
ENVIRONMENTAL APPENDIX

**Elizabeth River and Southern
Navigation Improvements
Draft Integrated General Reevaluation
Report and Environmental Assessment**

**Appendix F – Clean Water Act, Section
404(b) Report**

12 December 2017



**U.S. Army Corps
of Engineers
Norfolk District**



**THE PORT OF
VIRGINIA®**

**SECTION 404 (b) (1) EVALUATION
ELIZABETH RIVER AND SOUTHERN BRANCH
NAVIGATION IMPROVEMENTS, VIRGINIA**

I. INTRODUCTION

This report describes how the U.S. Army Corps of Engineers (USACE), the lead federal agency for construction and maintenance of the Elizabeth River and Southern Branch Navigation Improvements Project, will achieve full compliance with Section 404 of the Clean Water Act of 1977 (Public Law 95-217).

The 404(b)(1) guidelines in 40 CFR 230 contain the substantive criteria for evaluation of proposed discharges of dredged or fill material under Section 404. The principle behind the criteria is that no discharge of dredged or fill material is permitted that would result in unacceptable adverse effects to the aquatic ecosystem. Compliance with the guidelines is evaluated by reviewing the proposed discharge with respect to the four restrictions in 40 CFR 230.10. These restrictions state that:

- No discharge shall be permitted if there is a practicable alternative which would have less adverse impacts on the aquatic ecosystem;
- No discharge shall be permitted if it violates state water quality standards, violates toxic effluent standards or prohibitions under Section 307 of Act, or jeopardizes the continued existence of threatened or endangered species as identified under the Endangered Species Act of 1973.
- No discharge shall be permitted which will cause or contribute to the significant degradation of waters of the United States.
- No discharge shall be permitted unless appropriate and practicable steps have been taken to minimize potential adverse impacts to the aquatic ecosystem.

II. PROJECT DESCRIPTION

A. Location

The project is located in in the Commonwealth of Virginia. The Elizabeth River is situated within Norfolk Harbor adjacent the Cities of Chesapeake, Norfolk, and Portsmouth. Norfolk Harbor is located in the southeastern part of the Commonwealth of Virginia at the southern end of Chesapeake Bay, midway on the Atlantic Seaboard, approximately 170 miles south of Baltimore, Maryland, and 220 miles north of Wilmington, North Carolina. The harbor is formed by the confluence of the James, Nansemond, and Elizabeth Rivers.

The project occurs on subaqueous land, which is owned by the Commonwealth of Virginia and the Craney Island Dredged Material Management Area (CIDMMA) which is owned and operated by the USACE. A future dredged material placement site, the Craney Island Eastern Expansion (CIEE) will be initially owned and operated by the USACE. The Virginia Marine Resources Commission manages state-owned subaqueous lands in Virginia. Dredged material may also be rehandled and disposed of at approved offsite facilities.

The project area can be divided up into three channel segments: Segment 1, Segment 2, and Segment 3.

Segment 1

The authorized project dimensions for this channel segment include a channel 45 feet deep and 750 feet wide from Lamberts Bend to the junction of the Southern and Eastern branches; thence 45 feet deep and 450 feet wide in the Southern Branch to the Norfolk & Portsmouth Beltline Railroad; including an approach and turning area 45 feet deep opposite the Norfolk Naval Shipyard; thence 45 feet deep and 375 feet wide to the Norfolk Southern Lift Bridge. The USACE maintained this segment to a required depth of 40 feet under a previous project authorization. However, the Navy has already dredged and plans to maintain a portion of Segment 1, from Lamberts Bend to the Norfolk Naval Shipyard (NNSY). Specifically, for a length of three miles, it has dredged a 600-foot-width of the 750-foot width of federal channel from Lambert's Bend to the confluence of the Eastern and Southern Branches (the Elizabeth River Reach). From thence, for a length 2.0 miles, it has dredged a width of 450 feet, in keeping with the existing channel width, terminating at the NNSY (Southern Branch Lower Reach). The channel segment is maintained to a depth of 47 feet Mean Lower Low Water (MLLW) from Lamberts Point to the NNSY. Material is dredged from this area via a hydraulic cutterhead pipeline dredge and/or a clamshell dredge. This channel segment is divided into Segment 1a (north of the Perdue facility) and Segment 1b that portion of the federal channel south of Perdue.

Segment 2

This channel segment is authorized to a depth of 40 feet, and maintained to a required depth of 35 feet deep, and between 250 feet to 500 feet wide from the Norfolk Southern Lift Bridge to the Gilmerton Bridge. There is a turning basin at the mouth of St. Julians Creek, 40 feet deep, 400 to 600 feet long, and 800 feet wide; a turning basin not yet constructed at the mouth of Milldam Creek, 40 feet deep and 800 feet square. Material is dredged via hydraulic cutterhead pipeline dredge and/or clamshell dredge.

Segment 3

This channel segment is authorized to a depth of 35 feet and maintained to a required depth of 35 feet and maintained to a 250 to 300 feet width from the Gilmerton Bridge to the Chesapeake Extension and includes the Mains Creek Turning Basin. Material is dredged via hydraulic cutterhead pipeline dredge and/or clamshell dredge.

