US Army Corps of Engineers®
New York District

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

INTEGRATED FEASIBILITY REPORT & TIER 1 ENVIRONMENTAL IMPACT STATEMENT

APPENDIX A5:

Clean Water Act Section 404(b)(1) Evaluation

Draft Tier 1

September 2022

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1 Introduction

1.1 Authority and Purpose

The purpose of this Tier 1 404(b)1 Evaluation is to ensure that the New York (NY) and New Jersey (NJ) Harbor and Tributaries Coastal Storm Risk Management Study (NYNJHAT study) will not cause or contribute to significant degradation of the waters of the United States (US). This Study was authorized in response to the January 2015, United States Army Corps of Engineers (USACE) North Atlantic Coast Comprehensive Study (NACCS) which identified high-risk areas on the Atlantic Coast for warranting further investigation of flood and coastal storm risk management solutions including the NYNJHAT study. In February 2019, an NYNJHAT Feasibility Study Interim Report (Interim Report) was completed to document existing information and assumptions about the future conditions, and to identify knowledge gaps that warranted further investigation because of their potential to affect plan selection. The Interim Report states the impacts from Hurricane Sandy highlighted the national need for a comprehensive and collaborative evaluation to reduce risk to vulnerable populations within the North Atlantic region.

In response to the destruction laid forth by Hurricane Sandy in 2012, the U.S. Congress passed and the President signed into law the Disaster Relief Appropriations Act of 2013 (Public Law 113-2). The legislation appropriated over $50 billion to address damages caused by the hurricane, and to reduce future flood risk in ways that will support the long-term resilience of vulnerable coastal communities. Almost half of this appropriated funding supports the ongoing recovery and resilience of communities within the Study Area. In NYC alone, $17 billion has been committed to provide funding for projects and programs administered by the federal, state, and local governments (NYC Recovery, 2019). Developing a project that will reduce the frequency and severity of coastal storm damage supports one of the primary missions of USACE.

The USACE North Atlantic Division (NAD) was authorized by P.L. 113-2 to commence the NACCS to investigate coastal storm risk management (CSRM) strategies for areas impacted by the storm. Under the direction of Public Law 113-2, Chapter 4, USACE completed a Focus Area Analysis (FAA) for the NY-NJ Harbor and Tributaries (HATS) as part of the NACCS. The January 2015 NACCS final report identifies nine high-risk focus areas of the North Atlantic Coast that warrant additional analyses by USACE to address coastal flood risk. One of these areas is the NY-NJ Harbor and Tributaries area. Any Proposed Action for the NYNJHATS project will include Best Management Practices that will be fully designed and utilized to ensure that turbidity and sedimentation are limited to the area immediately adjacent to the project site and minimized to the greatest extent possible. This evaluation is based on the regulations presented in 40 CFR 230, Section 404(b)(1): Guidelines for Specification of Disposal Sites for Dredged or Fill Material. The regulations implement Sections 404(b) and 401(1) of the Clean Water Act (CWA), which govern disposal of dredged and fill material inside the territorial seas baseline [§230.2(b)].

1.1.1 Tier 1 Impact Analysis

The National Environmental Policy Act (NEPA) of 1969 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 CFR 1508.18.

To evaluate potential environmental impacts, USACE has prepared an Integrated Feasibility Report/Tier 1 Environmental Impact Statement (EIS). The EIS will be conducted in two stages known as tiers. Tiering, which is defined in 40 CFR 1508.28, 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).

The 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. It provides the groundwork for future project-level environmental and technical studies and modeling and agency consultation.

1.1.2 Modeling of Impacts for the Final Integrated Feasibility Report/Tier 1 Analysis

USACE Engineer Research and Development Center (ERDC) has developed the New York Bight Ecological Model (NYBEM) of the NYNJHAT Study Area. The model is presented in this Integrated Feasibility Report/Tier 1 EIS for Agency and public review of the model development and the preliminary modeling results of the NYNJHAT Study Alternatives. Feedback received on the NYBEM will inform the final version of the model and the results of its application to the NYNJHAT Study Area will be presented in the Final Integrated Feasibility Report/Tier 1 EIS.

The NYBEM focuses on tidally influenced ecosystems within the project boundary to quantify and evaluate potential Project impacts on aquatic resources. The USACE ERDC is also developing an Adaptive Hydraulics Model (AdH Model) to evaluate potential physical changes to flow, tidal range, and water elevations in both storm and non-storm conditions, as well as sediment budget. Currently, the Draft AdH Model has been incorporated into the Draft Integrated Feasibility Report/Tier 1 EIS; however, the Final Integrated Feasibility Report/Tier 1 EIS will utilize the information gained from the NYBEM and AdH modeling efforts, as well as project design, to determine potential impacts from the SSB (open and closed), including, but not limited to, the following physical and biological resources:

- Bathymetry
- Sediment and Soil Quality and Type
- Tides
- Currents and Circulation
- Salinity

- Dissolved Oxygen
- Turbidity
- Sea Level Change/Climate Change
- Flooding
- Wetlands and water resources

Based on additional analysis completed for Tier 2, a supplemental 404 (b) 1 evaluation may be developed, as required.

1.2 Project Background

Storms have historically severely impacted the NY/NJ Harbor region, including Hurricane Sandy most recently, causing loss of life and extensive economic damages. In response, the USACE-NYD is investigating measures to manage future flood risk in ways that support the long-term resilience and sustainability of the coastal ecosystem and surrounding communities, and reduce the economic costs and risks associated with flood and storm events for the NY-NJ Harbor and Tributaries (NY/NJ HATS) area (USACE 2019). The alternative concepts proposed would help the region manage flood risk that is expected to be exacerbated by relative sea level rise.

