be needed upon selection of the final project to ensure negligible impacts to nearby communities.

6.6. Implementation Considerations

Should this project be authorized by the U.S. Congress and funding appropriated for construction, the project design will be updated and modified during later stages of the planning process, and ultimately throughout the Preconstruction Engineering Design phase and construction. The public, stakeholder groups, and resource agencies will have the opportunity to share feedback that may change project design. Such modifications may require supplemental investigations into environmental and social benefits and impacts.

New York District will complete detailed analyses and design in the Preconstruction Engineering Design phase that will inform the final design and ultimately construction. The Preconstruction Engineering Design phase could begin after completion of this Study, and when the U.S. Congress authorizes a project. Detailed analyses include but are not limited to:

- A review of changed conditions since the completion of the study that may affect project design
- Updated engineering modeling
- Detailed surveys of physical and engineering data
- Detailed environmental and cultural resources surveys
- Detailed assessment of structures identified for nonstructural measures
- Additional environmental coordination that may be required if there are environmental, cultural, and/or historic resource impacts that were not identified during this Study

Current estimated construction schedules assume the projects for East Riser, Harlem River, and Oakwood Beach will be built by 2037. Different increments of the project may be completed as funding allows during this timeframe. Phased implementation will consider the priorities of the non-Federal sponsors, communities benefitted by the project, resource agencies, and efficiencies in the construction and/or contracting process.

Federal, state, and local governmental agencies, as well as non-profit and private interests will continue to implement coastal resilience projects throughout the General Study Area. It will be important to reassess existing conditions prior to construction to incorporate any changes to the General Study Area that may have occurred after the study is completed.

6.7. Operation, Maintenance, Repair, Replacement, & Rehabilitation

Operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) includes actions to sustain the constructed project and to maintain the stated level of benefits at the completion of construction and into the future. The non-federal sponsors are responsible for OMRR&R costs and actions. Generally, the non-Federal sponsors are required to repair, rehabilitate or provide replacement of components to maintain the original project benefits. A detailed OMRR&R manual will be developed during the Preconstruction Engineering and Design phase to outline the expected OMRR&R requirements for each project component. OMRR&R costs will be calculated and provided for the Final Integrated Interim Response Feasibility Report and Environmental Assessment.

7. Effects and Consequences*

A rating methodology tool was developed by the USACE New York District, and utilized in the preparation of the Environmental Appendices for each Actionable Element Site to qualitatively assess and compare the adverse and beneficial effects of each resource within the Study Area. A prior version of this tool was presented in the September 2022 Draft Integrated Report and Tier 1 (Programmatic) EIS. Enhancements to the tool since release of the Draft Report include refinements of adverse effects criteria definitions, development of beneficial effects criteria definitions, development of a Cultural Resource rule set, synthesizing the data by additional methods (averaging, as also done in the September 2022 report, numerical computing of the no action and beneficial effects, as well as escalating the highest adverse effect score and highest benefit score for alternative comparison purposes, to inform plan selection, the environmentally preferred alternative, and the wholistic adverse and beneficial effects anticipated by the alternatives of the Actionable Element Site). The applied scoring methodology is provided in the following tables:

Table 42: Applied Scoring Methodology for Adverse Effects

Adverse Effect Rating Criteria	
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 to Moderate (-2)	Effects to the resource are expected to be low to 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 (-1)	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 are not necessary to sustain low to no impact to the resource.
No Impact (0)	There would be no adverse effects to the resource because the resource would not be affected.

Table 43: Applied Scoring Methodology for Beneficial Effects

Beneficial Effect Rating Criteria	
Impact Rating and Numerical Score	**Description**
High (+5)	Effects to the resource would have substantial beneficial effects, locally and regionally in the near-term and long-term, that are measurable and quantifiable in some manner of significance (e.g. manage coastal storm risk for communities and ecosystems and significantly improve area above and beyond existing conditions that is quantifiable and measurable beyond qualitative existing condition.
Moderate to High (+4)	Effects to the resource would have substantial beneficial effects either locally and/or regionally in the near-term or long term, that is noticeably greater and may be quantifiable in some matter (e.g. manage coastal storm risk to communities and ecosystems, additional benefit(s) to the resource that is quantifiable or measurable beyond qualitative existing condition, or that is qualitatively beneficial to a number of related resources).
Moderate (+3)	Effects to the resources would have more substantial beneficial effects, that are localized to the resource, or multiple resources, that is noticeably greater and may be quantifiable in some manner (e.g. managed coastal storm risk for communities and ecosystems and additional benefits to the resource that is measurable beyond existing condition).
Low to Moderate (+2)	Effects to the resources would have additional beneficial effects beyond the prior rating criteria, that are localized to the resource (e.g. manage coastal storm risk for communities and ecosystems and an additional benefit to the resource).
Low (+1)	Effects to the resource would have some beneficial effects, that are localized to the resource, and improves beyond existing condition (e.g. manage coastal storm risk for communities and ecosystems).
No Impact (0)	There would be no anticipated beneficial effects to the resource because the resource would not be affected beyond that of existing condition.

Both rating methodologies analyses and qualitative scoring informed the effects assessments and the EQ account for Plan Selection and identifying the environmentally preferred alternative for each Actionable Element site. Scores for adverse impacts were rated for each resource on a scale of “0” to “–5”, with “0” being no impact to the resource, and “–5” being significant impacts to the resource that would be considered not environmentally acceptable.

The following tables present the results of the adverse and beneficial effects assessments completed in Appendix A for each of the Actionable Element Sites, including a high-level description of the effects anticipated. Refer to Appendix A for the detailed assessment and individual score cards presented for each individual resource presented below.

7.1. Harlem River

7.1.1. Natural Environment

The following table of effects was generated from the effects assessment presented in Appendix A, and provides a high-level overview of the anticipated adverse and beneficial effects of Construction, Operations and Maintenance, and Mitigation if applicable. Refer to Appendix A for supporting detail and individual effect rating score cards.

NATURAL ENVIRONMENT SCORECARD HARLEM RIVER Qualitative Rating Score	NO ACTION TOTAL SCORE[1]	SEAWARD TOTAL SCORE[2]	LANDWARD TOTAL SCORE[3]
WILDLIFE AND VEGETATION			
Wildlife	-1	0	-2
Fish	0	+4	0
Migratory Fish	0	+4	0
Terrestrial Vegetation	0	0	0
Submerged Aquatic Vegetation	NA	NA	NA
Invasive and Aquatic Nuisance Species	0	+1	+1
SPECIAL STATUS SPECIES			
Threatened and Endangered Species (Terrestrial)	0	+1	+1
Threatened and Endangered Species (Aquatic)	0	0	0
Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act Species	0	+1	+1
Marine Mammal Protection Act Species	NA	NA	NA
Sea Turtles	NA	NA	NA
Essential Fish Habitat and EFH-Designated Species	-1	+1	0

SPECIAL STATUS AREAS			
Wetlands	0	+2	0
Floodplains	0	0	0
Wild and Scenic Rivers	NA	NA	NA
Designated Critical Habitat	NA	NA	NA
Critical Environmental Areas	NA	NA	NA
Marine Protected Areas	NA	NA	NA
Coastal Zone Management Act Areas	-2	+2	+1
Coastal Barrier Resources Act Areas	NA	NA	NA
National Park Service Land	NA	NA	NA
Wildlife Refuge Land	NA	NA	NA
Commercial and Recreational Fishing	0	+1	0
Subtotal Scores (additive, for calculation)	*-4*	*+17*	*+2*
TOTAL AVERAGED SCORE (calculated, averaged. Subtotal divided by total number of resources applicable and scored):	-0.30	+1.30	+0.15
TOTAL HIGHEST ADVERSE EFFECT ESCALATED SCORE (for comparison purposes)	-2	-1	-2
TOTAL HIGHEST BENEFICIAL EFFECT ESCALATED SCORE (for comparison purposes)	+1	+4	+3

7.1.2. Adverse Effects Summary

Wildlife and Vegetation

No Action Alternative

The No Action Alternative adverse effects range from 0, or no adverse effect, to -1 (low adverse effect). The no action is anticipated to continue to have wildlife vulnerable to coastal flood risk and damages. Coastal storm damages would contribute to continued loss of habitat and food species based on repeated flooding and wind from storms and relative sea level change (RSLC). Although the no action would continue from the existing condition trajectory, frequency of storms and severity of storms may

increase over time, as may RSLC. Wildlife and vegetation disturbance, displacement, and, in severe cases casualties, could occur, as could degradation and/or removal of associated habitat for foraging and shelter.

Action Alternative – Seaward Alignment

During construction, Direct adverse effects from construction may cause temporary displacement, noise, vibrations, and disturbances that would make existing habitat temporarily unusable. Wildlife are expected to move to areas of nearby suitable habitat and avoid active construction, returning once construction is complete. Indirect effects may cause foraging / food sources to be disturbed and/or removed temporarily but are anticipated to return in frequency and abundance following construction. Wildlife in this area are accustomed to noise, vibration, and the activity of city life. Direct adverse effects from operations and maintenance impacts would be temporary and associated with upkeep of the complimentary NBS and seawall and deployable barrier closures before a storm, of which the activity and noise would encourage wildlife to disperse. Vegetation and trees along the riverfront and tie-ins may have to be removed. Operations and maintenance activities are anticipated to be negligible.

Action Alternative – Landward Alignment

Direct adverse effects from construction may cause temporary displacement, noise, vibrations, and disturbances that would make existing habitat temporarily unusable. Wildlife is expected to move to areas of nearby suitable habitat and avoid active construction, returning once construction is complete. Construction in areas of vegetation will remove wildlife habitat temporary particularly for small mammals and birds. Indirect effects may cause foraging / food sources to be disturbed and/or removed temporarily but are anticipated to return in frequency and abundance following construction. Wildlife in this area are accustomed to noise, vibration, and the activity of city life. Direct adverse effects to terrestrial vegetation include the removal of existing vegetative habitat along the footprint of the alignment and staging areas (if placed on vegetative areas). Most of the vegetation planted for this alternative would be on the western side and the floodwall could hinder growth of vegetation reducing available sunlight. Indirect adverse effects include habitat conversion from vegetation to floodwall losing habitat for terrestrial species. Operations and maintenance activities are anticipated to be negligible.

Special Status Species

No Action Alternative

The No Action Alternative adverse effects range from 0, or no adverse effect, to -1 (low adverse effect) primarily due to the coastal storm risk and RSLC. The no action is anticipated to continue to have the surrounding area vulnerable to the effects of coastal flood risk and damages. Although the no action would continue on the existing condition trajectory, frequency of storms may increase over time, as may RSLC. Stressors to special status species, such as erosion and habitat conversion, could occur, as could removal of associated existing habitat for foraging and shelter for wildlife.

Action Alternative – Seaward Alignment

Prior to construction, threatened and endangered species surveys may be conducted as necessary to identify potential special status plants or wildlife species present, or with the potential to be present. Should species be identified as present, or potentially present, avoidance is the primary mitigation action to prevent adverse effects to these species. The proposed efforts at this Actionable Element Site that are relevant to the terrestrial environment portions of the alignment (such as the floodwall tie-ins to high

ground) are highly urban. It is likely species potentially present in this area are accustomed to urban environments (e.g. bats). While Atlantic and Shortnose Sturgeon may be present in the Harlem River, there is no anticipated sustaining habitat along this portion of the river. Direct effects from construction will cause temporary and localized noise, vibration, and turbidity disturbances for species passing through, which will be mitigated through appropriate construction windows, and the utilization of other BMPs to reduce adverse effects. Operations and maintenance activities are anticipated to be negligible.

Action Alternative – Landward Alignment

Prior to construction, threatened and endangered species surveys may be conducted as necessary to identify potential special status plants or wildlife species present, or with the potential to be present. Should species be identified as present, or potentially present, avoidance is the primary mitigation action to prevent adverse effects to these species. The proposed efforts at this Actionable Element Site are primarily focused on a terrestrial environment that is highly urban. Potential indirect effects may include the temporary disturbance and/or removal of habitat for foraging species and prey during construction. Although the threatened and endangered species will be avoided, there may be ancillary disturbances that cannot be avoided that may deter species, such as noise and vibrations although those are anticipated to be temporary, low, and addressed through best management practices. Operations and maintenance activities are anticipated to be negligible.

Special Status Areas

No Action Alternative

The No Action Alternative adverse effects range from 0, or no adverse effect, to -2 (low to moderate adverse effect) primarily due to the coastal storm risk and RSLC.

Action Alternative – Seaward Alignment

During construction, the Action Alternative adverse effects range from 0, or no adverse effect, to -2 (low to moderate adverse effect) primarily due to the temporary disturbances of active construction, and the physical manipulation of the Actionable Element Site that would be anticipated to disturb existing special status areas. These disturbances include temporary removal of habitat and restricted access to portions of the site while active construction is commencing. Operations and maintenance activities are anticipated to be negligible

Action Alternative – Landward Alignment

During construction, the Action Alternative adverse effects range from 0, or no adverse effect, to -2 (low to moderate adverse effect) primarily due to the temporary disturbances of active construction, and the physical manipulation of the Actionable Element Site that would be anticipated to disturb existing special status areas. These disturbances include temporary removal of habitat and restricted access to portions of the site while active construction is commencing. Operations and maintenance activities are anticipated to be negligible.

7.1.3. Beneficial Effects Summary

Wildlife and Vegetation

No Action Alternative

No beneficial effects of the no action are anticipated.

Action Alternative – Seaward Alignment

Beneficial effects of the Seaward Alignment are primarily focused on the management of coastal storm risk and wave attenuation, as well as the additional related ecological benefits that provide qualitative, and quantifiable, benefits to several natural resources. The proposed project would add complimentary NBS. These NBS would create more friendly habitat for wildlife such as fish and birds increasing the availability of foraging and sheltering areas for wildlife in the vicinity, as well as species migrating through the area. This alternative would reduce risk to the more inland vegetation maintaining wildlife habitat during storm events. Therefore, many of the wildlife and vegetation resources would incur a range of "+1" to "+3" score depending on the individual resource.

Action Alternative – Landward Alignment

Beneficial effects of the Action Alternative are primarily focused on the management of coastal storm risk. This alignment may deter wildlife from accessing Harlem River Drive, decreasing incidents with traffic. The entire degraded greenspace may be replaced by native, pollinator friendly species, improving wildlife habitat and promote success of the native plantings through removal of all invasives in the greenspace. Direct beneficial effects from construction include reduced CSRM to vegetative damages. Indirect beneficial effect includes native habitat creation for wildlife with the conversion from invasive to native vegetation. Therefore, many of the wildlife and vegetation resources would incur a range of "0" to "+1" score depending on the individual resource, often with net outcomes of "0" that account for both adverse and beneficial effects.

Special Status Species

No Action Alternative

No beneficial effects of the no action are anticipated.

Action Alternative – Seaward Alignment

There are no effects anticipated to terrestrial threatened and endangered species during construction of the alignment therefore effects are represented by a corresponding rating criteria score of 0. Beneficial effects to aquatic threatened and endangered species are anticipated to be moderate, as the complimentary NBS will provide newly created habitat aquatic species to forage and shelter where none existed before. However, due to the limit in special status species habitat and presence anticipated for threatened and endangered species, a corresponding overall score of "0" to "+1" is anticipated.

Action Alternative – Landward Alignment

Beneficial effects to special status species are anticipated to be low, as existing degraded habitat will be replaced with native habitat, that may consider pollinator friendly species and encourage migratory birds or other special status species to forage. However, due to the limit in special status species habitat and presence anticipated for threatened and endangered species, a corresponding overall net score of "0" to "+1" is anticipated.

Special Status Areas

No Action Alternative

No beneficial effects of the no action are anticipated.

Action Alternative – Seaward Alignment

The seaward alternative would have beneficial effects to special status areas through the creation of the NBS such as oyster reefs, tidal wetlands, tide pools, and seawall panels, armor blocks, and or pile encapsulations that support aquatic marine organism growth. Direct and indirect beneficial effects from operation and maintenance of the site are anticipated due to the NBS. The site would continue to be monitored for establishment of the NBS. Maintenance may include non-native plant management. Any operations and maintenance activities, including herbicide applicable, will be done under Best Management Practices, and with the appropriate Federal and/or State permit and regulations. Therefore, operations and maintenance effects are anticipated to have low benefit. Many of the special status area resources would incur a range of "0" to "+3" score depending on the individual resource, with the greatest benefit to wetlands and Coastal Zone Management Act areas, with a net outcome of "0" to "+2".

Action Alternative – Landward Alignment

Beneficial effects to special status areas from the landward alignment are limited due to the lack of existing designated areas, but are anticipated to be highest for the Coastal Zone Management Act zone. The alignment will reduce coastal storm risk to the Harlem River waterfront area from the impacts associated with sea level change, storm surges, and coastal flooding. The landward alignment would reduce risk to the environment, life, property, and infrastructure from the impacts of coastal storms in the area. This alignment would remove invasive species from the degraded greenspace and may replace them with native, pollinator-friendly species, which would improve the existing wildlife habitat and promote the success of native plantings. Many of the special status area resources would incur a range of "0" to "+3" score depending on the individual resource, with the greatest benefit to Coastal Zone Management Act areas, with a net outcome of "0" to "+2".

7.1.4. Physical Environment

The following table of effects was generated from the effects assessment presented in Appendix A, and provides a high-level overview of the anticipated adverse and beneficial effects of Construction, Operations and Maintenance, and Mitigation if applicable. Refer to Appendix A for supporting detail and individual effect rating score cards.

