# ENGINEERING APPENDIX

# DRAFT NORFOLK HARBOR NAVIGATION IMPROVEMENTS MEETING AREA VALIDATION REPORT/ SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

## VIRGINIA

## APPENDIX A

## 2021

U.S. Army Corps
of Engineers
Norfolk District

THE PORT OF VIRGINIA®

# Engineering Appendix E:

# DMMP

**Norfolk Harbor Navigation Improvements– Dredged Material Placement Plan**

# 1 Introduction

USACE policy (ER 1105-2-100 section 3-2b(8) Dredged Material Management Plans) states the following:

> *Dredged material management planning for all Federal harbor projects is conducted by the Corps to ensure that maintenance dredging activities are performed in an environmentally acceptable manner, use sound engineering techniques, are economically warranted, and that sufficient confined disposal facilities are available for at least the next 20 years. These plans address dredging needs, disposal capabilities, capacities of disposal areas, environmental compliance requirements, potential for beneficial usage of dredged material and indicators of continued economic justification. The Dredged Material Management Plans shall be updated periodically to identify any potentially changed conditions*

A Preliminary Assessment conducted as a part of this Norfolk Harbor Channel Improvement Project concluded that there was sufficient disposal capacity for a 20-year period and identified the least cost disposal plan (Technical Memorandum dated 25Jul16). The Preliminary Assessment evaluated placement alternatives for each channel segment and identified the least cost placement site and any beneficial use opportunities for that material. Each placement site identified in the Preliminary Assessment, including beneficial use sites, has completed the requirements of the National Environmental Policy Act (NEPA) of 1969, which evaluated the potential environmental consequences dredged material placement at each site.

The existing DMMP for the Federal navigation projects at Hampton Roads is based on three placement areas: the Craney Island Dredged Material Management Area (CIDMMA), the Dam Neck Ocean Dredged Material Disposal Site (ODMDS), and the Norfolk ODMDS. Three USACE Erosion Control and Hurricane Protection projects, the USACE Craney Island Eastward Expansion project, and one Chesapeake Bay Bridge and Tunnel Authority project have completed NEPA documents and could accept dredged material for beneficial use[1]

This Dredged Material Placement Plan (DMPP) is organized as follows:

- Chapter 2: Characteristics of material dredged from each channel segment;
- Chapter 3: Placement area site characteristics and material requirements (including beneficial use sites);
- Chapter 4: Historical quantities and placement locations for maintenance and construction material;

[1] Norfolk Harbor and Channel Deepening Study Beneficial Reuse Sites Overview, Technical Letter #013. 08 Jun 2016.

- Chapter 5: Dredging and placement projections for 20 years
- Chapter 6: Identification of the least cost plan (the Federal standard).

On 4 August 2016, a Vertical Team Meeting was held on this project to discuss the Dredged Material Management Plan (DMMP). The meeting was conducted as a webinar and the attached PowerPoint presentation was used to facilitate the discussion. The DMMP was to be presented in the GRR/EAs as component to support the Plan Formulation Appendix. The Vertical Team concurred with the PDT's way forward on the DMMP for this study.

# 2 Sediment Characteristics

The sediments within the navigation channels, meeting areas, and Anchorage F are briefly discussed below. A detailed discussion of project sediments is contained in the Geotechnical attachment to the Engineering Appendix. Planning reaches (Table 1) identify the grouping of channel reaches used for plan formulation.

**Table 1: Navigation Channel Dimensions**

| | | Channel Depth (ft) | | Channel Width (ft) | | |
|---|---|---|---|---|---|---|
| Planning Reach | Channel Reaches | Authorized | Constructed | Authorized | Constructed | Length (miles) |
| Atlantic Ocean Channel to Lamberts Bend (Segment 1) | Atlantic Ocean Channel | 57 | 52 | 1,300 | 1,300 | 10.0 |
| | Thimble Shoal Channel | 55 | 50 | 1,000 | 1,000 | 13.0 |
| | Norfolk Harbor Entrance Reach | 55 | 50 | 1,500 | 1,000-1,4000 | 2.0 |
| | Norfolk Harbor Reach | 55 | 50 | 850-1,200 | 850-1,200 | 4.0 |
| | Craney Island Reach | 55 | 50 | 800 | 800 | 3.0 |
| Norfolk Harbor Entrance Reach to Newport News (Segment 2) | Newport News Channel | 55 | 50 | 800 | 800 | 5.4 |

## 2.1 Atlantic Ocean Channel

Material to be dredged in the Atlantic Ocean Channel (AOC) consists predominately of sandy materials. The AOC has been used as a borrow source for sandy material for the City of Virginia Beach's Big Beach project as well as for dike construction for the Craney Island Eastward Expansion.

### 2.2 Thimble Shoal Channel

Material to be dredged from the Thimble Shoal Channel (TSC) can be described as predominately sandy on the east side of the Chesapeake Bay Bridge Tunnel (CBBT), and predominately fines (silts and clays) with some sand on the west side of the CBBT. Material from the east side has been used in beneficial use projects including beach renourishment for the City of Norfolk's beaches and several Navy projects. Material from the east side also has been placed at the Dam Neck Ocean Dredged Material Disposal Site (ODMDS) when beneficial use opportunities were not available. Material west of the CBBT is typically not suitable for beneficial use and has historically been deposited in the Dam Neck ODMDS.

### 2.3 Norfolk Harbor Entrance Reach, Norfolk Harbor Reach, Craney Island Reach, Norfolk Harbor Anchorages, Sewells Point Anchorages

Material to be dredged from the remaining Segment 1 channels (Norfolk Harbor Entrance Reach, Norfolk Harbor Reach, Craney Island Reach, Norfolk Harbor Anchorages, Sewells Point Anchorages) consist predominately of fines (silts and clays) with some sands. This material is typically not suitable for beneficial use. Historically all maintenance and deepening material have been hydraulically dredged and placed into CIDMMA. Any sand settled out in CIDMMA is reclaimed (to the extent possible) for dike maintenance.

### 2.4 Newport News Channel

Material to be dredged from the Newport News Channel consists predominately of fines (silts and clays) with intermixed areas of sand lenses. Historically all maintenance and deepening material have been hydraulically dredged and placed into CIDMMA. Any sand settled out in CIDMMA is reclaimed (to the extent possible) for dike maintenance.

## 3 Placement Areas

There are three dredged material placement areas that have historically served and continue to serve the Norfolk Harbor Channels project:

- Craney Island Dredged Material Management Area (CIDMMA);
- Dam Neck Offshore Dredged Material Disposal Site (ODMDS); and
- Norfolk ODMDS

In addition to the three established placement areas, the Craney Island Eastward Expansion (CIEE), which was authorized by Congress in 2007, will be available to supplement the confined placement available at CIDMMA.

Four beneficial use sites, three historical and one new, are also available for suitable material from the Atlantic Ocean Channel and the Thimble Shoal Channel. Based on projected dredged material volumes and available capacity at existing placement areas, no additional placement areas are required.

## 3.1 Craney Island Dredged Material Management Area (CIDMMA)

CIDMMA is approximately two miles square with existing ground elevations within the cells varying from approximately +32 to +40 feet MLLW. CIDMMA receives dredged material which is pumped hydraulically into the cells. Dredged material is typically pumped in over the east dike. This is evidenced by the large sand mounds observed at the influent points where these heavier sand particles quickly settle out of the dredge slurry. Existing external dikes range in elevation from +35 to +45 feet MLLW.

CIDMMA is currently operated using the guidance from the existing DMMP prepared in 1981. The 1981 DMMP estimated that, over its operating life, CIDMMA would be able to accept over 250 MCY of dredged material (since it began operation in 1957), a significant increase over the original capacity estimate of 96 MCY.

The existing DMMP is based on the current configuration of CIDMMA, which is divided into three cells: South Cell (734 acres for storage), Center Cell (766 acres for storage) and North Cell (689 acres for storage). Currently Norfolk District rotates each of the three cells as necessary to allow adequate drying before dredged material is again pumped into the cell. The District also typically caps the volume of dredged material that can be pumped into an individual cell at no more than 5 MCY annually. Monthly inflows are typically limited to 650,000 CY.

The Norfolk District currently has an annual earthwork/grading contract to maintain and raise the perimeter and division dikes. Under this contract, approximately 750,000 CY of granular material is excavated and placed on the dikes annually. The material is borrowed from the eastern side of CIDMMA using conventional excavation equipment and hauled using off-road trucks to the required location. Existing dikes are continually maintained to compensate for consolidation settlement of the marine clay foundation beneath the dikes, and the need to maintain adequate freeboard on the dikes.

Each cell has two spillboxes along the west dike. Spillboxes are operated by the dredging contractor pumping into the cell. The dredging contractor is responsible for ensuring effluent being released from CIDMMA is clarified water. The contractor verifies by sampling the effluent total suspended solids (TSS). The target or goal is to release only clarified water from the spillboxes, with the daily average effluent TSS concentration of 500 mg/l as an upper action limit. Typically measured effluent TSS values are 100 mg/L or less.

As determined in the Craney Island Eastward Expansion Feasibility Report (USACE, 2006), capacity of CIDMMA is defined as when the dikes can no longer be raised. The CIEE Feasibility Report determined the maximum height of +50 feet MLLW without additional modifications to the subsurface or geometry.

CIDMMA capacity is regularly increased to meet short-term inflow projections by raising the height of the dikes. Dike heights currently range from 36 to 40 feet above MLLW. Under current conditions, the dikes are capable of being raised to elevation 50 feet, allowing for an interior fill height of 47 feet. With the dikes at 50 feet, the CIDMMA foundation is anticipated to have reached its bearing capacity (USACE, 2006).

The CIEE Feasibility Report estimated that CIDMMA would achieve its full capacity in 2025, which includes acceptance of 177 mcy from 2000 to 2025. Actual inflow from 2000 – 2015 are 65 mcy, indicating that remaining capacity is 52 mcy. This remaining capacity estimate is currently being revised with updated fill level and dike elevations.

At such time when CIDMMA is no longer available, Norfolk Harbor dredged material will be disposed of at the U.S. Environmental Protection Agency (USEPA) designated ocean disposal site (Norfolk Ocean Dredged Material Disposal Site), located approximately 35 miles from CIDMMA and 17 miles east of the mouth of the Chesapeake Bay.

## 3.2 Norfolk Ocean Dredged Material Disposal Site (ODMDS)

The Norfolk Ocean Disposal Site (NODS) is a 42,600-acre area, with an estimated total capacity of 1,300 MCY. The site is delineated by a circle with a radius of 4 nautical miles centered at 36 degrees, 59 minutes north latitude, and 75 degrees, 39 minutes west longitude. Water depth at the site ranges from 43 to 85 feet. NODS was developed, in part, to receive material after CIDMMA had achieved its capacity:

> *If in the future the Craney Island Dredged Material Management Area (Norfolk, Virginia) is no longer available, suitable material currently placed in the Craney Island DMMA could be placed in the ODMDS. (NODS Site Management Plan, February 2009)*

The Norfolk Ocean Disposal site is permitted to receive both coarse and fine grained materials that meet the Environmental Protection Agency's (EPA) requirements for ocean disposal. The site has been used since 1979. The current Site Management and Monitoring Plan (SMMP) is dated February 2009 and will be in effect until 2019.

Material dredged for placement at NODS will most likely be dredging via hopper dredged, although mechanical dredging with material transported to the site using bottom dump scows may be used. Placement will be performed and monitored in accordance with the Norfolk District's SMMP.

## 3.3 Dam Neck Ocean Dredged Material Disposal Site (ODMDS)

The Dam Neck ODMDS has an area of about 9-square nautical miles with a water depth averaging about 40 feet. The Dam Neck ODMDS is currently designed and managed to hold approximately 50 million cubic yards of dredged material. The Dam Neck SMMP states that future evaluation and management could increase this quantity.

No specific disposal method is required for this site. Disposal may be by hopper dredge, dump scow, or by pipeline discharge. There are no seasonal restrictions to the placement of dredged material within the Dam Neck ODMDS. Approximately 1.2 million cubic yards (CYS) of material from the three Federal navigation channels will be placed in the site every 2 years.

Material dredged for placement at Dam Neck will most likely be dredging via hopper dredge, although mechanical dredging with material transported to the site using bottom dump scows

may be used. Placement will be performed and monitored in accordance with the Norfolk District's Site Management and Monitoring Plan.