In 2012, Hurricane Sandy caused considerable loss of life, extensive damage to property, and massive 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 high tide. Twenty-six states were impacted by Hurricane Sandy, and disaster declarations were issued in 13 states. NY and NJ were the most severely impacted states, with the greatest damage and most fatalities in the NY Metropolitan Area. For example, a storm surge of 12.65 feet above normal high tide was reported at Kings Point on the western end of Long Island Sound and 9.4 feet at the Battery on the southern tip of Manhattan. Flood depths due to the storm tide were as much as nine feet in Manhattan, Staten Island, and other low-lying areas within the NY Metropolitan Area. The storm exposed vulnerabilities associated with inadequate coastal storm risk management (CSRM) measures and lack of defense to critical transportation and energy infrastructure.

Devastation in the wake of Hurricane Sandy revealed a need to address the vulnerability of populations, infrastructure, and resources throughout the entire North Atlantic coastal region. At the time of the publication of this report, Hurricane Sandy was the second costliest hurricane in the nation's history and the largest storm of its kind to hit the East Coast. To address the impacts and concerns associated with devastating storms, the USACE has proposed measures to manage coastal storm risk in the NY/NJ Harbor and its tributaries.

1.3 Coordination and Consultation History

Coordination with stakeholders has been a critical component of the NYNJHAT study. Since early 2017, the District has held many workshops and meetings with Cooperating Agencies and other stakeholders to share information on the study scope and purpose and formulation of alternatives, and to exchange ideas and information on natural and marine resources within the Study Area.

USACE announced the preparation of an Integrated Feasibility Report/Tiered EIS for the NYNJHAT feasibility in the February 13, 2018, Federal Register pursuant to the requirements of Section 102(2)(C) of NEPA. The NEPA scoping period initially spanned 45 days from July 6 – August 20, 2018 but was extended to 120 days due to numerous requests from the public. USACE held a total of nine public scoping meetings during the public scoping period. In 2019, four NYBEM workshops were held on January 3, March 11, June 6, and November 14 to help inform the NYBEM model set up to be used as a tool for assessing some direct and indirect effects of agency actions on regional ecosystems including the HAT Study, among others.

In February 2020, the HAT Study paused until October 2021 due to a lack of Federal funding. Following Study resumption, the USACE New York District held several Cooperating Agency meetings to facilitate open communication, share Study progress, status updates, and data as it became available, including an Engineering presentation on the Study Alternatives, a presentation on the Tentatively Selected Plan (TSP), and a presentation on the NYBEM results. This document serves as the start of the formal consultation process for the Proposed Action under the CWA.

2 Study Area

The Study Area is defined in 50 Code of Federal Regulations (CFR) 402.02 as "all areas to be affected directly or indirectly by the Proposed Action and not merely the immediate area involved in the action." The action area for this 404b(1) Evaluation includes the NY Metropolitan Area, including New York City (NYC) which is the most populous and densely populated city in the US, and five of the six largest cities in NJ by population. The shorelines of some of the NY/NJHAT Study Area is characterized by low elevation areas, developed with residential and commercial infrastructure, and is subject to tidal flooding during storms. The Study Area covers more than 2,150 square miles and comprises parts of 25 counties in NJ and NY, including Bergen, Passaic, Morris, Essex, Hudson, Union, Somerset, Middlesex, and Monmouth Counties in NJ; and Rensselaer, Albany, Columbia, Greene, Dutchess, Ulster, Putnam, Orange, Westchester, Rockland, Bronx, New York, Queens, Kings, Richmond, and Nassau Counties in NY.

The NYNJHAT Study Area for the Tier 1 EIS includes NY and NJ Harbor and tidally affected tributaries encompassing all of NYC, the Hudson River (HR) to Troy, NY; the lower Passaic, Hackensack, Rahway, and Raritan Rivers; and the Upper and Lower Bays of NY Harbor, Newark, Jamaica, Raritan and Sandy Hook Bays; the Kill Van Kull, Arthur Kill and East River tidal straits; and western Long Island Sound. The NY and NJ Harbor is located at the apex of the NY Bight. The Harbor exists within the larger confines of the Hudson-Raritan estuary, a diverse and significant habitat complex strongly influenced by tidal action and the mixing of seawater and freshwater drainage (USFWS 1997).

The Study Area is comprised of nine Planning Regions: Capital District Region, Mid-Hudson Region, Lower Hudson/East River Region, Upper Bay/Arthur Kill Region, Hackensack/Passaic Region, Lower Bay Region, Jamaica Bay (JB) Region, Long Island Sound Region, and Raritan Region (Figure 2-1).