PHYSICAL ENVIRONMENT SCORECARD HARLEM RIVER Qualitative Rating Score	NO ACTION TOTAL SCORE[1]	SEAWARD TOTAL SCORE[2]	LANDWARD TOTAL SCORE[3]
PHYSICAL RESOURCES			
Topography and Geology	**0**	**+1**	**+1**

PHYSICAL ENVIRONMENT SCORECARD HARLEM RIVER Qualitative Rating Score	NO ACTION TOTAL SCORE[1]	SEAWARD TOTAL SCORE[2]	LANDWARD TOTAL SCORE[3]
Surface Waters	-1	0	-1
Sediment	-1	0	-1
Land Use	0	0	0
Hydrological Resources			
Bathymetry	0	0	0
Inland Hydrology	0	0	0
Coastal Hydrology, Currents, and Circulation	0	0	0
Tides, Tidal Exchange, and Tidal Range	0	0	0
Sediment Transport	0	0	0
Water Quality	-1	0	0
Air Quality	0	0	0
Climate and Relative Sea Level Change	0	0	0
CULTURAL RESOURCES			
Historic Structures[1]	-1	+3	+1
Viewshed / Historic Setting[1]	-1	+4	-3
Terrestrial Archaeological Resources[1]	-1	+2	-2
Submerged Archaeological Resources[1]	-1	-1	0
Native American Land	NA	NA	NA
Hazardous, Toxic, Radioactive Waste	-1	0	0
Navigation and Traffic	0	+2	0
Noise and Vibration	0	0	+1

PHYSICAL ENVIRONMENT SCORECARD HARLEM RIVER Qualitative Rating Score	NO ACTION TOTAL SCORE[1]	SEAWARD TOTAL SCORE[2]	LANDWARD TOTAL SCORE[3]
Socioeconomics and Demographics	NS	NS	NS
Subtotal Scores (additive, for calculation)	*-8*	*+11*	*-4*
TOTAL AVERAGED SCORE (calculated, averaged. Subtotal divided by total number of resources applicable and scored):	-0.42	0.57	-0.21
TOTAL HIGHEST ADVERSE EFFECT ESCALATED SCORE (for comparison purposes)	-1	-1	-4
TOTAL HIGHEST BENEFICIAL EFFECT ESCALATED SCORE (for comparison purposes)	0	+4	+3

7.1.5. Adverse Effects Summary

Physical and Hydrological Resources

No Action Alternative

The No Action Alternative adverse effects range from 0, or no adverse effect, to -1 (low adverse effect) primarily due to the coastal storm risk and RSLC.

Action Alternative – Seaward Alignment

Minimal adverse effects are anticipated, as the area is highly urbanized with minimal amounts of soils available on the surface and topography dominated with buildings and roads. Temporary adverse impacts to surface waters will occur during the construction of seaward alternative. The in-water measure would be anticipated to be placed approximately 25-feet into the river, which would result in the Harlem River being less wide in this portion of the river. Given the river has limited use beyond vessels passing through and some recreational fishing, this effect is not anticipated to be significant. Temporary impacts to sediments include resuspension during foundation installation, removal during dredging and excavation, and change in type of sediment due to fill activities. Clearing and sediment excavation and fill and/or the presence of a new foundation or structure during the construction of the alternative are not anticipated to change the bathymetry appreciably.

Action Alternative – Landward Alignment

Minimal adverse effects are anticipated, as the area is highly urbanized with minimal amounts of soils available on the surface and topography dominated with buildings and roads. During storm conditions, surface waters would be expected to rise and continue to flood the Harlem River Drive, as anticipated under the no action alternative. The tie-ins to the alignment may change some greenspace into hard structures depending on exact siting. However, this will not impact any parks. Tie-ins and gates may also impact the Harlem River Drive as they span the drive with the alignment. Evacuation routes and access the future waterfront development will need to be coordinated with local officials.

Water Quality and Air Quality

No Action Alternative

The No Action Alternative adverse effects range from 0, or no adverse effect, to -1 (low adverse effect) primarily due to the coastal storm risk and RSLC. Water quality can be impaired with the continued flooding due to urban runoff.

Action Alternative – Seaward Alignment

Minor direct and indirect adverse effects from the seaward alternative are anticipated. During construction sediment will be resuspended locally. Best Management Practices such as sediment barriers will minimize sediment transport. Emissions from construction of the Action Alternative are anticipated to be below the de minimis levels on a yearly basis. The sole impact producing factor to air quality is regulated air emissions, which will be below General Conformity significance.

Action Alternative – Landward Alignment

No direct and indirect adverse effects from the landward alternative are anticipated to water quality, as the alignment would not have measures in the water, and construction would be conducted under a construction stormwater pollution prevention plan. Emissions from construction of the Action Alternative are anticipated to be below the de minimis levels on a yearly basis. The sole impact producing factor to air quality is regulated air emissions, which will be below General Conformity significance.

Cultural Resources

No Action Alternative

The No Action or No-Build Alternative was assessed in relation to the project's purpose and need. Under this scenario, no measures would be implemented to address future flood risks, which are anticipated to worsen due to relative sea level rise. As a result, this alternative would leave existing aesthetic, visual, historical, and cultural resources vulnerable to damage. Dozens of archaeological sites and aboveground historic resources within the study area face the risk of deterioration or destruction from coastal flooding and sea-level rise. Additionally, submerged cultural resources may be affected by underwater storm activity and alterations in seawater flow patterns associated with flooding and rising sea levels.

Action Alternative – Seaward Alignment

Despite its benefits, the seaward alignment results in low adverse effects to historic viewsheds due to the introduction of a hardened edge along the river. While less visually intrusive than a landward wall in some areas, the project may still alter the relationship between the city and river historically important to the area’s development.

Impacts to submerged archaeological resources are assessed as low adverse, due to high levels of past disturbance from dredging, bulkhead construction, and other marine activities. However, the potential for buried shipwrecks or waterfront structures remains, warranting archaeological review. While unlikely to yield significant finds, best practices would recommend a remote sensing survey prior to construction to confirm absence of intact features.

Action Alternative – Landward Alignment

The landward alignment results in moderate to high adverse effects to historic viewsheds, especially where the floodwall introduces vertical visual barriers not currently present in the streetscape. These changes may diminish the historic character of key corridors and obscure sightlines to landmarks and the Harlem River.

There is also moderate adverse potential to below-ground archaeological resources, particularly in the small, vegetated segment of the alignment. Though much of the footprint follows disturbed urban surfaces, any remaining intact archaeological deposits may be deeply buried beneath layers of fill or pavement. Construction-related excavation could pose a risk without appropriate testing or monitoring.

Visual Impact Area

The measures included in the study could disrupt or enhance existing viewscapes, depending on location and scale. Construction of structural measures may affect scenic byways, diminish, or lose existing residential views, and/or obstruct access to historic coastal sites (USACE 2019). Aesthetic valuation, a judgement of value based on appearance of an object and emotional responses, of the public is ongoing and will be updated as stakeholder input is aggregated but was not used to determine the preliminary impact rating.

Measures proposed for the Actionable Element will involve the construction of structures that have a potential to indirectly affect historic properties, most prominently by altering the visible environment (i.e., setting) of those resources. For this study, the visual impact study area (Indirect APE) includes those places within one mile (1.6 km) of proposed measures for the alternative that are in the potential viewshed (based on topography). This Visual Impact Area, or Zone of Visual Influence (ZVI), encompasses parts of northeast Harlem, Washington Heights and the Bronx, New York City. As of this writing, this preliminary visual impact analysis is an initial screening of impacted historic properties and may be refined in subsequent iterations.

A visibility analysis that takes the built environment and vegetation into account are beyond the scope of the Study. Additional discussion and evaluation of the visual impacts from the Alternative is available in the Cultural Resource Sub-Appendix.

Hazardous, Toxic, Radioactive Waste

No Action Alternative

The no action is anticipated to continue to have the surrounding area vulnerable to coastal flood risk and damages. Storm damage to a significantly urbanized area, such as the Lower Hudson/East River Planning Region, can cause new releases of petroleum and/or hazardous substances, further spread historical contaminated soils and sediment, increase potential risk of exposure, and extend time and increase costs for addressing HTRW sites.

Action Alternative – Seaward Alignment

While encountering HTRW during construction is not anticipated at this time, any intrusive subsurface work associated implementation of the proposed project has the potential to disturb soil/sediment that could be contaminated with HTRW. Should contaminated soil/sediment be disturbed, there could be increased risk to human health and the environment. However, to mitigate that risk, a subsurface planning investigation would be conducted during the PED phase to further characterize the subsurface conditions. This investigation will inform any potential HTRW risks associated with construction and implementation of the proposed project and ensure there are not HTRW concerns in any areas where the subsurface may be disturbed. As per Engineer Regulation 1165-2-132, HTRW collocated within the proposed measure footprints must be avoided where feasible, and where they cannot be avoided, those sites must be remediated at 100% nonfederal cost prior to construction. Best management practices will be employed during project implementation to ensure the construction is conducted in a manner that is protective of human health and the environment and that any handling of subsurface materials is in compliance with applicable regulatory requirements.

Action Alternative – Landward Alignment

While encountering HTRW during construction is not anticipated at this time, any intrusive subsurface work associated implementation of the proposed project has the potential to disturb soil/sediment that could be contaminated with HTRW. Should contaminated soil/sediment be disturbed, there could be increased risk to human health and the environment. However, to mitigate that risk, a subsurface planning investigation would be conducted during the PED phase to further characterize the subsurface conditions. This investigation will inform any potential HTRW risks associated with construction and implementation of the proposed project and ensure there are not HTRW concerns in any areas where the subsurface may be disturbed. As per Engineer Regulation 1165-2-132, HTRW collocated within the proposed measure footprints must be avoided where feasible, and where they cannot be avoided, those sites must be remediated at 100% nonfederal cost prior to construction. Best management practices will be employed during project implementation to ensure the construction is conducted in a manner that is protective of human health and the environment and that any handling of subsurface materials is in compliance with applicable regulatory requirements.

Navigation and Traffic

No Action Alternative

No adverse effects of no action are anticipated to navigation, as the area would continue to be vulnerable to coastal flood risk and damages. Traffic related effects would be anticipated from continued storm-related damages to infrastructure and road flooding, as the Harlem River Drive is within the floodplain and exposed to coastal storm risk. Continued storm related damages to Harlem River Drive may require repairs over time, incurring temporary construction effects.

Action Alternative – Seaward Alignment

Direct and indirect impacts during construction to navigation are anticipated from the seaward alternative. The navigation channel will need to be deauthorized on the western bank. However, this should not present an issue as the river contains bridge landings in the center effectively controlling the width and height of a navigation vessels accessing the river. During construction, notices to mariners will be issued to warn of the construction hazard. Northbound traffic along the Harlem River Drive may need

to be reduced to one lane during construction and detoured or reduced while constructing the deployable barriers and tie-ins. A construction traffic plan will be developed during the PED phase with local officials and neighbors.

Action Alternative – Landward Alignment

Direct and indirect impacts during construction to navigation are anticipated under the landward alternative. Traffic along the Harlem River Drive will need to be detoured or reduced during construction. Local travel will also need to be detoured during construction. A construction traffic plan will be developed during the PED phase with local officials and neighbors. This alignment would not provide a reduced risk of storm damages and flood risk to Harlem River Drive.

Noise and Vibration

No Action Alternative

No adverse effects of no action are anticipated, as the area would continue to be vulnerable to coastal flood risk and damages, and existing conditions for noise and vibrations would remain unchanged.

Action Alternative – Seaward Alignment

Direct and indirect adverse impacts are anticipated with the seaward alternative. The project would create temporary construction-related noise and vibration from heavy diesel-powered machinery to excavate, grade, and clear the site. Noise and vibrations would be largely on land. Wildlife are anticipated to avoid areas of active construction, noise, and vibration, moving to nearby suitable habitat until construction is complete. Because of the highly urbanized environment with moderate ambient sounds, much of the construction noise will be similar to existing conditions.

Action Alternative – Landward Alignment

Direct and indirect adverse impacts are anticipated with the landward alternative. The project would create temporary construction-related noise and vibration from heavy diesel-powered machinery to excavate, grade, and clear the site. Noise and vibrations would be largely on land. Wildlife are anticipated to avoid areas of active construction, noise, and vibration, moving to nearby suitable habitat until construction is complete. Because of the highly urbanized environment with moderate ambient sounds, much of the construction noise will be similar to existing conditions.

Socioeconomics and Demographics

No Action Alternative

The community near the Harlem River Actionable Element primarily consists of the New York City Housing Authority (NYCHA) Rangel Houses. This community experiences heightened social vulnerability due to significantly higher percentages of residents with limited English proficiency and poverty rates exceeding national and state averages. This experience is further underscored by below-median life expectancies, reflecting myriad difficult-to-quantify cumulative vulnerabilities. Community infrastructure in this area include the Arthur Tappan School (Public School 46), which serves pre-kindergarten to eighth, the Harlem Center for Opportunity, which offers transitional housing, the Rangel Community Center and the Rangel Pharmacy, both at the NYCHA Rangel Houses. No adverse effects of no action are anticipated, as the area would continue to be vulnerable to coastal flood risk and damages, and existing conditions for noise and vibrations would remain unchanged.

Action Alternative – Seaward Alignment

The Seaward Alignment of the Harlem River Actionable Element would create temporary construction-related noise and vibration from heavy machinery used for excavation, grading, and installation of infrastructure. Noise and vibrations would be primarily water-based. Best management practices will be utilized to reduce the effects of noise and vibration on surrounding communities, including adherence to local noise ordinance construction windows and implementation of environmental windows to minimize disturbance. Removal of greenspace is anticipated at tie-ins; however, this area is not currently utilized for recreation or leisure. Complimentary NBS will create new areas of natural space and aquatic habitat beneficial to aquatic species and migratory birds.

Action Alternative – Landward Alignment

The Landward Alignment of the Harlem River Actionable Element would create temporary construction-related noise and vibration from heavy machinery used for excavation, grading, and installation of infrastructure. Noise and vibrations would be primarily land-based, with potential localized disturbance during work near roadways and residential areas. Construction fencing would restrict access to the work area during construction, impacting pedestrian and vehicular traffic flow until construction is complete. Best management practices will be utilized to reduce the effects of noise and vibration on surrounding communities, including adherence to local noise ordinance construction windows and implementation of environmental windows to minimize disturbance.

7.1.6. Beneficial Effects Summary

Physical and Hydrological Resources

No Action Alternative

No beneficial effects of no action are anticipated, as the area would continue to be vulnerable to coastal flood risk and damages.

Action Alternative – Seaward Alignment

Direct and indirect beneficial effects from construction are anticipated to be minimal. Soils may be protected as erosion through coastal storm will be reduced. The proposed project would add complimentary NBS and create habitat for fish and benthic fauna to flourish. This would create breeding and foraging habitat for species that previously had no option in this river. Reef effect of the in-water structure also provides subsurface feeding opportunities further enhancing habitat. If oysters which naturally filter water are placed, a larger food pyramid with the improved water conditions would also occur. These effects would be anticipated to beneficially effect surface water conditions and quality of the river. The proposed project would add NBS which will include oyster reefs which help stabilize sediments. As well, the seaward alternative will prevent inland sediments from erosion and movement.

Action Alternative – Landward Alignment

Direct and indirect beneficial effects from construction are anticipated to be minimal. Soils may be protected as erosion through coastal storm will be reduced.

Water Quality and Air Quality

No Action Alternative

No beneficial effects of no action are anticipated, as the area would continue to be vulnerable to coastal flood risk and damages and water quality will not improve.

Action Alternative – Seaward Alignment

Minor direct and indirect beneficial effects from the seaward alternative are anticipated. The construction of the NBS may have beneficial local water quality impacts however that impact is anticipated to be minimal. The alignment will also prevent urban runoff from flowing into the river by physically stopping it however that impact is anticipated to be minimal if at all. If oysters which naturally filter water are placed, a larger food pyramid with the improved water conditions would also occur.

Action Alternative – Landward Alignment

No direct and indirect beneficial effects from the landward alternative are anticipated.

Cultural Resources

No Action Alternative

No beneficial effects of no action are anticipated, as the area would continue to be vulnerable to coastal flood risk and damages. Therefore, this effects category is representative as no impact, with a corresponding impact score of 0.

Action Alternative – Seaward Alignment

The seaward alignment, featuring a seawall extending approximately 25-feet into the Harlem River, tied into landward floodwalls at either end, provides moderate beneficial effects to historic structures by creating a buffer zone between vulnerable riverfront assets and storm surge. This design limits the need for intrusive measures within the historic urban core and reduces long-term flood damage risk to historic buildings along the shoreline.

The fill area between Harlem River Drive and the seawall can serve as a protective layer, further shielding inland historic resources and possibly creating space for interpretive elements or public access that supports heritage education and visibility.

Action Alternative – Landward Alignment

The landward alignment, consisting of a 7–12-foot AMSL floodwall along existing roads, medians, and sidewalks (with deployable gates at Harlem River Drive onramps), offers moderate beneficial effects to historic structures. By staying within the current built environment and avoiding direct intrusion on historic buildings, the alignment helps preserve structural integrity while reducing flood exposure. This risk reduction contributes to long-term preservation of historic assets in adjacent neighborhoods.

Additionally, the use of deployable gates instead of permanent barriers at critical access points allows for continued circulation and potentially reversible design, which supports the historic spatial relationships within the area.

Hazardous, Toxic, Radioactive Waste

No Action Alternative

No beneficial effects of no action are anticipated, as the area would continue to be vulnerable to coastal flood risk and damages.

Action Alternative – Seaward Alignment

Direct beneficial effects from construction include reduced CSRM flooding to the surrounding area that would be protected by the landward alternative. With reduced CSRM flooding risk, there would be less risk of severe storm damage to the surrounding urbanized area and less risk of petroleum and/or hazardous substances release, spread of historical contaminated soils and sediment, HTRW exposure, and delays and cost increases for addressing HTRW sites.

Action Alternative – Landward Alignment

Direct beneficial effects from construction include reduced CSRM flooding to the surrounding area that would be protected by the landward alternative. With reduced CSRM flooding risk, there would be less risk of severe storm damage to the surrounding urbanized area and less risk of petroleum and/or hazardous substances release, spread of historical contaminated soils and sediment, HTRW exposure, and delays and cost increases for addressing HTRW sites.

Navigation and Traffic

No Action Alternative

No beneficial effects of no action are anticipated, as the area would continue to be vulnerable to coastal flood risk and damages.

Action Alternative – Seaward Alignment

Direct beneficial effects of the seaward alternative are not anticipated to navigation, but are anticipated to traffic. Harlem River Drive and local roads near the site will have a reduced risk of flooding and damage during storm events.

Action Alternative – Landward Alignment

Minor direct beneficial effects of the landward alternative are anticipated, not to navigation but to the smaller on/off ramps of the Harlem River Drive that provide access to businesses and communities further west. These local roads near the site would have managed risk during storm events.

Noise and Vibration

No Action Alternative

No beneficial effects of no action are anticipated, as the area would continue to be vulnerable to coastal flood risk and damages, and existing conditions for noise and vibrations would remain unchanged.

Action Alternative – Seaward Alignment

Beneficial effects from the seaward alternative are anticipated. Noise from the river may be reduced from land and noise on land may be reduced on the river.

Action Alternative – Landward Alignment

Direct beneficial effects of the landward alternative are anticipated. Much of the noise from the Harlem River and traffic from the Harlem River Drive would be reduced for the businesses and residents in the area.

Socioeconomics and Demographics

No Action Alternative

No beneficial effects of no action are anticipated, as the area would continue to be vulnerable to coastal flood risk and damages, and existing conditions for noise and vibrations would remain unchanged.

