US Army Corps of Engineers®
New York District

NEW YORK AND NEW JERSEY HARBOR DEEPENING CHANNEL IMPROVEMENTS

NAVIGATION STUDY

FINAL INTEGRATED FEASIBILITY REPORT & ENVIRONMENTAL ASSESSMENT

APPENDIX A13:

Beneficial Use of Dredged Navigation Material Strategy

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1.0 Introduction

The U.S. Army Corps of Engineers (Corps), New York District (District) in partnership with the Port Authority of New York and New Jersey (PANYNJ) has developed feasibility level plans to provide improvements to the navigation channels of the New York (NY) and New Jersey (NJ) Harbor under the NYNJ Harbor Deepening Channel Improvements (NYNJHDCI) study.

The Recommend Plan is comprised of the following:

- Deepening the pathway to Elizabeth-Port Authority Marine Terminal by up to 5 feet (up to -55 feet mean lower low water (MLLW) and associated widening to allow passage of the design vessel (Maersk Triple E Ultra Large Container Vessel Class).
- Deepening the pathway to Port Jersey-Port Authority Marine Terminal by up to 5 feet (up to -55 feet MLLW), and associated widening to allow passage of the design vessel (Maersk Triple E Ultra Large Container Vessel Class).

The project assumes a construction start date of October 2024 with an overall duration of up to 14 years, ending in October 2038. As part of the alternative plan formulation strategy for this study, the least cost dredged material placement option was assumed consistent with the federal standard. Dredged material will be beneficially used and placed either upland, at the Historic Area Remediation Site (HARS), or on a reef. The discussion in this document is intended to provide a strategy to beneficially use the material that will be dredged as part the recommended plan.

2.0 Types of Beneficial Uses

The beneficial use of dredged material is the concept that dredged material can be used in a manner that will benefit society and the natural environment. To maximize the public benefits from dredging and placement, it is important to fully and equally consider all practicable placement alternatives. Dredging projects can provide the greatest public benefit by addressing multiple economic and environmental objectives simultaneously (e.g., harbor widening, wetlands creation, brownfields redevelopment, and recreational opportunities). Dredged material can be used beneficially for engineered, agricultural, recreational, and environmental enhancement purposes, as described in the seven categories described below (USEPA/USACE 2007):

1. Habitat Restoration and Development: using dredged material to build and restore wildlife habitat, especially wetlands or other water-based habitat (e.g., nesting islands and offshore reefs).
2. Beach Nourishment: using dredged material (primarily sandy material) to restore beaches subject to erosion
3. Parks and Recreation: using dredged material as the foundation for parks and recreational facilities; for example, waterside parks providing such amenities as swimming, picnicking, camping, or boating.
4. Agriculture, Forestry, Horticulture, and Aquaculture: using dredged material to replace eroded topsoil, elevate the soil surface, or improve the physical and chemical characteristics of soils.
5. Strip-Mine Reclamation and Solid Waste Management: using dredged material to reclaim strip mines, to cap solid waste landfills, or to protect landfills.

6. Construction/Industrial Development: using dredged material to support commercial or industrial activities (including brownfields redevelopment), primarily near waterways; for example, expanding or raising the height of the land base, or providing bank stabilization. In addition, dredged material may be used in construction material.
7. Multiple-Purpose Activities: using dredged material to meet a series of needs simultaneously, such as habitat development, recreation, and beach nourishment, which might all be supported by a single beneficial use project.

3.0 Suitability of Dredged Material for Various Uses

The estimated 33,000,000 cubic yards (CY) of material dredged from the project is estimated to be sand (Ambrose-Anchorage Channels), silt (KVK, Newark Bay channels and Port Jersey) and rock/till (KVK and Newark Bay channels) (Table 1 and 2). During the Pre-construction Engineering and Design (PED) phase, updates and revisions to the construction schedule and volume estimates will be completed.

