

Appendix D – 404(b) Analysis

Appendix D - Evaluation of Section 404(b)(1) Guidelines

I. Project Description

A. Location: Delaware Bay and New Jersey bayshore communities (Gandys Beach, Fortescue and Villas) within the lower portion of DRBC Zone 6 and Lower Reach E (Miah Maull and Brandywine Ranges) of the Delaware River Main Channel. These beach communities are characterized by broad marshes with a narrow barrier of sand along the beach. The post-channel deepening dredged material is anticipated to be predominantly coarse grained sand.

B. General Description: The project entails providing coastal storm risk management improvements (*i.e.* beach nourishment) to various New Jersey bayfront communities with the intent to beneficially use dredged material from the Federal navigation channel within the Delaware River. The required maintenance dredging of the 45-foot channel is anticipated to produce 465,000 cubic yards/year in spot shoals.

C. Authority and Purpose: The study authority for the New Jersey Beneficial Use of Dredged Material for the Delaware River Study (DMU) was the October 26, 2005 resolution of the Committee on Environment and Public Works of the United States Senate to request that the Secretary of the Army evaluate the authorized projects on the Delaware River to determine whether any modifications are advisable in the interest of beneficial use of dredged material as it relates to comprehensive watershed and regional sediment management, ecosystem restoration, navigation, stream restoration, water quality, and other allied purposes. In the aftermath of Hurricane Sandy (October 2012) and the subsequent passage of the Disaster Relief Appropriations Act, 2013 (PL 113-2), Congress authorized supplemental appropriations to Federal agencies for expenses related to the consequences of Hurricane Sandy. USACE was tasked to prepare an interim report to identify existing USACE projects for reducing flooding and storm damage risks in the area affected by Hurricane Sandy. The purpose of the project is coastal storm risk management using sand dredged periodically from the Delaware River main navigation channel to pump onto Delaware Bayfront communities.

D. General Description of Dredged or Fill Material: A multi-agency Sediment Quality Committee compiled a database of 932 *in situ* bulk chemistry sediment samples in 2012 (RSMT, 2013). The Committee considered guidelines that are currently in use in the Delaware Estuary to evaluate sediment quality, including Pennsylvania, New Jersey and Delaware state regulatory criteria for the evaluation of fill (soil, dredged material, *etc.*) at upland sites; sediment quality guidelines used for ecological effects screening purposes; state and DRBC water quality criteria, state criteria used to develop fish advisories; and eco-effects data for toxicity, bioaccumulation, and community health indices.

Statistical analyses of the mean COC concentrations in each DRBC Water Quality Zone identified significant differences between DRBC zones. The Committee concluded that dredged material from DRBC Zone 6 (Delaware Bay) is most suitable for “unrestricted” upland beneficial use projects.

Sediments suitable for “unrestricted” upland beneficial uses are usually interspersed among samples acceptable for “limited/restricted” upland beneficial uses throughout the Delaware Estuary.

In 2012, Gehagan & Bryant (GBA) conducted a supplemental geotechnical subsurface investigation for USACE Philadelphia District and the Philadelphia Regional Port Authority. GBA collected vibracore samples of the riverbed sediment at 51 discrete locations in the main channel. An extensive geotechnical laboratory testing program was performed, results of which indicated that the bulk of material encountered was sand. Results show that 92% of all samples were predominantly sand (sand fraction greater than 50%). Only 12% of grain size samples had silt and clay contents greater than 50%. The findings of this supplemental investigation essentially confirmed previous findings and assumptions regarding the sediment grain sizes in the channel.