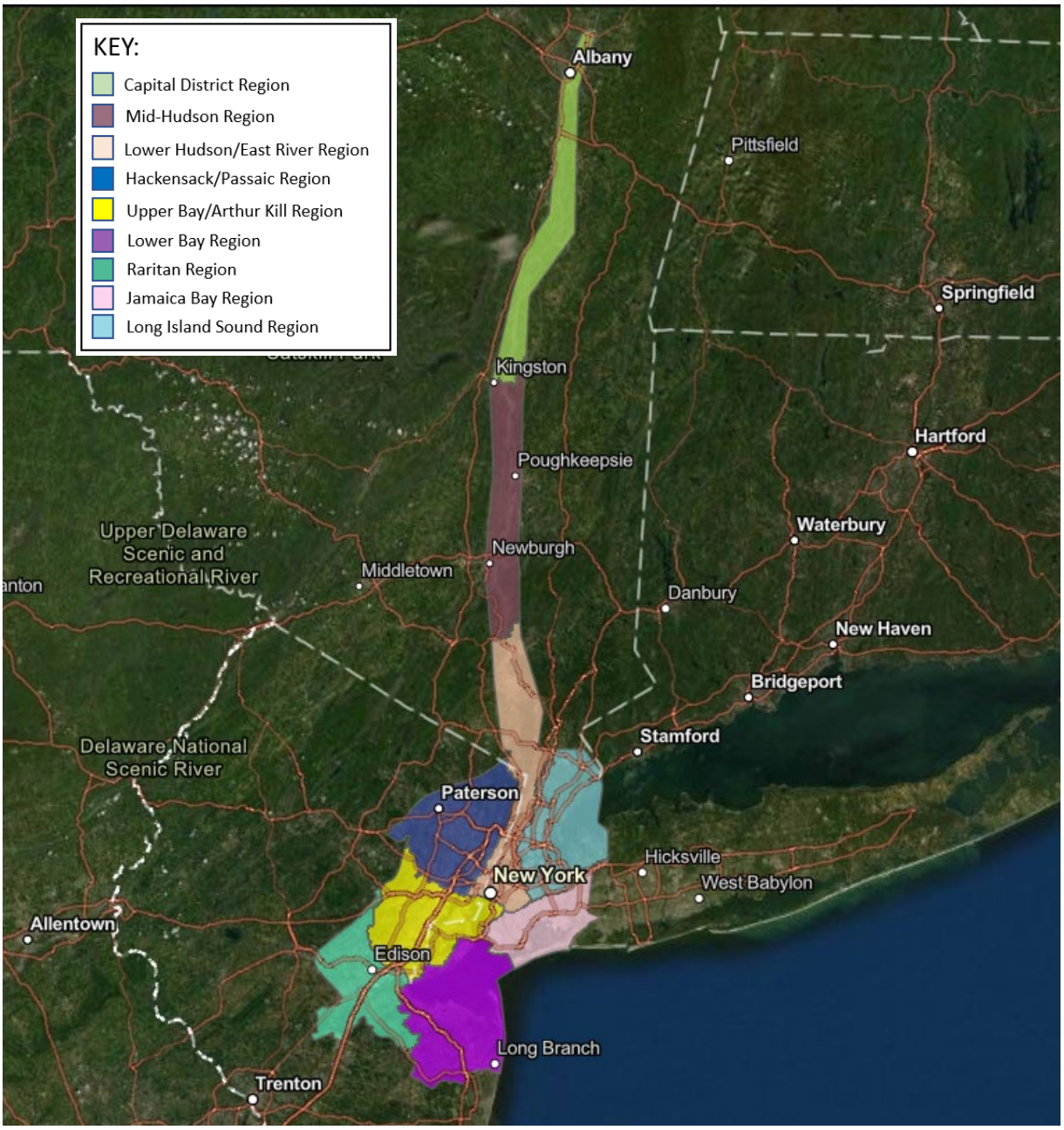

Figure 2-1. Overview of USACE New York-New Jersey Harbor and Tributaries Study Area and Planning Regions

3 Proposed Action

The Tier 1 EIS describes all alternatives evaluated for this NEPA study. This appendix evaluates only the project measures incorporated into the TSP.

3.0 Tentatively Selected Plan

The TSP is Alternative 3B – Multi-basin SSBs With Shore-Based Measures. The TSP includes a combination of coastal storm risk management (CSRM) measures that function as a system to manage the risk of coastal storm damage in the New York Metropolitan Area, including a combination of shore-based and in-water measures. These measures are located within the Hackensack/Passaic, Upper Bay/Arthur Kill, Lower Hudson/East River, Long Island Sound and Jamaica Bay Planning Regions. The TSP measures include storm surge barriers (SSBs), Shore-Based Measures (SBMs), complementary Induced Flooding-Mitigation Features (IFFs) and Risk Reduction Features (RRFs) as well as nonstructural measures and natural and nature-based features described in more detail as follows:

The TSP includes SSBs and complementary SBMs at Jamaica Bay, Arthur Kill, Kill Van Kull, Gowanus Canal, Newtown Creek, Flushing Creek, Sheepshead Bay, Gerritsen Creek, Hackensack River, Head of Bay, Old Howard Beach East, and Old Howard Beach West. The SBMs would provide land-based CSRM and include floodwalls, levees, elevated promenades, buried seawalls/dunes, revetments, berms, bulkheads, pedestrian/vehicular gates, and road raisings. Ringwalls and SBMs will also be considered under the TSP, to be further refined for the Final Integrated FR/Tier 1 EIS.

RRFs would provide CSRM in areas behind SSBs that may experience high frequency flooding when the barriers are not operated.

IFFs would provide CSRM in areas in front of SSBs that may experience induced flooding due to operation of the SSBs.

Nonstructural measures to be included in the TSP may include structure elevations and floodproofing. Currently, conceptual nonstructural measure locations are located throughout the Study area; however, nonstructural measures and locations will be further refined for the Final Integrated FR/Tier 1 EIS.

Natural and nature-based features (NNBF) to be included in the TSP consist primarily of natural features such as wetlands and living shorelines that may provide both CSRM and ecological enhancement. Specific NNBF types and locations will be further refined for the Final Integrated

FR/Tier 1 EIS. At this time, it is anticipated they will be located in areas that experience high frequency coastal flooding.

While the TSP will improve coastal flood risks in the project area, it will not totally eliminate flood risks; therefore, residual risk for flooding still remains a threat to life and property. It is essential that flood risk be proactively communicated to residents in accessible and thoughtful ways.

This assessment only includes structural measures of the TSP. Structural measures included in the TSP are show in Table 1 by Planning Region, and on Figures 2-2 and 2-3.

Table 3.1: Structural measures included in the TSP, by Planning Region.