## 3.4 Craney Island Eastward Expansion

The CIEE Southeast Cell is currently under construction, with its completion dependent on Federal funding. If available at the time of the proposed deepening, the cells could be considered as a placement area. The CIEE project expands existing CIDMMA to the east by constructing a new, approximate 522-acre, placement area. The CIEE area will be a total of approximately 8,500-ft x 2,500-ft. The cell will be subdivided with a cross dike to form the Southeast Cell and the Northeast Cell. With the proposed filling to elevation +18 feet MLLW, the Southeast Cell and Northeast Cell have a neat volume capacity of 6.7 and 12.7 MCY respectively. This is the volume within the cell, and does not include bulking of the dredged material.

CIEE will effectively provide an additional cell to CIDMMA. After the cell is completed (confined) filling with material from both the proposed deepening and maintenance dredging can occur. Hydraulic filling will be similar to existing CIDMMA operations, by the use of a hydraulic pipeline cutterhead dredge.

Approximately 4.8 mcy of sand is required to complete the construction the three cross dikes, and portions of the main dike, as part of the CIEE project. About 1.5 million cubic yards of sand will be required for each of the three cross dikes. The construction of the south and center cross dikes will be a component of the south east cell dike construction. In addition, some (i.e., the lower portion) or all of the north cross dike will be completed during the south east cell construction.

Sands mined from the Atlantic Ocean Channel or Thimble Shoal Channel (or both) that is placed using hydraulic techniques is anticipated to be the primary method of construction of the cross dikes. Material from the ocean channels will be delivered to site by hopper dredges and placed hydraulically. In the lower elevations (deeper water), the material may be bottom dumped while in the higher placement elevations, the hopper will pump the sand slurry through a pipeline and discharge at the location and elevation desired, as is done for beach nourishment projects. A spill barge will be used to help control the placement of the material and minimize turbidity.

Sand from upland sources will likely be transported to the site via barges and placed through a tremie pipe (from a spill barge) to the required location.

## 3.5 Beneficial Use Sites

Three USACE Erosion Control and Hurricane Protection projects, the USACE Craney Island Eastward Expansion project, and one Chesapeake Bay Bridge and Tunnel Authority project have completed NEPA documents and could accept dredged material for beneficial use.

Beach nourishment materials should be similar in geological make-up to the existing sediments of the native beach materials. Nourishment materials should have a low percentage of fine-grained sediments. The goal for typical local beach nourishment (Cities of Norfolk and Virginia Beach) material is a D50 grain size of greater than 0.2mm. Suitable materials will have no more than 5 percent fines by weight.

**Table1: NHC Deepening Project Potential Beneficial Use Sites**

| Project: | Description | NEPA/Permit Reference | Estimated Volume Needs |
|---|---|---|---|
| **Big Beach** | USACE/City of Virginia Beach federally authorized hurricane protection project | Beach Erosion Control and Hurricane Protection Main Report and Supplemental EIS 1984 USACE | 2 MCYs Estimated every 7 years |
| **Sandbridge** | USACE/City of Virginia Beach federally authorized hurricane protection project | Sandbridge Beach, VA Erosion Control and Hurricane Protection EA 2009 USACE; 2012 BOEM | 1.75 MCYs Estimated every 5 years |
| **Willoughby Norfolk** | USACE/City of Norfolk federally authorized hurricane protection project | Willoughby Spit and Vicinity Norfolk Virginia Beach Erosion and Hurricane Protection Project, EIS 1983 USACE | 1.2MCYs Estimated every 5 years |
| **CIEE** | USACE/VPA federally authorized expansion to CIDMMA | Final Environmental Impact Statement and Finding of No Significant Impact, dated Jan 2006 – EA Supp FONSI dated 11/10/2009 | 4 MCY |
| **CBBT** | CBBT Authority permitted parallel TSC tunnel project – material of expand portal islands 1 and 2 | Final Environmental Assessment and Finding of No Significant Impact, dated 7/31/15 | 1.75 MCY |

The Chesapeake Bay Bridge and Tunnel (CBBT) District, in cooperation with the Federal Highway Administration (FHWA), is in the process on bidding the parallel Thimble Shoal Tunnel. This construction will require the expansion of the two portal islands on either side of the TSC. One consideration documented in the projects Final EA and FONSI is borrowing sandy material from the TSC or AOC for expanded the portal islands (2015, FHWA). Dependent on the schedule of the proposal deepening project sandy material can be beneficially reused for the portal islands. The CBBT estimates the volume of sandy material required is 1.75 MCY (Add reference).

# 4 Historical Placement

The placement of material dredged from the Norfolk Harbor Channels depends on the characteristics of the dredged material and the cost of dredging and placement. Material dredged from the Atlantic Ocean Channel and the Thimble Shoal Channel east of the Chesapeake Bay Bridge Tunnel is typically suitable for ocean placement and is placed at the Dam Neck ODMDS,

which is the lowest cost placement area for this material. Material dredged from Norfolk Harbor Channels west of the Chesapeake Bay Bridge Tunnel are typically not suitable for ocean placement and are placed in CIDMMA, which is the least cost placement area for this material. Table 2 presents the historical placement of material dredged from the Norfolk Harbor Channels.

Table 2: Norfolk Harbor Channels Dredged Material Volumes and Placement Locations (1980 – 2015)

| | CIDMMA | Dam Neck | NODS | Total |
|---|---|---|---|---|
| 1980 | 1,087,166 | | | 1,087,166 |
| 1981 | 2,238,076 | 818,270 | | 3,056,346 |
| 1982 | 2,832,414 | 853,214 | | 3,685,628 |
| 1983 | 2,451,377 | | | 2,451,377 |
| 1984 | 3,109,514 | | | 3,109,514 |
| 1985 | 251,987 | | | 251,987 |
| 1986 | 529,325 | | | 529,325 |
| 1988 | 624,764 | | | 624,764 |
| 1989 | 905,069 | 275,135 | | 1,180,204 |
| 1991 | 931,755 | 146,400 | | 1,078,155 |
| 1992 | 1,136,614 | | | 1,136,614 |
| 1993 | 1,506,997 | 340,000 | | 1,846,997 |
| 1994 | 1,194,942 | | | 1,194,942 |
| 1995 | 2,354,330 | | | 2,354,330 |
| 1996 | 985,782 | 282,431 | | 1,268,213 |
| 1998 | 1,071,373 | | | 1,071,373 |
| 1999 | 1,155,578 | | | 1,155,578 |
| 2000 | 816,448 | 1,901,077 | | 2,717,525 |
| 2001 | 1,135,130 | | | 1,135,130 |
| 2002 | 1,042,895 | | | 1,042,895 |
| 2003 | 872,509 | 135,655 | | 1,008,164 |
| 2005 | 852,894 | | 1,496,645 | 2,349,539 |
| 2006 | 618,633 | 466,403 | | 1,085,036 |
| 2007 | 1,235,826 | | | 1,235,826 |
| 2008 | 438,316 | | | 438,316 |
| 2009 | 1,251,047 | 750,000 | | 2,001,047 |
| 2011 | 1,304,329 | 451,202 | | 1,755,531 |
| 2012 | 1,632,949 | | | 1,632,949 |
| 2013 | 54,981 | 1,113,744 | | 1,168,725 |
| 2014 | 1,098,544 | | | 1,098,544 |
| **Grand Total** | **36,721,564** | **7,533,531** | **1,496,645** | **45,751,740** |

# 5 Projected Future Dredged Material Volumes

## 5.1 Construction Material

Table 3 presents the new work dredged material volumes for authorized (WRDA 1986) 55-foot Norfolk Harbor Channel project as an example of potential dredged material quantities and placement locations. These volumes will be revised upon final selection of the recommended plan. In total, for the authorized 55-foot project approximately 26 mcy of new work material would be placed at the Dam Neck ODMDS and approximately 9 mcy of new work material would be placed in CIDMMA.

**Table 3: Example of Potential New Work Volumes (-55 ft MLLW)**

| Reach | Controlling Depth, ft MLW | Actual Depth | Comments | Volume, MCY | Placement Area |
|---|---|---|---|---|---|
| Atlantic Ocean Channel | 59 | -61 | 59' Reqd + 2' Allowable Overdepth | 6.5 | Dam Neck |
| Thimble Shoal Channel | 56 | -58 | 56' Reqd + 2' Allowable Overdepth | 8.2 | Dam Neck |
| TSC Meeting Area #1 | 56 | -58 | 56' Reqd + 2' Allowable Overdepth | 8.7 | Dam Neck |
| TSC Meeting Area #2 | 56 | -58 | 56' Reqd + 2' Allowable Overdepth | 2.6 | Dam Neck |
| Norfolk Harbor Sewells Point to Lamberts Bend | 55 | -58 | 55' Reqd + 1' Adv Maint +2' Allowable Overdepth | 6.1 | CIDMMA |
| Channel to Newport News | 55 | -57 | 55' Reqd + 2' Allowable Overdepth | 2.4 | CIDMMA |
| Anchorage F | 55 | -58 | 55' Reqd + 1' Adv Maint +2' Allowable Overdepth | 0.6 | CIDMMA |
| Total | | | | 35.1 | |

## 5.2 Maintenance Material

As an example of potential future maintenance volumes, Table 4 presents estimated maintenance volumes for the authorized -55-foot Norfolk Harbor Channel project. The available maintenance dredging records were used to develop an estimate of the annual sedimentation rate within the navigation channels in the study area. Historical (from 1980 onwards) and recent data were examined and used for developing the sedimentation rate (see Engineering Appendix Section 5 Future Maintenance Quantities) and future annualized maintenance dredging quantities.

**Table 4: Example of Potential Annualized Maintenance Volumes (-55MLLW)**

| Segment/Channel | Controlling Depth + Overdredge (feet, MLLW) | Current Annualized Dredge Volume (CY) | Proposed Annualized Maintenance Volume (CY) | % Increase Over Without-Project Conditions |
|---|---|---|---|---|
| 1 / Atlantic Ocean Channel | 60 | 164,400 | 303,800 | 85% |
| 1 / Thimble Shoal Channel | 57 | 325,600 | 486,600 | 49% |
| 1 / Norfolk Harbor Entrance Reach | 57 | 163,000 | 199,000 | 22% |
| 1 / Norfolk Harbor Craney Island Reach | 57 | 570,600 | 648,000 | 14% |
| 2 / Newport News Channel | 57 | 109,600 | 133,500 | 22% |
| **Total** | | **1,333,200** | **1,770,900** | **33%** |

# 6 Identification of the Least Costs Plan

The primary planning objective of a DMMP is to identify the Federal Standard, or the base plan, which is the least costly disposal plan consistent with sound engineering practice that meets all Federal environmental standards and meets placement needs for the 20-year planning horizon (Planners Guidance Notebook, USACE, 2000).

Figure 1 presents the locations of potential dredged material disposal sites relative to the federal channels. Distances to CIDMMA for the inner harbor channels are relatively short, with pumping distances ranging from 30,000 to 43,000 feet. Haul distances to the offshore disposal sites and beneficial use sites are considerably longer. Average one-way haul distances to the Dam Neck Offshore Disposal Site include:

- Atlantic Ocean Channel: 9 miles;
- Thimble Shoal Channel East: 17 miles
- Thimble Shoal Channel West: 26 miles;

- Meeting Area 1 (west): 25 miles; and
- Meeting Area 2 (east): 17 miles.

Table 5 presents a comparative cost assessment for each channel reach and for each potential placement site. Costs per cubic yard and total costs include all mobilization, dredging, material testing, and placement costs. Construction quantities are based on the assumption of a controlling depth equal to authorized depths in each reach and three feet of overdepth dredging in the Atlantic Ocean channels and two feet of overdepth dredging in all other reaches.

Big Beach (City of Virginia Beach) is used as the potential beneficial use placement site for the Atlantic Ocean Channel due to it being the closest site (and therefore least cost of other beneficial use sites considered). Willoughby (City of Norfolk) is used as the potential beneficial use placement site for Thimble shoal Channel east of the Chesapeake Bay Bridge Tunnel because it is the closest site (and therefore least cost of other beneficial use sites considered). Other sites, including Sandbridge, CBBT and the CIEE have longer hauls from the AOC and would have higher unit costs than shown in Table 5. Unit costs for beneficial reuse site include dredging, hauling, pump-out and upland crew.