Table 1: Deepen Pathways to Elizabeth – Port Authority Marine Terminal and Port Jersey – Port Authority Marine Terminal by 5 feet to -55 feet MLLW – Dimensions and Characteristics

	Proposed Maintained Channel Level[a] [ft MLLW]	Proposed Authorized Channel Level[b] [ft MLLW]	Total Depth[c] [ft MLLW]	Length of Improve-ment [ft]	Quantity to be Dredged (cy)	Channel Bottom Width	Predominant Side Slope	Predominant Channel Bottom Material Type
Ambrose Channel	-58	-58	-59	90,000	6,389,000	2,000	3:1	Sand
Anchorage Channel	-55	-55	-56.5	31,000	3,800,000	2,000	3:1	Sand
Port Jersey Channel	-55	-57	-58.5	6,000	3,003,000	450 to 2,313	3:1/1:1 against berths	Sand/silt/silty clay
Kill Van Kull	-55	-57	-58.5	28,000	4,451,000	800 to 2,313	3:1/1:1 through rock	HARS suitable material & moderately hard rock and till
Newark Bay	-55	-57	-58.5	13,000	14,148,000	1,740 to 2,008	3:1/1:1 through rock & against berths	Non-HARS suitable material & moderately hard rock and till
South Elizabeth Channel	-55	-57	-58.5	2,000	423,000	500 to 640	3:1/1:1 through rock & against berths	Non-HARS suitable material & moderately hard rock and till
Port Elizabeth Channel	-55	-57	-58.5	8,000	1,024,000	500 to 750	3:1/1:1 through rock & against berths	Non-HARS suitable material & moderately hard rock and till

[a]Maintained channel level includes the summer saltwater draft, squat, salinity, wave motion, and safety clearance. The channels will be maintained at this depth.
[b]The authorized channel level includes additional safety clearance needed for hard bottom.
[b]The total depth includes an additional dredging tolerance (paid overdepth). This is the sum of the depths and specific to each plan.

Table 2: Deepen Pathways to Elizabeth – Port Authority Marine Terminal and Port Jersey – Port Authority Marine Terminal by 5 feet to -55 feet MLLW – Quantities (Cubic Yards)

	Ambrose Channel	Anchorage Channel	Port Jersey Channel	Kill Van Kull	Newark Bay	S. Elizabeth Channel	Elizabeth Channel	TOTAL (cubic yards)
HARS suitable sand (HARS placement)	6,389,000	3,155,000	1,635,000	596,000	1,065,000	--	--	12,840,000
Non-HARS suitable sand/ sediment (upland placement)	--	645,000	1,368,000	87,000	5,215,000	169,000	842,000	8,326,000
Moderately Hard Rock/Till[1] (HARS placement)	--	--	--	2,402,000	5,614,000	176,000	138,000	8,330,000
"Harder" Rock[2] (HARS or reef placement)	--	--	--	819,000	11,000	--	--	830,000
"Hardest" Rock[3] (reef placement)	--	--	--	547,000	2,242,000	78,000	43,000	2,910,000
Total Quantity to be Dredged	**6,389,000**	**3,800,000**	**3,003,000**	**4,451,000**	**14,148,000**	**423,000**	**1,024,000**	**33,238,000**

Values may appear off due to rounding.
[1] Pleistocene silt, clay, sand, and gravel, [2] Schist, serpentenite, [3] Diabase, sandstone, and other rock
Note: Table 1 and 2 as presented in the main text of this Integrated Feasibility and Environmental Assessment Report for the NYNJHDCI study, repeated here for informational purposes.

In general, clean, coarse-grained sediments (sands) are suitable for a wide range of beneficial uses. Fine-grained sediments can be suitable for more limited uses such as wetlands habitat development. In addition to grain size and levels of contamination, other characteristics to consider are salinity of the sediments, water content, organic content, acidity, levels of nutrients, and engineering properties such as shear strength and compressibility. Table 3 presents the most compatible use of each material type (USEPA/USACE 2007):

Table 3 – Material Types and Associated Potential Beneficial Uses

Material Type	Potential Beneficial Use*
Rock	***Habitat Restoration and Development*** ***Beach Nourishment (offshore berms only)*** Parks and Recreation Agriculture, Forestry, Horticulture, and Aquaculture Strip-Mine Reclamation/Solid Waste Management ***Construction/Industrial Development***
Sand and Gravel	***Habitat Restoration and Development*** ***Beach Nourishment*** ***Parks and Recreation*** Agriculture, Forestry, Horticulture, and Aquaculture Strip-Mine Reclamation/Solid Waste Management ***Construction/Industrial Development***
Consolidated Clay	***Habitat Restoration and Development*** Parks and Recreation ***Agriculture, Forestry, Horticulture, and Aquaculture*** Construction/Industrial Development
Silt/Soft Clay	***Habitat Restoration and Development*** Parks and Recreation ***Agriculture, Forestry, Horticulture, and Aquaculture*** Construction/Industrial Development
Mixture (rock/sand/gravel/silt/soft clay)	Habitat Restoration and Development Beach Nourishment (offshore berms only) Parks and Recreation Agriculture, Forestry, Horticulture, and Aquaculture Strip-Mine Reclamation/Solid Waste Management Construction/Industrial Development