Planning Region	Storm Surge Barriers	Tide Gates	Floodwalls	Levees	Elevated Promenades	Buried Seawalls/Sand Dunes	Seawalls	Revetments	Berms	Bulkheads	Pedestrian/Vehicular Gates	Road Raising
Capital District												
Mid-Hudson												
Lower Hudson/East River	●		●	●	●		●				●	
Upper Bay/Arthur Kill	●	●	●	●			●	●	●		●	
Lower Bay												
Hackensack/Passaic			●					●	●		●	●
Raritan Region												
Long Island Sound	●		●		●		●					
Jamaica Bay	●	●	●	●	●	●	●	●	●	●	●	●

● = Included in the Planning Region

Figure 3-1. NY/NJHAT Study Tentatively Selected Plan

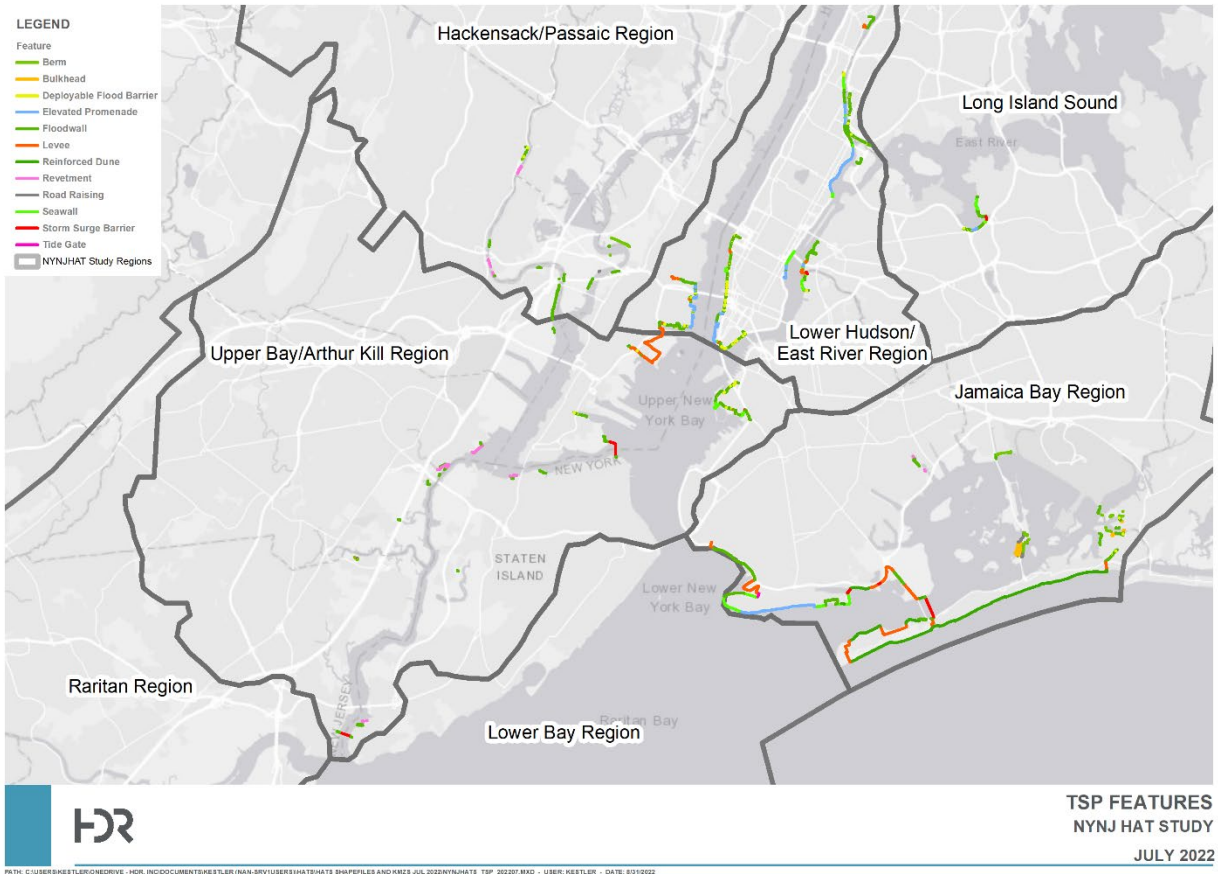

Figure 3-2. Overview of NYNJHAT Study Measures Included in the TSP Existing Conditions

The Study Area and description of existing environment have been separated into nine Planning Regions based on the hydrologic unit codes (HUCs) from the Watershed Boundary Dataset of the U.S. Geological Survey (USGS). Figure 2-1 provides an overview of the NYNJHAT Study Area. The following sections describe the Planning Regions in the NYNJHAT Study Area.

3.1 Planning Regions

3.1.1 Upper Bay/ Arthur Kill Region

The Upper Bay/Arthur Kill Region (Figure 2-1) is based on the 10-digit HUCs for the Arthur Kill-Upper Bay watershed and the Rahway River watershed, from the Watershed Boundary Dataset (USGS 2018). This region lies between the mouth of the HR and the Lower Raritan River and includes portions of Richmond and Kings counties in NY, as well as Governors Island, NY County. This region also includes portions of Hudson, Essex, Union, and Middlesex counties in NJ. The Upper Bay is comprised predominantly of deep water (67 percent is >25 ft [7 m] deep).

The Arthur Kill is a tidal strait that connects to Upper Bay via the Kill Van Kull (another tidal strait) and mixes waters with Newark Bay. The Arthur Kill also connects Newark Bay with Raritan Bay. Important tributaries to the Arthur Kill include the Rahway and Elizabeth Rivers, Old Place Creek, Woodbridge Creek, and Fresh Kills Creek (USACE 2004a). The Upper Bay/Arthur Kill Region has a dynamic hydrology due to the variation in tidal velocity, amount of freshwater flow, and bathymetry among the connecting bays (USACE 1999).