Action Alternative – Seaward Alignment

The Seaward Alignment of the Harlem River Actionable Element presents several moderate long-term benefits that support the preservation of Harlem's historic character and resilience by safeguarding adjacent historic structures and fabric from storm-related flooding. Crucially, this alignment manages risk to vital community institutions within the area, including the Arthur Tappan School (Public School 46), the Harlem Center for Opportunity, and the NYCHA Rangel Houses (including the Rangel Community Center and the Rangel Pharmacy). Protecting these cornerstones of the community preserves not only physical assets but also the social fabric and networks essential for community well-being and resilience, ensuring continued access to critical support and fostering social interaction. Additionally, the creation of new natural space and aquatic habitat through NBS offers potential new recreation benefits.

Action Alternative – Landward Alignment

The Landward Alignment of the Harlem River Actionable Element will help prevent flood risk and therefore protect the longevity of vital community institutions within the risk management area, including the Arthur Tappan School (Public School 46), the Harlem Center for Opportunity, and the NYCHA Rangel Houses (including the Rangel Community Center and Pharmacy). Protecting these cornerstones of the community preserves not only physical assets but also the social fabric and networks essential for community well-being and resilience, ensuring continued access to critical support and fostering social interaction. Mitigation efforts offer the potential to re-establish the remaining green space into quantifiable native nature space or park space, creating new opportunities for community recreation and leisure and enhancing the quality of life for local residents.

7.2. East Riser

7.2.1. Natural Environment

The following table of effects was generated from the effects assessment presented in Appendix A, and provides a high-level overview of the anticipated adverse and beneficial effects of Construction, Operations and Maintenance, and Mitigation if applicable. Refer to Appendix A for supporting detail and individual effect rating score cards.

NATURAL ENVIRONMENT SCORECARD EAST RISER Qualitative Rating Scores	NO ACTION TOTAL SCORE	ACTION TOTAL SCORE
WILDLIFE AND VEGETATION		
Wildlife	**-1**	**0**
Fish	**-1**	**-1**
Migratory Fish	**N/A**	**N/A**
Terrestrial Vegetation	**-1**	**0**
Submerged Aquatic Vegetation	**N/A**	**N/A**
Invasive and Aquatic Nuisance Species	**-1**	**0**
SPECIAL STATUS SPECIES		
Threatened and Endangered Species (Terrestrial)	**-1**	**0**
Threatened and Endangered Species (Aquatic)	**N/A**	**N/A**
Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act Species	**-1**	**0**
Marine Mammal Protection Act Species	**N/A**	**N/A**
Sea Turtles	**N/A**	**N/A**
Essential Fish Habitat and EFH-Designated Species	**-1**	**0**
SPECIAL STATUS AREAS		
Wetlands	**-1**	**+2**
Floodplains	**-1**	**+2**
Wild and Scenic Rivers	**N/A**	**N/A**
Designated Critical Habitat	**N/A**	**N/A**
Critical Environmental Areas	**N/A**	**N/A**
Marine Protected Areas	**N/A**	**N/A**
Coastal Zone Management Act Areas	**-1**	**+1**

NATURAL ENVIRONMENT SCORECARD EAST RISER Qualitative Rating Scores	NO ACTION TOTAL SCORE	ACTION TOTAL SCORE
Coastal Barrier Resources Act Areas	N/A	N/A
National Park Service Land	N/A	N/A
Wildlife Refuge Land	N/A	N/A
Commercial and Recreational Fishing	N/A	N/A
Subtotal Scores (additive, for calculation)	***-10***	***4***
TOTAL AVERAGED SCORE (calculated, averaged. Subtotal divided by total number of resources applicable and scored):	**-1**	**0.5**
TOTAL HIGHEST ADVERSE EFFECT ESCALATED SCORE (for comparison purposes)	**-1**	**-1**
TOTAL HIGHEST BENEFICIAL EFFECT ESCALATED SCORE (for comparison purposes)	**0**	**+3**

7.2.2. Adverse Effects Summary

Wildlife and Vegetation

No Action Alternative

As excerpted from the September 2022 New Jersey Meadowlands East Riser Ditch Pumping Station and Channel Improvements project:

"Under the No Action alternative, the [East Riser Ditch] *would continue to support limited habitat for terrestrial and aquatic wildlife species. Erosion and sedimentation would continue to adversely affect the ERD and downstream habitats by increasing the turbidity of the water and smothering aquatic substrates. Therefore, under the No Action alternative, continued flooding, erosion, and sedimentation could have a long-term minor impact on habitat for wildlife and fish within the project area."*

The no action is anticipated to continue to have wildlife vulnerable to coastal flood risk and damages.

Action Alternative

As excerpted from the September 2022 New Jersey Meadowlands East Riser Ditch Pumping Station and Channel Improvements project:

"Under the Proposed Action, terrestrial and aquatic habitats would be affected by construction of the ERD improvements and pump station. Vegetation supporting wildlife habitat, including riparian forested areas, would be removed or disturbed during construction. In addition, there is potential for direct harm

to terrestrial and aquatic wildlife from the use of heavy equipment along the ERD. Most of the common wildlife and fish species in the project area would be able to move away from construction equipment, noise, and disturbance. In addition, disturbed areas would be revegetated with native plant species following construction. Therefore, there would be short-term minor impacts on wildlife habitats in the project area from the construction of the Proposed Action. In the long term, the Proposed Action would have a minor beneficial effect on wildlife and fish because it would increase native vegetative cover in the project area and reduce sedimentation to downstream aquatic habitats."

Special Status Species

No Action Alternative

As excerpted from the September 2022 New Jersey Meadowlands East Riser Ditch Pumping Station and Channel Improvements project:

"Because there is no suitable habitat for listed species, there would be no effect on federally listed species under the No Action alternative. The ERD would continue to support very limited habitat for state threatened and endangered species. Continued flooding, erosion, and sedimentation would have a negligible impact on the state's threatened and endangered species and their habitats through continued habitat degradation."

"Under the No Action alternative, there would be no construction of flood reduction measures and the ERD would continue to support habitat for migratory birds. Continued flooding, erosion, and sedimentation would have a negligible impact on migratory birds within the project area by potentially reducing some of the available riparian habitat."

"Under the No Action alternative, flooding of the ERD would continue to adversely affect downstream habitats, including designated EFH in Berry's Creek, by carrying sediments, [urban runoff] contaminants, and debris that could be harmful to EFH species. Therefore, under the No Action alternative, continued flooding would have a long-term minor impact on EFH downstream of the project area."

Action Alternative

As excerpted from the September 2022 New Jersey Meadowlands East Riser Ditch Pumping Station and Channel Improvements project:

"Under the Proposed Action, there would be no effect on federally listed species because there is no suitable habitat for threatened and endangered species. Through consultation with USFWS, as described in the RBDM EIS, the U.S. Department of Housing and Urban Development determined that there was no potential for effects on bat species (NJDEP 2018b). Although the Proposed Action would remove trees in the riparian zone, the project area would be revegetated with native species. Construction BMPs described in the RBDM EIS to protect migratory birds during vegetation clearing could also provide protection for state-listed bird species (Section 5.11)."

"Under the Proposed Action, habitats that support migratory birds, including riparian and shrubland habitats along the ERD, would be removed or disturbed by construction of the ERD improvements and pump station. If construction activity occurs during the migratory bird breeding season, construction activities that could result in the destruction of nests, eggs, or young birds in the nest. Construction BMPs identified in the RBDM EIS would include scheduling vegetation removal and disturbance outside of the nesting season. Where construction timing cannot be altered to avoid the breeding and nesting

season, preconstruction surveys for nesting activity would be conducted by qualified avian biologists, and no-disturbance buffers would be instituted around active nests (NJDEP 2018b). In addition, areas where vegetation is removed would be revegetated with native plant species following construction. Therefore, with implementation of BMPs, the Proposed Action would have a minor impact on migratory birds.

There are no known bald eagle nests in or near the project area; thus, there would be no impact on bald eagles under the Proposed Action."

"there is potential for stormwater runoff during construction to impact water quality in Berry's Creek. To reduce the risk of erosion, sedimentation, and associated water quality impacts, a project-specific SWPPP would be implemented (Section 5.4). During operation, flows from the pump station would be conveyed through a below-grade pipe to Berry's Creek. An energy dissipation structure would be installed at the outfall from the pump station to avoid scour in Berry's Creek. Therefore, impacts on EFH in Berry's Creek would be negligible."

Special Status Areas

No Action Alternative

As excerpted from the September 2022 New Jersey Meadowlands East Riser Ditch Pumping Station and Channel Improvements project:

"Under the No Action alternative, the risk of flooding in and beyond the project area would not be substantially reduced. The wetlands adjacent to the ERD receive runoff from surrounding industrial and commercial land use areas, resulting in these wetlands trapping contaminated sediment from stormwater runoff. Future repeated flood events could cause erosion, carrying even more contaminated sediment into these wetlands, further degrading their function and value. Because of the already degraded nature of the wetlands, the No Action alternative would have a long-term, minor, adverse impacts on wetlands within and around the project area."

"The No Action alternative would have no direct impact on floodplains because construction for flood reduction measures would not occur. However, the risk of flooding in and beyond the floodplains of the project area would not be reduced, and additional construction, repairs, or mitigation efforts may be required in the future to address damage after flooding. It is anticipated that the amount of land subject to inland flooding surrounding the ERD would increase due to an increase storm frequency, intensity, and duration, as well as from sea level rise (Section 5.3). The increased flooding could cause an increase in sediment buildup in downstream structures such as culverts, and further increase flood risk by impeding flow. As discussed in Section 5.19, structures and residences surrounding the project area would continue to be at risk of loss of life and property damage during future storm events. Because the occurrence of flooding is expected to increase owing to climate change and sea level rise, this alternative would have a minor, long-term, adverse impacts on people and property within the floodplain as well as on the natural floodplain function depending on the extent and duration of flooding."

Action Alternative

As excerpted from the September 2022 New Jersey Meadowlands East Riser Ditch Pumping Station and Channel Improvements project:

*"Under the Proposed Action, short-term, minor impacts on 0.88 acres of wetlands would occur during construction as a result of temporary fill, vegetation removal, and grading activities (**Appendix A, Figure 5**). Temporary fill and vegetation removal would result in physical and biological effects from alteration of drainage, physical loss of wetlands, and/or interruption of tidal exchange (Shuldiner and Cope 1979). The Proposed Action would require dewatering for the construction of the pump station* (not part of this proposed Alternative, as was already funded and in construction)*, culvert/railroad crossings, and dredging of the ERD. These activities could increase turbidity in adjacent wetlands for the duration of dewatering activities. The Proposed Action would revegetate disturbed areas with native, deeply rooting plant species to stabilize the soil and prevent soil erosion that could impact wetlands. Following construction, localized areas of temporary wetland impacts would be restored to preconstruction conditions and would be expected to recover within a short period of time.*

Although not part of this proposed Alternative but included herein for awareness, [a] *total of 0.37 acres of freshwater emergent wetlands would be permanently filled as a result of the construction and operation of the ERD pump station under the Proposed Action. The Subapplicant would be required to provide wetland mitigation for this permanent impact on wetlands in compliance with the CWA and any required USACE permit conditions.*

For remaining portions of the project, that are part of this proposed Alternative, [i]*mplementation of the Proposed Action would result in short-term minor impacts on wetlands from the placement of permanent fill needed to construct the ERD pump station that would be mitigated to result in no net loss of wetland functions or acres."*

"Construction of the Proposed Action would affect floodplains through changes in vegetation, sedimentation, hazardous materials exposure, and floodplain capacity. The Proposed Action would temporarily remove vegetation, adversely affecting floodplain functions in the short term. However, revegetation with native plants would improve and benefit floodplain functions and values in the long term (Section 5.8). Construction could result in accidental releases of hazardous waste from previously unknown underground sources or minor leaks from construction equipment, and ground disturbance could cause sediment to run off into the floodplain and result in minor adverse impacts on water quality, aquatic life, and hazardous materials. The Subapplicant would implement a Stormwater Pollution Prevention Plan (SWPPP) in accordance with the general stormwater permit for construction activities (Section 5.4) and a site-specific Erosion and Sediment Control Plan (Section 5.1). These measures would be required by the state and local permits would be required for construction (to avoid and minimize impacts). Therefore, construction of the Proposed Action would have negligible short-term impacts on the floodplain."

7.2.3. Beneficial Effects Summary

Wildlife and Vegetation

No Action Alternative

No beneficial effects of no action are anticipated, as the area would continue to be vulnerable to coastal flood risk and damages.

Action Alternative

The proposed project would replace non-native terrestrial vegetative habitat with native vegetative habitat more suitable for native wildlife. The increased function and capacity of the CSRM measures would support less frequent and intensive flooding effect to wildlife, and could more naturally support the absorption of flood damages to surrounding communities. The action will not create new aquatic habitat, and aside from the physical modifications to the channel and culverts, is not anticipated to increase fish prevalences or presence within the channel due to the existing tide gate structure.

As excerpted from the September 2022 New Jersey Meadowlands East Riser Ditch Pumping Station and Channel Improvements project:

"In the long term, the Proposed Action would have a beneficial minor effect on vegetation because it would increase native vegetative cover in the project area and reduce sedimentation to downstream aquatic habitats by reducing erosion of soils into the ERD."

Special Status Species

No Action Alternative

No beneficial effects of the no action are anticipated.

Action Alternative

As excerpted from the September 2022 New Jersey Meadowlands East Riser Ditch Pumping Station and Channel Improvements project:

"In the long term, the area may provide slightly improved habitat conditions for state-listed species."

"The Proposed Action would stabilize the banks of the ERD, which would reduce the amount of silt in the waters of the ERD over the long term. This would have a minor beneficial effect on water quality and EFH in Berry's Creek."

Although the Action would remove trees in the riparian zone, construction related disturbances will also remove non-native terrestrial vegetation and replace with native vegetation that would be more suitable habitat for stop over migrations, foraging, roosting, and nesting.

Special Status Areas

No Action Alternative

No beneficial effects of the no action are anticipated.

Action Alternative

As excerpted from the September 2022 New Jersey Meadowlands East Riser Ditch Pumping Station and Channel Improvements project:

"Implementation of the Proposed Action is anticipated to have long-term, moderate, beneficial impacts on wetland functions and services in and around the project area as a result of improved bank stabilization and the addition of native plantings along the ERD. The Proposed Action would reduce the occurrence of severe flooding events in and around the project area, reducing the amount of sediment and pollutants that could be transported to surrounding wetlands."

*"The improvements to the ERD would provide increased flood protection for up to approximately 141 structures (**Appendix A, Figure 7**). Implementation of the Proposed Action would reduce the extent of flooding in the project area and reduce the risk of future flood damage to surrounding structures. A reduction in the occurrence of severe floods would improve floodplain function because the floodplain would not be inundated with sediment- and pollutant-filled water. Therefore, the Proposed Action would have a long-term, moderate, beneficial impact on floodplain function.*

7.2.4. Physical Environment

The following table of effects was generated from the effects assessment presented in Appendix A, and provides a high-level overview of the anticipated adverse and beneficial effects of Construction, Operations and Maintenance, and Mitigation if applicable. Refer to Appendix A for supporting detail and individual effect rating score cards.

PHYSICAL ENVIRONMENT SCORECARD EAST RISER Qualitative Rating Scores	NO ACTION TOTAL SCORE	ACTION TOTAL SCORE
PHYSICAL RESOURCES		
Topography and Geology	**-1**	**0**
Surface Waters	**-3**	**+2**
Sediment	**-1**	**+1**
Land Use	**-1**	**0**
HYDROLOGICAL RESOURCES		
Bathymetry	**-1**	**0**
Inland Hydrology	**0**	**+2**
Coastal Hydrology, Currents, and Circulation	**N/A**	**N/A**
Tides, Tidal Exchange, and Tidal Range	**0**	**+1**
Sediment Transport	**-1**	**+1**
WATER QUALITY	**-3**	**+2**
AIR QUALITY	**-1**	**0**
CLIMATE AND RELATIVE SEA LEVEL CHANGE	**-2**	**0**

PHYSICAL ENVIRONMENT SCORECARD EAST RISER Qualitative Rating Scores	NO ACTION TOTAL SCORE	ACTION TOTAL SCORE
CULTURAL RESOURCES[1]		
Historic Structures[1]	**0**	**+1**
Viewshed / Historic Setting[1]	**-1**	**+1**
Terrestrial Archaeological Resources[1]	**-1**	**-1**
Submerged Archaeological Resources[1]	**0**	**0**
NATIVE AMERICAN LAND	**N/A**	**N/A**
HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE	**-1**	**+1**
NAVIGATION	**N/A**	**N/A**
NOISE AND VIBRATION	**-1**	**0**
SOCIOECONOMICS AND DEMOGRAPHICS	**NS**	**NS**
Subtotal Scores (additive, for calculation)	***-18***	***11***
TOTAL AVERAGED SCORE (calculated, averaged. Subtotal divided by total number of resources applicable and scored):	**-1.05**	**+0.64**
TOTAL HIGHEST ADVERSE EFFECT ESCALATED SCORE (for comparison purposes)	**-3**	**-1**
TOTAL HIGHEST BENEFICIAL EFFECT ESCALATED SCORE (for comparison purposes)	**0**	**+3**

[1] Cultural Resource Category is broken out by resource of significance.

N/A Not Applicable, NS Not Scored.

7.2.5. Adverse Effects Summary

Physical and Hydrological Resources

No Action Alternative

As excerpted from the September 2022 New Jersey Meadowlands East Riser Ditch Pumping Station and Channel Improvements project:

"Under the No Action alternative, there would be no impact on geology or soils from construction of flood reduction measures. Flood impacts would not be reduced under the No Action alternative, but there

would be no impact on bedrock from flooding due to its depth. Continued flood events would physically damage soils by eroding surface soils and carrying them downstream, thereby destroying beneficial fungi and other microbes, limiting gas exchange, and destroying the structure of soil aggregates (Ponnamperuma 1984). Loss of vegetation as a result of flooding along the riparian area surrounding the ERD would also result in increased soil erosion in the flooded areas. This could lead to slight increases in the amounts of sediments, nutrients, and contaminants transported into waterbodies and nearby wetlands. Additionally, ongoing soil erosion has the potential to lead to changes in topography. The severity of these impacts would be limited, as more than 95 percent of the soil in the project area is considered low-quality, developed urban land; thus, a reduction in the soil's physical quality as a result of ongoing flooding would not be of high importance. Additionally, the amount of soil that is undeveloped and susceptible to erosion is small and the topography is generally flat, so the impact of erosion on topography would be negligible. Therefore, the No Action alternative would have a long-term negligible adverse impact on soils and topography in the project area."