B. Description of Proposed Work

The Preferred Alternative (Alternative 3) is to hydraulically and/or mechanically dredge Segment 1a to a required depth of 45 feet MLLW, Segment 1b to a required depth of 42 feet MLLW, Segment 2 to a required depth of 39 feet MLLW, and to maintain existing channel depths in Segment 3 to a required depth of 35 feet MLLW. Required depths do not necessarily indicate the maximum, potential dredging depths which may also include Advanced Maintenance Dredging (1 foot), Paid Allowable Overdepth Dredging (2 feet), and Non-Pay Allowable Overdepth dredging (2 feet). Also, there is a potential for contaminated sediments in some portions of Segment 1 and within Segment 2, therefore, additional removal of contaminated sediments may be needed as well.

Prior to commencement of construction, dredged material will undergo evaluation procedures including chemical and biological testing in accordance with federal guidance and regulations to provide information to reach a factual determination concerning Clean Water Act, Section 404 requirements (40 CFR 230.11) and applicable state water quality standards. During construction effluent discharged from the CIDMMA will be managed in accordance with Commander's Policy WRD-01 to maximize the retention of suspended solids minimizing migration of contaminants through the effluent pathway beyond the boundaries of the disposal site.

Sediment testing for contaminants of concern and the extent of contamination will be conducted during the Preconstruction, Engineering, and Design Phase of the project. Dredging within the Elizabeth River and Southern Branch Navigation Improvements Project is anticipated to generate dredged material with contamination from Segment 1 and within Segment 2 that exceeds the acceptance criteria of CIDMMA. Contaminated dredged material will need to be disposed of at an approved upland site(s). Potential upland disposal sites for contaminated material may include, but are not limited to, the following:

- Charles City County Landfill
- CFS, Tri-City Regional Landfill & Recycling Center
- John C. Holland Enterprises Landfill
- Southeastern Public Service Authority (SPSA) Regional Landfill
- Portsmouth City Craney Island Landfill
- Bethel Landfill
- King and Queen Sanitary Landfill

Additionally, the following soil processing services could include the following:

- Port Tobacco/Weanack Land, LLC (also can accept some dredged material)
- Clearfield MMG, Inc. Soil Recycling

Material is transported to the placement site by pipeline if hydraulically dredged or by scow/barge if mechanically dredged. Hydraulically dredged material is conveyed directly to upland containment cells. Scow/barges may be bottom dumped in the Craney Island Rehandling Basin or directly pumped out into a containment cell at CIDMMA.

Discharge of return flow (effluent and surface runoff) from a confined disposal facility, such as the CIDMMA, to waters of the United States is specifically defined as a dredged material discharge under the Clean Water Act. Dredged material testing is performed to determine its suitability for placement at CIDMMA and to assist with making factual determinations regarding the effect of the dredged material discharge on the aquatic ecosystem and compliance with 404(b)(1) Guidelines. Dredged material testing is performed in accordance with the Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. – Testing Manual, Inland Testing Manual (U.S. Environmental Protection Agency (USEPA) 1998), USACE Manual, Evaluation of Dredged Material Proposed for Disposal at Island, Nearshore, or Upland Confined Disposal Facilities – Testing

Manual (2003); and the USACE (2013) Commander's Policy Memorandum WRD-01 Deposition of Dredged Material and Use of the Craney Island Dredged Material Management Area, Norfolk Harbor, Virginia.

Where environmental contaminants occur in the sediment, specialized mechanical, clamshell buckets designed to contain the dredged material would be used to prevent dispersion of contaminated dredged material.

Dredged material meeting sediment testing requirements for placement at the CIDMMA would be placed in the CIRB or directly in one of the containment cells at CIDMMA. Material would be transported to the placement site by hydraulic pipeline if hydraulically dredged or by barge/scow if mechanically dredged to be bottom dumped in CIRB or directly pumped out into a containment cell at CIDMMA. In the future, after the completion of the construction of the CIEE, some of the dredged material may be placed in this site as well.

On the west side of the CIDMMA, each containment area has two primary spillways, each with four, 36-inch diameter outlet pipes. The pipes discharge effluent from the CIDMMA into the Hampton Roads. The east side is higher in elevation, where material flows downslope to the west, depositing the heaviest particles first. The spillways allow the release of water after the sediments from the dredged material have settled out. In general, under typical pumping operations, it can take up to five days to reach a working pool level with three feet of freeboard. Spillway stop-logs (boards) are used to control water levels during dredged material placement operations. Dredged material placed at CIDMMA is evaluated to determine compliance with CWA Section 404(b)(1) and CIDMMA facility requirements prior to commencement of dredging activities. During dredged material placement operations the effluent (dredged material discharge to waters of the U.S.) is monitored to ensure only clarified effluent is released. The effluent is visually inspected a minimum of six times per day at each operating spillway, approximately once every four hours. If at any time it is visually apparent that effluent other than clarified water is being released from CIDMMA, the effluent Total Suspended Solids is sampled and then immediate action is taken at the spillway to reduce the amount of suspended solids in the effluent by increasing the water retention time. Total suspended solids testing in effluent are conducted at a minimum twice daily, approximately every 12-hours at each operating spillway. The testing is to ensure that dredged material placement operations are conducted in a manner to confine solids to the placement site to the maximum extent practicable in accordance with the Commander's Policy WRD-01 for operation of the CIDMMA.