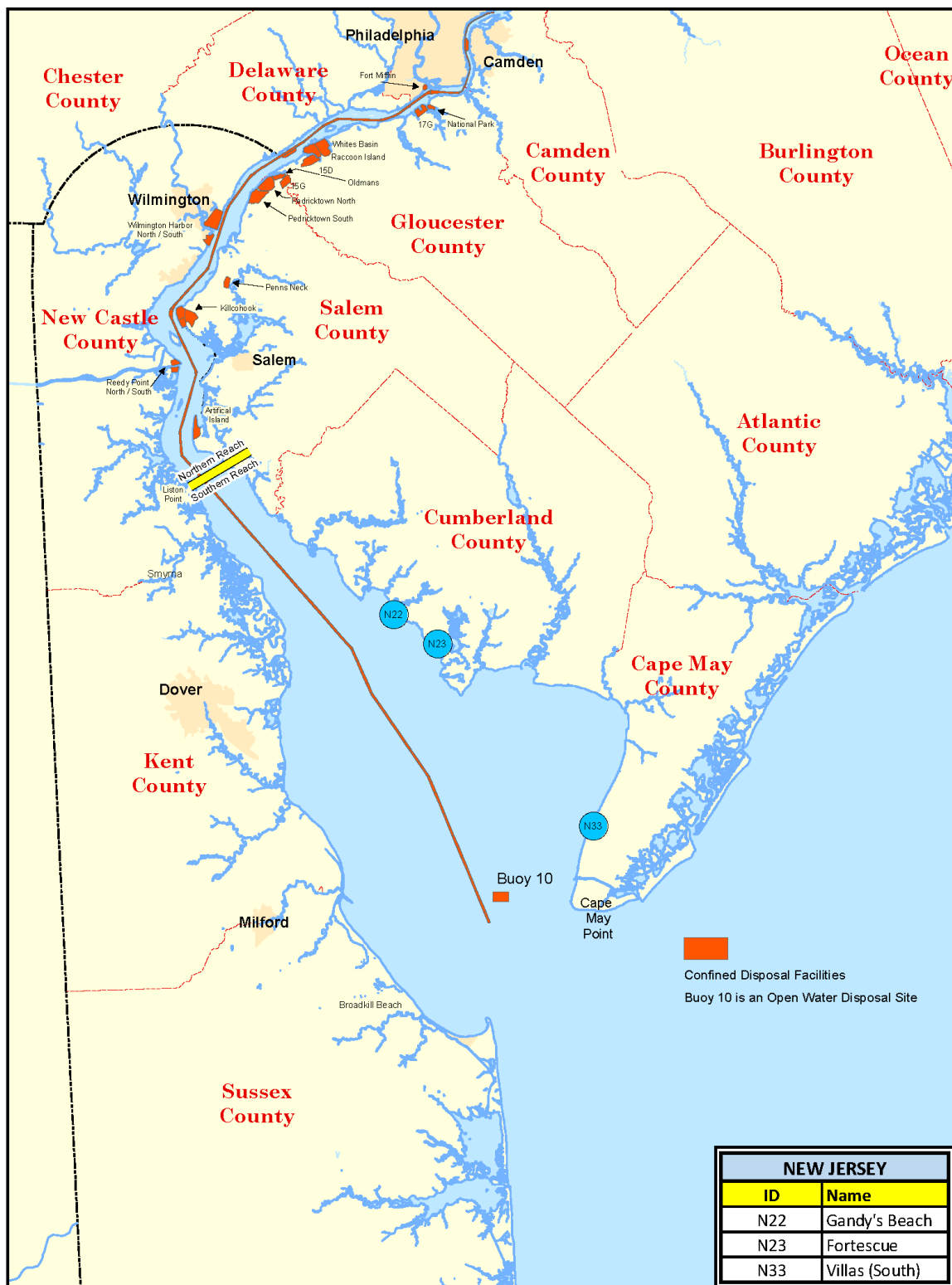
The Philadelphia District has placed sand dredged from Lower Reach E - Brandywine and Miah Maull ranges of the Main Channel (the project dredged material source area) in Buoy 10 in 2005, 2006 and 2011. In 2014, 11 sediment grab samples were collected in and around the Buoy 10 open water disposal site. All samples were analyzed for grain size and ranged from 96.1% to 99.8% sand. The remaining components were shell fragments. The current estimate of sand within the Buoy 10 boundaries is approximately 750,000 cy.

The terminal groins at Gandys and Fortescue will be comprised of a timber stem section that will prevent sediment migration. The timber stem will be comprised of sheeting, walers and piles. The timber stem will be anchored bayward by a rubble mound groin, comprised of armor stone and bedding stone.

E. Description of the Proposed Discharge Sites

(1) Location (map): The locations of the dredged material beneficial use sites are shown on Figure 1. The bayfront communities are Gandys Beach, Fortescue and Villas (South).

Figure 1 – Location of Proposed Discharge Sites



(2) Size (acres): Villas (49 acres), Gandys Beach (14 acres), Fortescue (28 acres)

(3) Type of Sites: Existing barrier beaches fronting the Delaware Bay in Cape May and Cumberland Counties, New Jersey.

(4) Types of Habitat: Coastal barrier beach with narrow sandy berm and low dunes with some vegetation.

(5) Timing and Duration of Discharge: Maintenance dredging will occur every two years in selected reaches over a 50 year period. Periodic nourishment cycle is 8 years.

F. Description of Disposal Method: Generic medium size hopper dredge utilizing mooring barge and booster pumps for direct placement.