These waterways exist within a heavily industrialized and developed corridor. The NJ side of the Arthur Kill is industrialized; large areas of wetlands are intermingled with industrial facilities on the NY side. The Arthur Kill and Kill Van Kull have deepwater navigation channels that allow transport of cargo into and out of the Ports of NY and NJ. While the Arthur Kill is highly industrialized, approximately 55 percent of the shoreline is natural mudflats and marshes.

The Gowanus Canal is a prominent site within the Upper Bay Planning Region. The canal is a 100-foot-wide, 1.8-mile-long canal in a highly developed section of Brooklyn, NY that has become one of the most contaminated water bodies in the country. Contaminants found in high levels include polycyclic aromatic hydrocarbons, polychlorinated biphenyls, mercury, lead, and copper. In 2010, this site was added to the U.S. Environmental Protection Agency (USEPA) Superfund List. A plan has been put in place to dredge the contaminated soil and then cap the area (USEPA 2018).

Shoreline habitat can be found in the form of wetlands on the west side of Liberty Island. Remnant mudflats are located along the NJ coastline (USACE, 2000; USACE, 1999). Sandy shallows within the Bay Ridge Flats that have been significantly reduced in size over time by dredging are located along the eastern edge of the bay. These flats provide some habitat to many species of young fishes. The Upper Bay is still a critical component of the Study Area because it serves as a migratory pathway for many fish species, providing access to important feeding, overwintering, and nursery areas (USACE, 2004).

3.1.2 Lower Bay Region

The Lower Bay Region (Figure 2-1) is based on the 10-digit HUCs for the Raritan Bay-Lower Bay watershed and the Navesink River-Shrewsbury River watershed, and well as the 8-digit HUC for the Mullica-Toms subbasin, from the Watershed Boundary Dataset (USGS 2018). This includes a portion of Richmond County in NY, and portions of Middlesex and Monmouth counties in NJ.

Major waterbodies in this area provide a combination of marine and estuarine habitats that support diverse ecological communities (USACE, 2004) and are hydrologically connected to the Upper Bay and HR, JB, and the Atlantic Ocean. There are major estuarine wetland systems throughout the region. The Sandy Hook peninsula makes up one unit of the National Park Service (NPS)'s Gateway National Recreation Area (GNRA). The Staten Island Unit of GNRA consists of Great Kills Park, Miller Field, and Fort Wadsworth (NPS, 2018). GNRA features important sections of estuarine wetland habitat and freshwater forested/shrub wetland habitat (USFWS, 2018). Sandy Hook is a

nine-mile narrow sand spit that has a fairly extensive vegetated dune system and two distinct maritime forest communities that encompass 285 acres (RPA, 2003).

The uplands along the shoreline of the Lower Bay are important as migratory and wintering stopover habitat for migratory perching birds and raptors, as well as an important staging area for many species of waterfowl on the Atlantic Flyway (USACE, 2017). Beach habitat provides foraging areas for waterfowl and shorebirds (RPA, 2003). The Sandy Hook Unit of GNRA provides habitat for roughly 60 percent of the NJ piping plover (federally threatened, NY - and NJ State-endangered) population. This region also contains valuable fish and shellfish habitat (RPA, 2003).

3.1.3 Jamaica Bay Region

The JB Region (Figure 2-1) is based on the 8-digit HUCs for the Southern Long Island subbasin from the Watershed Boundary Dataset (USGS 2018). This includes a portion of Kings, Nassau, and Queens Counties in NY.

The Region is heavily utilized for recreation. There are many maintained beaches with public access along the Rockaway Peninsula through Fort Tilden and Jacob Riis Parks (NYC Parks, 2018). Beach attendance data provided by the Department of Parks and Recreation (DPR), NYC, indicates that approximately 7.7 million beach visits per year occur on the Rockaway Peninsula at Rockaway Beach (USACE, 2018). JB is a popular destination for recreational boaters, kayakers, kite surfers, hikers, and birders. Coney Island, on the south shore of Long Island in Brooklyn, includes an amusement park with a boardwalk along the beach. Many areas, both on- and off-shore, are designated for fishing. Recreational species include bluefish, tautog, weakfish, black sea bass, winter flounder, summer flounder, and striped bass (USACE, 2017).

JB to the high tide line is designated as a NY State Department of Environmental Conservation (NYSDEC) Critical Area and JB and Breezy Point have been designated as Significant Coastal Fish and Wildlife Habitats by the NYSDEC. JB was also designated as a special natural waterfront area by NYC's Department of City Planning.

3.1.4 Hackensack/Passaic Region

The Hackensack/Passaic River Region (Figure 2-1) is based on the 8-digit HUCs for the Hackensack-Passaic subbasin from the Watershed Boundary Dataset (USGS 2018). This includes portions of Bergen, Passaic, Essex, and Hudson counties in NJ, as well as a small part of Rockland County in NY. The population in this region is approximately 2,067,000.

This watershed is connected to Upper Bay and Lower Bay via Kill Van Kull and Arthur Kill, respectively. An important and ecologically valuable habitat in this region is the NJ Hackensack Meadowlands, which includes the largest remaining brackish wetland complex in the Study Area, measuring approximately 8,400 acres (USACE 2004b). Although degraded, the Meadowlands and

surrounding areas in this region represent significant open spaces that continue to provide ecosystem functions, including flood storage and fish/wildlife habitat, and offer a variety of potential restoration opportunities (USFWS, 1997).