Uses in bold italics test are the most suitable uses for the corresponding material type.
Source: USEPA/USACE 2007

Dredged Material Management Plans (DMMPs) are Corps planning documents prepared to identify the quantity and type of material dredged from Federal and local navigation channels and establishes a strategy for how dredged material will be managed and placed. Beneficial use of dredged material for habitat restoration has been a primary goal of recent DMMPs. Large-scale projects in the NYNJ Harbor area use dredged material for a number of projects that contribute to the restoration goals of the region (e.g., Hudson-Raritan Estuary Comprehensive Restoration Plan) such as offshore reefs, shallow marine habitat, capping contaminated sediments and restoring coastal wetland and marsh island habitat, as well as recreation and beach nourishment, and remediation (USACE 2008). Diverting uses of dredged materials to restore habitat is a valuable, cost-effective method that can also reduce the need for mining virgin

materials to complete these restoration projects.

Consistent with the DMMP for the Port of New York and New Jersey Update (USACE 2008), the completed NYNJ Harbor Deepening Project provided more than 52,000,000 CY of dredged material that was beneficially used in the region. Dredged material generated from the NYNJHDCI will also be consistent with the DMMP for the Port of New York and New Jersey Update.

Several planning considerations and challenges for future beneficial use placement options include the need to assess demand, relative benefits, timing of availability, ability for the local sponsor to pay 100 percent of any increased differential costs, synchronizing the need and placement of sites with the proposed action (and other existing Operations & Maintenance projects) and developing suitable plans and specifications with receiving local sponsors. Although most aquatic restoration projects require relatively little material, recontouring subaqueous borrow areas, creating upland habitat, creating artificial reefs, and restoring wetland islands present opportunities in the estuary to use large amounts of clean dredged material and rock for restoration.

Also, in accordance with Engineering Regulation 1165-2-132, dredged material will be tested under dredged material placement criteria for their suitability for beneficial use in accordance with the appropriate guidelines and criteria including, but not limited to, Section 404 of the Clean Water Act and/or Section 103 of the Marine Protection Research and Sanctuaries Act and supplemented by the Corps of Engineers Management Strategy for Disposal of Dredge Material: Containment Testing and Controls.

4.0 Coordination

Beneficial use will be a priority for the management of dredged materials from the NYNJHDCI project. Given the volume of dredged material likely to be created (approximately 33,000,000 CY), the anticipated benefits from the beneficial use of such material are great and the New York District is committed to coordinating with Federal, state, and local stakeholders to identify potential beneficial use placement opportunities.

Currently, the New York District is coordinating with National Marine Fisheries Service (NMFS) regarding continuing to seek Essential Fish Habitat (EFH) enhancement opportunities in the NY and NJ Harbor. In addition to NMFS, the study team is coordinating with the Restoration Work Group of the New York-New Jersey Harbor & Estuary Program (HEP). The Restoration Work Group consists of technical experts that identify solutions to problems common to the restoration community within the Harbor, including beneficial use opportunities. Based on a request from the New York District's Executive Office, the Restoration Work Group provided the study team a list of potential beneficial reuse projects (including type of material and volume needed) that can potentially be coordinated during PED, presented in the next section. The New York District is also coordinating with the Regional Dredging Team, State and local agencies, and will coordinate with the identified landowners or jurisdictional authorities for the viability of the placement site to receive material from a regulatory perspective and will participate in any monitoring activities required for beneficial use placement.

5.0 Potential Beneficial Use Sites

The following is a curated list of potential beneficial use placement sites provided by the Restoration Work Group that may be viable options for the dredged material generated during the NYNJHDCI, with consideration for the corresponding appropriate material type (Table 4), location, quantity and need of each placement site (Table 5). Note that beneficial use sites will be explored further and selected during PED, as deemed consistent with the DMMP, dredged material placement sampling criteria, and in coordination with landowners or jurisdictional authorities. This list is provided for the purpose of preliminarily identifying sites that may benefit from such placement, other than at the HARS or upland disposal sites.