As an illustration of the base plan (least cost plan), Table 6 is based on the assumption that each channel is dredged to its currently authorized depth, with three feet of over depth dredging in the Atlantic Ocean Channel and two feet of overdepth dredging in all other channels. Dredge quantities include maintenance material above the existing maintained depths. In the least cost plan, dredged material from the inner channels is placed at CIDMMA and material from the Thimble Shoal Channel and Atlantic Ocean Channel are placed at the Dam Neck ODMDS.

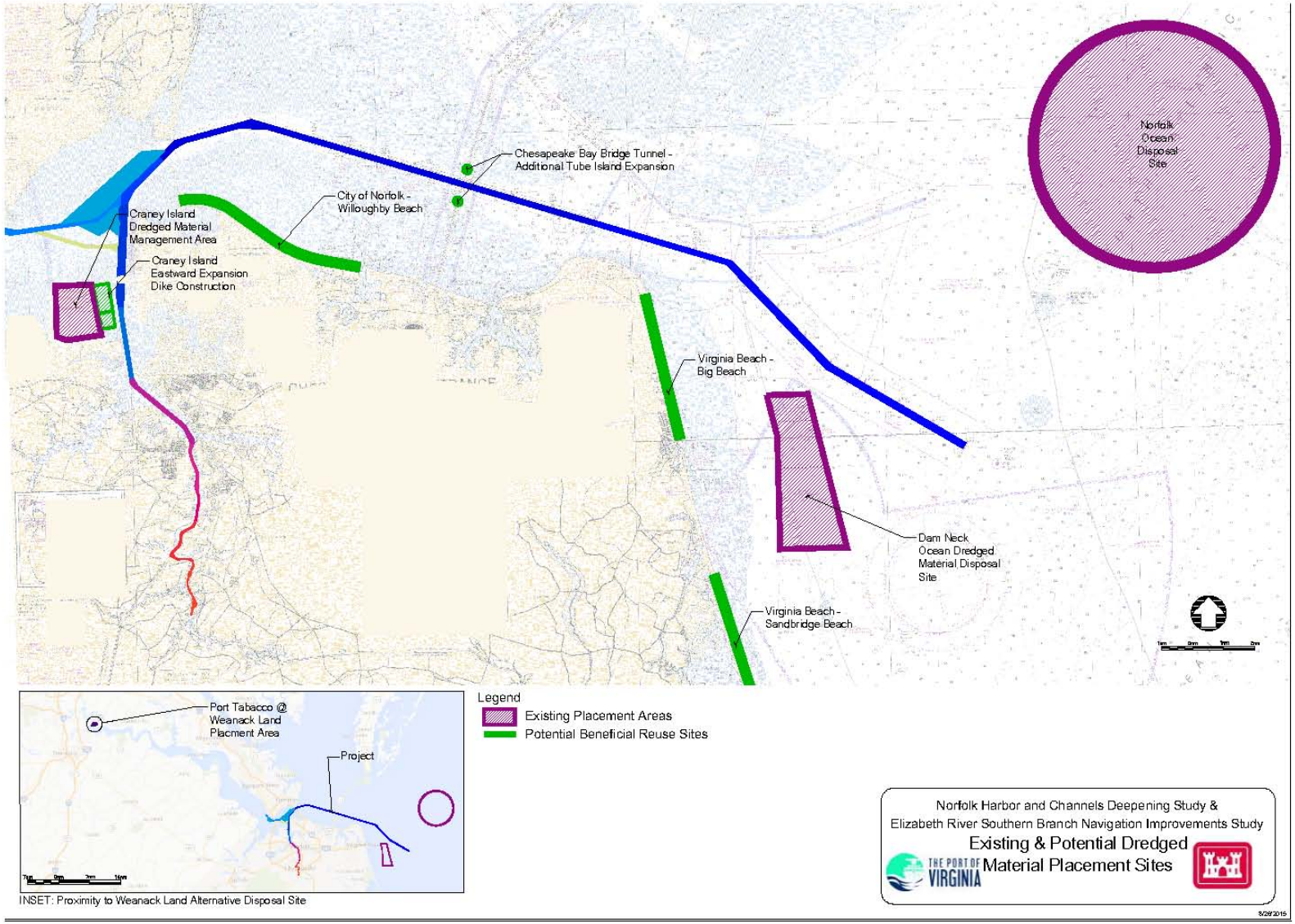


**Figure 1: Dredged Material Placement Sites**

**Table 5: Lowest Unit Cost Placement Site by Channel Reach**

| Reach | Quantity (cy) | CIDMMA | Dam Neck ODMDS | Norfolk ODMDS | Big Beach** | Willo-ughby** |
|---|---|---|---|---|---|---|
| Atlantic Ocean Channel | 6,489,167 | xx | $5.37 | xx | $7.99 | xx |
| Thimble Shoal Channel East | 1,426,752 | xx | $7.82 | xx | xx | $9.36 |
| Thimble Shoal Channel West | 6,807,585 | xx | $11.84 | xx | xx | xx |
| Norfolk Harbor Sewells Point to Lambert's Bend | 6,100,666 | $4.22 | xx | xx | xx | xx |
| Channel to Newport News | 2,400,730 | $8.86 | xx | xx | xx | xx |
| Sewells Point Anchorage F | 653,168 | $8.42 | xx | xx | xx | xx |
| TSC Meeting Area #1 | 8,690,139 | xx | $10.87 | xx | xx | xx |
| TSC Meeting Area #2 | 2,623,737 | xx | $7.36 | xx | xx | $8.19 |

Quantity calculations are for authorized depths.

**Table 6: Lowest Total Cost Placement Site by Channel Reach**

| | | | Least Cost Plan | | Beneficial Use Plan | |
|---|---|---|---|---|---|---|
| Reach | Placement Area | Quantity | Unit Cost | Total Cost | Unit Cost | Total Cost |
| Atlantic Ocean Channel | Dam Neck | 6,489,167 | $5.37 | $34,847,000 | $7.99 | $51,848,000 |
| Thimble Shoal Channel East | Dam Neck | 1,426,752 | $7.82 | $11,157,000 | $9.36 | $13,354,000 |
| Thimble Shoal Channel West | Dam Neck | 6,807,585 | $11.84 | $80,602,000 | xx | xx |
| Norfolk Harbor Sewells Point to Lambert's Bend | CIDMMA | 6,100,666 | $4.22 | $25,745,000 | xx | xx |
| Channel to Newport News | CIDMMA | 2,400,730 | $8.86 | $21,270,000 | xx | xx |
| Sewells Point Anchorage F | CIDMMA | 653,168 | $8.42 | $5,500,000 | xx | xx |
| TSC Meeting Area #1 | Dam Neck | 8,690,139 | $10.87 | $94,462,000 | xx | xx |
| TSC Meeting Area #2 | Dam Neck | 2,623,737 | $7.36 | $19,311,000 | $8.19 | $21,488,000 |

*Note that only a portion of the material from these reaches may be suitable for placement at CIDMMA

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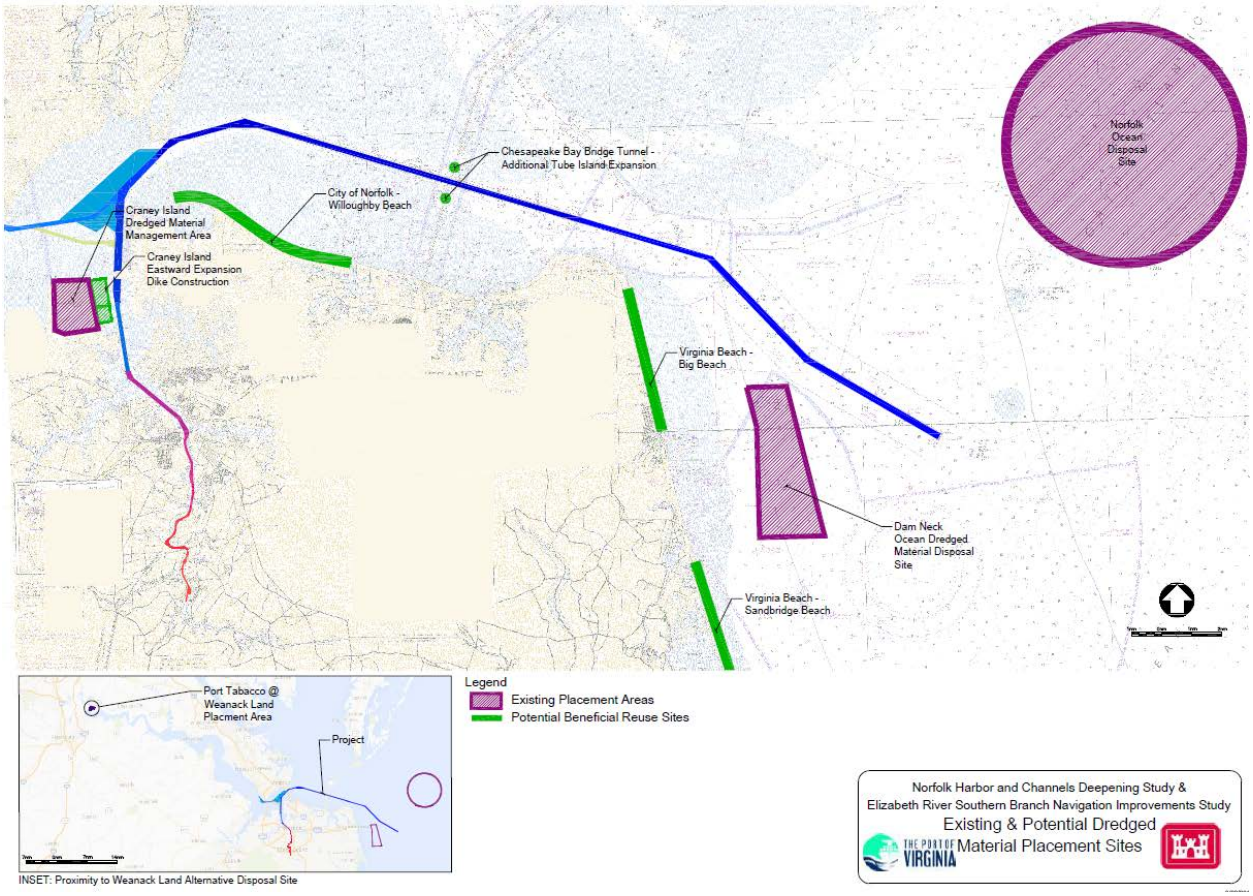
Norfolk Ocean Disposal Site
Chesapeake Bay Bridge Tunnel - Additional Tube Island Expansion
City of Norfolk - Willoughby Beach
Craney Island Dredged Material Management Area
Craney Island Eastward Expansion Dike Construction
Virginia Beach - Big Beach
Dam Neck Ocean Dredged Material Disposal Site
Virginia Beach - Sandbridge Beach
Port Tabacco @ Weanack Land Placment Area
Project
INSET: Proximity to Weanack Land Alternative Disposal Site
Legend
Existing Placement Areas
Potential Beneficial Reuse Sites
Norfolk Harbor and Channels Deepening Study &
Elizabeth River Southern Branch Navigation Improvements Study
Existing & Potential Dredged Material Placement Sites
THE PORT OF VIRGINIA

CENAO-PM-C 24 August 2016

MEMORANDUM FOR RECORD

THRU: Douglas Stamper, Project Manager, Programs and Civil Works Branch

Mr. Richard Klein, Chief, Programs and Civil Works Branch

Ms. Susan Conner, Chief, Planning and Policy Branch

FOR: Office Files

SUBJECT: Norfolk Harbor and Channels and Elizabeth River Southern Branch Deepening Projects

1. On 4 August 2016, a Vertical Team Meeting was held on the subject projects to discuss the Dredged Material Management Plan (DMMP) for each of the ongoing general reevaluation studies. The meeting was conducted as a webinar and the attached PowerPoint presentation was used to facilitate the discussion. The following individuals participated in the meeting:

- Norfolk District: Doug Stamper, Susan Conner, Kristen Scheler, Richard Harr, Rachel Haug, Alicia Logalbo, Richard Klein, Robert Pruhs, Mike Anderson,
- VPA: Jeff Florin, Ira Brotman, Mike McGarry
- DDNPCX: Idris Dobbs, Todd Nettles, Eric Bush, Daniel Small, Kim Otto,
- NAD: Naomi Fraenkel
- HQUSACE (OWPR): Jeremy LaDart

2. The purpose of the meeting was to meet the following goals:

- Ensure that the DMMPs being developed for both studies meet the DMMP requirements for feasibility-level studies (**See Slide 2**);
    - Provides for 20 years of placement capacity
    - Establishes a base plan (least cost placement plan)
    - Assesses potential for beneficial use
    - Demonstrates economic justification
    - Provides agency review and consultation
    - Provides public involvement
    - Demonstrates consistency with environmental requirements

- Demonstrate that continuing the current dredged material management practices will fulfill the DDMP requirements; and

- Obtain Vertical Team (NAD, DDNPCX, and HQUSACE) concurrence.