"The No Action alternative would not reduce the risk of flooding, and floodwaters would continue to result in erosion and runoff that pollutes surface waters… Water would continue to inundate the area during flood events, entering the drainage system and causing backwater conditions, surcharging, and flow reversal in some locations. Receding floodwaters have the potential to transport debris, petroleum-based pollutants (e.g., motor oil), sediments, and… sewage to surface waters. [F]loodwater that contains bacteria (e.g., fecal coliform and enterococcus) could be conveyed into surface waters and result in public health threats (EPA 2012). Sewage [discharges] also contributes to excess nutrients, such as phosphorus, which can result in algae growth that could result in lower dissolved oxygen levels that affect aquatic life (Minnesota Pollution Control Agency 2009). In addition, the occurrence of flood events is anticipated to increase in the future because of sea level rise… which could increase [surface runoff] loads in the ERD and Berry's Creek, making it difficult to reach future TMDL standards.

Action Alternative

As excerpted from the September 2022 New Jersey Meadowlands East Riser Ditch Pumping Station and Channel Improvements project:

"Excavation would occur during construction of the Proposed Action. The channel would be widened and deepened to a maximum of 12 feet from the top of the bank, and the pump station complex would disturb approximately 1 acre with excavation to 10 feet deep. However, there would be no overall change in the topography of the project area. There would be no impacts on bedrock from excavation because construction actives would not reach the depth of the bedrock.

The Proposed Action would have minor, short-term adverse impacts on soils and topography from ground-disturbing activities during construction. Construction effects would be temporary, and the Subapplicant would implement a site-specific Soil Erosion and Sediment Control Plan, reviewed and certified by the Bergen County Soil Conservation District, to ensure that appropriate best

management practices (BMPs) are used to minimize impacts on soil resources. The Proposed Action would include bank stabilization measures such as geolifts and riprap placed along channel banks to reduce erosion. In addition, channel banks and adjacent riparian areas (approximately 9.5 acres) would be planted with deep-rooted species to stabilize the soil and prevent soil erosion."

"Prior to any construction activities occurring within the channel, the ERD would be dewatered using temporary cofferdams. The water diversion equipment would be used to establish adequate flow conveyance around the cofferdams' in-channel construction sites. Once the channel sections have been dewatered, construction activities would include adding temporary fill and grading for the pump station construction, culvert/railroad crossing replacements, and dredging of the ERD. These activities would alter surface water flow, specifically during dredging activities in the ERD, where approximately 20,020 cy of sediment would be removed. There would be a minor short-term impact on water quality with the implementation of the mitigation measures and BMPs listed in the RBDM EIS. Measures such as sediment filtration and water diversion would reduce the amount of sediment and other potential pollutants from reaching Berry's Creek from construction-related equipment and activities.

During vegetation removal and grading activities, surface water quality would be temporarily impacted by increases in suspended sediment."

Water Quality and Air Quality

No Action Alternative

As excerpted from the September 2022 New Jersey Meadowlands East Riser Ditch Pumping Station and Channel Improvements project:

"The No Action alternative would not reduce the risk of flooding, and floodwaters would continue to result in erosion and runoff that pollutes surface waters by carrying sediments, contaminants, and debris into the ERD and adjacent wetlands. Water would continue to inundate the area during flood events, entering the drainage system and causing backwater conditions, surcharging, and flow reversal in some locations. Receding floodwaters have the potential to transport debris, petroleum-based pollutants (e.g., motor oil), sediments, and contaminants (e.g., sewage) to surface waters. Sewage-contaminated floodwater that contains bacteria (e.g., fecal coliform and enterococcus) could be conveyed into surface waters and result in public health threats (EPA 2012). Sewage contamination also contributes to excess nutrients, such as phosphorus, which can result in algae growth that could result in lower dissolved oxygen levels that affect aquatic life (Minnesota Pollution Control Agency 2009). In addition, the occurrence of flood events is anticipated to increase in the future because of sea level rise and climate change (Section 5.3), which could increase contaminant loads in the ERD and Berry's Creek, making it difficult to reach future TMDL standards. The No Action alternative would have a moderate, long-term, adverse impact on water quality."

"Under the No Action alternative, temporary construction-related emissions would not occur because flood reduction measures would not be implemented. Therefore, there would be no short-term adverse impacts on air quality.

In the long term, continued flood events could result in road closures, causing traffic congestion and diversion of vehicles away from flooded areas. Additionally, construction equipment would be used to repair flood damage resulting from the continued flood events. Emissions from equipment used for flood-related repairs and additional vehicle emissions generated by flood-related road detours could result in negligible emissions of criteria pollutants within a nonattainment area. However, these emissions would not result in a NAAQS exceedance, change the status of the maintenance area, or conflict with applicable air quality plans. Hence, there would be a negligible adverse impact on air quality from vehicle and equipment emissions resulting from continued equipment use for flood-related repairs and

additional vehicle emissions generated by flood-related road detours. Because the frequency and duration of flooding is expected to increase as a result of sea level rise and climate change, the No Action alternative would have a negligible long-term adverse impact on air quality."

Action Alternative

As excerpted from the September 2022 New Jersey Meadowlands East Riser Ditch Pumping Station and Channel Improvements project:

"Prior to any construction activities occurring within the channel, the ERD would be dewatered using temporary cofferdams. The water diversion equipment would be used to establish adequate flow conveyance around the cofferdams' in-channel construction sites. Once the channel sections have been dewatered, construction activities would include adding temporary fill and grading for the pump station construction, culvert/railroad crossing replacements, and dredging of the ERD. These activities would alter surface water flow, specifically during dredging activities in the ERD, where approximately 20,020 cy of sediment would be removed. There would be a minor short-term impact on water quality with the implementation of the mitigation measures and BMPs listed in the RBDM EIS. Measures such as sediment filtration and water diversion would reduce the amount of sediment and other potential [urban runoff] from reaching Berry's Creek from construction-related equipment and activities."

"A general conformity applicability analysis was completed for the RBDM EIS to determine the potential levels of nonattainment criteria or maintenance pollution that may be emitted under the larger RBDM project (NJDEP 2018b). Based on the projected annual estimated emissions for the study area, it was determined that temporary construction and periodic use of the diesel-powered generators at the pump station during emergency conditions would not exceed the annual de minimis levels for criteria pollutants under general conformity (Section 4.9.4 of the RBDM EIS)"

Cultural Resources

No Action Alternative

The No Action or No-Build Alternative was assessed in relation to the project's purpose and need. Under this scenario, no measures would be implemented to address future flood risks, which are anticipated to worsen due to relative sea level rise. As a result, this alternative would leave existing aesthetic, visual, historical, and cultural resources vulnerable to damage. Cultural resources within the study area face the risk of deterioration or destruction from coastal flooding and sea-level rise

Action Alternative

The construction activities associated with the East Riser Alternative—including channel modifications, culvert replacements, and the replacement of a railroad bridge, are expected to result in low adverse effects on cultural resources. The Area of Potential Effect (APE) is primarily confined to existing roadways, paved surfaces, and previously disturbed corridors such as road shoulders and graded embankments, which significantly limits the likelihood of encountering intact archaeological deposits. Based on background research, historic maps, and aerial photographs, both prehistoric and historic archaeological sensitivity within the APE is low. The most sensitive areas are those near map-documented buildings, which may warrant monitoring during construction. Additionally, one historic district (the Vanguard Associates Mobile Home Park) is located within 300 meters of the APE, but is not directly affected. Therefore, while potential impacts are limited, minor adverse effects could result from construction near previously undocumented or poorly mapped cultural features.

Hazardous, Toxic, Radioactive Waste

No Action Alternative

The no action is anticipated to continue to have the surrounding area vulnerable to coastal flood risk and damages. Storm damage to a significantly urbanized area, such as the Hackensack/Passaic Planning Region, can cause new releases of petroleum and/or hazardous substances, further spread historical contaminated soils and sediment, increase potential risk of exposure, and extend time and increase costs for addressing HTRW sites. Although the no action would continue from the existing condition trajectory, frequency of storms and severity of storms may increase over time, as may RSLC.

Action Alternative

Any intrusive subsurface work associated implementation of the proposed project has the potential to disturb soil/sediment that could be contaminated with HTRW. Should contaminated soil/sediment be disturbed, there could be increased risk to human health and the environment. However, a subsurface planning investigation would be conducted during the PED phase to further characterize the subsurface conditions. This investigation will inform any potential HTRW risks associated with construction and implementation of the proposed project and ensure there are not HTRW concerns in any areas where the subsurface may be disturbed. As per Engineer Regulation 1165-2-132, HTRW collocated within the proposed measure footprints must be avoided where feasible, and where they cannot be avoided, those sites must be remediated at 100% nonfederal cost prior to construction. Best management practices will be employed during project implementation to ensure the construction is conducted in a manner that is protective of human health and the environment and that any handling of subsurface materials is in compliance with applicable regulatory requirements.

Noise and Vibration

No Action Alternative

As excerpted from the September 2022 New Jersey Meadowlands East Riser Ditch Pumping Station and Channel Improvements project:

"Under the No Action alternative, no construction for flood reduction measures would occur that would result in an increase in noise levels. In the long term, the risk of flooding would not be reduced. Construction activities to repair flood damage would temporarily increase noise levels in the immediate vicinity of the work. Any construction activities that may occur would be required to comply with local construction noise ordinances. Therefore, over the long term, there would be minor, reoccurring, short-term adverse noise impacts because the continued risk of flooding would periodically generate associated construction noise from repairs."

Action Alternative

As excerpted from the September 2022 New Jersey Meadowlands East Riser Ditch Pumping Station and Channel Improvements project:

"Under the Proposed Action, construction activities would temporarily increase noise levels in the project vicinity but would conform to the local noise ordinances for the time of day that construction noise is allowed. As described in the RBDM EIS, work would occur during normal waking hours from 7:00 a.m. to 4:00 p.m., which is more restrictive than local ordinances, and the construction schedule would be communicated to the public (NJDEP 2018b). Noise barriers would be placed between construction

activities and sensitive receptors and the quietest practicable construction methods and equipment would be used. Stationary equipment, such as generators and compressors, would be enclosed and vehicle idling would be limited (NJDEP 2018b). Noise complaint and response procedures would be established (NJDEP 2018b). Hence, there would be a minor short-term increase in noise levels during construction."

Socioeconomics and Demographics

No Action Alternative

No adverse effects of no action are anticipated, as the area would continue to be vulnerable to coastal flood risk and damages, and existing conditions for noise and vibrations would remain unchanged.

Action Alternative

The project would create temporary construction-related noise and vibration from heavy diesel-powered machinery to excavate, grade, and clear the site. Noise and vibrations would be largely on land, with some localized disturbance during construction of the channel, railroad bridge replacement, and riprap placement. Construction fencing would restrict access to the work area during construction, until construction is complete. Best management practices will be utilized to reduce the effects of noise and vibration on surrounding communities, such as local noise ordinance construction windows and environmental windows.

7.2.6. Beneficial Effects Summary

Physical and Hydrological Resources

No Action Alternative

No beneficial effects of no action are anticipated, as the area would continue to be vulnerable to coastal flood risk and damages.

Action Alternative

As excerpted from the September 2022 New Jersey Meadowlands East Riser Ditch Pumping Station and Channel Improvements project:

Overall, the Proposed Action would reduce the frequency of flood events in the project area, resulting in a reduced potential for soil erosion in the long term. Because most of the project area is currently developed, the magnitude of this beneficial effect would be small. Therefore, the Proposed Action would have a long-term, negligible beneficial impact on soils and no effect on topography."

"The Proposed Action would reduce the frequency of severe flood events in the project vicinity, resulting in a long-term, moderate, beneficial impact on surface water flow, quality, and sediment/contaminant transport downstream by decreasing stormwater and pollutant loading. In the event of a flood, floodwaters would inundate a smaller area and would therefore be less likely to transport [urban runoff] pollutants such as oils, fuels, and sewage from the surface into the channel. The ERD channel improvements and installation of the pump station would increase stormwater conveyance capacity, thereby reducing the frequency of flooding events upstream."

Water Quality and Air Quality

No Action Alternative

No beneficial effects of no action are anticipated, as the area would continue to be vulnerable to coastal flood risk and damages.

Action Alternative

As excerpted from the September 2022 New Jersey Meadowlands East Riser Ditch Pumping Station and Channel Improvements project:

"The Proposed Action would reduce the frequency of severe flood events in the project vicinity, resulting in a long-term, moderate, beneficial impact on surface water flow, quality, and sediment/contaminant transport downstream by decreasing stormwater and pollutant loading. In the event of a flood, floodwaters would inundate a smaller area and would therefore be less likely to transport pollutants such as oils, fuels, and sewage from the surface into the channel. The ERD channel improvements and installation of the pump station would increase stormwater conveyance capacity, thereby reducing the frequency of flooding events upstream."

"There would be a negligible, long-term, beneficial impact from the reduced risk of flooding that would avoid flood-related emissions from roadway detours and the use of construction equipment for repairs."

Cultural Resources

No Action Alternative

No beneficial effects of no action are anticipated, as the area would continue to be vulnerable to coastal flood risk and damages. Therefore, this effects category is representative as no impact, with a corresponding score of 0.

Action Alternative

Despite its low overall sensitivity, the East Riser Alternative presents opportunities for beneficial effects on cultural resource management. The project footprint's location in previously disturbed areas provides a high potential for avoiding significant archaeological resources through informed design and targeted monitoring. If implemented, cultural resource protection measures (such as archaeological monitoring near map-documented buildings or pre-construction survey in less-disturbed sections) would support compliance with Section 106 of the National Historic Preservation Act (NHPA), enhancing preservation planning without major changes to the project. These activities contribute to long-term cultural resource stewardship and help document areas with little prior survey coverage, and work occurs within already disturbed corridors with minimal changes to the surrounding setting and character. Additionally, no long-term or operational effects on cultural resources are anticipated following construction, ensuring continued preservation of nearby historic properties such as the Vanguard Associates Mobile Home Park.

Viewshed. The measures included in the study will enhance existing viewscapes, depending on location and scale. Construction of nature-based measures may positively affect scenic byways, improve existing residential views, and/or increase access to historic coastal sites (USACE 2019). Aesthetic valuation, a judgement of value based on appearance of an object and emotional responses, of the public is ongoing and will be updated as stakeholder input is aggregated, but was not used to determine the preliminary impact rating.

Measures proposed for the AE will not involve the construction of structures that have a potential to indirectly affect historic properties, there are no historic properties impacted by the Action Alternative, and will not alter the

visible environment (i.e., setting) of those resources. For this study, the visual impact study area (Indirect APE) includes those places within one mile (1.6 km) of proposed measures for the alternative that are in the potential viewshed (based on topography). This Visual Impact Area, or Zone of Visual Influence (ZVI), primarily encompasses parts of the New Jersey Hackensack Meadowlands District.

Hazardous, Toxic, Radioactive Waste

No Action Alternative

No beneficial effects of no action are anticipated, as the area would continue to be vulnerable to coastal flood risk and damages.

Action Alternative

Direct beneficial effects from construction include a cleaner East Riser Ditch with decreased concentrations of any contaminants in the sediment and reduced CSRM flooding to the surrounding area. With reduced CSRM flooding risk, there would be less risk of severe storm damage to the surrounding urbanized area and less risk of petroleum and/or hazardous substances release, spread of historical contaminated soils and sediment, HTRW exposure, and delays and cost increases for addressing HTRW sites.

Noise and Vibration

No Action Alternative

No beneficial effects of no action are anticipated, as the area would continue to be vulnerable to coastal flood risk and damages, and existing conditions for noise and vibrations would remain unchanged.

Action Alternative

As excerpted from the September 2022 New Jersey Meadowlands East Riser Ditch Pumping Station and Channel Improvements project:

"The risk of flooding would be reduced, thereby reducing occasional increases in noise from flood-related repairs. Accordingly, the Proposed Action would have a negligible, long-term, beneficial impact on noise levels."

Socioeconomics and Demographics

No Action Alternative

No beneficial effects of no action are anticipated, as the area would continue to be vulnerable to coastal flood risk and damages.

Action Alternative

Beneficial effects would be anticipated from the reduced flood prevalence in the community that effect access to residences, roads, and business operations.

7.3. Oakwood Beach

7.3.1. Natural Environment

The following tables of effects was generated from the adverse and beneficial effects assessment presented in Appendix A, providing a high-level overview of the anticipated adverse and beneficial effects of Construction, Operations and Maintenance, and Mitigation if applicable. Refer to Appendix A for supporting detail of the adverse and beneficial effects analysis and the corresponding individual resource effect rating score cards.

NATURAL ENVIRONMENT SCORECARD OAKWOOD BEACH Qualitative Rating Scores	NO ACTION TOTAL SCORE	ACTION TOTAL SCORE
WILDLIFE AND VEGETATION		
Wildlife	**-1**	**+4**
Fish	**-1**	**+4**
Migratory Fish	**-1**	**+4**
Terrestrial Vegetation	**-1**	**+4**
Submerged Aquatic Vegetation	**N/A**	**N/A**
Invasive and Aquatic Nuisance Species	**-1**	**+4**
SPECIAL STATUS SPECIES		
Threatened and Endangered Species (Terrestrial)	**-1**	**+1**
Threatened and Endangered Species (Aquatic)	**0**	**0**
Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act Species	**-1**	**+4**
Marine Mammal Protection Act Species	**N/A**	**N/A**
Sea Turtles	**N/A**	**N/A**
Essential Fish Habitat and EFH-Designated Species	**-1**	**+2**
SPECIAL STATUS AREAS		
Wetlands	**-1**	**+4**

NATURAL ENVIRONMENT SCORECARD OAKWOOD BEACH Qualitative Rating Scores	NO ACTION TOTAL SCORE	ACTION TOTAL SCORE
Floodplains	0	+5
Wild and Scenic Rivers	N/A	N/A
Designated Critical Habitat	N/A	N/A
Critical Environmental Areas	N/A	N/A
Marine Protected Areas	-1	+4
Coastal Zone Management Act Areas	-1	0
Coastal Barrier Resources Act Areas	N/A	N/A
National Park Service Land	-1	+4
Wildlife Refuge Land	N/A	N/A
Commercial and Recreational Fishing	N/A	N/A
Subtotal Scores (additive, for calculation)	***-12***	***44***
TOTAL AVERAGED SCORE (calculated, averaged. Subtotal divided by total number of resources applicable and scored):	**-0.92**	**3.14**
TOTAL HIGHEST ADVERSE EFFECT ESCALATED SCORE (for comparison purposes)	**-1**	**-1**
TOTAL HIGHEST BENEFICIAL EFFECT ESCALATED SCORE (for comparison purposes)	**0**	**+5**

7.3.2. Adverse Effects Summary

Wildlife and Vegetation

No Action Alternative

The No Action Alternative adverse effects range from 0, or no adverse effect, to -1 (low adverse effect) primarily due to the coastal storm risk, persistent wildfires, and RSLC.