II. Factual Determination

A. Physical Substrate Determinations

(1) Substrate Elevation and Slope: Increase in surface elevations at the beneficial use sites.

(2) Sediment Type: The material projected to be dredged from the navigation channel is similar in grain size to the existing sediment types at the beneficial use sites.

(3) Dredged/Fill Material Movement: Not significant. There will be temporary increases in turbidity at the discharge points for the beach placement sites.

(4) Physical Effects on Benthos: Burial within intertidal zone at the beneficial use sites: Benthic evaluations (Scott, 2012) have concluded that the existing benthic communities are neither significant nor unique, and have evolved to thrive in higher energy intertidal and shallow water zones. The organisms are expected to rapidly recolonize the area from adjacent untouched areas.

(5) Action Taken to Minimize Impact: Runoff at the beach placement sites will be minimized through creation of a temporary sand dike during pumping. Standard construction practices to minimize turbidity and erosion would be employed.

B. Water Circulation, Fluctuation and Salinity Determinations

(1) Water. Slight short-term elevation of turbidity in the vicinity of the outfall pipe.

a. Salinity - No significant effect.

- b. Water chemistry - No significant effect.
- c. Clarity - Minor short-term increase in turbidity during construction at discharge sites.
- d. Color - Minor short-term effect during construction.
- e. Odor - No effect.
- f. Taste - No effect.
- g. Dissolved gas levels - No significant effect.
- h. Nutrients - Minor effect.
- i. Eutrophication - No effect.
- j. Others as appropriate - None.

(2) Current patterns and circulation:

- a. Current patterns and flow - No significant impact.
- b. Velocity - No significant effects on tidal velocity and longshore current velocity regimes.
- c. Stratification - Thermal stratification occurs beyond the mixing region created by the surf at the bay beach intertidal zone. There is a potential for both winter and summer stratification. The normal pattern should continue post construction of the project.
- d. Hydrologic regime - The regime is largely marine and estuarine. This will remain the case following construction of the project.

(3) Normal water level fluctuations - Construction of the work would not affect the tidal regime.

(4) Salinity gradients - There should be no significant effect on existing salinity gradients.

(5) Actions that will be taken to minimize impacts –Utilization of sand from a clean, high energy environment and excavation with a hopper dredge and pumping sand directly onto the beach above the mean high tide line. Scheduling and sequencing beach placements to avoid construction on beaches during high use seasons by migratory shorebirds and horseshoe crabs.

C. Suspended Particulate/Turbidity Determinations

(1) Expected Changes in Suspended Particulate and Turbidity Levels in the Vicinity of the Placement Sites: there would be a short-term elevation of suspended particulate concentrations during construction phases in the immediate vicinity of the discharge at beneficial use sites.

(2) Effects (degree and duration) on Chemical and Physical Properties of the Water Column:

a. Light penetration - Short-term, limited reductions would be expected as a result of the discharge at the beneficial use sites.

b. Dissolved oxygen - There is a potential for a decrease in dissolved oxygen levels at the beneficial use sites, but the anticipated low levels of organics in the dredged material should not generate a high, if any, oxygen demand. No significant effects anticipated as a result of the short-term placement operations.

c. Toxic metals and organics - No significant impacts.

d. Pathogens - Pathogenic organisms are not expected to be a problem in the areas at the beneficial use placement sites.

e. Aesthetics - No significant impact.

(3) Effects on Biota:

a. Primary production, photosynthesis - Minor, short-term effects related to turbidity. Increase in productivity due to re-establishment of dune vegetation.

b. Suspension/filter feeders - Minor, short-term effects related to suspended particulate outside the immediate deposition zone. Sessile organisms would be subject to burial within the deposition areas at the beneficial use sites.

c. Sight feeders - Minor, short-term effects related to turbidity.

d. Actions taken to minimize impacts include the establishment of a temporary sand dike above the mean high tide line to reduce runoff to the bay during construction and minimize impacts to intertidal benthic resources. Standard construction practices will also be employed to minimize turbidity and erosion.

D. Contaminant Determinations

The discharge of dredged material is not expected to introduce, relocate, or increase contaminant levels at either the dredging location or from the beneficial use sites in Delaware Bay.

E. Aquatic Ecosystem and Organism Determinations

(1) Effects on Plankton: The effects on plankton should be minor and mostly related to light level reduction due to turbidity. Significant dissolved oxygen level reductions are not anticipated.

(2) Effects on Benthos: Benthic communities will be temporarily displaced within the intertidal zone of the beneficial use sites. The area is expected to be recolonized within 1-2 growth seasons through horizontal and in some cases, vertical migration of benthos. Impacts on benthic communities will not be significant.