3. The following paragraphs present the major points of discussion focused on the meeting goals presented in paragraph 2.

a. Provides for 20 years of Placement Capacity. The location of the Norfolk Harbor and Channels Deepening Project and the Elizabeth River Southern Branch Navigation Improvements Project are show on **Slide 3** and the projected quantities for construction and 20-year maintenance for each project are shown on **Slide 4**.

Although no complete and approved DMMP currently exists for each of the two projects, all of the information, as presented, currently exists and additional calculations are being done to assure 20+ years of capacity for each project. The needed capacity currently exists (**See Slide 5**) at a combination of the three existing placement areas (**See Slide 6**) consisting of the Dam Neck Ocean Dredged Material Disposal Site (ODMDS), the Norfolk ODMDA, and the Craney Island Dredged Material Management Area (CIDMMA). Specific information, including estimated total capacity, was presented on **Slides 7, 8, and 9**, respectively.

b. Establishes a Base Plan (Least Cost Placement Plan). The PDT has established the following Least Cost (Base) Dredged Material Placement Plan for each project, as follows;

- Norfolk Harbor and Channels Deepening (**See Slides 10 and 11**): Plan consists of using the ODMDSs for the Thimble Shoal and Atlantic Ocean Channels and the CICMMA for the Norfolk Harbor Channel; and

- Elizabeth River Southern Branch Navigation Improvements (**See Slides 12**): Plan consists of using the CIDMMA for the suitable material and several potential upland sites for the material unsuitable for placement at CIDMMA (**See Slide 17**). One potential site, Port Tobacco at Weanak (**See Slides 17 and 18**), has proven to be a successful dredged material handling site and transfer area to the Charles City County Landfill.

c. Assesses Potential for Beneficial Use**.** Beneficial Use Opportunities (**Slides 14 and 15**)
- Big Beach, Sandbridge, Willoughby, CIEE, and CBBT
- To be addressed in more detail during PED Phase
- Based on Sponsor need, timing, and incremental costs

d. Demonstrates Economic Justification, Provides Agency Review and Consultation, Provides Public Involvement, and Demonstrates Consistency with Environmental Requirements. As indicated on **Slide 19**, dredged material placement is a component of the GRR/EA for each project. The DDMPs will be presented in the GRR/EAs as components of the Plan Formulation

Appendix for both studies which will ensure that economic justification, agency review and consultation, public involvement, and environmental consistency determination will be addressed for each project.

e. Demonstrate that continuing current dredged material management practices fulfills DMMP requirements. Continued management of CIDMMA and ODMDS sites using our existing proven successful practices will ensure long-term capacity for the project. As will be outlined in the DMMP.

4. Comments provided by the Vertical Team:

- Although the DMMP accounts for 20 years, please note that the economics for the plan formulation must account for 50 years of disposal. RESPONSE: Understood

- Please note that the eastward expansion of Craney Island has a different cost-share (86/14) than most projects. RESPONSE: noted

- Question on ocean disposal permitting now and in the future. RESPONSE: The Ocean Disposal Sites are permitted though 2019 (needs to be confirmed) and the PDT is confident that these sites will continue to be approved for use in the future (needs to be confirmed by Robert Pruhs).

- Ensure that PDT looks at beneficial use sites. RESPONSE: Although that is not the base plan, it will be mentioned in both the DMMP and the NEPA document for both studies that beneficial use opportunities exist and those will be evaluated in the future based on needs and timing.

- PDT needs to verify and document that the least cost that was originally established is still the least cost plan today. RESPONSE: Concur and PDT will document this.

5. In summary (Slide 20), both DMMPs meet all requirements from ER 1105-2-110 and continues existing dredged material management practices. The DDMPs will be presented in the GRR/EAs as components of the Plan Formulation Appendix for both studies. The Vertical Team concurred with the PDT's way forward on the DMMP for both studies.

Prepared with notes provided by Susan Conner, Chief, Planning and Policy Branch, and Douglas Stamper, Project Manager, Programs and Civil Works Branch.

Robert N. Pretlow, Jr., PE, PMP
Project Manager
Programs and Civil Works Branch
USACE, Norfolk District

ATTACHMENT

# APPENDIX F

*Dam Neck Ocean Disposal Site (DNODS)*

*Site Management and Monitoring Plan*

The following Site Management and Monitoring Plan for the Dam Neck Ocean Dredged Material Disposal Site (ODMDS) has been developed and agreed to pursuant to the *Water Resources Development Act Amendments of 1992 (WRDA)* to the Marine Protection, Research, and Sanctuaries Act of 1972 (MPRSA) for the management and monitoring of ocean disposal activities, as resources allow, by the U.S. Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (USACE).

_____ _____

Cosmo Servidio
Regional Administrator
U.S. EPA Region III

Date

_____ _____

Patrick V. Kinsman, PE
Colonel, U.S. Army
Commanding

Date

_____ _____

John T. Litz, PMP
Colonel, U.S. Army
Commander and District Engineer

Date

This plan is effective from date of signature for a period not to exceed ten (10) years. The plan shall be reviewed and revised more frequently if site use and conditions at the site indicate a need for revision.

# SITE MANAGEMENT AND MONITORING PLAN FOR THE DAM NECK OCEAN DISPOSAL SITE (DNODS)

SITE MANAGEMENT AND MONITORING PLAN FOR THE DAM NECK OCEAN DREDGED MATERIAL DISPOSAL SITE (ODMDS)

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## INTRODUCTION

Section 102(c) of the Marine Protection, Research, and Sanctuaries Act of 1972 (MPRSA), details the responsibility of the U.S. Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (USACE) to monitor and manage Ocean Dredged Material Disposal Sites (ODMDS) to ensure that ocean dredged material disposal activities will not unreasonably degrade the marine environment or endanger human health or economic potentialities. MPRSA, as amended by section 506(a) of the Water Resources Development Act (WRDA) of 1992, and a Memorandum of Agreement Between EPA and USACE require the development of a site management and monitoring plan (SMMP) to specifically address the disposal of dredged material at the Dam Neck ODMDS. Following opportunity for public review and comment, the SMMP shall be required for all disposal activities at the site. All section 103 (MPRSA) ocean disposal permits or evaluations shall be conditioned as necessary to assure consistency with this SMMP.

This SMMP has been prepared in accordance with the *Guidance Document for Development of Site Management Plans for Ocean Dredged Material Disposal Sites* (February 1996), which was prepared by the EPA and the USACE and provides a framework for the development of site monitoring and management plans required by MPRSA and WRDA. The SMMP may be modified if it is determined that such changes are warranted as a result of information obtained during the monitoring process. The SMMP shall be reviewed and revised at least every 10 years.

## SCOPE OF THE SMMP

ODMDS management involves a broad range of activities including regulating times, the quantity, and the physical/chemical characteristics of dredged materials dumped at the site. ODMDS management involves establishing disposal controls, conditions, and requirements to avoid and minimize potential impacts to the marine environment. Finally, ODMDS management involves monitoring the site environs to verify that unanticipated or significant adverse effects are not occurring from past or continued use of the site and that permit conditions are met.

MPRSA, as amended by WRDA 1992, provides that the SMMP shall include but not be limited to:

- A baseline assessment of conditions at the site;
- A program for monitoring the site;
- Special management conditions or practices to be implemented at each site that are necessary for the protection of the environment;
- Consideration of the quantity and physical/chemical/biological characteristics of dredged materials to be disposed of at the site;
- Consideration of the anticipated use of the site over the long term;
- A schedule for review and revision of the SMMP.

## OBJECTIVES OF SITE MANAGEMENT

There are three primary objectives in the management of the Dam Neck ODMDS which

provide guidelines in making management decisions necessary to fulfill mandated responsibilities to protect the marine environment as discussed previously:

- Protection of the marine environment, living resources, and human health and welfare;
- Documentation of disposal activities at the ODMDS and provision of information which is useful in managing the dredged material disposalactivities
- Provision for beneficial use of dredged material whenever practical

## DAM NECK OCEAN DREDGED MATERIAL DISPOSAL SITE (ODMDS)

The Dam Neck ODMDS (Figure 1) was designated by EPA pursuant to Section 102(c) of MPRSA as suitable for the ocean disposal of dredged material from three federal navigation channels: the Atlantic Ocean Channel, the Cape Henry Channel, and the Thimble Shoal Channel. The final rule was promulgated by EPA on March 31, 1988 (FR. Vol. 53 No. 62), effective March 31, 1988. The Dam Neck ODMDS boundary coordinates are asfollows:

36° 51' 24.1" N., 75° 54' 41.4" W.,
36° 51' 24.1" N., 75° 53' 02.9"W.,
36° 46' 27.4" N., 75° 51' 39.2" W.,
36° 46' 27.5" N., 75° 54' 19.0" W.,
36° 50' 05.0" N. 75° 54' 19.0" W.

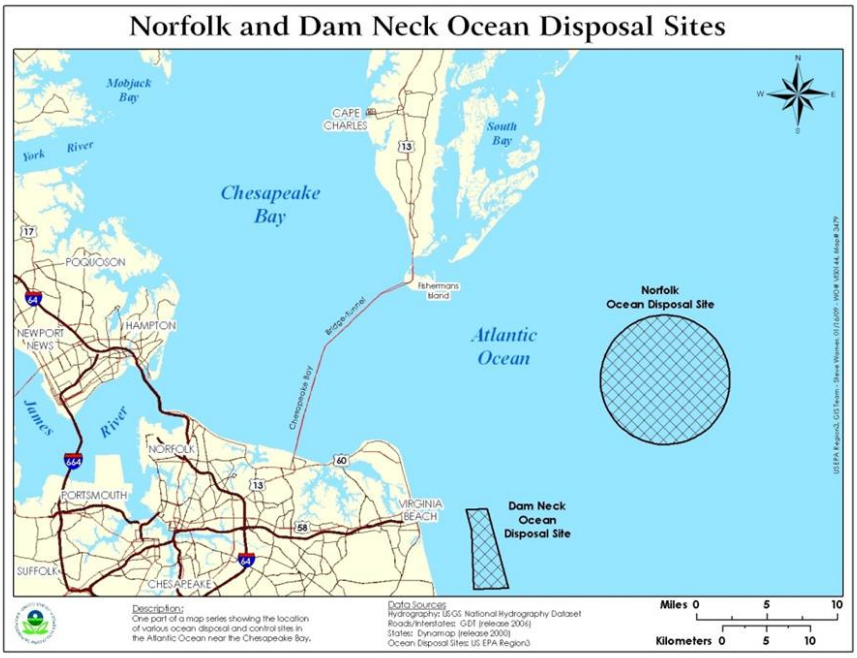



Figure 1. Map of Dam Neck ODMDS.

The Dam Neck ODMDS has an area of about 9-square nautical miles. Water depth within the ODMDS averages about40 feet. This bathymetry is typical of the inner continental shelf, with a smooth bottom and a gradual seaward slope (less than 1 foot per 1,000 feet).

Current use of the site for maintenance dredging indicates that approximately 1.2 million cubic yards (MCY) of maintenance dredged material from three federal navigation channels will be placed in the site every two years. Improvements of federal navigation channels (i.e. deepening and/or widening projects) may results in approximately 5 MCY per year during construction.

## DISPOSAL HISTORY

The Dam Neck ODMDS has been in use since 1967 when the Corps initially deepened Thimble Shoal Channel to 45 feet. Since that time, all new work and maintenance dredged material from Cape Henry Channel and Thimble Shoal Channel, with limited exceptions, have been deposited at the Dam Neck ODMDS. These deposits included a variety of naturally occurring marine sediments, ranging from silts and clays to fine, medium, and coarse sands. Disposal of dredged material at the Dam Neck ODMDS has occurred using either a hopper dredge or bottom dump scow. However, this does not preclude the use of other disposal methods.

## MANAGEMENT CONCERNS AND ISSUES

**Mounding.** The cumulative effects of dredged material disposal at the Dam Neck ODMDS have been limited to bathometric changes.