Table 4: Generated Dredged Material Types Key for Table 5

Generated Dredged Material by Type
A. HARS Suitable Sand
B. Moderately Hard Rock/Till (Pleistocene silt, clay, sand, and gravel)
C. "Harder" Rock (Schist, serpentinite)
D. "Hardest" Rock (Diabase, sandstone, and other rock)

Table 5: Curated List of Potential Beneficial Use Sites by Project, Location, and Material Type Placement Purpose and Volume Provided by the Restoration Working Group

Project	Location	Coordinates	Material Type Used	Material placement / purpose	Volume Needed
Alley Creek, Little Neck Bay	East River, LI Sound	40° 46.239'N 73° 45.358'W	A	Elevation change/wetland restoration	5,000 CY / Acre - 5 acres = 25,000
Arlington Marsh	Arthur Kill	40° 38.597'N 74° 10.405'W	A/B	Elevation change/wetland restoration	2,000 CY / Acre - 10 acres = 20,000
East Newark Waterfront Park	Passaic River	40° 43.984'N 74° 9.098'W	A	Fresh water wet meadow	One Acre - depth not determined. Clean sand-FY 2022
Ferry Point Park	East River, LI Sound	40° 48.655'N 73° 50.343'W	A	Elevation change/wetland restoration	5,000 CY / Acre - 2 acres = 10,000
Four Sparrow Marsh	Jamaica Bay	40° 36.136'N 73° 54.355'W	A	Elevation change/wetland restoration	3,000 CY / Acre - 3 acres = 9,000
Fresh Creek - HRE	Jamaica Bay	40° 38.215'N 73° 52.596'W	A	Elevation change/wetland restoration/channel restoration	3ft clean material over 35 acres= 170,000 CY
Goose Pond Wetland, Broad Channel	Jamaica Bay	40° 36.647'N 73° 49.345'W	A	Elevation change/wetland restoration	5,000 CY / Acre - 2 acres = 10,000

Project	Location	Coordinates	Material Type Used	Material placement / purpose	Volume Needed
HRE - Naval Station Earle Oyster Reef	Lower Bay	40° 26.867'N 74° 3.377'W	C/D	Subtidal reef base	(complement/replacement of shell in gabions)
HRE - Pumpkin Patch East Marsh Island	Jamaica Bay	40° 37.694'N 73° 50.495'W	A	Elevation change/wetland restoration	352,000 CY
HRE - Pumpkin Patch West Marsh Island	Jamaica Bay	40° 37.353'N 73° 51.125'W	A	Elevation change/wetland restoration	328,000 CY
HRE - Stony Creek Marsh Island	Jamaica Bay	40° 36.664'N 73° 51.066'W	A	Elevation change/wetland restoration	152,000 CY
HRE- Bush Terminal Oyster Reef	Upper New York Bay	40° 39.282'N 74° 1.082'W	C/D	Subtidal reef base	(complement/replacement of shell in gabions)
HRE- Duck Point Marsh Island	Jamaica Bay	40° 37.637'N 73° 51.673'W	A	Elevation change/wetland restoration	214,000 CY
HRE- Elders Point Marsh Island	Jamaica Bay	40° 38.116'N 73° 50.831'W	A	Elevation change/wetland restoration	285,000 CY
HRE- Head of Jamaica Bay	Jamaica Bay	40° 37.541'N 73° 45.620'W	C/D	Subtidal reef base	(complement/replacement of shell in gabions)
Hudson River Reefs - Dobbs Ferry Reef	Lower Hudson River	41° 0.991'N 73° 53.100'W	D	Subtidal reef base	5,000 CY / Acre - 5 acres = 25,000
Hudson River Reefs - Hastings On-Hudson Reef	Lower Hudson River	40° 59.227'N 73° 53.342'W	D	Subtidal reef base	5,000 CY / Acre - 5 acres = 25,000
Hudson River Reefs - Irvington Reef	Lower Hudson River	41° 2.976'N 73° 52.493'W	D	Subtidal reef base	5,000 CY / Acre - 5 acres = 25,000
Hudson River Reefs - North West Yonkers	Lower Hudson River	40° 57.721'N 73° 53.779'W	D	Subtidal reef base	5,000 CY / Acre - 5 acres = 25,000
Hudson River Reefs - Riverdale	Lower Hudson River	40° 54.209'N 73° 55.014'W	D	Subtidal reef base	5,000 CY / Acre - 5 acres = 25,000
Hudson River Reefs - Sleepy Hollow	Lower Hudson River	41° 6.465'N 73° 52.109'W	D	Subtidal reef base	5,000 CY / Acre - 5 acres = 25,000