Maintenance of the Proposed Project would occur over a 50-year project timeline. Dredged material discharges will occur during and following dredged material placement operations at the CIDMMA and at the CIRB. Construction of the entire project could take up to approximately three years and effluent discharges would occur intermittently as needed during this time. Following construction, maintenance of the channels will vary depending on shoaling rates and may occur approximately annually to every three to five years. Effluent discharge durations will occur for approximately three to six months and may occur intermittently throughout the maintenance cycles.

The project construction is anticipated to begin in 2023 but would be contingent on the availability of federal and non-federal sponsor funding.

C. Authority and Purpose

Section 201 of the Water Resources Development Act (WRDA) of 1986 (Public Law 99-662) authorized the construction of the 55-foot Norfolk Harbor and Channels, Virginia, Project, as described in House Document 99-85, dated July 18, 1985, entitled “Norfolk Harbor and Channels, Virginia.” The authority states, as follows:

“The project for navigation, Norfolk Harbor and Channels, Virginia: Report of the Chief of Engineers, dated November 20, 1981, at a total cost of \$551,000,000, with an estimated first Federal cost of \$256,000,000 and an estimated first non-Federal cost of \$295,000,000, including such modifications as the Secretary determines to be necessary and appropriate for mitigation of any damage to fish and wildlife resources resulting from construction, operation, and maintenance of each segment of the proposed project. The Secretary, in conjunction with appropriate Federal, State, and local agencies, shall study the effects that construction, operation, and maintenance of each segment of the proposed project will have on fish and wildlife resources and the need for mitigation of any damage to such resources resulting from such construction, operation, and maintenance.”

D. Description of Material

1. **General Characteristics of Proposed Fill Material** – Dredged material is composed of a heterogenous mixture of silt, clay, and sand.
2. **Quantities of Fill Material** – No fill of wetlands would occur with implementation of the Preferred Alternative.
3. **Source of Material** – The Norfolk Harbor and Channels, from Lambert’s Point on the main branch of the Elizabeth River to the Norfolk Southern Lift Bridge on the Southern Branch of the Elizabeth River (Segment 1 that consists of Segment 1a and 1b), the reach of the Southern Branch of the Elizabeth River Channel (Segment 2), that extends from the Norfolk Southern Lift Bridge to the Gilmerton Bridge, and the reach of the Southern Branch of the Elizabeth River that extends from the Gilmerton Bridge to the Chesapeake Extension and includes the Mains Creek Turning Basin (Segment 3).

E. Description of Proposed Discharge Sites

1. **Location of the Sites** – The Craney Island Rehandling Basin discharge site is located in the Elizabeth River. The CIDMMA containment cells discharge through spillways to the Hampton Roads.

2. **Size of Wetland Sites** – No jurisdictional wetlands are located in the CIRB or at the CIDMMA effluent discharge sites; tidal wetlands occur along some portions of the shoreline adjacent to the federal channel.
3. **Type of Aquatic Resources** – a variety of benthic fauna such as sponges, sea squirts, sea stars, and barnacles and infauna that burrow into bottom sediments such as worms (primarily polychaetes and nematodes), clams, and other tunneling organisms have the potential to occur at the CIDMMA effluent discharge sites.
4. **Timing and Duration of Discharge** – Dredged material discharges will occur during and following dredged material placement operations at the CIDMMA and at the CIRB. Construction of the entire project could take up to approximately three years and effluent discharges would occur intermittently as needed during this time. Following construction, maintenance of the channels will vary depending on shoaling rates and may occur approximately annually to every three to five years. Effluent discharge durations will occur for approximately three to six months and may occur intermittently throughout the maintenance cycles.

F. Description of Disposal Method

Dredging- Dredged material that meets suitability criteria is planned for placement at the CIDMMA. Dredging within the Elizabeth River Southern Branch Navigation Improvements Project Area is anticipated to generate material with contamination within portions of Segment 1 and within Segment 2 that exceeds the acceptance criteria of CIDMMA. Contaminated dredged material will need to be disposed of at an approved upland site(s). An engineered cap may be required to be installed after contamination removal to isolate the location from the environment. In some areas where warranted, contaminated material may be completely removed to depth in accordance with USACE policy (PGL NO. 49, 28 Jan. 1998; Section 312, WRDA 90 as amended) if economically justified based on future operation and maintenance costs savings for dredging and disposal of dredged material from the project.

Potential upland disposal sites for contaminated material may include, but are not limited to, the following:

- Charles City County Landfill
- CFS, Tri-City Regional Landfill & Recycling Center
- John C. Holland Enterprises Landfill
- Southeastern Public Service Authority (SPSA) Regional Landfill
- Portsmouth City Craney Island Landfill
- Bethel Landfill
- King and Queen Sanitary Landfill

Additionally, the following soil processing services may include, but are not limited to, the following:

- Port Tobacco/Weanack Land, LLC (also can accept some dredged material)
- Clearfield MMG, Inc. Soil Recycling

III. FACTUAL DETERMINATIONS

A. Physical Substrate Determination

1. Substrate Elevation and Slope

The elevation of the CIDMMA effluent discharge site consists of a shallow area with gradual sloping. Wetlands that occur along the shoreline flanking the federal navigation channel and along the CIDMMA shoreline are located in shallow elevations with gradual slopes.