## OCEAN DREDGED MATERIAL SITE MANAGEMENT

All ocean disposal at the Dam Neck ODMDS must be conducted in accordance with the Ocean Regulations and Criteria (40 CFR Parts 220-229), whether conducted as a permit activity or as a Federal activity. The following are Dam Neck ODMDS management requirements and all permits or evaluation concurrences shall be conditioned to include these requirements.

**Evaluation of Dredged Materials to be Disposed.** Only dredged materials which have been evaluated in accordance with EPA's Ocean Dumping Regulations and Criteria and found suitable will be accepted for disposal in the Dam Neck ODMDS. Furthermore, disposal shall be limited to dredged material from navigation channels at the mouth of the Chesapeake Bay, as described in the Dam Neck ODMDS Site Designation (1988).

Guidance for evaluation of dredged materials under the MPRSA Section 103 program is provided in the Evaluation of Dredged Material Proposed for Ocean Disposal Testing Manual ("Green Book", EPA, 1991) and the Southeast Regional Implementation Manual (SERIM, EPA, 2008), as updated. The Mid Atlantic Regional Implementation Manual also provides guidance and can be referred to, as updated. The determination of dredged material suitability for ocean disposal must be documented in a MPRSA Section 103 evaluation and receive written concurrence by EPA Region III prior to disposal. Dredged materials will be reevaluated for suitability for ocean disposal in accordance with current USACE/EPA guidance at an interval of at least every three years. Re-evaluation and testing procedures should be coordinated with the USACE and the EPA prior to any sampling or testing.

**Dredged Material Suitable for Beneficial Uses.** Beneficial uses refers to the concept that

dredged material can be disposed in a manner that is economically and environmentally acceptable and accrues natural resource benefits to society. Beach-compatible dredged materials (sands) should be placed on nearby beaches or within the active littoral system when it is economically feasible and environmentally acceptable to do so. Other beneficial uses of dredged materials, such as their use to enhance or develop fisheries resource features (reefs or berms) are also encouraged with appropriate environmental review. Site capacity and mounding problems are favorably affected by not placing beach compatible sand in the ODMDS.

**Methods of Disposal.** No specific disposal method is required for this site. Disposal may occur by hopper dredge, dump scow, or by pipeline discharge. The most frequently used method is by hopper dredge. Dredged materials must be discharged within the ODMDS boundaries. The placement of dredged materials outside the ODMDS boundaries is not authorized. An approved ocean disposal verification plan, such as the USACE Dredge Quality Management system or an approved equivalent, must be implemented by all dredged material placement operations at the designated site. Placement methods, which prevent mounding of dredged materials from becoming unacceptable navigation hazards will be used. Placement methods which minimize interference to fishing in adjacent areas will be used. Specific procedures, which accomplish these goals, are discussed under the Specific Requirements section.

**Disposal Quantities.** Quantities of dredged materials placed within the ODMDS will be limited to those amounts that do not produce unacceptable adverse effects to human health and welfare and the marine environment or human uses of the environment (as defined in EPA's Ocean Dumping Regulations and Criteria). The Dam Neck ODMDS is currently designed and managed with a remaining capacity of approximately 60 million cubic yards of dredged material. Future evaluation and management could increase this quantity.

**Timing of Disposal.** There are no seasonal restrictions to the placement of dredged material within the Dam Neck ODMDS. However, seasonal restrictions or seasonal special requirements may be associated with a particular dredging activity at a particular location.

**Disposal Buoys.** To assist in assurance that all disposal takes place in the proper location, the U.S. Coast Guard has placed two special buoys to mark the location of actual discharge within the disposal site. The Coast Guard will monitor these buoys periodically. Differential global positioning system is required for all disposal vessels.

## SPECIFIC REQUIREMENTS

**Ocean Disposal Compliance Reporting.** Vessels used for dredged material disposal will be required to operate under an approved disposal plan. The location and quantity of each disposal load placed within the Dam Neck ODMDS will be maintained in a computerized database by the Corps. All exception loads (i.e., reported disposal out of the ODMDS boundaries or no location reported) will be documented and the disposal operator questioned to determine what occurred and the reason for the exception. The disposal plan will include requirements for an automated system that will record the horizontal location and draft condition of the disposal vessel from the time it passes the Chesapeake Bay Bridge-Tunnel

outbound until the vessel passes the bridge-tunnel inbound. Vessel positioning shall be by differential global positioning system.

Minimum reporting requirements for each load are as follows:

- Dredge or vessel name
- Sequential load number
- Date
- Time in one-minute intervals for the disposal cycle specified previously
- Vessel positioning in latitude/longitude (World Geodetic System 1984) or horizontal datum based on Virginia State Plane Coordinate System (South Zone) North American Datum 1983 (NAD 83) in U.S. Survey feet
- Draft of vessel in feet
- Depth of water in feet referred to National Ocean Service (NOS) mean lower low water (MLLW), National Tidal Datum Epoch (NTDE) 1983-2001
- Begin and end dump event times and positions
- Source of dredged material (i.e. reach name)
- Volume of dredged material disposed, in cubic yards

This data shall be available on a daily basis and submitted electronically to USACE and EPA Region III on a weekly basis. No vessel shall leave for the disposal site without the ability to collect and record the ocean disposal compliance monitoring data specified. The disposal positions reported shall be those of the disposal vessel itself (i.e., the scow not the tug).

**Summary Report.** A summary report of operations shall be provided to the USACE, Norfolk or Baltimore District and EPA Region III within 60 days of either the government's acceptance of the work (in the case of federal dredging projects) or the applicant's completion of the ocean disposal activity (in the case of Section 103 permitted projects). Minimum required data to be included in the summary report are as follows:

- Project Name
- Permit/Federal Project Number
- Location of which material was dredged (waterway/channel/reach)
- Public notice or permit data
- Disposal Site Used
- Project Type (Federal or permitted)
- Type of work (New or maintenance work)
- Method of Dredging and Disposal
- Disposal Dates (Range of disposal dates from start to finish)
- Quantity of dredge materials disposed (in cubic yards)
- Point of Contact for Disposal Activity

**Disposal "Zones" within ODMDS.** In order to manage site use (maximize site capacity, reduce multiple user conflicts, facilitate monitoring and management, and reduce potential adverse impacts to the marine environment) the USACE, in consultation with EPA, has designated seven (7) sediment management zones (or cells) within the ODMDS for dredged material placement (Figure 2). Cells 1, 3, and 4 will generally be used to place sand from channel construction, if not used on beaches or elsewhere, and Cells 2, 5, 6, and 7 will generally be used for maintenance materials and material from channel construction which

is predominantly clay and silt. Cells will be managed to maximize available capacity for specific sediment physical characteristics as assigned. These cells should be evaluated as needed to address future site capacity and needs.

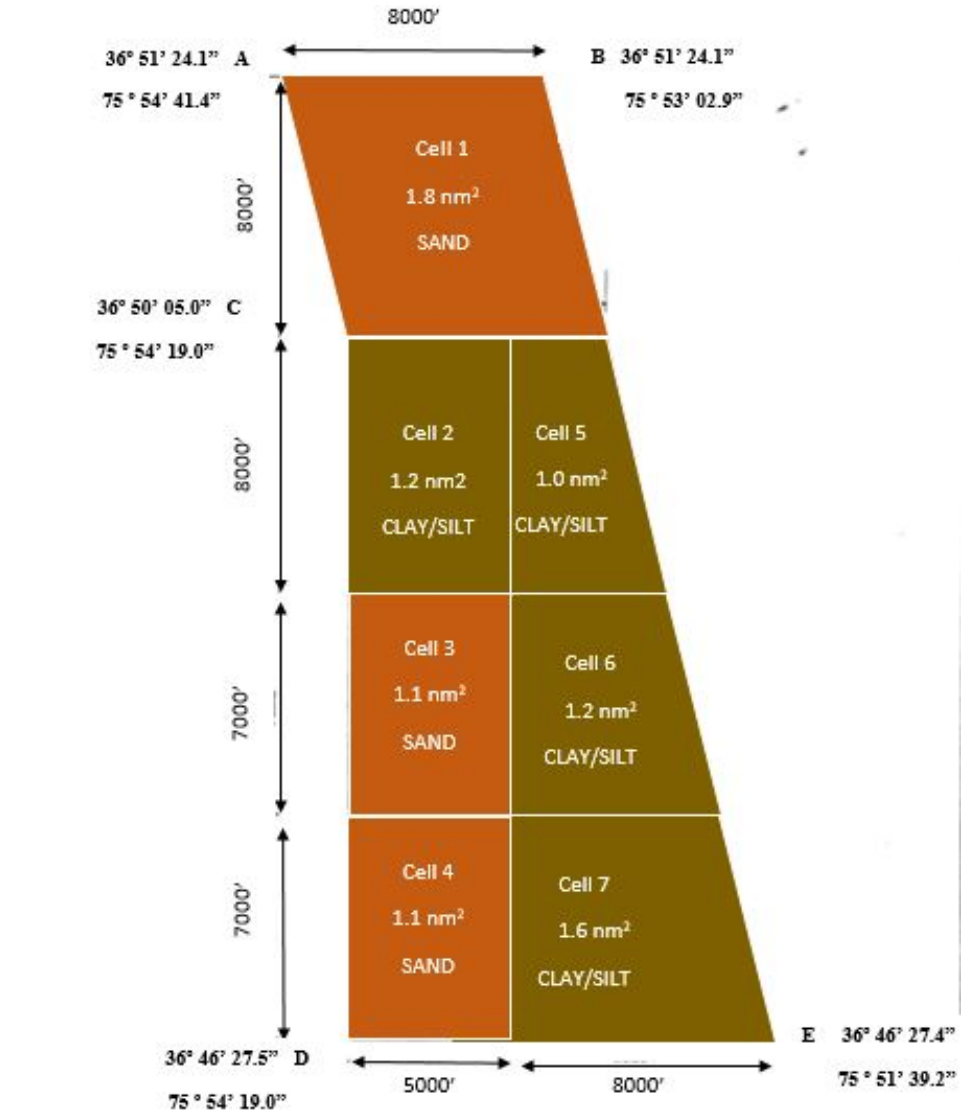



Figure 2. Dam Neck ODMDS sediment management cells.

**Control of Mounding.** Dredged material disposal shall be conducted in a manner to maximize ODMDS capacity and minimize mounding of material. Dumps shall be scattered throughout designated disposal zones and not placed repeatedly at one location. Depths at the time of disposal will be monitored to determine if adjustment of disposal methods is needed to prevent unacceptable mounding.

**Emergency Dumps and Misdumps.** If a Dam Neck ODMDS user experiences an emergency situation which causes a dumping of material outside of the ODMDS, the site user must notify the USACE, Norfolk or Baltimore District, the U.S. Coast Guard Sector Hampton Roads, and EPA Region III in writing within 10 days of the emergency dump, the reason for the emergency, and the location of the dump. If, in the opinion of EPA Region III and the USACE District, the misplaced dredged materials are hazardous to the marine environment and its uses, or if the materials create hazards to navigation, the site user shall remove such material and deposit it where directed. A misdumped load may be considered a violation of the MPRSA and subject to penalties and should be reported in the same manner as emergency dumps.

## BASELINE ASSESSMENT OF CONDITIONS AT THE DAM NECK ODMDS

**Site Designation EIS Baseline.** Baseline conditions at the Dam Neck ODMDS are principally reported in the site designation final environmental impact statement, *Final Supplement 1 to the Final Environmental Impact Statement and Appendix: Dam Neck Ocean Disposal Site and Site Evaluation Study, Norfolk Harbor and Channels, Virginia, Deepening and Disposal* (June 7, 1985). These baseline data include information referenced from scientific literature as well as information compiled from field surveys at the Dam Neck ODMDS. These field survey data include: water and sediment chemistry; benthic macroinfauna and epifauna population characteristics; and concentrations of trace metals and chlorinated hydrocarbons in benthic macroinfauna tissues.

## SITE MONITORING

**Goals of Site monitoring.** Site monitoring is conducted to ensure the environmental integrity of an ocean dredged material disposal site and to verify compliance with site designation criteria, any special site management conditions, and with permit conditions or federal authorization requirements. Monitoring should provide useful and pertinent information to inform site management decisions. The main purpose of a disposal site monitoring program is to determine whether site management practices, including disposal operations, need to be changed to avoid unacceptable impacts. Site monitoring is not a stand-alone activity. It is based on the site designation process, the characteristics of the dredged materials, and compliance with authorized activities.