Action Alternative

During construction, the Action Alternative adverse effects range from 0, or no adverse effect, to -1 (low adverse effect) primarily due to the temporary disturbances from active construction, and the physical

manipulation of the Actionable Element Site that would be anticipated to displace wildlife and disturb existing vegetation during the removal of non-native invasive phragmites. Wildlife would be anticipated to avoid areas of construction, and return once construction is complete. Operations and maintenance activities are anticipated to be negligible.

Special Status Species

No Action Alternative

The No Action Alternative adverse effects range from 0, or no adverse effect, to -1 (low adverse effect) primarily due to the coastal storm risk, persistent wildfires, and RSLC.

Action Alternative

During construction, the Action Alternative adverse effects range from 0, or no adverse effect, to -1 (low adverse effect) primarily due to the temporary disturbances of active construction, and the physical manipulation of the Actionable Element Site that would be anticipated to deter wildlife and disturb existing vegetation during the removal of non-native invasive phragmites. Environmental windows will be implemented as appropriate for species of concern, anticipated to include at a minimum a no-construction window from November to March for Red Knots, as recommended for the neighboring South Shore of Staten Island USACE project. Ancillary disturbances that cannot be avoided may deter species, such as construction related noise and vibrations, although those are anticipated to be temporary, low, and addressed through the no-construction windows. Operations and maintenance activities are anticipated to be negligible.

Special Status Areas

No Action Alternative

The No Action Alternative adverse effects range from 0, or no adverse effect, to -1 (low adverse effect) primarily due to the coastal storm risk, persistent wildfires, and RSLC.

Action Alternative

During construction, the Action Alternative adverse effects range from 0, or no adverse effect, to -1 (low adverse effect) primarily due to the temporary disturbances of active construction, and the physical manipulation of the Actionable Element Site that would be anticipated to disturb existing special status areas. These disturbances include temporary removal of habitat and restricted access to portions of the site while active construction is commencing. Operations and maintenance activities are anticipated to be negligible

7.3.3. Beneficial Effects Summary

Wildlife and Vegetation

No Action Alternative

No beneficial effects of the no action are anticipated.

Action Alternative

Beneficial effects of the Action Alternative are primarily focused on the management of coastal storm risk and wave attenuation, as well as the additional related ecological wetland enhancement benefits that provide noticeable qualitative, and quantifiable, benefits to several natural resources and reduced

wave attenuation. Further benefits to wildlife and vegetation would be anticipated, as the site would be transition from non-native invasive habitat to native habitat, increasing the availability of foraging and sheltering areas for wildlife in the vicinity, as well as species migrating through the area (e.g. birds). As this site is part of the Atlantic Flyway, the National Park Service, Gateway National Recreation Area (a Marine Protected Area) and New York Bight Estuary, the benefits of this project would be of regional significance to multiple resources and communities throughout the area. Therefore, many of the wildlife and vegetation resources would incur a "+5" score, with a net outcome of "+4" in consideration for the adverse effect of "-1".

Special Status Species

No Action Alternative

No beneficial effects of the no action are anticipated.

Action Alternative

Beneficial effects to special status species are anticipated primarily for birds protected under the Migratory Bird Treaty Act, as well as for Osprey, a species of special concern, due to the inclusion of Osprey nests proposed as part of the project. As this site is part of the National Park Service, Gateway National Recreation Area (a Marine Protected Area) and New York Bight Estuary, as well as a State and Federally listed wetland, the benefits of this project would be of regional significance to multiple resources and communities throughout the area. However, due to the limit in special status species habitat and presence anticipated for threatened and endangered species, a corresponding overall score of "+1" is anticipated; while Migratory Bird Treaty Act species would incur a "+5" score, with a net outcome of "+4" in consideration for the adverse effect of "-1".

Special Status Areas

No Action Alternative

No beneficial effects of the no action are anticipated.

Action Alternative

Beneficial effects of the Action Alternative are highest for wetlands, floodplains, National Park Service land, and Marine Protected Areas. The increased function and capacity of the CSRM wetland would be designed to function as a nature-based CSRM feature that could more naturally support the absorption of flood damages, and would be more readily able to function as a natural CSRM buffer between the coast and surrounding communities. Benefit to the surrounding Great Kills Park, NPS jurisdiction would be anticipated with this nature-based solution. Increased benefits would be observed from managing fire risk that can have direct and indirect effects to the Oakwood Beach neighborhood, wildlife, and fish, such as air quality concerns, smoke, fire damage, and storm damage related pollution. As this site is part of the National Park Service, Gateway National Recreation Area (a Marine Protected Area) and New York Bight Estuary, as well as a State and Federally listed wetland, the benefits of this project would be of regional significance to multiple resources and communities throughout the area. Therefore, many of the special status area resources would incur a "+5" score, with a net outcome of "+4" in consideration for the adverse effect of "-1".

7.3.4. Physical Environment

The following table of effects was generated from the effects assessment presented in Appendix A, and provides a high-level overview of the anticipated adverse and beneficial effects of Construction, Operations and Maintenance, and Mitigation if applicable. Refer to Appendix A for supporting detail and individual effect rating score cards.

PHYSICAL ENVIRONMENT SCORECARD OAKWOOD BEACH Qualitative Rating Scores	NO ACTION TOTAL SCORE	ACTION TOTAL SCORE
Physical Resources		
Topography and Geology	**-1**	**0**
Surface Waters	**-1**	**+2**
Sediment	**-1**	**+1**
Land Use	**0**	**+5**
Hydrological Resources		
Bathymetry	**0**	**+1**
Inland Hydrology	**0**	**+2**
Coastal Hydrology, Currents, and Circulation	**0**	**+1**
Tides, Tidal Exchange, and Tidal Range	**0**	**+1**
Sediment Transport	**0**	**+1**
Water Quality	**-1**	**+1**
Air Quality	**0**	**+1**
Climate and Regional Sea Level Change	**-1**	**+1**
Cultural Resources[1]		
Historic Structures[1]	**0**	**0**
Viewshed / Historic Setting[1]	**-1**	**+3**
Terrestrial Archaeological Resources[1]	**-1**	**-1**
Submerged Archaeological Resources[1]	**0**	**0**

PHYSICAL ENVIRONMENT SCORECARD OAKWOOD BEACH Qualitative Rating Scores	NO ACTION TOTAL SCORE	ACTION TOTAL SCORE
Native American Land	N/A	N/A
Hazardous, Toxic, and Radioactive Waste	-1	0
Navigation	N/A	N/A
Noise and Vibration	0	0
Socioeconomics and Demographics	NS	NS
Subtotal Scores (additive, for calculation)	*-8*	*19*
TOTAL AVERAGED SCORE (calculated, averaged. Subtotal divided by total number of resources applicable and scored):	-0.44	1.05
TOTAL HIGHEST ADVERSE EFFECT ESCALATED SCORE (for comparison purposes)	-1	-1
TOTAL HIGHEST BENEFICIAL EFFECT ESCALATED SCORE (for comparison purposes)	0	+5

[1] Cultural Resource Category is broken out by resource of significance.

N/A Not Applicable, NS Not Scored.

7.3.5. Adverse Effects Summary

Physical and Hydrological Resources

No Action Alternative

The No Action Alternative adverse effects range from 0, or no adverse effect, to -1 (low adverse effect) primarily due to the coastal storm risk, persistent wildfires, and RSLC.

Action Alternative

During construction, the Action Alternative adverse effects range from 0, or no adverse effect to -2, or low to moderate adverse effect primarily due to the temporary disturbances of active construction, and the physical manipulation of the Actionable Element Site.

The majority of Physical Environment resources would have no or negligible adverse and no or negligible beneficial effects from the operations and maintenance of the Actionable Element, as the site would continue to be monitored for wetland development, inclusive of invasive species management and maintaining the path along the western side of the site. Otherwise, the site may persist self-sufficiently

with minimal artificial support. As this Actionable Element is a CSRM-focused wetland enhancement replacing low quality habitat with a vegetative mosaic with tidal channel network that is conducive to the surrounding area, the enhancement itself in its operating state provides a moderate benefit to viewshed.

As the anticipated adverse effects of this Actionable Element are low ("-1") for the majority of Physical Environment resources and low to moderate ("-2") for a few resources, additional mitigation beyond avoidance is not necessary to sustain low adverse effect qualitative rating; therefore, a collective scorecard was not generated. This does not mean that best management practices or mitigation (avoidance) will not be implemented, but rather, that it is not necessary to quantify beyond what is already being performed as part of the implementation of the project. Refer to the Individual Scorecards in each resource section of this Appendix for supporting detail and individual resource effect rating score cards.

Water Quality and Air Quality

No Action Alternative

The No Action Alternative adverse effects range from 0, or no adverse effect, to -1 (low adverse effect) primarily due to the coastal storm risk, persistent wildfires, and RSLC.

Action Alternative

Water quality at the site would be anticipated to improve with native plantings and sediments serving as natural wetland filters of pollutants. Salinity in the created tidal channel network would take on the characteristics of the adjacent Main Tidal Channel of which they would connect into. As over 1-acre of land will be disturbed, a NPDES/SPDES permit will be required under the Clean Water Act. BMPs will be utilized to reduce adverse effects and prevent discharges into navigable waters. Sediment resuspension and turbidity would be anticipated during construction, although would be temporary and settle post construction.

Emissions from construction of the Action Alternative are below the de minimis levels on a yearly basis. The sold impact producing factor to air quality is regulated air emissions, which will be below General Conformity significance. Therefore, all qualitative scores are rated "0" for no effect.

Negligible operations and maintenance assumption emissions are anticipated, as the site would be a restored wetland habitat. It is possible that some vegetative maintenance may occur but would be infrequent and limited to invasive species management, or small area mowing. Therefore, all qualitative scores are rated "0" for no effect.

Cultural Resources

No Action Alternative

The no action or no-build alternative was evaluated against the project purpose and need. The no action or no-build alternative would have impacts to existing aesthetic, visual, historical, or cultural resources since there would be no measures to manage future flood risks that are expected to be exacerbated by RSLC. Archaeological resources in the Study Area are at risk of damage or destruction from coastal flooding and sea-level rise. Additionally, submerged resources may be affected by underwater storm action and changes in seawater flow that accompany sea-level rise and flooding. Without CSRM measures, the AE will be impacted by the 1% floodplain.

Action Alternative

Although the alternative includes a known archaeological site and is designated as sensitive for prehistoric archaeological resources, the site has been extensively modified by past development, fill, and infrastructure activities. As such, any intact archaeological deposits are expected to be deeply buried and isolated, reducing their vulnerability to disturbance from planned surface-level work. However, certain components of the ~~project;~~project, such as tidal channel excavation and dune regrading, may involve limited subsurface impacts. These potential effects warrant a low-to-moderate adverse effect rating for terrestrial archaeological resources during construction. No adverse effects are anticipated for submerged archaeological resources or above-ground historic structures. However, targeted archaeological monitoring or testing in higher sensitivity zones will be necessary to avoid unanticipated impacts and ensure compliance with Section 106 of the National Historic Preservation Act.

Hazardous, Toxic, Radioactive Waste

No Action Alternative

The No Action Alternative adverse effects range from 0, or no adverse effect, to -1 (low adverse effect) primarily due to the coastal storm risk, persistent wildfires, and RSLC.

Action Alternative

While encountering HTRW during construction is not anticipated, any intrusive subsurface work associated with implementation of the proposed project has the potential to disturb soil/sediment that could be contaminated with HTRW. Should contaminated soil/sediment be disturbed, there could be increased risk to human health and the environment. However, a subsurface planning investigation would be conducted during the PED phase to further characterize the subsurface conditions. This investigation will inform any potential HTRW risks associated with construction and implementation of the proposed project and ensure there are not HTRW concerns in any areas where the subsurface may be disturbed. As per Engineer Regulation 1165-2-132, HTRW collocated within the proposed measure footprints must be avoided where feasible, and where they cannot be avoided, those sites must be remediated at 100% nonfederal cost prior to construction.

Noise and Vibration

No Action Alternative

No adverse effects of no action are anticipated, as the area would continue to be vulnerable to coastal flood risk and damages, and existing conditions for noise and vibrations would remain unchanged.

Action Alternative

The project would create temporary construction-related noise and vibration from heavy diesel-powered machinery to excavate, grade, and clear the site. Noise and vibrations would be largely on land, with some localized disturbance in water during construction of the new tidal channel network and riprap placement; however, the use of water-based equipment will not be utilized (e.g. barges/dredges). Wildlife are anticipated to avoid areas of active construction, noise, and vibration, moving to nearby suitable habitat until construction is complete.

Socioeconomics and Demographics

No Action Alternative

The No Action Alternative adverse effects range from 0, or no adverse effect, to -1 (low adverse effect) primarily due to the coastal storm risk, persistent wildfires, and RSLC.

Action Alternative

The project would create temporary construction-related noise and vibration from heavy diesel-powered machinery to excavate, grade, and clear the site. Noise and vibrations would be largely on land, with some localized disturbance in water during construction of the new tidal channel network and riprap placement; however, the use of water-based equipment will not be utilized (e.g. barges/dredges). Construction fencing would restrict access to the work area during construction, until construction is complete.

7.3.6. Beneficial Effects Summary

Physical and Hydrological Resources

No Action Alternative

No beneficial effects of no action are anticipated, as the area would continue to be vulnerable to coastal flood risk and damages.

Action Alternative

Beneficial effects of the Action Alternative range from 0, or no benefit, to +5 for high benefits particularly for Land Use. Land use quality would increase, as the proposed project would remove non-native phragmites, and replace with native habitat, inclusive of a new network of tidal channels more suitable for an estuarine wetland habitat, providing additional areas for wildlife to forage and shelter. Increased benefits would be observed from managing fire risk that can have direct and indirect effects to the surrounding Oakwood Beach land uses, neighborhoods, wildlife, and fish, such as air quality concerns, smoke, fire damage, and storm damage related pollution. 1.30-acres of newly created tidal channels would expand the available surface waters, bathymetry, and sediments at the site, introducing additional opportunity for benthic resources and fish access into the site. As this site is part of the National Park Service, Gateway National Recreation Area (a Marine Protected Area) and New York Bight Estuary, as well as a State and Federally listed wetland, the benefits of this project would be of regional significance to multiple resources and communities throughout the area.

Water Quality and Air Quality

No Action Alternative

No beneficial effects of no action are anticipated, as the area would continue to be vulnerable to coastal flood risk and damages.

Action Alternative

Beneficial effects of the Action Alternative range from +1 (low) to +2 (low to moderate). The proposed project would remove non-native phragmites of which fill and degrade wetlands, and replace with native habitat, inclusive of a new network of tidal channels more suitable for an estuarine wetland habitat,

providing additional areas for wildlife to forage and shelter, and improvements to water quality. Air quality is anticipated to improve from the managed wildfire risk.

Cultural Resources

No Action Alternative

No beneficial effects of no action are anticipated, as the area would continue to be vulnerable to coastal flood risk and damages. Therefore, this effects category is representative as no impact, with a corresponding score of 0.

Action Alternative

The Oakwood Beach Alternative is expected to yield moderate beneficial impacts to cultural resources, particularly in the form of landscape restoration that enhances the cultural viewshed and reestablishes the ecological and visual character of the shoreline. The creation of a vegetative mosaic with native plants, the reintroduction of tidal channels, and dune restoration will help restore a historically and environmentally significant shoreline buffer. These improvements align with long-term resilience and sustainability goals and reflect traditional environmental knowledge systems tied to Indigenous and early land use patterns. Additionally, the removal of non-native invasive species will improve the interpretive integrity of the site and support the area's role as a natural defense system, benefiting the NYNJHATS General Study area and adjacent South Shore and Great Kills Park. These landscape-scale improvements provide lasting scenic, educational, and ecological value that reinforce the cultural identity of the region. The measures included in the study will enhance existing viewscapes, depending on location and scale. Construction of nature-based measures may positively affect scenic byways, improve existing residential views, and/or increase access to historic coastal sites (USACE 2019). Aesthetic valuation, a judgement of value based on appearance of an object and emotional responses, of the public is ongoing and will be updated as stakeholder input is aggregated but was not used to determine the preliminary impact rating. Measures proposed for the AE will not involve the construction of structures that have a potential to indirectly affect historic properties, there are no historic properties impacted by the Action Alternative, and will not alter the visible environment (i.e., setting) of those resources. For this study, the visual impact study area (Indirect APE) includes those places within one mile (1.6 km) of proposed measures for the alternative that are in the potential viewshed (based on topography). This Visual Impact Area, or Zone of Visual Influence (ZVI), encompasses parts of coastal Staten Island, New York City. As of this writing, this preliminary visual impact analysis is an initial screening of impacted historic properties and will be refined in subsequent iterations. Additional visual assessment for the measures proposed at Oakwood Beach was deemed unnecessary because the design elements do not introduce visual changes that rise to the threshold of an adverse effect under Section 106 criteria. An adverse visual effect occurs only when a new element added to the landscape diminishes the aspects of a property’s significance or integrity, such as its historic setting, that contribute to its eligibility for listing in the State or National Registers of Historic Places (S/NRHPs). The Action Alternative, which includes elements such as vegetative plantings, grading, and berms with naturalistic contours, are compatible with the existing coastal landscape. These measures do not obstruct significant views to or from eligible or listed historic properties, nor do they introduce visual elements that are out of scale, incompatible, or in stark contrast with the surrounding character. Because the proposed nature-based components are designed to blend with the natural setting and do not diminish the visual integrity or appreciation of any known historic resource in the area, neither adverse aesthetic nor obstructive effects are anticipated. Accordingly, based

on established guidance and definitions of visual impacts, further detailed visual analysis was not required for this portion of the undertaking.

Hazardous, Toxic, Radioactive Waste

No Action Alternative

No beneficial effects of no action are anticipated, as the area would continue to be vulnerable to coastal flood risk and damages.

Action Alternative

Beneficial effects of the Action Alternative are anticipated to be low (+1). With managed CSRM flooding, there would be less risk of severe storm damage to the surrounding urbanized area and less risk of petroleum and/or hazardous substances release, spread of historical contaminated soils and sediment, HTRW exposure, and delays and cost increases for addressing HTRW sites. Additionally, increased benefits would be observed from managing fire risk to nearby HTRW sites with the restoration of the wetland, and removal of highly ignitable non-native phragmites.