2. Comparison of Fill Material and Substrates at Discharge Sites

The substrate at the CIDMMA effluent discharge site would be similar in composition to the material dredged from the federal navigation channel. However, there will be some variability in the percentage of sand, silt, and clay with the dredged material as compared to the substrate at the effluent discharge site.

3. Dredged/Fill Material Movement

No expected movement will take place. Dredged Material will be placed in an upland containment cell and will not mix with substrate.

4. Physical Effects on Benthos

No anticipated effects to benthos are anticipated from clarified effluent discharges from the CIDMMA. Effluent discharges will be visually monitored and tested for Total Suspended Solid concentrations. Any effects from the discharge of clarified effluent containing concentrations of total suspended solids and turbidity are expected to be localized and temporary in nature and will have negligible to minor effects to water quality.

5. Erosion and Accretion Patterns

No expected changes to erosion or accretion patterns will result from this project.

6. Actions Taken to Minimize Impacts.

Actions will comply with the Commonwealth of Virginia water quality standards and Commanders Policy WRD-01 which governs operation of CIDMMA. Prior to commencement of construction, dredged material will undergo evaluation procedures including chemical and biological testing in accordance with federal guidance and regulations to provide information to reach a factual determination concerning Clean Water Act, Section 404 requirements (40 CFR 230.11) and applicable state water quality standards. During construction effluent discharged from the CIDMMA will be managed in accordance with Commander's Policy WRD-01 to maximize the retention of suspended solids minimizing migration of contaminants through the effluent pathway beyond the boundaries of the disposal site. Historically, effluent water quality studies have reported average total suspended solids concentrations of 95 mg/L or less.

To facilitate water quality management, each containment area within the CIDMMA has two primary spillways.

These facilities allow for the removal of the solids from the discharge water and is anticipated to result in the discharge of clarified effluent that has temporary, negligible to minor impacts to water quality resulting from increased concentrations of total suspended solids and turbidity.

B. Water Circulation, Fluctuation, and Salinity Determinations.

1. Water

No significant changes in the clarity, color, and quality of the Elizabeth River are anticipated at the effluent discharge point.

- a. **Salinity** – No effect to salinity is anticipated from the discharges.
- b. **Water Chemistry** – No effect to water chemistry is anticipated from the discharges.
- c. **Clarity** – Increased Total Suspended Solids and turbidity at the discharge sites would result in localized and temporary impacts to water quality that are negligible to minor.
- d. **Color** – No anticipated effect to water color is anticipated from the discharges.
- e. **Odor** – No anticipated effect to odor levels from the discharges.
- f. **Taste** – No anticipated effect.
- g. **Dissolved Gas Levels** – No anticipated effect to dissolved gas levels is anticipated from the discharges.
- h. **Nutrients** – No anticipated effect to nutrient concentrations are anticipated at from the discharges.
- i. **Eutrophication** – No eutrophication within the Elizabeth River is anticipated from the discharges.

2. Current Patterns and Circulation.

- a. **Current Patterns and Flow** – No effects are anticipated from the discharges.
- b. **Velocity** – No effects are anticipated from the discharges.
- c. **Stratification** – No effects are anticipated from the discharges.

- d. **Hydrologic Regime** – No effects are anticipated from the discharges.
- e. **Aquifer Recharge** – No effects are anticipated from the discharges.
- 3. **Normal Water Level Fluctuations** – No effects are anticipated from the discharges.
- 4. **Salinity Gradients** – No effects are anticipated from the discharges.
- 5. **Actions that will be taken to minimize impacts** – None necessary as no effects from the discharges are anticipated.

C. Suspended Particulate/Turbidity Determinations.

- 1. **Suspended particulates and turbidity level**

Localized and temporary adverse effects to water quality from increased Total Suspended Solids and turbidity are anticipated from the CIRB and CIDMMA effluent discharge sites. Total Suspended Solids and turbidity levels will quickly return to ambient conditions after discrete discharges from scows/barges in the CIRB and from CIDMMA effluent discharges after consideration of disposal site dilution and dispersion.
- 2. **Effects on chemical and physical properties of the water column**
 - a. **Light Penetration** – Any effect to light penetration from increased Total Suspended Solids and turbidity resulting from effluent discharges would result in a temporary, negligible to minor impact.
 - b. **Dissolved Oxygen** – No effect to Dissolved Oxygen levels are anticipated from the discharges.
 - c. **Toxic Metals and Organics** – To determine whether dredged material is suitable for placement at CIDMMA, or will be required to be disposed at an approved upland disposal facility, dredged material is tested for contaminants in accordance with the Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S.- Testing Manual, Inland Testing Manual (USEPA 1998), USACE Manual, Evaluation of Dredged Material Proposed for Disposal at Island, Nearshore, or Upland Confined Disposal Facilities – Testing Manual (2003); and the USACE (2013) Commander's Policy Memorandum WRD-01 Deposition of Dredged Material and Use of the Craney Island Dredged Material Management Area, Norfolk Harbor, Virginia. Therefore, sediments containing toxic metals and organics that exceed acceptance or water quality standards will not be placed at the CIDMMA. Therefore, the discharges will not result in the release of unacceptable levels of chemical contaminants to the Craney Island Rehandling Basin or the Hampton Roads.