To use site monitoring as an effective tool, site managers will define in quantitative terms the unacceptable impacts that dredged material is having on the resources of concern. Where applicable, action levels can be set well below the defined unacceptable effect level and corrective measures can be taken before unacceptable effects occur. Continuous monitoring of all physical, chemical, and biological parameters and resources in and around the ocean dredged material disposal site is not necessary. A monitoring program should be structured to address specific questions (hypotheses) and measure key indicators and endpoint, particularly those defined during site designation or specific project issues that arise. A tiered strategy for a monitoring program is desirable. With a tiered approach, an unacceptable result may trigger further and often more complex monitoring. The technical framework for evaluating environmental impacts of dredged material placement can be

found in EPA-842-B- 92-008.

**Dam Neck ODMDS Monitoring Objectives.** The objectives of the site monitoring plan for the Dam Neck ODMDS are to provide information to:

- Determine if the disposal activities are occurring in compliance with site restrictions and permit conditions;
- Indicate the short and long-term fate of dredged material placed at the site;
- Determine the effect of the dredged material disposal on uses of the marine environment outside the ODMDS.
- Determine whether unreasonable degradation to the marine environment is occurring

**Monitoring Methods and Rationale.** The EPA and USACE will coordinate on the strategies proposed below for the Dam Neck ODMDS to monitor the physical, ecological, and chemical conditions to address the monitoring objectives above. These methods have provided information to address specific and current management issues at the site including: mounding (and site capacity), dumps occurring outside the disposal area, movement or fate of material, and ecological and chemical impacts within the site and surrounding area. Information obtained during any future monitoring may indicate the need for additional monitoring at a higher, more complex, level. If more intensive monitoring is required, this monitoring plan must be revised or an additional threshold for action established.

1. **Physical Monitoring**
    a. **Evaluation of Direction and Magnitude of Material Movement.** The extent and probable direction in which local waves and currents erode and transport the dredged material mounds may be important in determining potential effects of site use on adjacent marine resources and in managing use of the site. Sediment dispersion can increase site capacity and make material available for transport outside site boundaries. When applicable, hydrodynamic and sediment transport models such as LTFATE and MPFATE may be used to evaluate dredged material movement at the Dam Neck ODMDS. These models are included in the USACE's PC based Automated Dredging and Disposal Alternatives Modeling System (ADDAMS).
    b. **Multibeam Echosounder Surveys.** The USACE and/or permit recipient will conduct multibeam echosounder surveys after dumping activities to monitor the bathymetry of the site. Additional multibeam echosounder surveys will be required if site use and/or activity differs from the maintenance dredged material disposal described previously.
2. **Ecological Monitoring**
    a. Monitoring of benthic infauna and/or epifauna will occur at the site every other year, as funding allows. This information will be collected within the disposal site and surrounding areas. Diversity indices will be analyzed and compared to prior monitoring and disposal activity within the site. Information collected from this monitoring may be used to revise the SMMP. If degradation to the marine environment is suspected, more intensive

ecological monitoring may be warranted.

3. **Chemical Monitoring**
    a. Monitoring of the sediment chemistry within the disposal site and the surrounding area will occur at the site every other year, as funding allows. Sediment will be analyzed for contaminants of concern that are determined during the Section 103 permit evaluation process. This information may inform the need for more intensive ecological monitoring, and may be used to revise SMMP.

**Other Survey Techniques.** Additional survey techniques such as side scan sonar, multi-beam echosounder surveys, video recordings, still photography, bottom grab samples, and vertical sediment profiling may be utilized on a periodic basis to determine the effects of disposal in the Dam Neck ODMDS. The USACE and EPA Region III will coordinate the appropriate use of these techniques when circumstances warrant additional monitoring.

**Disposal Site Use Records.** All dredged material disposal activities at the Dam Neck ODMDS will be conducted under an approved verification plan. The USACE will maintain a database of site use. Documented site use information along with other information collected during monitoring will be used to direct future ocean disposal and monitoring activities. The data requirements werediscussed previously. All records of use and monitoring will be made available to the public.

**Data Reporting.** Data collected will be made available to interested parties.

## ANTICIPATED SITE USE

It is anticipated that the Dam Neck ODMDS will be used every year or every other year for the placement of maintenance dredged material from the three Federal navigation channels, depending on the dredging requirements for these channels. Current anticipated use also includes the disposal of new material from the deepening of Thimble Shoals and Atlantic Ocean Channels.

## MODIFICATION OF THE DAM NECK ODMDS SMMP

Should the results of the monitoring surveys or valid reports from other sources indicate that continued use of the ODMDS would lead to unacceptable effects, then the ODMDS SMMP will be modified to mitigate these adverse effects. The SMMP will be reviewed and updated at least every 10 years. The SMMP will be reviewed and updated as necessary if site use changes significantly. For example, the SMMP will be reviewed if the quantity or type of dredged material placed at site changes significantly or if conditions at the site indicate a need for revisions. The plan should be updated in conjunction with activities authorizing use of the site.

In general, EPA and the USACE shall share responsibility for implementation of the SMMP. The USACE will be responsible for implementation of the SMMP for Federal operations and maintenance and newwork projects. This agreement does not obligate the Norfolk or Baltimore District, USACE or EPA, Region III to expend funds for site

monitoring or maintenance of the Dam Neck ODMDS. If conditions at the Dam Neck ODMDS indicate that testing or monitoring of the site is needed and funds are not available to perform this evaluation, appropriate management actions, which may include closure of the site, will be taken.

## REFERENCES


U.S. Army Corps of Engineers. *Final Supplement I to the Final Environmental Impact Statement and Appendix: Dam Neck Ocean Disposal Site and Site Evaluation Study, Norfolk Harbor and Channels, Virginia, Deepening and Disposal.* December 14, 1984.

U.S. Environmental Protection Agency and U.S. Army Corps of Engineers. *Evaluation of Dredged Material Proposed for Ocean Disposal*, EPA-503/8-91/001.

U.S. Environmental Protection Agency and U.S. Army Corps of Engineers. *QA/QC Guidance for Sampling and Analysis of Sediments, Water, and Tissues for Dredged Material Evaluations.* EPA-823/B- 95/001.

# Dredged Material Placement Plan for the

## Norfolk Harbor and Channels Deepening Project

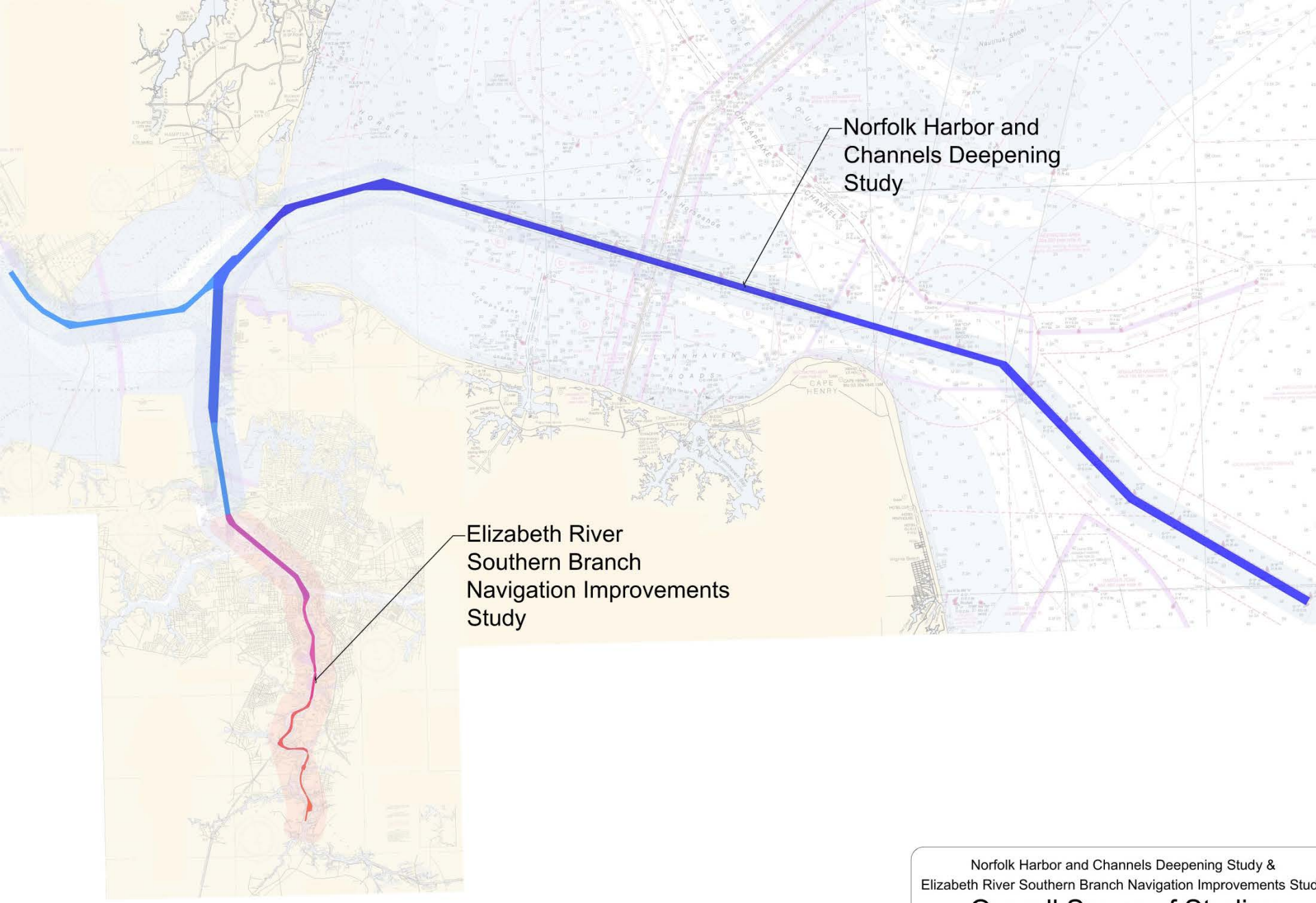
**And**

## Elizabeth River and Southern Branch Navigation Improvements Project
## General Reevaluation Studies

28 July 2016

# Meeting Objectives

- Demonstrate that the DMMP for NH & ERSB
  - Provides for 20-years of placement capacity
  - Establishes a base plan (least cost placement plan)
  - Assesses potential for beneficial use
  - Demonstrates economic justification
  - Provides agency review and consultation
  - Provides public involvement
  - Demonstrates consistency with environmental requirements
- Demonstrate that continuing current dredged material management practices fulfills DMMP requirements




Norfolk Harbor and Channels Deepening Study &
Elizabeth River Southern Branch Navigation Improvements Stud

# Overall Scope of Studies

# Projected Quantities

- Norfolk Harbor
  - Construction: 35 MCY *(2/3rds to Offshore)*
  - Annual maintenance: 1.5 MCY to 2 MCY
  - 20-year total: 65 MCY to 75 MCY
    - *Offshore: 45 MCY*
    - *CIDMMA: 22 MCY*
- Eliz. River and So. Branch
  - Construction: 1.7 MCY
  - Annual maintenance: 60,000 CY
  - 20-year total: 2.5 MCY
    - Upland: 1 MCY
    - CIDMMA: 2 MCY