3.1.5 Raritan Region

The Raritan River Region (Figure 2-1) is based on the 8-digit HUCs for the Raritan subbasin in the Watershed Boundary Dataset (USGS 2018). This includes portions of Middlesex, Monmouth, Somerset, and Union counties in NJ, and is the westernmost region in the Study Area. The population in this region is approximately 955,000.

This region contains the lower six miles of the Raritan River before its confluence with Raritan Bay (USACE 2004a). The shoreline of the Lower Raritan River is flanked by residential or industrial development. Land use is predominantly industrial development with bulk-headed shorelines and piers at the river's mouth, and changes to a mix of industrial, commercial, and residential development farther upstream (USACE, 2004a; USACE, 1999). Agricultural lands are located along the upstream boundary of the region (USACE, 2004a). Isolated pockets of tidal wetlands occur along the shore (USACE, 2004a; USACE, 1999). An unremediated landfill, the former Raritan Arsenal, and the Sayreville and Werner generating stations are also located along the shoreline.

This tidally influenced river features diverse floral and faunal assemblages (RPA 2003; USACE 2004a). A large wetland complex of 1,000 acres, located in Edison Township, provides habitat for waterfowl, wading birds, mammals, and fish (USACE 2004a). Saltwater intrusion occurs throughout the length of the Lower Raritan River, with sensitive estuarine resources such as tidal wetlands, submerged aquatic vegetation, and intertidal mud flats occurring in shallow, nearshore areas (USACE 1999). Some fallow or abandoned agricultural lands afford open spaces for upland wildlife (USACE, 2004a). However, these habitats are isolated and somewhat degraded due to the industrial land uses in the region.

3.1.6 Long Island Sound Region

The Long Island Sound Region (Figure 2-1) is based on the 8-digit HUCs for the Bronx, Saugatuck, Long Island Sound, and Northern Long Island subbasins from the Watershed Boundary Dataset (USGS 2018). This region contains sections of Bronx County and Queens County, as well as portions of Westchester and Nassau Counties.

The Long Island Sound is connected to the Upper Bay via the East River, a tidal strait. Tributaries of the Sound in this region include the Bronx River, Flushing Creek, Westchester Creek, Hutchinson River, Mamaroneck River, and Byram River. There are major estuarine wetlands in Little Neck Bay, sections of the coastline in Sands Point on Long Island, Hen Island and Milton Harbor, Mamaroneck River and its tributaries, and Pelham Bay Park (USFWS 2018). The 437-acre Thomas Pell Wildlife Refuge is also within Pelham Bay Park on the Bronx River. A portion of this region has been

designated as the Upper East River-Long Island Sound Special Natural Waterfront Area (SNWA) by NYC due to the extensive marsh systems in the area, such as those in Alley Pond Park, and islands that support significant populations of nesting shorebirds (NYCDCP 2011).

This region is heavily utilized for recreation. Fishing occurs from vessels and the shorelines of this area. In Western Long Island, bays such as Little Neck, Flushing, Manhasset, and Hempstead bays are important recreational fishing areas (USACE, 2000). Species sought include striped bass, bluefish, weakfish, scup, black sea bass, tautog, summer flounder and winter flounder.

3.1.7 Lower Hudson/East River Region

The Lower HR/East River Region (Figure 2-1) is based on the 8-digit HUCs for the Lower Hudson subbasin in the Watershed Boundary Dataset (USGS 2018). This region extends from the Upper Bay to the Bear Mountain Bridge (also known as the Purple Heart Veterans Memorial Bridge), and includes all of NY County, as well as portions of Kings, Queens, Bronx, Rockland, and Westchester Counties in NY and portions of Bergen and Hudson Counties in NJ.

Strong semi-diurnal tides make the HR one of the few major tidal rivers of the North Atlantic coast (USFWS 1997). The water level of the HR rises and falls, accompanied by changes in flow direction, based on the ocean's tide from the Upper Bay to Troy, NY. Salt water from the ocean remains in the mix between the Governor Mario M. Cuomo Bridge (formerly known as the Tappan Zee Bridge) and Poughkeepsie, depending on the time of year and drought conditions (NY State Department of Environmental Conservation [NYSDEC] 2014).

Within the Lower Hudson/East River Planning Region, the east side of the HR from Yonkers to the town of Peekskill is designated as state Critical Environmental Area.

3.1.8 Mid-Hudson Region

The Mid-Hudson Region (Figure 2-1) is based on the 8-digit HUCs for the Hudson-Wappinger subbasin and the Rondout subbasin in the Watershed Boundary Dataset (USGS 2018). This region includes portions of Orange, Putnam, Ulster, and Dutchess counties in NY. This region includes portions of Orange, Putnam, Ulster, and Dutchess counties in NY.

There are major wetland systems at Constitution Marsh, Moodna Creek, Fishkill Creek, and Sleightsburgh Park at the mouth of Rondout Creek (USFWS 2018).

3.1.9 Capital District Region

The Capital District (Figure 2-1) is the northernmost portion of the Study Area and is based on the 8-digit HUCs for the Middle Hudson, Mohawk, and Hudson-Hoosic subbasins in the Watershed Boundary Dataset (USGS 2018). This region includes portions of Ulster, Dutchess, Greene, Columbia, Albany, and Rensselaer Counties in NY.

4 General Construction and Material Descriptions

The Proposed Action includes combinations of levees, SSBs, seawalls, elevated promenades, floodwalls and buried seawalls/dunes and non-structural measures including preservation. General components of the Proposed Action include clearing and sediment/seabed excavation and fill and/or the presence of a new foundation or structure during the construction of nearly all measures. During the Tier 2 phase project measures will be defined and more specific construction methods and materials will be determined in addition to amounts of dredge and fill required for each measure or alternative.