- d. **Pathogens** – No anticipated pathogens will be released from the discharges.
- e. **Aesthetics** – Discharges are not anticipated to effect water column aesthetics other than increased Total Suspended Solids and turbidity that will have a temporary, negligible to minor impact on water quality.

3. **Effects on Biota**

- a. **Primary Production, Photosynthesis** – There are no anticipated effects to primary producers from the discharges.
- b. **Suspension/Filter Feeders** – There are no anticipated effects to suspension/filter feeders from the discharges.
- c. **Sight Feeders** - There are no anticipated effects to sight feeders from the discharges.

4. **Action to Minimize Impacts.**

Dredged material will be tested and the data used to make factual determinations with regard to dredged material discharge requirements of CWA, Section 404, CIDMMA facility requirements, and applicable state water quality standards. Effluent discharged from the CIDMMA will be monitored for Total Suspended Solids consistent with Commanders Policy WRD-01 (USACE 2013) to ensure the release of clarified effluent only. Previous water quality monitoring from the CIDMMA effluent discharge sites have reported average Total Suspended Solids concentrations of 95 mg/L or less. Contaminated sediments that dredged material testing indicates will not comply with CWA, Section 404(b)1, CIDMMA facility requirements, or state water quality standards may be managed with additional engineering processes to ensure sediment and associated sediment pore water retained in the dredging process will comply with the guidelines, standards, and alternate disposal facility requirements.

D. **Contaminant Determination**

1. **Evaluation of the Biological Availability of Possible Contaminants in the Fill Material**

a. **Physical Characteristics of the Fill Material**

The dredged material is composed of a heterogeneous mixture of silt, clay, and sand.

b. **Hydrography in Relation to Known or Suspected Sources of Contamination** – The Elizabeth River is considered one of the most impacted regions in the Chesapeake Bay watershed in terms of water quality and bottom sediment composition. The river receives a wide variety of point and non-point source loadings from its 300-square-mile drainage area, where approximately one-half

million people reside. Impacts from point and non-point source loadings are exacerbated by the relatively poor flushing characteristics caused by low freshwater input and relatively weak tidal currents. There is a history of industrial chemical contamination that has occurred within Segment 1 and Segment 2. Key contaminants of concern known to occur in this area consist of Polyaromatic Hydrocarbons (PAHs), Total Petroleum Hydrocarbons (TPHs), polychlorinated biphenyls (PCBs), and heavy metals (Fugro Consultants, Inc. 2016). Please refer to the Integrated General Reevaluation Report/ Environmental Assessment (GRR/EA) for a more detailed analysis of sources of contamination.

- c. **Results from Previous Testing of the Material or Similar Material in the Vicinity of the Project** – A substantive number of geotechnical and environmental sediment sampling studies have been conducted in portions of the Elizabeth River, including the Southern Branch, and provide data on the type and extent of chemical contamination within portions of the sediment profile within the ROI. A report compiled by Fugro Consultants, Inc. (2016) summarized existing subsurface geotechnical and environmental data based on data from the Fugro Consultants, Inc. Hampton Roads Database and a literature search where they collected and synthesized additional bathymetry and geotechnical data. These data are from samples collected within and adjacent to the ROI and include results from both federal and private investigations (Fugro Consultants, Inc. 2016). From these sources, a total of 352 analyses were identified to occur in the channel or in the vicinity of the channel and incorporated into the Fugro Consultants, Inc. Report (2016). This included 311 vibracores/gravity cores, 38 marine borings, and three cone penetrometer tests (Fugro Consultants, Inc. 2016). Based on this data compilation, key contaminants of concern known to occur within Segment 1 and Segment 2 consist of PAHs, TPHs, PCBs, and heavy metals (Fugro Consultants, Inc. 2016).
- d. **Known, Substantive Sources of Persistent Pesticides from Land Runoff or Percolation** – Tributyltin as high as 70 times the state standard occurs in the Southern Branch of the Elizabeth River, which flows past shipyards and industrial sites in Chesapeake and Portsmouth.
- e. **Spill Records for Petroleum Products or Designated Hazardous Substances** – The DEQ VEGIS database was searched for records of petroleum releases. There were records of spill that occurred within the Elizabeth River.
- f. **Other Public Records of Significant Introduction of Contaminants from Industries, Municipalities or Other Sources**
The DEQ VEGIS database was searched and records have been

found that indicated that introduction of chemical contaminants from industries, municipalities or other sources.

- g. Known Existence of Substantial Deposits of Substances Which Could Be Released in Harmful Quantities by Man-Induced Discharges** – Dredging within the Elizabeth River Southern Branch Navigation Improvements Project Area is anticipated to generate material with chemical contamination within portions of Segment 1 and within Segment 2 that exceed Clean Water Act Section 404(b)(1) requirements and the acceptance criteria of CIDMMA. Contaminated dredged material that is unsuitable for placement at CIDMMA will need to be managed with an engineered process to ensure compliance of dredged discharges and disposal at approved upland site(s). Please refer to the Integrated GRR/EA for a detailed description of potential contaminants of concern in Segment 1 and Segment 2 within the project area.