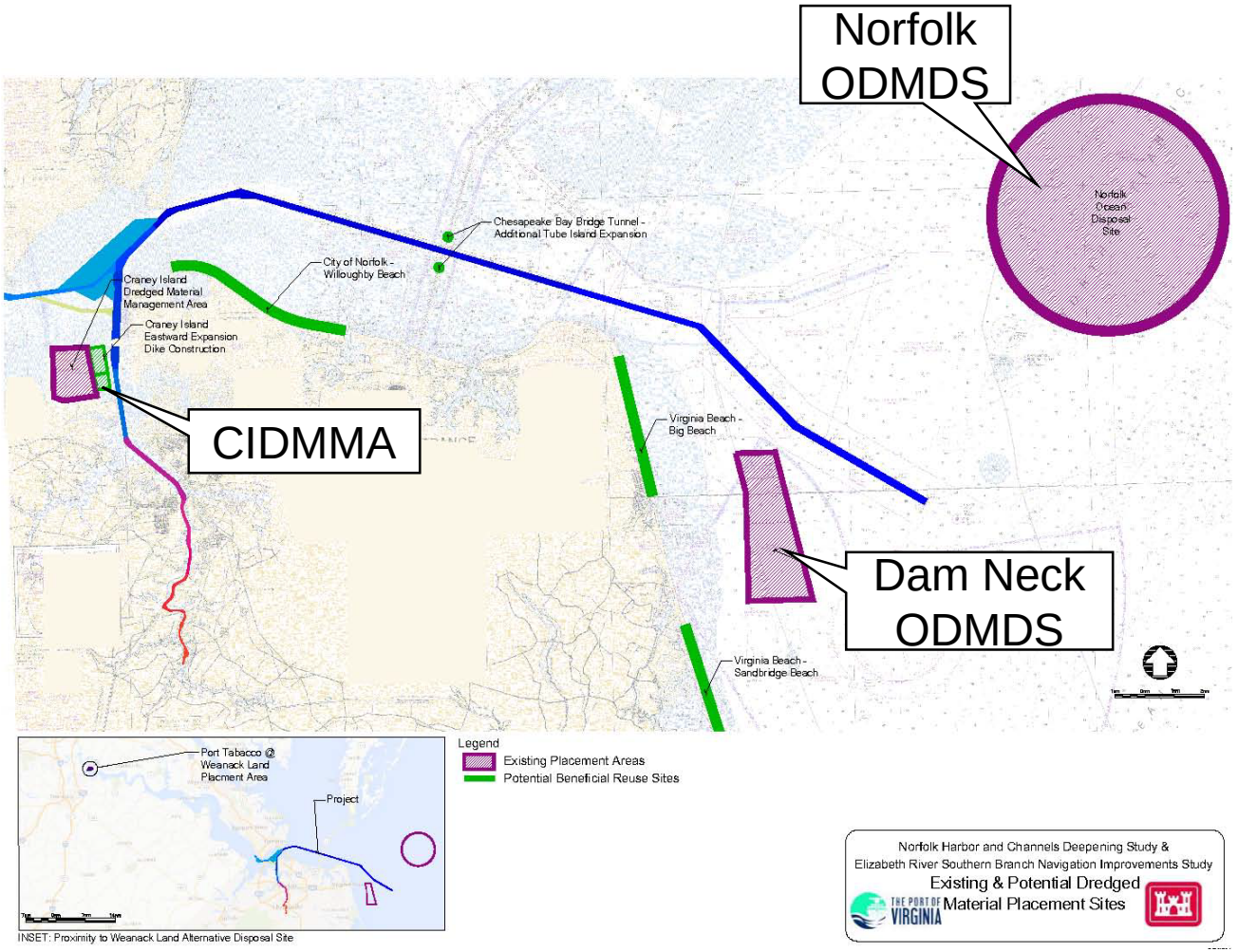
# Capacity Availability

- DMMP Based on 3 Established and Operating Placement Areas
  1. Dam Neck ODMDS
     - Initiated in 1970’s current SMMP 2009 - 2019
  2. Norfolk ODMDS
     - Initiated in 1970’s current SMMP 2009 - 2019
  3. CIDMMA
     - Feasibility Study & NEPA 1981
     - In continuous use since 1981

# Placement Areas

DMMP Exist. At Each:

- Dam Neck
- Norfolk
- CIDMMA



# Dam Neck Ocean Dredged Material Disposal Site (ODMDS)

- ~9-square Nautical Miles
- Water Depth ~40 feet
- Designed for Min 50 MCY
- SMMP allows for possible capacity expansion
- No Time of Year Restrictions

# Norfolk Ocean Dredged Material Disposal Site (ODMDS)

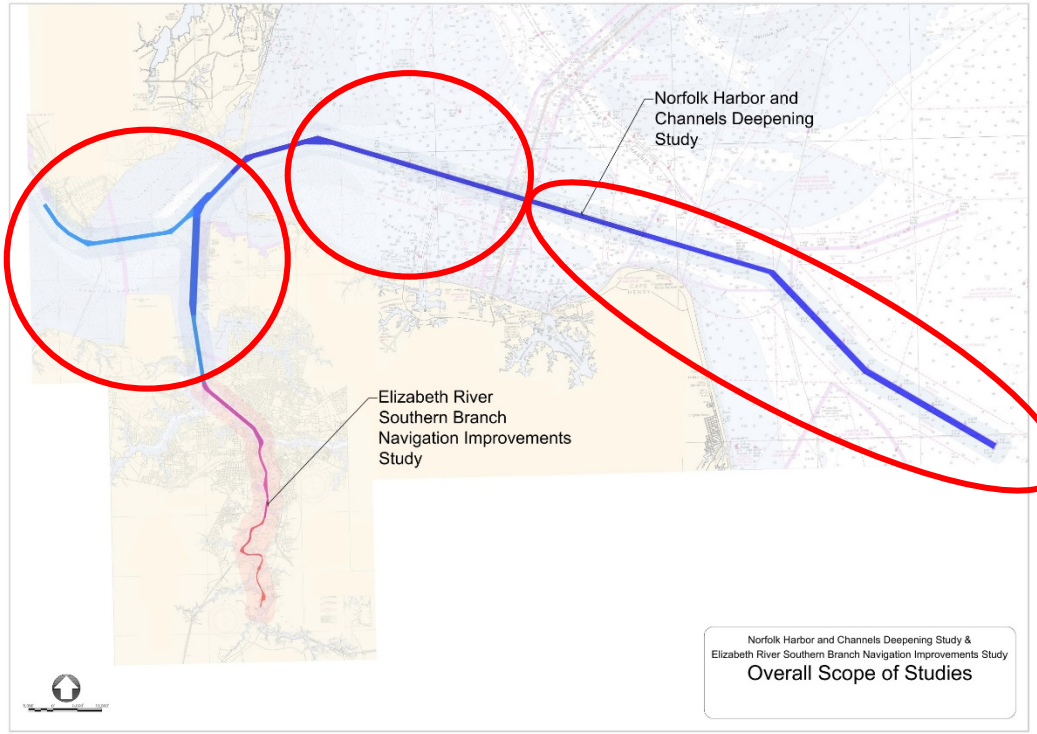
- Estimated total capacity of 1,300 MCY.
- Circle With a Radius of 4 NM (50 square NM)
- Water Depth ~43 to 85 feet
- Designed for Post-CIDMMA

# Craney Island Dredged Material Management Area Capacity

- CIDMMA, Feas Report:
  - Feas Report, Capacity ~117 MCY (2000 to 2025 )
  - Actual Inflows 2000 to 2015 ~65 MCY
  - Therefore, 117 MCY – 65 MCY = 52 MCY Capacity
  - Needs to be validated
- CIEE:
  - Adds 43 MCY to CIDMMA capacity
  - CIEE Acts as CIDMMA's 4th Cell
  - SE Cell Scheduled for early 2020
- Total CIDMMA & CIEE capacity = >95MCY

# Norfolk Harbor – Least Cost Plan

- Ocean Channels: TSC and AOC
  - Offshore Disposal
- Norfolk Harbor Reaches
  - CIDMMA



# “55-foot” NHC – Least Cost Plan

| Reach | Nominal Depth | Actual Depth | Comments | Volume, MCY | Placement Area |
|---|---|---|---|---|---|
| **Atlantic Ocean Channel** | 55 | -60 | 57' Reqd + 3' Allowable Overdepth | 6.5 | Dam Neck |
| **Thimble Shoal Channel** | 55 | -57 | 55' Reqd + 2' Allowable Overdepth | 8.2 | Dam Neck |
| **TSC Meeting Area #1** | 55 | -57 | 55' Reqd + 2' Allowable Overdepth | 8.7 | Dam Neck |
| **TSC Meeting Area #2** | 55 | -57 | 55' Reqd + 2' Allowable Overdepth | 2.6 | Dam Neck |
| **Norfolk Harbor Sewells Point to Lamberts Bend** | 55 | -57 | 55' Reqd + 2' Allowable Overdepth | 6.1 | CIDMMA |
| **Channel to Newport News** | 55 | -57 | 55' Reqd + 2' Allowable Overdepth | 2.4 | CIDMMA |
| **Anchorage F** | 55 | -57 | 55' Reqd + 2' Allowable Overdepth | 0.6 | CIDMMA |
| **Total** | | | | **35.2** | |

Summary of New Work by Placement Area:

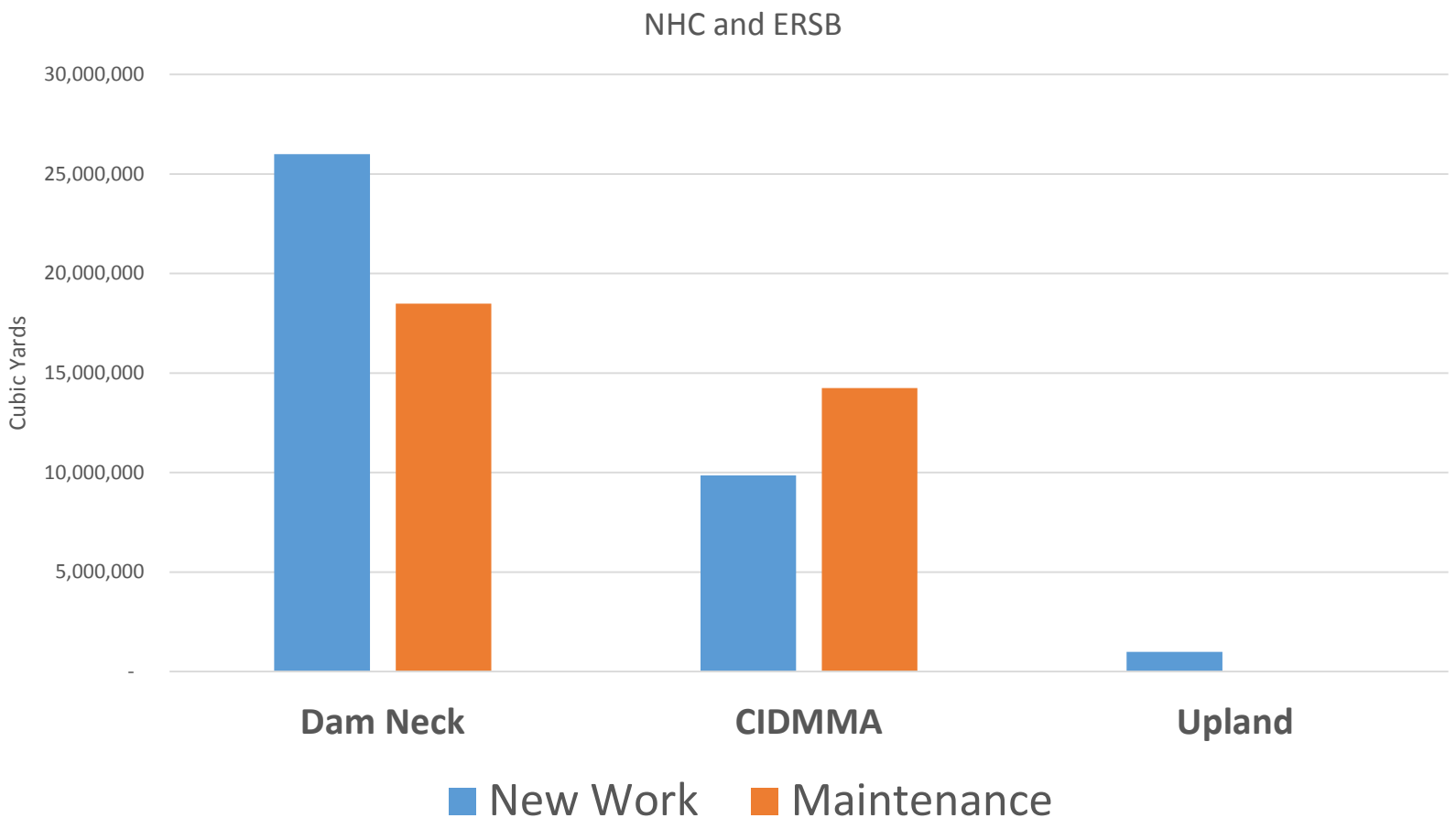
- Offshore: ~26MCY
- CIDMMA: ~9 MCY

# ERSB – Least Cost

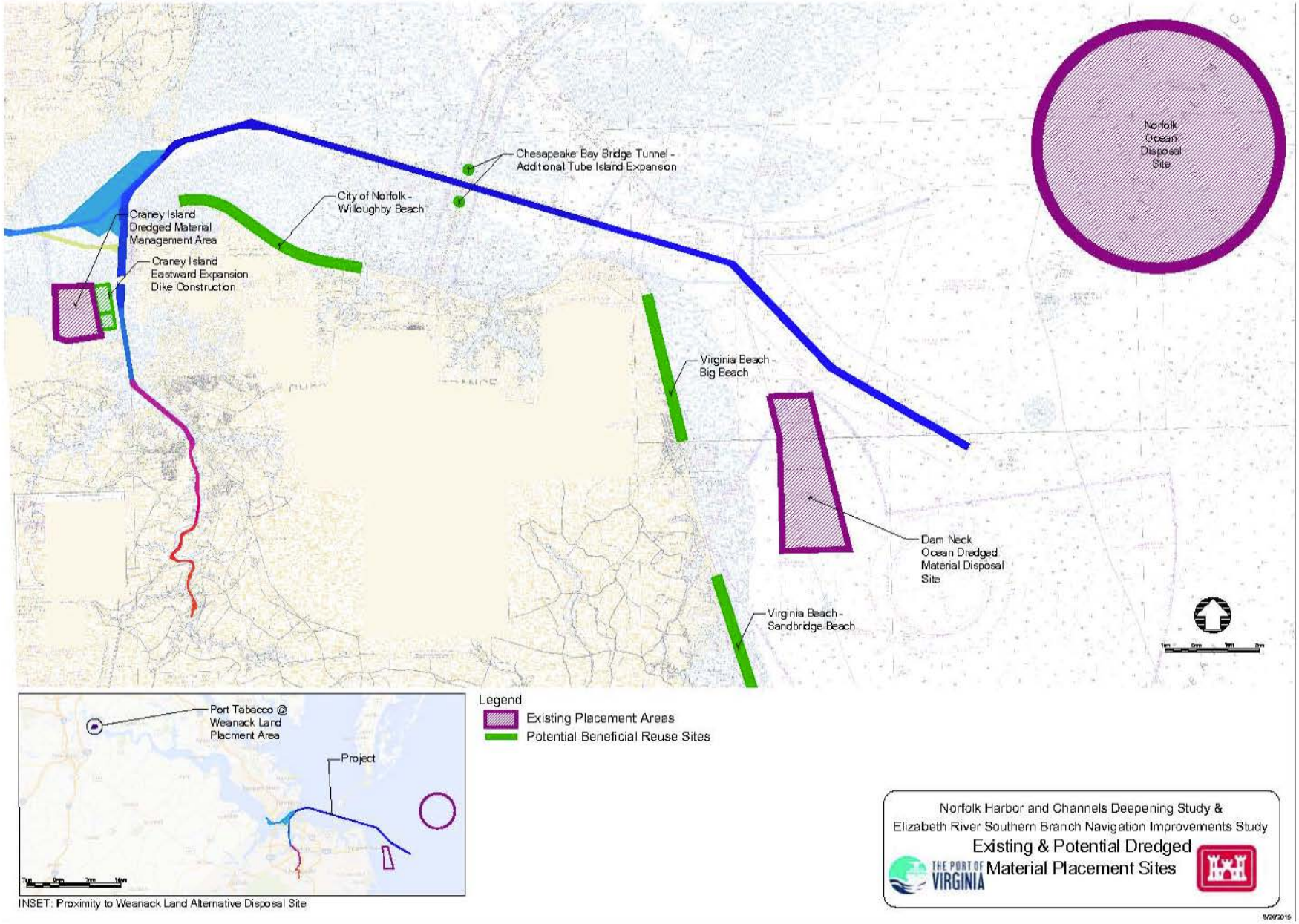
| | | Least Cost Plan | | |
|---|---|---|---|---|
| **Reach** | **Quantity (CY)** | **Placement Area** | **Unit Cost** | **Total Cost** |
| **Elizabeth River Reach (-45')** | 610,000 | CIDMMA | $6.58 | $7.7M |
| **Lower Reach (-45')** | 90,000 | CIDMMA | $11.66 | $1.1M |
| **Middle Reach (-40')** | 270,000 | Port Tobacco /Landfill | $88.48 | $23.9M |
| **Upper Reach A (to -40)*** | 726,000 | Port Tobacco /Landfill | $88.36 | $64.2M |
| **Upper Reach B (to -37)*** | 19,000 | Port Tobacco /Landfill | $103.49 | $2.0M |

* No beneficiaries – dredging unlikely

# New Work and
# 20-YR Maintenance Dredging Estimate



# Beneficial Reuse Sites



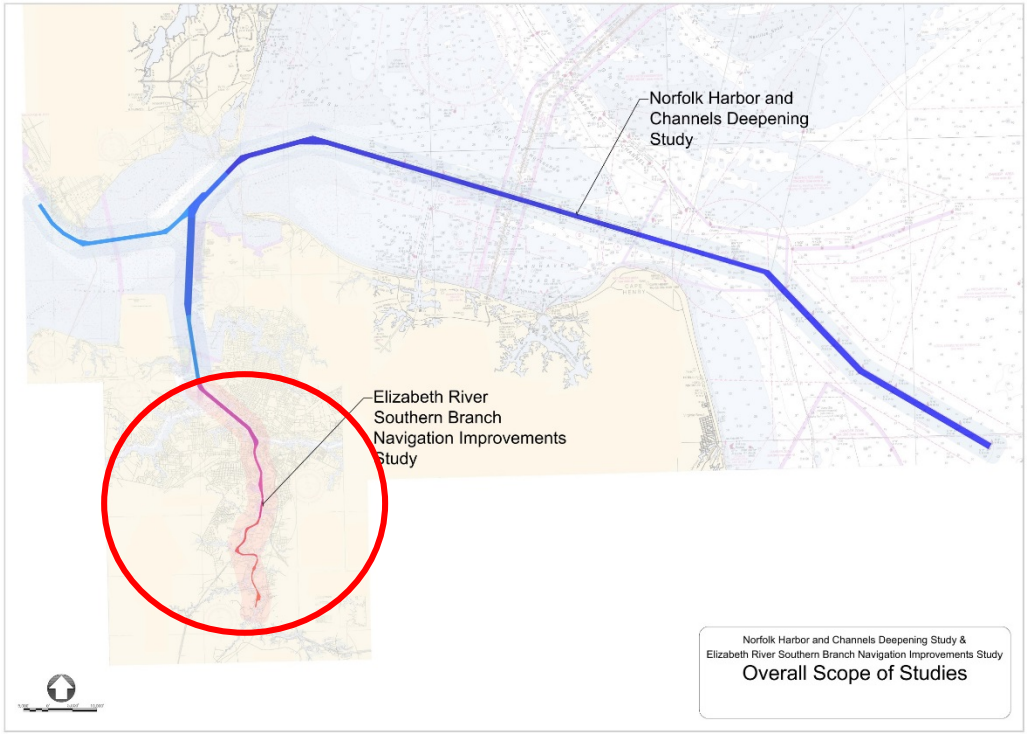
# Beneficial Reuse Sites

- NEPA Compliant
- Limited to sandy areas, including TSC (East of CBBT), AOC and TSC Meeting Area #2
- No ERSB beneficial use

| | | Least Cost Plan | | | Beneficial Use Plan | | |
|---|---|---|---|---|---|---|---|
| **Reach** | **Quantity** | **Placement Area** | **Unit Cost** | **Total Cost** | | **Unit Cost** | **Total Cost** |
| **Atlantic Ocean Channel** | 6.5 MCY | Dam Neck | $5.37 | $36.7M | Big Beach | $7.99 | $57.6M |
| **Thimble Shoal Channel East** | 1.4 MCY | Dam Neck | $7.82 | $12.1M | Willoughby | $9.36 | $15.3M |
| **TSC Meeting Area #2** | 2.6 MCY | Dam Neck | $7.36 | $20.2M | Willoughby | $8.19 | $23.4M |

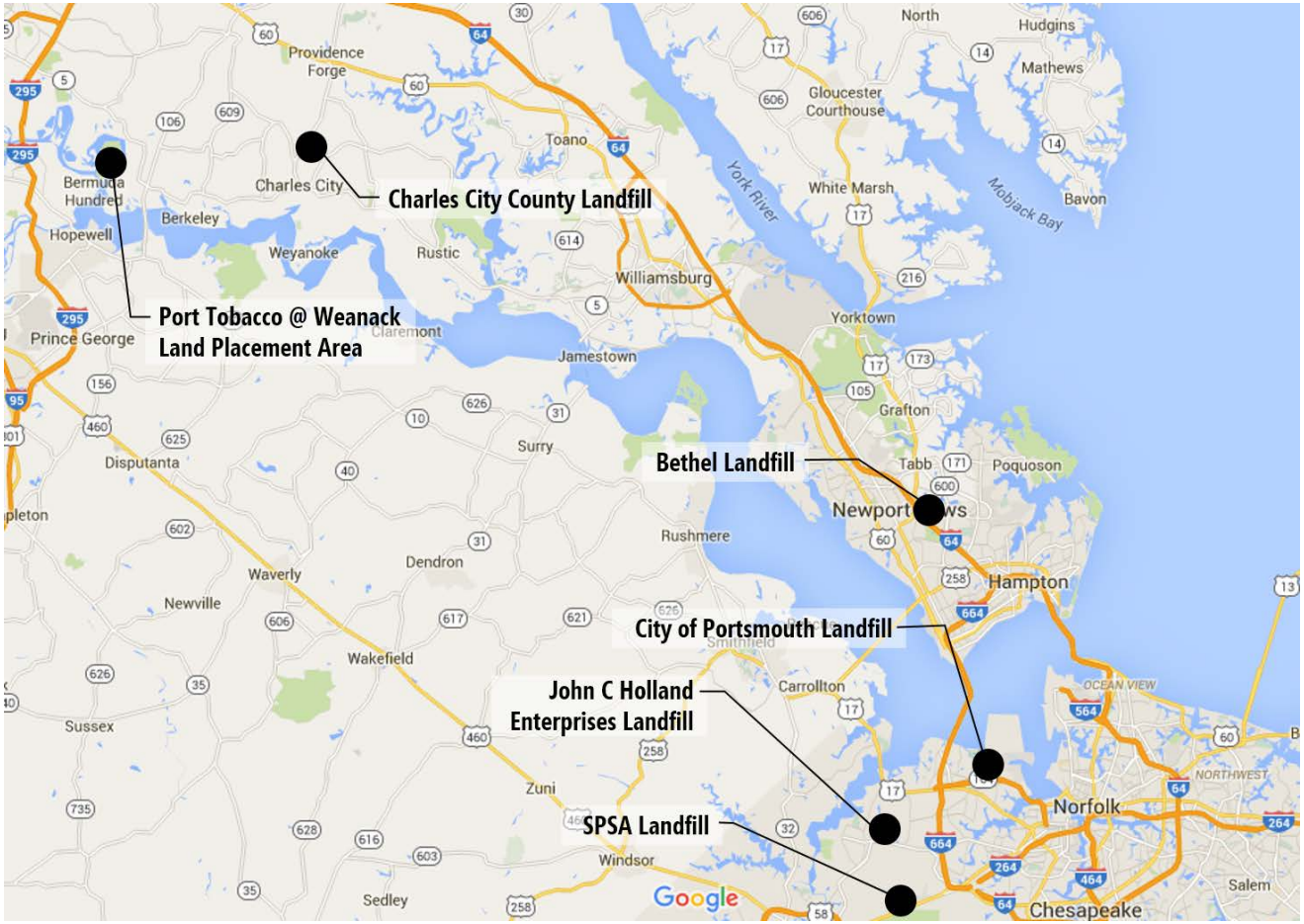
# ERSB – Some Material Unsuitable for CIDMMA

- Southern Branch
  - CIDMMA
  - Upland



# Upland Sites
# Material Unsuitable for CIDMMA

- Southern Branch



# Port Tobacco @ Weanak

- Successful track record of handling dredged material on site and transfer to Charles City County Landfill
- Current capacity to receive ~1MCY
- Expansion capacity to ~2MCY (authorized under existing permits)

# Dredged Material Placement is a Component of the GRR/EA

- Included in economic justification
- Included in agency review & consultation
- Included in public involvement
- Included in the environmental consistency determination

# DMMP Summary

- DMMP meets all requirements from ER 1105-2-110
  - Section 3.2b(8), and
  - Appendix E Section E-15
- Will be presented in the GRR/EA as a component of the Plan Formulation Appendix
- Continues existing dredged material management practices