Construction of levees, floodwalls, elevated promenades, seawalls, and seawall/dune will require excavation for installation of the support structures, armoring materials, and flood protection structures. Levees will generally be located in upland areas but have the potential to cross streams and wetlands and may require fill in a regulated waterbody. Levees involve construction of an impervious core that supports a surrounding earthen structure. Seawalls and floodwalls will likely require sediment removal and fill below mean higher high water (MHHW) as they will be located in tidal high energy zones or at coastal ledges. The support structures will be placed below mean sea level (MSL) and will involve pile driving, dredging, fill and installation of the armoring wall. Seawalls will consist of a rubble mound structure on the seaward side and a floodwall on the landward site. The rubble mound will be comprised of armor stone and an underlayer of smaller stone that will slope upward to the concrete seawall.

Elevated promenades will maintain waterfront access for pedestrians and reduce risk to lower lying areas from flooding on the landward side. Construction of these structures may permanently impact uplands, wetlands and their transition zones through removal of vegetation and filling. Steet flat sheet cofferdams will be installed in waterfront areas and backfilled with sand to provide an elevated support structure. Upland and in-water sediment removal will be required to install the cofferdam structure. Stone and riprap will be placed on the seaward side of the structure for in-water structure protection.

Composite seawalls with beach and dune are proposed to be installed on beaches to reduce risk from induced flooding from installation of the SSBs. Similar to the levee design, pile driving, sediment removal and fill of sediment, and installation of stone will be required to construct the support structure that will be covered in sand to create a beach/dune feature. These structures will be placed upland of existing mean high water but will reduce risk to beaches from erosion during large storms and surges. In water fill is not anticipated with this feature. Operation and maintenance of all the shore-based measures are expected to have minor or no impact on water quality.

SSBs and tide gates are in-water measures that will require fill to construct the foundations and gate supports. The SSBs are proposed to cross the full width of the federal navigation channel when closed during times of potential flooding and allow vessel traffic to pass all other times. In water

construction will require installation and removal of temporary cofferdams, dredging, fill, rock placement concrete work and pile driving. Construction has the potential to temporarily increase turbidity. Additionally, temporary water quality impacts due to vessel traffic and anchoring may occur but are expected to return to pre-existing conditions quickly after construction completion.

4.1 General Characteristics of Fill Material

The material dredged from the project is estimated to be sand, silt, and rock/till, depending on the location and measures selected. Each project measure would require different amounts and types of fill material. Some measures will be shore based and involve more sediment displacement and fill on land, like levees and seawalls and others such as SSBs and tide gates that will involve fill for in-water support features. Fill that meets the construction specifications for flood and/or CSRM structures to be used within wetlands or open water will be obtained from a state approved and permitted commercial source. Any pre-fabricated materials will be obtained from a reputable and licensed manufacturer.

4.2 Quantity of Material

The estimated total volume of material being dredged for the SSBs only is presented in Table 5-1. The estimate of the total volume of material being dredged inclusive of shore-based measures and tide gates will be determined in the Tier 2 analysis.

Table 5-1: Approximate Quantity of Dredge Material for Storm Surge Barriers for the TSP

Planning Region	Storm Surge Barrier Location	Dredge Quantity (CY)
Jamaica Bay	Jamaica Bay	1,543,776
Upper Bay Arthur Kill	Arthur Kill	964,211.50
	Kill van Kull	1,847,379.91
	Gowanus Canal	27,698.90
Lower Hudson/East River	Newtown Creek	55,920.30
Long Island Sound	Flushing Creek	192,066.00
	Total	**4,631,053**

4.3 Potential Sources of Dredged Material

The potential sources of the dredged material will depend on the final design but will likely include a subset of the waterways listed below.

- Newark Bay
- Arthur Kill
- Kill Van Kull
- Lower NY Bay
- Upper NY Bay
- East River
- Long Island Sound
- Newtown Creek
- Gowanus Canal
- Coney Island Creek
- Sheepshead Bay
- Gerritsen Creek
- JB
- Hackensack River

4.4 Description of Proposed Discharge Site

The exact placement of the dredged material will be determined in the Tier 2 process. All dredged material will be disposed of, placed or beneficially used in accordance with state and local guidelines.

4.5 Time and Duration of Disposal

The timing and duration of dredging and placement of fill material is unknown as planning studies are ongoing. Beneficial use of dredge material and locations will be further assessed in the Tier 2 analysis.

4.6 Disposal Method

Excavated material will be moved via barge or pipeline to the permitted and/or receiving disposal, placement or beneficial use areas.

4.7 Construction Sequence

The project construction sequence will be determined during the Pre-engineering and Design (PED) phase of the project, post-authorization.

5 Factual Determination

Table 6-2: Review of Compliance – Section 230.10(a)-(d)

	YES	NO
a. The discharge represents the least environmentally damaging practicable alternative and, if in a special aquatic site, the activity associate with the discharge must have direct access or proximity to, or be located in the aquatic ecosystem to fulfill its basic purpose.	X	
b. The activity does not appear to: 1) violate applicable state water quality standards or effluent standards prohibited under Section 307 of the CWA; 2) jeopardize the existence of Federally- listed threatened and endangered species or their habitat; and 3) violate requirements of any Federally designated marine sanctuary.	X	
c. The activity will not cause or contribute to significant degradation of waters of the U.S. including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, aesthetic and economic values.	X	
d. Appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem.	X	

Table 6-3: Technical Evaluation Factors (Subparts C-F)

	N/A	NOT SIGNIFICANT	SIGNIFICANT
a. Potential Impacts on Physical and Chemical Characteristics of the Aquatic Ecosystem (Subpart C)			
1) Substrate		X	
2) Suspended particulates/turbidity		X	
3) Water column impacts		X	
4) Current patterns and water circulation		X	
5) Normal water circulations		X	