- 2. Contaminant Determination**

To determine whether dredged material is suitable for placement at CIDMMA, or will be required to be disposed at an approved upland disposal facility, dredged material is tested for contaminants in accordance with the Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S.- Testing Manual, Inland Testing Manual (USEPA 1998), USACE Manual, Evaluation of Dredged Material Proposed for Disposal at Island, Nearshore, or Upland Confined Disposal Facilities – Testing Manual (2003); and the USACE (2013) Commander's Policy Memorandum WRD-01 Deposition of Dredged Material and Use of the Craney Island Dredged Material Management Area, Norfolk Harbor, Virginia.

- E. Aquatic Ecosystem and Organism Determinations**

- 1. Effects on Plankton**

No impacts to plankton are anticipated from the CIRB or CIDMMA effluent discharges.

- 2. Effects on Benthos**

No impacts to benthos are anticipated from the CIRB or CIDMMA effluent discharges.

- 3. Effects on Nekton**

No impacts to nekton are anticipated from the CIRB or CIDMMA effluent discharges.

- 4. Effects on Aquatic Food Web**

No impacts to the aquatic food web are anticipated from the CIRB or CIDMMA effluent discharges.

- 5. Effects on Special Aquatic Sites**

- a. **Sanctuaries and Refuges** – No sanctuaries or refuges will be impacted from the CIDMMA effluent discharges.
- b. **Wetlands** – **There are no anticipated direct impacts to wetlands.** There may be some potential, negligible slumping of marsh shoreline; however, we do not anticipate that this would reduce the existing wetland acreage or impact wetland function. No wetland mitigation would be required.
- c. **Mudflats** – There are no anticipated direct impacts to mudflats. There may be some potential, negligible slumping of marsh shoreline; however, we do not anticipate that this would reduce the existing mudflat acreage or impact mudflat function. No mudflat mitigation would be required.
- d. **Vegetated Shallows** – There may be some potential, negligible slumping of marsh shoreline; however, we do not anticipate that this would reduce the existing wetland acreage or impact wetland function. No wetland mitigation would be required.
- e. **Riffle and Pool Complexes** - No impacts to riffle or pool complexes will occur; the project does not affect any streams.

6. Effects on Threatened and Endangered Species

Federally listed species that have the potential to occur in the project area are provided below in Table 1 (A Bald Eagle Act Determination is provided as well). Implementation of the Preferred Alternative is not anticipated to adversely affect federally listed species. A summary of impacts resulting from overall project implemented is provided in Table 1. However, discharge of dredged material to the CIRB and discharges of effluent from the CIDMMA are not anticipated to cause any adverse effects to federally listed species. Although there is designated critical habitat for some of the listed species in Table 1, no designated critical habitat occurs in the Action Area for this project.

Table 1. Species Conclusion Table.

Species/Resource Name	Conclusion	Notes/Documentation
Piping plover and red knot	May Affect, Not Likely to Adversely Affect	The project may slightly impact flight and foraging behaviors but would have a negligible to minor impact.
Atlantic sturgeon	May Affect, Not Likely to Adversely Affect	Because of the slow speed of the dredging vessels and dredging equipment, collisions would be unlikely. Dredging may impact prey species and cause sturgeon to leave the

Species/Resource Name	Conclusion	Notes/Documentation
		Action Area from the dredging turbidity plume and noise. However, dredging is not anticipated to substantially affect any foraging behaviors.
Shortnose sturgeon	May Affect, Not Likely to Adversely Affect	Species would not likely occur in the Action Area. Effects would be discountable.
Blue whale, north Atlantic right whale, and sperm whale	May Affect, Not Likely to Adversely Affect	These species would not likely occur in the Action Area. Effects would be discountable.
Fin whale and sei whale	May Affect, Not Likely to Adversely Affect	Whales would be a rare occurrence in the Action Area. Because of the slow speed of the dredging vessels and dredging equipment, collisions would be unlikely. Dredging may temporarily impact prey species and cause whales to leave the Action Area from the dredging turbidity plume and noise disturbances. However, dredging is not anticipated to substantially affect any foraging behaviors.
West Indian manatee	May Affect, Not Likely to Adversely Affect	Manatees would be transient species and would not likely occur in the Action Area. Effects would be discountable.
Northern long-eared bat	No Effect	There no suitable foraging or roosting habitat in the Action Area. There is no hibernacula in the ROI. The project would not affect flights if they occur in this area.
Hawksbill sea turtle and leatherback sea turtle	May Affect, Not Likely to Adversely Affect	These species would not likely occur in the Action Area. Effects would be discountable.
Sea turtles: green, Kemp's Ridley, leatherback, and loggerhead	May Affect, Not Likely to Adversely Affect	Because there is no hopper dredging in the Action Area, turtle entrainment would not be anticipated. Dredging may temporarily impact prey species and cause sea turtles, if present, to leave the Action Area from the dredging turbidity plume and disturbance. However, dredging

Species/Resource Name	Conclusion	Notes/Documentation
		would not substantively affect any foraging behaviors. Collisions with dredging vessels or dredging equipment would be unlikely. No nesting occurs in the Action Area.
Bald eagle	Unlikely to disturb nesting bald eagles. Does not intersect with eagle concentration area.	No bald eagle nests exist within the Action Area or within three miles of the CIDMMA.
Candidate species	No effect; No species present.	