Noise and Vibration

No Action Alternative

No beneficial effects of no action are anticipated, as the area would continue to be vulnerable to coastal flood risk and damages.

Action Alternative

Following wetland enhancement and establishment of the vegetative mosaic, the newly created habitat may attract more song and wading birds. Birders have been observed walking the Oakwood Beach front, providing an additional recreational value for bird identification. As this site is not adjacent to any residential housing, the wildlife noises would not be considered nuisance noise.

Socioeconomics and Demographics

No Action Alternative

No beneficial effects of no action are anticipated, as the area would continue to be vulnerable to coastal flood risk and damages.

Action Alternative

Beneficial effects of the Action Alternative are primarily focused on the nature of the wetland enhancement providing noticeable qualitative, and sometimes quantifiable, benefits to physical and cultural resources. Although not anticipated in abundance, birders have been observed walking the Oakwood Beach front, in which the project would be expected to provide an additional recreational value for birding. As this site is not adjacent to any residential housing, the wildlife noises would not be considered nuisance noise. A newly placed mowed path connecting the western adjacent parking lot at Great Kills Park would connect to the Site, and additionally to a walking/bike path, increasing recreational access to the enhanced wetland.

7.4. Reasonably Foreseeable and Connected Actions*

Sources of human-induced mortality, injury, harassment of wildlife, and changes to the natural environment in the Study Area that are reasonably certain to occur in the future include interactions in state-regulated and recreational fishing activities, vessel collisions, ingestion of plastic debris, pollution, deforestation, coastal development, relative sea level change, and catastrophic events. The full magnitude of these consequences is not completely known. However, best information available was utilized in the assessment of reasonably foreseeable effects.

7.4.1. Interim Response Actionable Elements

Reasonably foreseeable and connection action effects from the implementation of each Actionable Element Site Action Alternative at Harlem River, East Riser, and Oakwood Beach would not be anticipated as a result of implementation of an action at each location due to the distance between each site, and difference in the measures proposed, particularly in the short-term. Individually, however, impacts over an extended duration of time (100+ years) may exhibit connected effects of climate-driven storm events, as they are anticipated to increase in frequency and severity over time, compounded with low, intermediate, and high RSLC projections. Each Actionable Element Site is complementary to the overall Comprehensive Plan, and collectively with additional measures to be proposed in the future as either Interim Responses or following completing of the Tier 1 phase, Tier 2 documents advancing the Recommended Plan, would be anticipated to have connected action effects that vary depending on resource type.

7.4.2. Overall Comprehensive Plan

As each Actionable Element Site is part of the overall Comprehensive Plan, and will become part of every Alternative and Future Without-Project Conditions, connection action impacts of the larger Study must also be considered. Those effects are also presented in the September 2022 Draft Integrated FR/Tier 1 (Programmatic) EIS, and included here relevant to the Actionable Element Sites. Any reasonably foreseeable and connected action effects that may be applicable to the Interim Response Actionable Element Sites are noted, where applicable.

State Water Fisheries

This Section describes state water fisheries for those species that are applicable. Impacts to sea turtles, shortnose sturgeon, and Atlantic sturgeon are discussed below.

Fishing activities are considered one of the most significant causes of serious injury or death for sea turtles. Finkbeiner *et al.* (2011) compiled sea turtle bycatch information in U.S. fisheries from 1990 through 2007, before and after implementation of bycatch mitigation measures. In the Atlantic, a mean estimate of 137,700 bycatch interactions, of which 4,500 were mortalities, occurred annually (since implementation of bycatch mitigation measures). Kemp's ridleys interacted with fisheries most frequently, with the highest level of mean annual mortality (2,700), followed by loggerheads (1,400), greens (300), and leatherbacks (40). The Southeast/Gulf of [America] (formerly Mexico) shrimp trawl fishery was responsible for the vast majority of U.S. interactions (up to 98%) and mortalities (more than 80%). Fishing gear in state waters, including bottom trawls, gillnets, trap/pot gear, and pound nets, interacts with sea turtles each year. NMFS is working with state agencies to address the bycatch of sea

turtles in state water fisheries within the action area of this consultation where information exists to show that these fisheries capture sea turtles. Action has been taken by some states to reduce or remove the likelihood of sea turtle bycatch and/or the likelihood of serious injury or mortality in one or more gear types. However, given that state managed commercial and recreational fisheries along the U.S. Atlantic coast are reasonably certain to occur within the action area in the foreseeable future, additional interactions of sea turtles with these fisheries are anticipated. There is insufficient information to quantify the number of sea turtle interactions with state water fisheries as well as the number of sea turtles injured or killed as a result of these interactions. While actions have been taken to reduce sea turtle bycatch in some state water fisheries, the overall effect of these actions is not fully known, and the future effects of state water fisheries on sea turtles are presently difficult to quantify due to data and monitoring limitations.

Information on interactions with shortnose and Atlantic sturgeon with state fisheries operating in the NYNJHATS General Study Area is not available, and it is not clear to what extent these future activities will affect listed species differently than the current activities.

Effects of State Water Fisheries related to the Interim Response Actionable Element Sites are not anticipated as Harlem River has no designated commercial fisheries, East Riser does not have fisheries in the vicinity, and Oakwood Beach is part of a Marine Protected Area that restricts commercial and recreational fishing.

Habitat Loss

Loss of habitat by conversion of forests, grassland and coastal habitats to commercial, residential, and industrial development has contributed to species loss. Future development and habitat loss is expected to occur and effect the listed species over the temporal scale of the NYNJHATS (i.e., over the next 50 years).

The listed bat species depend upon trees for roosting within the native range (USFWS 2022b) and future development could contribute to habitat loss within the Study Area. The northern long-eared bat is sometimes found in structures such as buildings, barns, sheds, under eaves, so it is possible these bats would utilize man- made structures if trees were not available. Bats could possibly leave their existing habitat in search of other wooded or forested locations as future development continues.

Shoreline development will inevitably impact shorebirds that utilize marshes and beach habitat for nesting, breeding, and foraging each year. Impacts are unpredictable and depend upon habitat protections and future development along beachfronts in the NYNJHATS General Study Area.

Monarch butterfly populations have declined due to habitat loss over the past two decades (Federal Register 2020) and future development in meadows or fields where wildflowers and milkweed grow could continue to impact the species. Milkweed is the sole food source for monarch butterfly larvae and reproduction is dependent on its presence in the spring and summer northern habitats. Monarch butterflies also utilize habitat along coastal beaches with dunes and future development along beaches could impact the species (NYSDEC 2022b). Seabeach amaranth is a flowering plant that occurs on barrier islands, inlets and over wash areas (Federal Register 1990) that could also be impacted by coastal development. Beach slope is a critical factor for the growth of seabeach amaranth and changes to existing slopes could degrade or reduce the habitat available to the species.

Adverse effects from Habitat Loss related to the Interim Response Actionable Element Sites is not anticipated, as effects will be mitigated, if applicable, and in some cases create additional native, suitable habitat for native terrestrial, aquatic, and pollinator species to thrive. The Harlem River Seaward Alignment would not remove habitat, but instead would aim to create habitat through the addition of complementary nature-based solutions that would support reef-effect and foraging and sheltering areas for fish, and foraging areas for birds. The Harlem River Landward Alignment would remove roughly 1-acre of greenspace that is deteriorated with invasive species, and restore more than mitigate with native plant species with an emphasis on pollinator mammals and insects. East Riser would mitigate in-kind and in-place for riverine habitat loss related to channel modification, and plans to keep grey-areas "grey" and green-areas "green" to negate associated habitat loss. Oakwood Beach is a CSRM-focused wetland enhancement with dune restoration that would remove non-native, invasive habitat and replace with native habitat, creating quality habitat for native species to return to.

Vessel Interactions

NMFS's Sea Turtle Stranding and Salvage Network (STSSN) data indicate that vessel interactions are responsible for a number of sea turtle strandings within the action area each year. In the U.S. Atlantic from 1997- 2005, 14.9% of all stranded loggerheads were documented as having sustained some type of propeller or collision injuries (NMFS and USFWS 2007). The incidence of propeller wounds rose from approximately 10% in the late 1980s to a record high of 20.5% in 2004 (STSSN database). Such collisions are reasonably certain to continue. Collisions with boats can stun, injure, or kill sea turtles, and many live-captured and stranded sea turtles have obvious propeller or collision marks (Dwyer *et al.* 2003). However, it is not always clear whether the collision occurred pre-or postmortem. NMFS believes that vessel interactions with sea turtles will continue in the future.

Vessel interactions would not be anticipated at either East Riser or Oakwood Beach Interim Response Actionable Element Sites, nor the Landward Harlem River Alignment, as work would be primarily conducted on land, using land-based equipment. The Seaward Harlem River Alignment may be conducted from land and from water; however, given the area of construction and the anticipation that vessels would be limited to the Harlem River, vessel strikes for sea turtles or MMPA species are not anticipated.

7.4.3. Pollution and Contaminants

Human activities in the action area causing pollution are reasonably certain to continue in the future, as are impacts from them on birds, mammals, insects, plants, fish, and sea turtles. However, the level of impacts cannot be projected. Sources of contamination in the action area include atmospheric loading of pollutants, stormwater runoff from coastal development, groundwater discharges, and industrial development. Chemical contamination may have effects on listed species' reproduction and survival. The extent of these effects is dependent upon the type of contaminant and the chemical concentration in a given habitat.

Excessive turbidity due to coastal development and/or construction sites could influence the foraging ability of many animals that utilize the aquatic environment (*e.g.,* birds, fish, mammals, reptiles). Marine debris (*e.g.*, discarded fishing line or lines from boats, plastics) also has the potential to entangle animals or to be consumed by them. For example, sea turtles, birds, and marine mammals commonly ingest plastic or mistake debris for food which sometimes leads to asphyxiation.

The Interim Response Actionable Element Sites would not be anticipated to introduce pollution or contaminants into the environment, and would not incur additive effects. Construction would be done with implementation of BMPs and site-specific construction Stormwater Pollution Prevention Plans. Restored habitat would meet State and Federal regulatory criteria and thresholds to not introduce pollutants to wildlife and their associated habitat.

7.4.4. State NPDES Permits

Actions carried out or regulated within the action area also include the regulation of dredged material discharges through CWA Section 401-certification and point and non-point source pollution through the National Pollutant Discharge Elimination System. New York has been delegated authority to issue NPDES permits by the EPA. These permits authorize the discharge of pollutants in the action area. Permittees include municipalities for sewage treatment plants and other industrial users.

The Actionable Element Sites would all be subject to NPDES/SPDES permit for disturbances of over 1-acre of land during construction.

7.4.5. Relative Sea Level Change

RSLC is expected to continue and could impact a variety of species and habitats in the NYNJHATS General Study Area, and the Interim Response Actionable Element Sites. Given the rate of change associated with climate effects (i.e., on a decadal to century scale), it is likely that climate will influence the status of any listed species over the temporal scale of the NYNJHATS (i.e., over the next 50 years) or that the abundance, distribution, or behavior of those species in the Study Area will significantly change as a result of RSLC.

There are numerous impacts associated with climate and the effects within the Study Area are difficult to predict. RSLC will continue to impact coastal habitats such as marshes, inlets, barrier islands, coastal meadows, and sand dunes which provide habitat for seabeach amaranth and the monarch butterfly. According to the NYS 2100 Commission Report (2013), RSLC in New York City and Long Island is projected to be as many as six feet within the next 90 years (USACE 2013). Coastal storms will cause flooding at increased heights and over larger areas than in the past as RSLC continues. It is also projected that frequency and intensity of coastal storms will increase (NPCC 2013). As tropical storms continue to increase in severity, forested inland habitat that is utilized by ESA-listed species of bats in the NYNJHATS General Study Area will be impacted. Beach erosion is another concern and contributes to habitat loss for shorebirds that depend upon nesting locations each year. These impacts are unpredictable and will vary in severity over the temporal scale.

7.4.6. Other Construction Projects in the Study Area

Other permitted and pending projects located within the Study Area have been authorized by permits issued under the USACE's Permits Program for the Clean Water Act Section 404 and Section 10 of the Rivers and Harbors Act of 1899. Some of these applicants have already completed some dredging; others have not begun or scheduled the work. Some examples of dredging projects in the NY/NJ Harbor include the Harbor Deepening Project, Harbor Deepening Channel Improvements Project, East Rockaway Inlet maintenance, Jamaica Bay Federal Navigation Channel maintenance, and maintenance of several other USACE navigation channel maintenance projects in the Harbor (USACE 2022). Other

than the Port Authority and USACE projects, the permitted and pending work typically represents maintenance around pier areas and includes dredging, pier rehabilitation, and pier maintenance, rehabilitation of wave breaks, bridge abutment rehabilitation, and wharf reinforcements. Numerous sand and aggregate borrow areas also lie off the coasts of New Jersey and New York. These areas are dredged periodically and used for beach nourishment and CSRM. Some examples of other coastal projects include the South Shore Staten Island, Passaic River Tidal Protection Area, the Sea Bright to Manasquan Project, the East Rockaway Inlet to Rockaway Inlet and Jamaica Bay project, and others.

In addition to dredging, beach nourishment, and navigation projects, several other in-water and restoration projects exist in the region. For example, the Hudson River Estuary Program includes the development of a habitat restoration plan and provides funding and planning assistance for restoration projects (USACE 2020a). Restoration efforts include the improvement of water quality and wetlands, as well as bird, shellfish, and other sensitive species habitat in the Port District of New York and New Jersey (USACE 2020a). Additional restoration projects in the region include the New York Rising Community Reconstruction Program, implemented in 2013 with over 3,000 projects across the state addressing critical infrastructure, drainage improvements, and shoreline protection (USACE 2020b). Environmental mitigation and restoration related to the Tappan Zee Bridge replacement project on the Hudson River include wetland restoration and management, oyster restoration, and stormwater treatment construction projects (USACE 2020b). In addition, the NYCDEP is undertaking large infrastructure improvement projects at several of its wastewater treatment facilities including at Wards Island in Manhattan and Coney Island in southern Brooklyn. The anticipated effect of these projects would overall improve water quality in the New York/New Jersey Harbor, representative of a net benefit but would need to be evaluated in more detail and for specific waterbodies in the Comprehensive Plan's Tier 2 NEPA documents.

Short-term connected impacts are related to Project activities and in-water construction associated with other permitted projects that are ongoing concurrently within the Harbor area. These short-term impacts would be a combination of disturbances associated with each project. Construction impacts are the combined effect on wildlife and the natural environment related to temporary effects such as increased turbidity, habitat disturbance, and/or discharge in the NYNJHATS General Study Area. Impacts related to construction would be minimized as practicable using BMPs.

Long-term connected impacts would be limited to localized changes in water column depth, bathymetric contours, hydrodynamics, and sedimentation rates, such as those potential impacts associated with the operation and maintenance of the existing or proposed deepened channels, any deepening or operations and maintenance proposed by private entities, and the berth deepening being proposed by the Port Authority of New York and New Jersey, as well as sand borrow and beach nourishment activities and other restoration projects ongoing or planned for the region. However, restoration activities related to habitat improvement or CSRM are expected to generate benefits to the NYNJHATS General Study Area by reducing water quality impacts from potential flooding and improve quality of habitats and wetlands.

Specifically, in response to connected action impacts on fishes, mobile life stages are expected to find acceptable habitat elsewhere within the Harbor beyond the temporary and localized dredging plumes. Early life stages that are pelagic and planktonic will be carried through areas of dredging by tidal currents resulting in little effect on them. The life stages that would be most susceptible to the

deepening dredging are demersal eggs and larvae. Eggs are demersal and adhesive for a short period following fertilization; larvae are largely passive drifters with limited capabilities to move within the water column. The magnitude of impacts from this and other projects would be directly related to work occurring in specific habitat and spawning grounds.

7.4.7. Other Storm Risk Management Projects in the Study Area

It is recognized that much of the NYNJHATS General Study Area are highly developed. Over the course of the NYNJHATS, separate new projects and developments have been or may be planned, and may go into construction in the future. As described in the September 2022 Integrated FR/Tier 1 (Programmatic) EIS, approximately 50 different planned and in- development storm risk management projects could potentially impact the proposed NYNJHATS General Study Area. For these separate CSRM related studies and projects, which ha1971ve not been assumed to be in place as part of the NYNJHATS No Action Alternative, continued coordination will be needed to further refine and optimize the reaches and proposed alignments between those studies and projects and what may be advanced as part of, or throughout the duration of, the NYNJHATS. A brief list of key projects that will need further coordination is provided in this Section. It is recognized that this list will require review and updates in subsequence phases of the Study.

- NJDEP Rebuild by Design – Hudson River, NY
- NJDEP Rebuild by Design – Meadowlands, NJ
- NYC East Side Coastal Resiliency Project, NY
- NYC Lower Manhattan Coastal Resiliency Project, NY
- Port Monmouth Coastal Strom Risk Management Project, NJ
- South Shore of Staten Island Coastal Strom Risk Management Project, NY
- Coney Island Coastal Storm Risk Management Project, NY

7.5. Unavoidable Adverse Environmental Effects*

Unavoidable, short-term, adverse impacts from implementation of the Actions Alternatives at each Actionable Element Site (Harlem River, East Riser, and Oakwood Beach) would primarily be associated with construction activities. Impacts would include periodic noise and vibrations, fugitive dust emissions, and disruption to traffic flow and parking; however, these impacts would be short-term and generally limited to the immediate area. There are no anticipated unavoidable, long-term, adverse environmental impacts as the operations and maintenance of these Actions would be minimal and temporary. Refer to Appendix A for additional detail on adverse environmental effects.

7.6. Irreversible and Irretrievable Commitment of Resources*

Implementation of the Actionable Element proposed actions would result in an irreversible and irretrievable commitment of resources by the Army. Committed resources would include building materials, supplies, and their costs; labor; planning and engineering costs; infrastructure capacity; funds used for construction; tree replacement costs; and the land that would be developed. Other

committed resources would include water, natural gas, fossil fuels, and electricity used for the construction and continued operation and maintenance of the proposed actions.

7.7. Avoidance, Minimization, and Mitigation Measures*

Mitigation measures, including avoidance and minimization vary depending on the Actionable Element Site and Alternatives assessed; therefore, this information can be found in more detail in Appendix A. Below are summary tables of the potential best management practices (BMPs) and/or mitigation actions that may be implemented.