Project	Location	Coordinates	Material Type Used	Material placement / purpose	Volume Needed
Hudson River Reefs - Yonkers	Lower Hudson River	40° 56.004'N 73° 54.367'W	D	Subtidal reef base	5,000 CY / Acre - 5 acres = 25,000
Hutchinson River, Pelham Bay Park	East River, LI Sound	40° 51.865'N 73° 48.634'W	A	Elevation change/wetland restoration	1,000 CY / Acre - 5 acres = 5,000
Idlewild Park, Hook Creek Park	Jamaica Bay	40° 38.945'N 73° 44.492'W	A	Elevation change/wetland restoration	1,000 CY / Acre - 10 acres = 10,000
Lemon Creek	Raritan Bay	40° 30.698'N 74° 11.931'W	A	Elevation change/wetland restoration	1,000 CY / Acre - 5 acres = 5,000
Liberty Island Aquatic Reef	Upper New York Bay	40° 41.590'N 74° 2.787'W	C	Subtidal reef base	1,400 CY / Acre - 20 acres = 28,000
Liberty Island Aquatic Reef	Upper New York Bay	40° 41.590'N 74° 2.787'W	D	Subtidal reef base	5,000 CY / Acre - 20 acres = 100,000
Liberty State Park	Upper New York Bay	40° 41.590'N 74° 2.787'W	B/C	Rock revetment/channel stabilization	1–3-foot boulders: 22,800 CY gravel/cobble mix: 10,500 CY
Lincoln Park West	Hackensack River	40° 43.730'N 74° 5.536'W	A	Elevation change/wetland restoration	1600 CY / Acre - 10 acres = 16,000
Lower Bay Reef (rock)	Lower Bay	40° 32.308'N 74° 0.235'W	C/D (large rock)	Subtidal reef base	TBD
Mott Basin, Jamaica Bay Park	Jamaica Bay	40° 35.969'N 73° 46.798'W	A	Elevation change/wetland restoration	5,000 CY / Acre - 2acres = 10,000
Old Bridge Waterfront Park	Raritan Bay	40° 27.573'N 74° 14.872'W	A/D	Rock jetty, rock revetment/ beach nourishment	TBD
Rockaway Community Park	Jamaica Bay	40° 36.148'N 73° 46.979'W	A	Elevation change/wetland restoration	5,000 CY / Acre - 2 acres = 15,000
Rockaway Reef (rock)	NY Bight	40° 33.955'N 73° 49.522'W	C/D (large rock)	Subtidal reef base	222 acres needed
Saw Mill Creek	Arthur Kill	40° 36.573'N 74° 11.402'W	A	Clean Cap for restoration	TBD

Project	Location	Coordinates	Material Type Used	Material placement / purpose	Volume Needed
Sawmill Creek WMA	Hackensack River	40° 46.040'N 74° 6.973'W	A	Elevation change/wetland restoration	TBD
Snakapin Lagoon	East River, LI Sound	40.805115375 82 989, - 73.856253213 60 934	A	Elevation change/wetland restoration	5,225 CY / Acre - 2 acres = 10,500
Spring Creek - HRE	Jamaica Bay	40° 39.046'N 73° 50.956'W	A	Elevation change/wetland restoration	1,000 CY / Acre - 2 acres = 2,000
Turtle Cove, Pelham Bay Park	East River, LI Sound	40° 51.529'N 73° 48.215'W	A	Elevation change/wetland restoration	5,000 CY / Acre - 4 acres = 20,000

Source: RWG 2021 (portion of)
NOTES:
TBD – To be determined

6.0 Summary

As discussed in this Appendix, beneficial use placement sites for the NYNJHDCI contracts will be identified during PED. The beneficial use placement locations will be determined based on the type of material (e.g. sand, silt, rock), volume needed at a particular project location, suitability of the material as established through testing and consistent with the DMMP for the Port of New York and New Jersey Update, and in coordination with Federal, State, and Local stakeholders. All viable beneficial use placement locations be screened and selected as soon as reasonably practicable during PED.

7.0 Acronyms

CY	cubic yards
EFH	Essential Fish Habitat
DMMP	Dredge Material Management Plan
HARS	Historic Area Remediation Site
KVK	Kill van Kull
MLLW	Mean lower low water
NJ	New Jersey
NMFS	National Marine Fisheries Service
NY	New York
NYNJHDCI	New York New Jersey Harbor Deepening Project
NYNJHEP	New York-New Jersey Harbor Estuary Program
PED	Preconstruction, Engineering and Design
RWG	Restoration Working Group
TBD	To be determined
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency

8.0 References

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