7. Effects on Other Wildlife

No impacts to wildlife are anticipated from the CIRB or CIDMMA effluent discharges or from the negligible slumping that could occur to shoreline wetlands.

8. Actions to Minimize Impacts

Dredged material will be tested and the data used to make factual determinations with regard to dredged material discharge requirements of CWA, Section 404, CIDMMA facility requirements, and applicable state water quality standards. Effluent discharged from the CIDMMA will be monitored for Total Suspended Solids consistent with Commander’s Policy WRD-01 (USACE 2013) to ensure the release of clarified effluent only. Contaminated sediments that dredged material testing indicates will not comply with CWA, Section 404(b)1, CIDMMA facility requirements, or state water quality standards may be managed with additional engineering processes to ensure sediment and associated sediment pore water retained in the dredging process will comply with the guidelines, standards, and alternate disposal facility requirements.

F. Proposed Disposal Site Determinations

1. Mixing Zone Determination

- a. **Depth of Water at the Disposal Site** – CIRB depths may range between 10 feet MLLW and 42 feet MLLW. The depth of the CIDMMA effluent discharge site ranges from approximately 3 feet MLLW to 6 feet MLLW.
- b. **Current Velocity** – Variable, the velocity within the Elizabeth River, Hampton Roads, lower Chesapeake Bay, and Atlantic Ocean is dependent on the tides.

- c. **Degree of Turbulence** – Negligible
- d. **Water Column Stratification** – Negligible
- e. **Discharge Vessel Speed and Direction** – Slow, wake speeds are typical of vessel traversing this area.
- f. **Rate of Discharge** – Dredged material placed by hydraulic method may not exceed a rate of 22,500 cubic yards in a 24-hour period. The user may request higher production rates if it can be demonstrated or determined that effluent water quality will be maintained. Depending on the duration and the amount of material being dredged, the discharge pipe may be required to be moved during the dredged cycle. Dikes shall be constructed, raised, extended, and maintained to contain the materials.
- g. **Dredged Material Characteristics** – Sediment composed of a heterogeneous mixture of sand, silt, and clay.
- h. **Number of Discharges Per Unit of Time** – Discharges would occur at intervals throughout the construction and maintenance period.

2. **Disposal Site and Size**

The CIDMMA, is the USACE's upland disposal site, which is near the northern limits of the project. The CIDMMA has been in continuous use since 1957, serving the navigation dredging needs of the Norfolk Harbor. The 2,500-acre area was originally designed for a life span of 20 years, with a capacity of 96 million cubic yards (mcy). However, as a result of modifications that USACE has made to the site, CIDMMA has been able to accept over 268 mcy of material to-date. Frequent placement and subsequent consolidation results in varying topography throughout the site. The existing dikes that contain dredged material have elevations ranging from 36 feet to 40 feet, but based on analysis of dike stability, dikes could be raised to 50 feet.

Dredged material that is unsuitable for CIDMMA will likely need to be dewatered in accordance with federal and state water quality requirements and taken to existing upland disposal site(s). In the future an expansion cell will be created to the CIDMMA, the CIEE. This site may also be used in the future for dredged material placement.

3. **Actions to Minimize Adverse Discharge Effects**

To determine whether dredged material is suitable for placement at CIDMMA, or will be required to be disposed at an approved upland disposal facility, dredged material is tested for contaminants in accordance with the Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S.- Testing Manual, Inland Testing Manual (USEPA 1998), USACE Manual, Evaluation of Dredged Material Proposed for Disposal at Island, Nearshore, or Upland

Confined Disposal Facilities – Testing Manual (2003); and the USACE (2013) Commander’s Policy Memorandum WRD-01 Deposition of Dredged Material and Use of the Craney Island Dredged Material Management Area, Norfolk Harbor, Virginia.

In addition, effluent discharged from the CIDMMA will be monitored for Total Suspended Solids in accordance with the USACE (2013) Commander’s Policy WRD-01 to ensure the release of clarified effluent only. Previous monitoring of effluent discharges have reported average Total Suspended Solid concentrations of 95 mg/L or less. Contaminated sediments that dredged material testing indicates will not comply with CWA, Section 404(b)1, CIDMMA facility requirements, or state water quality standards may be managed with additional engineering processes to ensure sediment and associated sediment pore water retained in the dredging process will comply with the guidelines, standards, and alternate disposal facility requirements.

4. Determination of Compliance with Applicable Water Quality Standards

State Water Quality Certification under Section 401 of the Clean Water Act will be obtained through coordination and concurrence of the Federal Consistency Determination for this project from the Virginia Department of Environmental Quality.

5. Potential Effects on Human Use Characteristics

- a. Municipal and Private Water Supply** – The proposed project would not affect municipal or private water supplies.
- b. Recreational and Commercial Fisheries** – There is no anticipated effect to recreational or commercial fisheries resulting from the CIDMMA effluent discharges or any indirect, negligible effects resulting from slumping of shoreline wetlands.
- d. Water-Related Recreation** – There is no anticipated effect to recreation.
- e. Aesthetics of the Aquatic Ecosystem** – There is no anticipated effect to the aesthetic quality of the aquatic ecosystem other than temporary, negligible to minor increases in Total Suspended Solids and turbidity from the CIDMMA effluent discharges.
- f. Parks, National and Historical Monuments, National Seashores Wilderness Areas Research Sites, and similar Preserves** – There will be no effect.
- f. Determination of Secondary Effects on Aquatic Ecosystems** – None anticipated.