(3) Effects on Nekton: Only a temporary displacement is expected as nekton would probably avoid active work areas.

(4) Effects on Aquatic Food Web: Only a minor, short-term impact on the food web is anticipated. This impact would extend beyond the construction period until recolonization of beneficial use sites occurred (estimated to be between 4 to 18 months).

(5) Effect on Special Aquatic Sites: The overall impact will be positive with beneficial use of dredged material to restore and protect barrier beaches and shoreline habitat.

(6) Threatened and Endangered Species: No significant impacts are expected. Section 7 consultation will be completed with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service during preparation of the integrated feasibility report/environmental assessment. Re-initiation of consultation will occur as needed.

(7) Other Wildlife: No Significant Effect.

(8) Actions to minimize impacts: Recommended environmental windows will be observed to the extent possible to minimize impacts to aquatic resources. Standard construction techniques will be employed to reduce impacts to the beaches and intertidal zone and to marine species at the dredging locations.

F. Proposed Placement Site Determinations

(1) Mixing Zone Determination: The following factors have been considered in evaluating the placement sites:

a. Depth of water at placement locations: Zero to approximately five feet.

b. Current velocity, direction, and variability at placement locations: predominant current is longshore current which is wind dependent for its velocity in shallow water.

c. Dredged material characteristics, constituents, amount, and type of material, and settling velocities: predominately medium to coarse grained sand as defined by the Unified Soil Classification characteristics for beach and dune construction.

d. Number of discharges per unit of time: continuous over the construction period.

An evaluation of the factors above indicates that the placement sites and/or size of mixing zone are acceptable.

(2) Determination of compliance with applicable water quality standards: extensive testing of water quality parameters has been completed. It is anticipated that the discharges at the beneficial use sites will be in compliance with all State and Federal water quality standards.

(3) Potential Effects on Human Use Characteristics:

a. Municipal and private water supply - No effect.

b. Recreational and commercial fisheries – No significant adverse impacts. Impacts of prey species within the intertidal zone are temporary and the benthic species will recolonize the areas after construction.

c. Water related recreation - No significant impacts. The placement areas will be temporarily cordoned off during construction.

d. Aesthetics - No significant impacts. Aesthetics along the Bayfront placement areas will be improved by re-establishing a natural appearing beach berm and vegetated dune.

e. Parks, national and historic monuments, national seashores, wilderness areas, etc. - Beach restoration will benefit neighboring state and federal wildlife refuges by providing a sand source for longshore transport.

G. Determination of Cumulative Effects on the Aquatic Ecosystem - None anticipated.

H. Determination of Secondary Effects on the Aquatic Ecosystem - Any secondary effects would be minor.

III. Findings of Compliance or Non-Compliance with the Restrictions on Discharge

A. No significant adaptation of the Section 404(b)(1) Guidelines were made relative to this evaluation.

B. The alternative measures considered for accomplishing the project objectives are detailed in Section 3 of the integrated feasibility report/environmental assessment.

C. It is not anticipated that the placement of dredged material at the selected sites would violate any applicable state water quality standards. The disposal operation will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

D. Placement of dredged sand on the selected bayfront beaches is not expected to harm any endangered species or their critical habitat as construction will not occur when listed species are present. Placement operations will restore habitat for beach nesting and foraging species such as migratory shorebirds, horseshoe crabs and diamondback terrapins the following reproductive season following completion of construction. Formal consultation will be completed with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service prior to construction. There are no Marine Sanctuaries designated by the Marine Protection, Research, and Sanctuaries Act of 1972 in the project area. Coordination of the selected plan with the U.S. Fish and Wildlife Service regarding the Coastal Barrier Resources Act has been completed.

E. The proposed placement of dredged material will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife will not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity, and stability, and recreational, aesthetic and economic values will not occur. The proposed

placement sites are expected to provide positive benefits to communities through erosion protection, provide additional beach and intertidal habitat for wildlife, and added recreational areas by beneficially using sand dredged from the main navigation channel that would ordinarily be disposed overboard in the bay's Buoy 10 site.

F. Appropriate steps to minimize potential adverse impacts of the discharge on the marine system. Environmental windows will be observed to the extent possible to minimize impacts to aquatic resources. Standard construction techniques will be used to reduce the impacts of pumping material and water onto the beaches.

G. On the basis of the guidelines, the proposed placement sites for the discharge of dredged material are specified as complying with the 404 (b)(1) guidelines with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects to the aquatic ecosystem.