7.7.1. Harlem River

RESOURCE CATEGORY	POTENTIAL BMPs AND MITIGATION
Wildlife and Vegetation	Erosion and sediment control BMPs, vegetation restoration and compensation, invasive species BMPs, tree/shrub clearing restriction windows, replanting with native vegetation, pre-construction vegetation surveys.
Special Status Species	Avoidance. Continued coordination with respective regulatory Agencies.
Special Status Areas	Erosion and sediment control BMP, continued coordination with respective regulatory Agencies.
Physical Resources	Erosion and sediment control BMPs, disturbed areas restored to pre-construction land use.
Hydrological Resources	Erosion and sediment control BMP, water quality certificate recommendations/BMP
Air Quality and Clean Air Act	Air emissions from construction of the Actionable Element Site are anticipated to be below all de minimis levels on a yearly basis; and therefore, is not anticipated to trigger General Conformity Review.
Cultural Resources	In continued coordination with NYSHPO, LPC, and other stakeholders, avoid/minimize adverse effects to Cultural Resources in accordance with stipulations of the Programmatic Agreement.
HTRW	Avoidance and minimization of impacts to HTRW sites, implementation of BMPs when working near HTRW sites. Coordination with Federal, State, and Local agencies as needed.
Navigation	Develop traffic control plans.

Noise and Vibration	Construction timeframes will be coordinated with local ordinance. Noise and vibration monitoring may be conducted during construction.
Socioeconomics and Demographics	Construction timeframes will be coordinated with local ordinances, noise and vibration monitoring/surveys may be conducted during construction. Additional BMPs may be tailored to the community concerns.

Avoidance, Mitigation, and Best Management Practices Considerations:

Action Alternative – Seaward Alignment

As the anticipated adverse effects of this Actionable Element are low ("-1" and "-2") additional mitigation beyond avoidance is not necessary to sustain low adverse effect qualitative rating. This does not mean that best management practices or mitigation (avoidance) will not be implemented, but rather, that it is not necessary to quantify beyond what is already being performed as part of the implementation of the project. Refer to the Environmental Appendices for supporting detail and individual resource effect rating score cards.

Action Alternative – Landward Alignment

As the anticipated adverse effects of this Actionable Element are low ("-1" and "-2") additional mitigation beyond avoidance is not necessary to sustain low adverse effect qualitative rating. This does not mean that best management practices or mitigation (avoidance) will not be implemented, but rather, that it is not necessary to quantify beyond what is already being performed as part of the implementation of the project. An exception to this generalization is the acknowledgement of the greenspace (although degraded by urban influences and non-native invasives) that would be permanently removed. In accordance with USACE policy, post-construction site restoration efforts offer the potential to re-establish the remaining greenspace into quantifiable native nature space or park space, creating new opportunities for community recreation and leisure and enhancing the quality of life for local residents. Refer to the Environmental Appendices for supporting detail and individual resource effect rating score cards.

7.7.2. East Riser

RESOURCE CATEGORY	POTENTIAL BMPs AND MITIGATION
Wildlife and Vegetation	Erosion and sediment control BMPs, vegetation restoration, invasive species BMPs, tree/shrub clearing restriction windows, replanting with native vegetation, pre-construction vegetation surveys
Special Status Species	Environmental window restrictions for construction and maintenance activities, terrestrial aquatic species and vegetation surveys, continued coordination with respective regulatory Agencies.
Special Status Areas	Erosion and sediment control BMPs, continued coordination with respective regulatory Agencies.
Physical Resources	Erosion and sediment control BMPs, disturbed areas restored to pre- construction land use.
Hydrological Resources	Erosion and sediment control BMPs, water quality certificate recommendations/BMPs
Air Quality and Clean Air Act	Air emissions from construction of the Actionable Element are anticipated to be below all de minimis levels on a yearly basis; and therefore, is not anticipated to trigger General Conformity Review.
Cultural Resources	In continued coordination with NYSHPO, NJHPO, LPC, NPS and other stakeholders, avoid/minimize adverse effects to Cultural Resources in accordance with stipulations of the Programmatic Agreement.
HTRW	Avoidance and minimization of impacts to HTRW sites, implementation of BMPs when working near HTRW sites. Coordination with Federal, State, and Local agencies as needed.
Navigation	Not Applicable.
Noise and Vibration	Construction timeframes will be coordinated with local ordinance. Noise and vibration monitoring may be conducted during construction.
Socioeconomics and Demographics	Construction timeframes will be coordinated with local ordinances, noise and vibration monitoring/surveys may be conducted during construction. Additional BMPs may be tailored to the community concerns.

Avoidance, Mitigation, and Best Management Practices Considerations:

As the anticipated adverse effects of the proposed Alternative of the Actionable Element are low (“-1”) additional mitigation beyond avoidance is not necessary to sustain low adverse effect qualitative rating, therefore, no mitigation scores were generated. This does not mean that best management practices or mitigation (avoidance) will not be implemented, but rather, that it is not necessary to

quantify beyond what is already being performed as part of the implementation of the project. Refer to the Environmental Appendix for supporting detail and individual resource effect rating score cards.

7.7.3. Oakwood Beach

RESOURCE CATEGORY	POTENTIAL BMPs AND MITIGATION
Wildlife and Vegetation	Erosion and sediment control BMPs, vegetation restoration and compensation, invasive species BMPs, tree/shrub clearing restriction windows, replanting with native vegetation, pre-construction vegetation surveys
Special Status Species	Avoidance. Environmental window restrictions for construction and maintenance activities, terrestrial aquatic species and vegetation surveys, continued coordination with respective regulatory Agencies.
Special Status Areas	Erosion and sediment control BMPs, continued coordination with respective regulatory Agencies.
Physical Resources	Erosion and sediment control BMPs, disturbed areas restored to pre- construction land use.
Hydrological Resources	Erosion and sediment control BMPs, water quality certificate recommendations/BMPs
Air Quality and Clean Air Act	Air emissions from construction of the Actionable Element are anticipated to be below all de minimis levels on a yearly basis; and therefore, is not anticipated to trigger General Conformity Review.
Cultural Resources	In continued coordination with NYSHPO, NJHPO, LPC, NPS and other stakeholders, avoid/minimize adverse effects to Cultural Resources in accordance with stipulations of the Programmatic Agreement.
HTRW	Avoidance and minimization of impacts to HTRW sites, implementation of BMPs when working near HTRW sites. Coordination with Federal, State, and Local agencies as needed.
Navigation	Not Applicable.
Noise and Vibration	Construction timeframes will be coordinated with local ordinance. Noise and vibration monitoring may be conducted during construction.
Socioeconomics and Demographics	Construction timeframes will be coordinated with local ordinances, noise and vibration monitoring/surveys may be conducted during construction. Additional BMPs may be tailored to the community concerns.

Avoidance, Mitigation, and Best Management Practices Considerations:

As the anticipated adverse effects of this Actionable Element are low (“-1”) additional mitigation beyond

avoidance is not necessary to sustain low adverse effect qualitative rating, therefore, no mitigation scores were generated. This does not mean that best management practices or mitigation (avoidance) will not be implemented, but rather, that it is not necessary to quantify beyond what is already being performed as part of the implementation of the project. Refer to the Environmental Appendices for supporting detail and individual resource effect rating score cards.

8. Environmental Compliance*

Compliance with the following laws, regulations, and Executive Orders (***Table 44*** and ***Table 45***), as applicable, is required for environmental acceptability of the Actionable Element Site alternatives, which includes but is not limited to the following:

Table 44: Regulatory Compliance Status

Title of Law	U.S. Code	Compliance Status
Abandoned Shipwreck Act of 1987	43 United States Code (U.S.C.) 2101	In Progress
American Indian Religious Freedom Act of 1978	Public Law No. 95-341, 42 U.S.C. 1996	In Progress
Anadromous Fish Conservation Act of 1974	16 U.S.C. 757 a et seq.	In Progress
Archaeological and Historic Preservation Act of 1974	Public Law 93-291 and 16 U.S.C.469-469c	In Progress
Archaeological Resources Protection Act of 1979	16 U.S.C. 470aa–470mm	In Progress
Bald and Golden Eagle Protection Act of 1962, as amended	16 U.S.C. 668	In Progress
Clean Air Act of 1972, as amended	42 U.S.C. 7401 et seq.	In Progress
Clean Water Act of 1972, as amended	33 U.S.C. 1251 et seq.	In Progress
Coastal Barrier Resources Act of 1982	Public Law 114-314	In Progress
Coastal Zone Management Act of 1972, as amended	16 U.S.C. 1451 et seq.	In Progress
Comprehensive Environmental Response, Compensation and Liability act of 1980	42 U.S.C. 9601	N/A
Emergency Wetlands Resources Act	16 U.S.C. 3901-3932	In Progress
Endangered Species Act of 1973	16 U.S.C. 1531	In Progress
Estuary Protection Act of 1968	16 U.S.C. 1221 et seq.	In Progress
Fish and Wildlife Coordination Act of 1958, as amended	16 U.S.C. 661	In Progress
Flood Control Act of 1970	33 U.S.C. 549	In Progress
Hudson River Valley National Heritage Area	Title IX of Public Law 104-333 (1996), as amended by Section 324 of Public Law 105-83 (1997)	In Progress
Land and Water Conservation Act	16 U.S.C. 460	In Progress
Magnuson-Stevens Fishery Conservation and Management Act – Essential Fish Habitat Amendment	16 U.S.C. 1801	In Progress

Title of Law	U.S. Code	Compliance Status
Marine Mammal Protection Act of 1972, as amended	16 U.S.C. 1361	In Progress
Marine Protection, Research, and Sanctuaries Act of 1972	33 U.S.C. 1401	In Progress
Migratory Bird Conservation Act of 1928, as amended	16 U.S.C. 715	In Progress
Migratory Bird Treaty Act of 1918, as amended	16 U.S.C. 703	In Progress
National Environmental Policy Act of 1969, as amended	42 U.S.C. 4321 et seq.	In Progress
National Historic Preservation Act of 1966, as amended	54 U.S.C. Section 300101	In Progress
NativeAmerican GravesProtection and Repatriation Act of 1990	25 U.S.C. 3001	In Progress
Noise Control Act of 1972, as amended	42 U.S.C. 4901	In Progress
Resource Conservation and Recovery Act of 1976	42 U.S.C. 6901 et seq.	N/A
Rivers and Harbors Act of 1888, Section 11	33 U.S.C. 608	In Progress
Rivers and Harbors Act of 1899	33 U.S.C. 401 et seq.	In Progress
Safe Drinking Water Act of 1974, as amended	42 U.S.C. 300	N/A
Submerged Lands Act of 1953	43 U.S.C. 1301 et seq	In Progress
Toxic Substances Control Act of 1976	15 U.S.C. 2601	N/A

Table 45: Executive Order Compliance Status

Title of Executive Order	Executive Order Number	Compliance Status
Consultation and Coordination with Indian Tribal Governments	13175	In Progress
Facilitation of Cooperative Conservation	13352	In Progress
Floodplain Management	11988	In Progress
Federal Compliance with Pollution Control Standards	12088	In Progress
Federal Compliance with Right-to-Know Laws and Pollution Prevention	12856	N/A
Invasive Species	13112	In Progress
Marine Protected Areas	13158	In Progress
Offshore Oil Spill Pollution	12123	N/A
Protection and Enhancement of Environmental Quality	11514/11991	In Progress
Protection and Enhancement of the Cultural Environment	11593	In Progress
Protection of Wetlands	11990	In Progress
Protection of Children from Environmental Health and Safety Risks	13045	In Progress
Planning for Federal Sustainability in the Next Decade (2015)	13693	In Progress
Responsibilities of Federal Agencies to Protect Migratory Birds	13186	In Progress

Environmental commitments and site-specific compliance for each Actionable Element Site is provided in Appendix A.

9. Next Steps

9.1. Gap analysis results

Each Actionable Element was evaluated to identify if (1) existing site information provided by the NFS were sufficient to develop a "Class 3" estimate consistent with USACE ER 1110-2-1302, (2) engineering models and designs provided by the NFS were compliant with USACE engineering regulations, and (3) the projects were adequately designed to achieve their stated benefits. The following sections outline the data gaps and associated engineering risks in achieving a "Class 3" estimate for each Actionable Elements.

9.1.1. Harlem River

Seaward Alignment

The NFS provided reports related to the Harlem River Greenway to NY District to utilize in the Harlem River design effort. A full list of reports considered can be found in Appendix B. The data available at the time of the report is sufficient to generate a conceptual design and provide a Class 4 cost estimate. However, to further the level of design maturity and provide a Class 3 cost estimate during the next phase of the project, additional data will need to be collected. ***Table 46*** summarizes the primary data gaps from an engineering and design perspective, and the potential impact on the project. The list in ***Table 46*** is not anticipated to be all inclusive or comprehensive as it is anticipated that additional data in accordance with local, state and federal regulations and non-engineering disciplines may also be required. Additional information on the can be found in Appendix B.

Table 46: Harlem River Data Gaps

Category	Data Gap	Impact	Action Step
Geotechnical Information	Detailed Subsurface Exploration	Lack of soil borings and laboratory testing data will require conservative design assumptions (i.e., weak soil parameters), potentially increasing the size and cost of structure in this reach. Lack of understanding as to the variability of bedrock (depth to bedrock, rock quality, and rock composition) impacts selected foundation type and size, likewise impacting cost	Complete project specific geotechnical investigation including CPTs, SPTs, boreholes with soil sampling and rock coring, and laboratory testing. Geophysical testing to understand depth to rock along the line of protection may also be recommended.

Category	Data Gap	Impact	Action Step
		of structure and selected construction methodology.	
Utilities (Storm Water)	Storm water infrastructure mapping is not available	The need for, size and details of outfall penetrations through the alignment is not well defined. Conservative assumptions can be made but large contingencies around this item remain.	Obtain storm water infrastructure as-built records, digital infrastructure files and other pertinent storm water data.
Utilities (Subaqueous Cables)	Type(s) and size of cabled utilities at or below riverbed have not been identified	The need for, size and details of utility crossing is not well defined. Conservative assumptions can be made but large contingencies around this item remain	Complete utility survey. Obtain as-builts or record drawings.
Utilities (Other)	Utility survey is not available	Impacts to existing utilities and/or need for relocation of utilities is largely undefined. Although it is generally believed that few utilities are present within the footprint of the proposed (waterside) alignment conservative assumptions will need to be made and contingencies are high.	Complete utility survey. Obtain as-builts or record drawings.
Record Drawings of Infrastructure	Record drawings of existing infrastructure (e.g., Harlem River Drive 155th Street subway Tunnel Macombs Dam Bridge and the MTA 148th Street Yard)	The CSRM alignment will be constructed in close proximity to existing infrastructure. To avoid conflicts and interference with existing civil works construction drawings or as-builts are needed.	Obtain record drawings

Category	Data Gap	Impact	Action Step
Other Environmental	Tree Survey is missing	Lack of tree survey leads to assumption that no major trees are affected.	Complete tree survey to better estimate impacts to and need of removal of trees.
Real Estate	No parcel investigations were completed along alignment	Construction easements and any possible limitations imposed during construction may affect project design	Complete preliminary easement mapping and identify real estate data needs
Topography & Bathymetry	Surveyed topographic information.	Surveyed topographic elevations are needed for next phase of design. Especially elevations of grades where overhead obstructions are present (next to or under Harlem River Drive) lead to assumptions that need to be verified.	Obtain topographic survey.
Coastal Hydrodynamic Models	Information on design wave characteristics is sparse within the Harlem River.	Design wave characteristics kept uniform for the entire alignment based on conservative assumptions. Spatially more refined design wave information could provide more economical design.	Complete wave modeling to establish design wave characteristics.
Soil Investigations	Lack physical and chemical analysis of the sediments	Lack of soil investigations will present a schedule risk for implementation, and present uncertainty in potential material disposal costs. Additionally, changes to the spatial extents of the design may be needed to avoid potentially contaminated areas.	Assess the risk for contaminated soils and apply appropriate cost/schedule contingency or perform soil investigations.

Landward Alignment

The data gap analysis for the Harlem River Actionable Element focused on identifying the gaps in advancing the in-water alignment to a Class 3 estimate. While the two alignments utilize different CSRM measures and have different spatial extents, the data gaps identified for the in-water alignment apply for the inland alignment. To advance this alignment forward to a Class 3 estimate, additional geotechnical, utility, and topographic information would need to be obtained. The inland alignment crosses MTA underground infrastructure requiring a CSRM feature which prevents additional loading. There is uncertainty in best feature type and design to prohibit additional loading on the MTA's infrastructure. Record drawings of the BD line at 155th Street would need to be consulted to gain more certainty of the design in this section.

9.1.2. East Riser

The NFS provided New York District with the hydrologic (HEC-HMS) and hydraulic (HEC-RAS) modeling used to obtain a NJDEP Flood Hazard Area Individual Permit for the East Riser site. New York District reviewed the models to determine if (1) hydrologic and hydraulic processes were accurately captured and if (2) the existing modeling followed USACE policies and guidance. It was determined that the existing modeling accurately captured the hydrologic and hydraulic conditions of the site, however, the existing modeling did not meet the following USACE policies and guidance.

Table 47: East Riser Data Gaps

Category	Data Gap	Impact	Action Step
Hydrologic Modeling	No calibration was performed on HEC-HMS model based on EM 1110-2-1417	Model Calibration would change model parameters and could change the predicted flows	Perform Model calibration
	Future without project flows were not calculated per EM 1110-2-1417	Future without project conditions may cause higher flows	Perform future without project condition flows for proposed conditions
Hydraulic Modeling	Future flows were not calculated nor incorporated into the HEC-RAS model per EM 1110-2-1416.	The HEC-RAS model does not have a future without project (FWOP) nor a future with project (FWP) model. Future flows may	Analyze future flows in HEC-HMS and incorporate the flows into HECRAS.