IV. FINDINGS OF COMPLIANCE OR NONCOMPLIANCE WITH THE RESTRICTIONS ON DISCHARGE

A. Adoption of the Section 404(b)(1) Guidelines to this Evaluation

No significant adaptations of the guidelines were made relative to this evaluation.

B. Evaluation of the Availability of Practicable Alternatives to the Proposed Discharge Sites Which Would Have Less Adverse Impacts on the Aquatic Environment

A series of alternatives with various configurations of deepening of Segment 1, Segment 2, and Segment 3 were considered during plan formulation. During the planning process, no practicable alternatives were identified that would reduce adverse impacts to the aquatic environment.

C. Compliance with Applicable State Water Quality Standards

Dredged material will be tested in accordance with federal guidance and regulations and the data will be used to make a factual determination with regard to dredged material discharge requirements of CWA, Section 404, CIDMMA facility requirements, and applicable state water quality standards. State Water Quality Certification under Section 401 of the Clean Water Act will be obtained through coordination and concurrence of the Federal Consistency Determination for this project from the Virginia Department of Environmental Quality.

D. Compliance with Applicable Toxic Effluent Standards or Prohibitions under Section 307 of the Clean Water Act

Section 307 of the Clean Water Act establishes limitation or prohibitions on the discharge materials containing certain toxic pollutants. Contaminated dredged material that exhibits acute toxicity will be managed for alternate disposal at a permitted upland facility. Dredged materials identified for alternate disposal may be managed with additional engineering processes to ensure contaminated sediment and associated sediment pore water retained in the dredging process will comply with the 404 guidelines, standards, and alternate disposal facility requirements.

Dredged material that are determined to be suitable for the CIDMMA will not contain unacceptable levels of contaminants that may result in non-compliance with applicable toxicity standards or prohibitions under Section 307 of the Clean Water Act.

E. Compliance with the Endangered Species Act of 1973

Please refer to the section above regarding compliance with the Endangered Species Act of 1973.

F. Compliance with Specific Measures for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act of 1972

Not applicable – no open ocean disposal of dredged material is planned.

G. Evaluation of the Extent of Degradation of Waters of the United States

1. Significant Adverse Effects on Human Health and Welfare

- a. Municipal and Private Water Supplies** – The project would not affect municipal or private water supplies.
- b. Recreational or Commercial Fisheries** - There would be no anticipated effects to fisheries from the CIDMMA effluent discharges or from indirect effects to wetlands.
- c. Plankton** – There would be no anticipated effects to plankton from the discharges.
- d. Fish** – There would be no anticipated effects to fish from the discharges or from indirect effects to wetlands.
- e. Shellfish** – There would be no anticipated effects to shellfish resources from the discharges or from indirect effects to wetlands.
- f. Wildlife** - There would be no anticipated effects to wildlife from the discharges or from indirect effects to wetlands.
- g. Special Aquatic Sites** – Indirect, negligible effects resulting from slumping of shoreline wetlands and mudflats has the potential to occur. However this impact would be anticipated to be so negligible that no change in the acreage or ecosystem function would be anticipated.

2. Significant Adverse Effects on Life Stages of Aquatic Life and Other Wildlife Dependent on Aquatic Ecosystem

There would be no significant, adverse effects on any life stages or aquatic or other wildlife that is dependent on the aquatic ecosystem from the discharges.

3. Significant Adverse Effect on Aquatic Ecosystem Diversity, Productivity, and Stability

There are no significant, adverse impacts on aquatic ecosystem diversity, productivity, and stability from the CIDMMA effluent discharges.

4. Significant Adverse Effect on Recreational, Aesthetic, and Economic Values

There are no significant, adverse impacts to recreational, aesthetic, or economic values.

H. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem

Appropriate steps to minimize potential adverse impacts from any discharges on aquatic systems have been incorporated.

I. Finding

The proposed discharges of fill material are specified as complying with the requirements of the 404(b)(1) Guidelines, with the inclusion of appropriate and practicable conditions as identified herein to minimize pollution or adverse effects on the aquatic ecosystem. These conditions will be attached and made part of the project record.

Approved by: _____

Date: _____

References

Fugro Consultants (Fugro). 2016. Geotechnical Evaluation; Elizabeth River and Southern Branch of the Elizabeth River Deepening Study; Hampton Roads, Virginia. Prepared for Moffatt & Nichol.

U.S. Army Corps of Engineers. 2013 (USACE). Deposition of Dredged Material and Use of the Craney Island Dredged Material Management Area, Norfolk Harbor, Virginia.

U.S. Army Corps of Engineers. 1983. Dredging and Dredged Material Disposal. Engineer Manual 1110-2-5025, Office, Chief of Engineers, Washington, DC.

U.S. Environmental Protection Agency (USEPA). 1998. Evaluation of dredged material proposed for discharge in waters of the U.S. – testing manual, inland testing manual. Prepared by Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, D.C. and Department of the Army, U.S. Army Corps of Engineers, Operations, Construction, and Readiness Division, Washington, D.C.