	N/A	NOT SIGNIFICANT	SIGNIFICANT
6) Salinity gradients		X	
b. Potential Impacts on Biological Characteristics of the Aquatic Ecosystem (Subpart D)			
1) Threatened and endangered species		X	
2) Fish, crustaceans, mollusks, and other organisms in the aquatic food web		X	
3) Other wildlife (mammals, birds, reptiles and amphibians)		X	
c. Potential Impacts on Special Aquatic Sites (Subpart E)			
1) Sanctuaries and refuges		X	
2) Wetlands		X	
3) Mud Flats		X	
4) Vegetated Shallows		X	
5) Coral Reefs	X		
6) Riffle and pool complexes	X		
d. Potential Effects on Human Use Characteristics (Subpart F)			
1) Municipal and private water supplies	X		
2) Recreational and commercial fisheries		X	
3) Water-related recreation		X	
4) Aesthetic impacts		X	
5) Parks, national and historic monuments, national seashores, wilderness areas, research sites and similar preserves		X	

Table 6-4: Evaluation and Testing - Subpart G

A. THE FOLLOWING INFORMATION HAS BEEN CONSIDERED IN EVALUATING THE BIOLOGICAL AVAILABILITY OF POSSIBLE CONTAMINANTS IN DREDGED OR FILL MATERIAL. (CHECK ONLY THOSE APPROPRIATE).		
	1) Physical characteristics	X
	2) Hydrography in relation to known or anticipated sources of contaminants	X
	3) Results from previous testing of the material or similar material in the vicinity of the project.	X
	4) Known, significant sources of persistent pesticides from land runoff or percolation	N/A
	5) Spill records for petroleum products or designated hazardous substances (Section 311 of CWA)	X
	6) Public records of significant introduction of contaminants from industries, municipalities or other sources	X
	7) Known existence of substantial material deposits of substances which could be released in harmful quantities to the aquatic environment by man-induced discharge activities	X
	8) Other sources (specify)	N/A
List appropriate references – See Tier 1 EIS		

	YES	**NO**
b. An evaluation of the appropriate information factors in 3a above indicates that there is reason to believe the proposed dredge material is not a carrier of contaminants, or that levels of contaminants are substantively similar at extraction and disposal sites and not likely to require constraints.	X	

Table 6-5: Disposal Site Delineation - Section 230.11(f)

A. THE FOLLOWING INFORMATION HAS BEEN CONSIDERED IN EVALUATING THE BIOLOGICAL AVAILABILITY OF POSSIBLE CONTAMINANTS IN DREDGED OR FILL MATERIAL. (CHECK ONLY THOSE APPROPRIATE).		
	1) Depth of water at disposal site	Yes
	2) Current velocity, direction, variability at disposal site	Yes
	3) Degree of turbulence	Yes
	4) Water column stratification	Yes
	5) Discharge of vessel speed and direction	Yes
	6) Rate of discharge	Yes
	7) Dredged material characteristics (constituents, amount, and type of material, settling velocities)	Yes
	8) Number of discharges per unit of time	Yes
	9) Other factors affecting rates and patterns of mixing (specify)	Yes
List appropriate references – See Tier 1 EIS		
	YES	**NO**
b. An evaluation of the appropriate information factors in 4a above indicated that the disposal sites and/or size of mixing zones are acceptable.	X	

Table 6-6: Actions to Minimize Adverse Effects (Subpart H)

	YES	**NO**
All appropriate and practicable steps have been taken, through application of recommendation of Section 230.70-230.77 to ensure minimal adverse effects of the proposed discharge.	X	

Table 6-7: Factual Determination - Section 230.11

A REVIEW OF APPROPRIATE INFORMATION, AS IDENTIFIED IN ITEMS 2-5 ABOVE, INDICATES THERE IS MINIMAL POTENTIAL FOR SHORT OR LONG TERM ENVIRONMENTAL EFFECTS OF THE PROPOSED DISCHARGE AS RELATED TO:		
	YES	**NO**
a. Physical substrate at the disposal site (review Section 2a, 3, 4, and 5 above)	X	
b. Water circulation, fluctuation and salinity (review Sections 2a, 3, 4, and 5)	X	
c. Suspended particulates/turbidity (review Sections 2a, 3, 4, and 5)	X	
d. Contaminant availability (review Sections 2a, 3, and 4)	X	
e. Aquatic ecosystem structure, function, and organisms (review Sections 2b, 2c, 3, and 5)	X	
f. Proposed disposal site (review Section 2, 4, and 5)	X	
g. Cumulative effects on the aquatic ecosystem	X	
h. Secondary effects on the aquatic ecosystem	X	

Table 6-8: Findings of Compliance or Non-Compliance

	YES	**NO**
The proposed disposal site for discharge of dredged or fill material complies with Section 404(b)(1) guidelines	X	

In summary, based on the broad-level Tier 1 review, the implementation of the NYNJHATS Proposed Action to reduce coastal storm risk to NY and NJ from storm surges, sea level rise and flooding that involves placement and/or beneficial use of the dredged material will be coordinated with or directed by the affected states and:

- Will have no significant adverse effects of the discharge of pollutants on human health or welfare, including but not limited to effects on municipal water supplies, plankton, fish, shellfish, wildlife, and special aquatic sites.

- Will have no significant adverse effects of the discharge of pollutants on life stages of aquatic life and other wildlife dependent on aquatic ecosystems, including the transfer, concentration, and spread of pollutants or their byproducts outside of the disposal site through biological, physical, and chemical processes;

- Will have no significant adverse effects of the discharge of pollutants on aquatic ecosystem diversity, productivity, and stability.

- Will have no significant adverse effects of discharge of pollutants on recreational, aesthetic, and economic values.

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