Category	Data Gap	Impact	Action Step
		impact the recommended alternative.	
	Ineffective flow areas are used instead of the currently preferred method of using higher manning's n values to represent buildings and obstructions.	Water surface elevations may differ when using manning's n values to represent buildings.	Test and/or incorporate higher manning's n values into the model where ineffective flow areas are currently used to represent buildings.
	The channel modifications within the model represent the 60% design and the pump station is at 90% design. The channel modification plans given to the NY District are at 100% design and have changed from the 60% design.	Channel modification and pump station design may impact the benefits of the selected alternative.	CENAN-EN reviewed the 100% design and confirmed the designs are similar enough to not significantly impact results.
	Documentation is needed to show incremental analysis for culvert/bridge openings and channel modifications to ensure the selected plan is the most cost-effective plan for the East Riser Ditch.	The selected plan may not be the plan that would have been selected by USACE.	Provide documentation or perform analysis with different culvert/bridge/channel modification dimensions to determine the most cost-effective plan for the East Riser Ditch.
	No calibration was performed on the HEC-RAS model.	Calibration was stated to be performed qualitatively from field crews due to a lack of gage data. There is no documentation stating the calibration steps or criteria. Therefore, it cannot be determined how accurate the	Due to lack of stream gage data, calibration may be difficult. One possible action includes gathering high water marks

Category	Data Gap	Impact	Action Step
		HEC-RAS model is compared to existing/real conditions.	from future flood events.
	The stormwater pump performance curves for the ERD pump station within the HEC-RAS model do not match the pump curve data contained within the Appendix of the 100% DDR. The HEC-RAS inputs under "Pump Efficiency Curve" are straight-lines (where flow stays the same with varying head), while the DDR shows more typical pump curves.	Without updates to match, the HEC-RAS model and/or the DDR pump design may not accurately depict the actual, with-project pumping conditions. Field-observed hydraulic properties (including WSE and velocity) may differ from the intended design values / model results.	Confirm the reasoning behind the differences or change the HEC-RAS model pump efficiency curve to match the 100% DDR.
	The pump ON/OFF water surface elevations for the ERD pump station within the HEC-RAS model do not match the WSE from the 100% DDR. The HEC-RAS model indicates pump ON/OFF elevations ranging from 2.75 to 1.75, while the 100% DDR indicates elevations ranging from 0.5 to (-) 1.5.	Without updates to match, the HEC-RAS model and/or the DDR pump design may not accurately depict the actual, with-project pumping conditions. Field-observed hydraulic properties (including WSE and velocity) may differ from the intended design values / model results.	Confirm the reasoning behind the differences or change the HEC-RAS model pump ON/OFF water surface elevations to match the 100% DDR.
Coastal Boundary Conditions	Future sea level change was not included in the coastal tailwater condition in accordance with ER 1100-2-8162. Additionally, a qualitative future condition analysis was not performed in accordance with ECB 2018-4.	Changes to the coastal tailwater condition could result in a different recommended solution, since the coastal tailwater would be incorporated into the HEC-RAS model.	Analyze and include future sea level change in relevant models.

Category	Data Gap	Impact	Action Step
Compliance with ER 1105-2-103 and ER 1165-2-21	The drainage area of East Riser Ditch South, the location of the proposed project, has a drainage area of 1.249 square miles which is less than the specified urban drainage area of 1.5 square miles criteria, based on ER 1165-2-21and also the project does not meet the minimum flow threshold requirements of ER 1165-2-21 for both 1% and 10% flood discharges.	If the project doesn't meet the criteria as specified in ER 1165-2-21, the project cannot progress as it would not be in compliance with USACE participation in urban flood damage reduction projects	The size of the drainage area and magnitude of channel flows in East Riser need to be further investigated to determine if the site meets the design criteria for USACE participation in urban flood damage reduction projects (ER 1165-2-21).
Compliance with ER 1105-2-103 and ER 1165-2-21	The drainage area of East Riser Ditch South, the location of the proposed project, has a drainage area of 1.249 square miles which is less than the specified urban drainage area of 1.5 square miles criteria, based on ER 1165-2-21and also the project does not meet the minimum flow threshold requirements of ER 1165-2-21 for both 1% and 10% flood discharges.	If the project doesn't meet the criteria as specified in ER 1165-2-21, the project cannot progress as it would not be in compliance with USACE participation in urban flood damage reduction projects	The size of the drainage area and magnitude of channel flows in East Riser need to be further investigated to determine if the site meets the design criteria for USACE participation in urban flood damage reduction projects (ER 1165-2-21).

NJDEP utilized an InfoWorks model to simulate flows in East Riser and to size the channel improvements, culvert replacements, and railroad bridge improvements in the proposed alternative. While InfoWorks is certified for use in USACE projects, the provided HEC-HMS and HEC-RAS

models will be used to advance the East Riser Actionable Element Site to the Final Integrated Interim Response Feasibility Report. The major engineering risk associated with East Riser stems from the modeled design flows. Incorporating the USACE policies and guidance listed above into the HEC-HMS and HEC-RAS models may result in different design flows and thus a different sizing or configuration of the recommended plan. Further evaluation and modification of the hydrologic and hydraulic modeling is recommended prior to the release of the final report to confirm the recommend plan. Once the modeling is finalized and the recommended plan is confirmed, USACE will evaluate the site investigations and designs of the channel modifications provided by NJDEP to confirm that the existing information is sufficient to meet a Class 3 cost estimate.

9.1.3. Oakwood Beach

The basis of the project design and cost estimate presented in this draft report was taken from the Oakwood Beach Habitat Restoration 100% submittal prepared by Hazen and Sawyer in August 2020. Given the 2020 plans and specifications were completed to a 100% design level, there is sufficient information to achieve a USACE Class 4 cost estimate for the project as presented in the plans, at this phase; however, further data collection/site investigations and engineering may be necessary to achieve/verify the stated CSRM objectives and a produce Class 3 cost estimate prior to finalizing this report. The extent of these investigations and engineering will be dependent on its stated benefits and outcome of the Abbreviated Risk Analysis.

Table 48: East Riser Data Gaps

Category	Data Gap	Impact	Action Step
Soil Investigations	Lack physical and chemical analysis of the sediments	Lack of soil investigations will present a schedule risk for implementation, and present uncertainty in potential material disposal costs. Additionally, changes to the spatial extents of the design may be needed to avoid potentially contaminated areas.	Assess the risk for contaminated soils and apply appropriate cost/schedule contingency or perform soil investigations.
Hydraulic/ Hydrodynamic Modeling	The proposed project shares the same tidal channel with the South Shore of Staten Island (SSSI) CSRM project to the northeast. No evaluation of the potential impacts to the water budget associated with	Lack of hydrodynamic modeling will present a risk to the functionality/survivability of the wetland.	Perform hydrodynamic modeling to evaluate if there is enough tidal exchange to sustain the two wetlands.

Category	Data Gap	Impact	Action Step
	shared tidal flow were made regarding the two projects.		
Basis of Design Documentation (BOD)	No basis of design documentation was provided.	Lack of BOD documentation presents uncertainty in the adequacy of the design for CSRM and quantity take-offs/cost estimate.	Establish design criteria and re-evaluate project design.
Utilities (Other)	Utility survey is not available	Impacts to existing utilities and/or need for relocation of utilities is largely undefined. Although it is generally believed that few utilities are present within the footprint of Great Kills Park.	Complete utility survey.
Borrow Source for Sand Dunes	No borrow source was identified for dunes	The function of the dune is unknown. If dunes are needed to throughout the project life, periodic renourishment will add cost to the project.	Evaluate need for sand dunes to be maintained throughout the project life. Identify borrow source and renourishment costs if needed.
Other Environmental	Tree Survey, wetland delineation and bio-benchmarking data	Lack of information presents uncertainty with design, performance and cost.	Complete tree survey, bio benchmarking, and wetland delineation to better estimate impacts to and need of removal of trees.
Real Estate	Record of real estate coordination with National Park Service	Construction easements, permanent easements, special Use Permit and any possible limitations imposed during construction may affect project design	Complete preliminary easement mapping and identify real estate data needs
Topography & Bathymetry	Updated surveyed topographic information.	Surveyed topographic elevations are needed for next phase of design.	Obtain topographic survey.

Category	Data Gap	Impact	Action Step
Coastal Hydrodynamic Modeling	Numeric modeling of potential wave attenuation	Wave attenuation benefits maybe under- or over- stated.	Complete numeric modeling of wave attenuation with Corps certified model.

10. Public Coordination and Reviews

Coordination with stakeholders has been a critical component of the NYNJHATS. Since early 2017 the New York District has held several workshops and meetings with Cooperating/Participating Agencies and other Federal, State, and local stakeholders to share information on the Study scope, purpose, and formulation of alternatives, as well as to exchange ideas and information on natural and marine resources within the General Study Area. Refer to the September 2022 Draft Integrated Feasibility Report (FR)/Tier 1 (Programmatic) EIS report for additional information.

New York District hosted 41 public engagement meetings to date; nine of which were held during the scoping period, nine were public meetings held after publication of the Interim Report and twenty-three were held after publication of the Draft Feasibility Report. The study team is in receipt of over 7,767 individual comments on the study since inception. Many of the comments came in during the scoping period, from July to November of 2018, and during the draft feasibility public review period, from September of 2022 to March of 2023. The two main comment themes received, regarded concerns with the overall study process and concerns for environmental impacts. During the scoping period, the public expressed concerns regarding the Civil Works Transformation process, posing the question of how an informed decision on Alternatives could be made without a full investigation of factors, especially environmental impacts to local resources. This feedback prompted NY District to develop the NYNJHATS Interim Report in February 2019 as a means by which to provide the public with more information on the Study's progress prior to the publication of the September 2022 Draft Integrated Feasibility Report (FR)/Tier 1 (Programmatic) EIS report.

10.1. Interim Report (February 2019)

Following the Interim Report publication, a total of 376 letters were received via mail, e-mail, and public meeting cards to date. Many of the letters received included more than one comment, totaling to 841 individual comments. These comments have been reviewed by New York District and categorized into 10 themes, presented in the pie chart below (***Figure 25***).

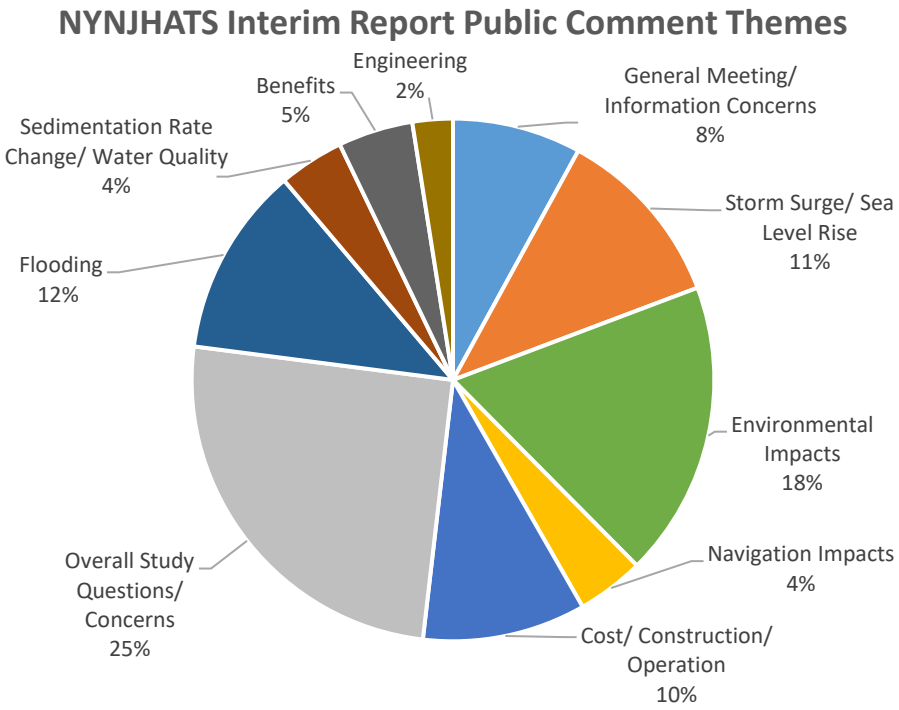

Figure 25: NYNJHATS Interim Report Common Public Comment Themes

10.2. Draft Feasibility Report (September 2022)

Following the Draft Feasibility Report publication, a total of 258 letters were received via mail, e-mail, and public meeting cards to date. Many of the letters received included more than one comment, totaling to 2,767 individual comments. The Project Delivery Team held 12 public meetings in a hybrid format, utilizing Webex to receive comments, both in person and virtually. The team, additionally, held four in-person meetings and seven virtual meetings. These comments have been reviewed by New York District and categorized into 11 themes, presented in the pie chart below (***Figure 26***). After review of the comments and discussion with the vertical team and stakeholders, the NFSs and New York City sent a tri-party letter endorsing the advancement of Alternative 3B in the study.

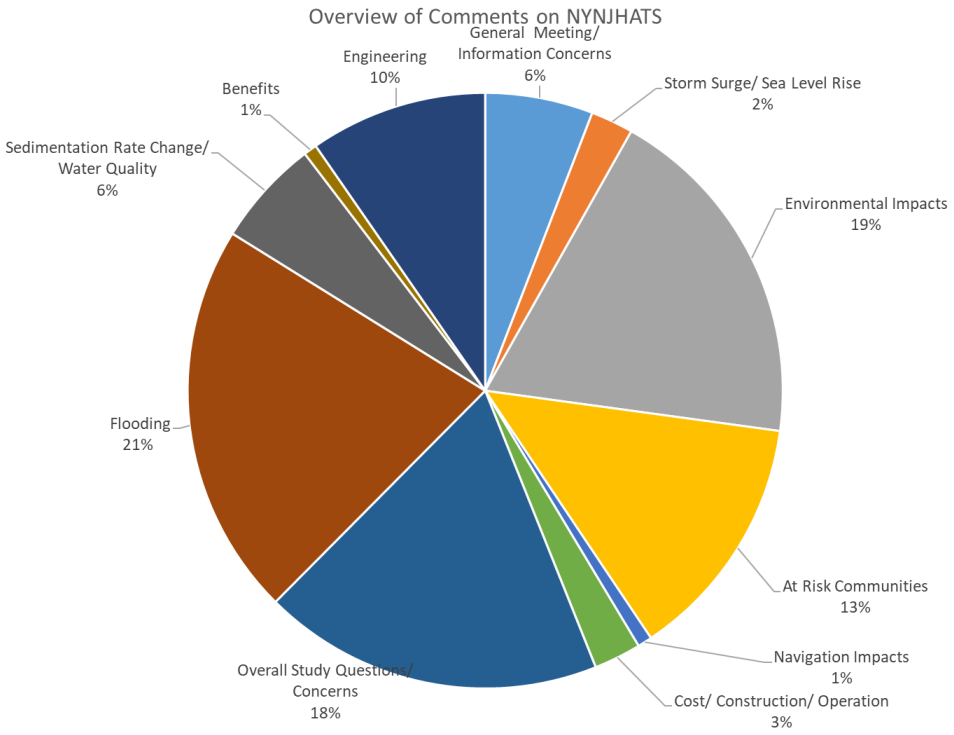

Figure 26: NYNJHATS Draft Integrated Report Common Public Comment Themes

10.3. Draft Interim Response for Actionable Elements (July 2025)

Building on the extensive public coordination efforts detailed in Sections 10.1 and 10.2, the New York District continued stakeholder engagement during the development and release of the Draft Integrated Interim Response FR/EA. This phase of engagement focused on soliciting feedback on specific proposed actions intended to address identified needs and contribute to the overall project goals.

Prior to release of the Draft Integrated Interim Response FR/EA, the study Team conducted a series of outreach activities, including website and social media announcements, two virtual Public Information Sessions (held on July 23rd, 2025), and a recorded Public Information Session now available on the Study website for asynchronous viewing. Following publication, a public comment period will be initiated on July 24th, 2025, and remain open through August 25th, 2025. During this period, six in-person public meetings at locations near proposed actions, as well as two virtual public meetings for the general public, are planned. Comments are being accepted via the Study website, email, mail, and phone.

Following the close of the public comment period on August 25th, 2025, the study team will undertake a comprehensive analysis of all feedback received from the public and Cooperating/Participating Agencies. Responses to comments will be included as an appendix to the Final Integrated Interim Response FR/EA, and this section will be updated at that time with an engagement summary and a

summary of comments received. Ultimately, the insights gained from this public coordination process and agency review will be used to refine the Actionable Elements and contribute to the finalization of the Integrated Interim Response FR/EA, guiding the project towards a well-informed and sustainable solution for the region.

11. Draft Recommendation

In making the following recommendations, I have given consideration to all significant aspects in the overall public interest, including environmental, social and economic effects, engineering feasibility and compatibility of the project with the policies, desires, and capabilities of New York State, the State of New Jersey, and other non-Federal interests.

I recommend that the selected plan for CSRM in the New York-New Jersey Harbor and Tributaries region, as fully detailed in this Integrated Interim Response Feasibility Report and Environmental Assessment, be authorized for construction as a federal project, subject to such modifications as may be prescribed by the Chief of Engineers to meet the direction of Congress for the NYNJHATS as directed in Section 1343 of WRDA 2024. The Tentatively Selected Plan is Alternative C, consisting of three independent Actionable Elements as near-term localized actions, focusing on flood risk management: a CSRM-focused nature-based solution in Oakwood Beach, Staten Island; a CSRM structural feature in northern Manhattan; and a comprehensive solution for multiple flood drivers within the Meadowlands, New Jersey. Although this is a Draft Integrated Feasibility Report and Environmental Assessment with an appropriate design maturity level for authorization, any required mitigation and adaptive management will be further refined in subsequent phases of the study and in coordination with the appropriate federal, state, and local agencies.

The study team, which includes the New York District, NJDEP, NYSDEC, NYCDEP, and NYSDOS has analyzed the best available information needed to develop the three Actionable Elements described in this report. During this analysis, it became clear that the Harlem River Actionable Element will not be sufficiently developed or detailed to support USACE design maturity requirements within the timeline for inclusion in a Chief of Engineer's Report, which could be considered by Congress for authorization in a potential Water Resources Development Act (WRDA) of 2026. In addition, the New York District, NYSDEC, and NYCDEP believe robust, meaningful public coordination and additional engineering and alternative analyses are needed to ensure broader efforts on the Harlem River are evaluated, and to thoroughly coordinate with other government agencies about their plans and the expectations of their communities for the Harlem River. Presently, NYSDEC, NYCDEP, and others are investing significant resources in water quality improvements and creating waterfront access for communities within the Harlem River watershed. The intent is to continue developing this site for inclusion in a future Interim Feasibility Report for potential authorization in a future WRDA, subject to future availability of funds. Inclusion in a future report allows New York District and its project sponsors the opportunity to take a broader look at the Harlem River and ensure the development of the Harlem River any Actionable Element supports and improves upon these efforts while integrating the added benefit of coastal storm management and flood risk reduction. The other Actionable Elements, East Riser and Oakwood Beach, are being further developed and have undergone previous public review and coordination and are projected to be ready for potential Congressional consideration to be authorized in WRDA 2026.

The recommendations contained herein reflect the information available at this time and current departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of a national Civil Works construction program nor the

perspective of highest review levels within the Executive Branch. Consequently, the recommendations may be modified by the Chief of Engineers before they are transmitted to the Congress as proposals for authorization and implementing funding. However, prior to transmittal to Congress, the partners, the State, interested Federal agencies, and other parties will be advised of any modifications and will be afforded an opportunity to comment further.

Alexander L. Young
Colonel, U.S. Army
District Engineer

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