

This SETTLEMENT AGREEMENT is entered into this the 24 day of March, 2005, by and among the Village of Bald Head Island ("Village" or "Plaintiff") and the United States Army Corps of Engineers ("the Corps" or "Defendant") (collectively the "Parties").

WHEREAS, the Village contends that the Corps is responsible for damages caused by the certain acts and omissions further detailed in the Second Amended Complaint in Civil Action No: 7:03-CV-243-FL(1) (all capitalized terms not otherwise defined in this Settlement Agreement shall be as defined in this Second Amended Complaint), such damages including, but not limited to, the continued sloughing and shoaling of the South Beach shoreline into the modified Navigation Channel that results in severe erosion of certain portions of the South Beach shoreline causing the consequent inundation of, damage to, and now closure of, South Bald Head Wynd and the infrastructure for Village water, sewer, and electrical utilities.

WHEREAS, the Corps does not agree with these contentions and does not believe that sufficient study has been undertaken to determine the extent, if any, of a causal link between its channel dredging activities in the vicinity of South Beach, and the erosion of the South Beach shoreline and related damage.

WHEREAS, the Village has received assurances that the Corps will fulfill its obligations detailed in the Environmental Assessment – Preconstruction Modifications of Authorized Improvements, particularly the Appendix A - Sand Management Plan ("the Sand Management Plan"), dated February 2000, including the removal of beach quality material from the navigation channel and subsequent disposal on the South Beach area of the Village of Bald Head, as specified in the construction contract referred to as Clean Sweep, and originally intended to occur in FY 2004. The Village has also received assurances that the Corps will regularly meet and consult with the Village regarding the schedule and location for placement of beach quality sand on the Village South Beach shoreline for those future occasions when the Sand Management Plan contemplates disposal on Bald Head Island.

WHEREAS, the Village and the Corps have agreed to a schedule for monitoring, meetings and consultations between the Corps and the Village, including such experts and consultants as the Village may from time to time employ, regarding appropriate response to any further beach sloughing.

WHEREAS, the Village and the Corps desire that they work together to solve the problem of South Beach sloughing and shoaling into the Navigational Channel and wish to do so through mutual communication and cooperation and, if possible, to avoid further litigation.

NOW, THEREFORE, in consideration of the premises stated and the terms and conditions hereinafter set forth, the parties agree:

1. The Corps commenced the Clean Sweep contract in November 2004 and completed the work on January 25, 2005. This work included the excavation of material from the Wilmington Navigation Channel and the placement of all beach quality sand thus excavated onto South Beach, with the fill taper beginning at station 47+00 and the full design section continuing eastward to station 125+00 with a five hundred foot transition to existing shoreline at station 130+00, a location that was determined in consultation with the Village.

2. The dredging and sand disposal contractors employed by the Corps completed all work for the phase of Clean Sweep between station 47+00 and station 110+00, including beach-fill, beach-tilling, and removal of all equipment, temporary grade stakes and beach-fill pipelines, by January 20, 2005. During the time between January 20, 2005 and April 30, 2005, this area will not be available to the Corps, but will be exclusively available to the Village to allow installation and completion of a groin field (discussed below) before the April 30, 2005 deadline set by permit.

3. The Village agrees and intends to reconstruct a soft groin field consisting of approximately sixteen (16) sand filled tube groins spaced roughly 400 feet apart along approximately 6,600 feet of shoreline between stations 47+50 and 104+00. Construction of this new sand filled tube groin field is slated to begin in Fiscal Year 2005, **however**, construction of the groin field is **contingent** upon the following:

a. The Corps' placement schedule for beach quality material onto the westernmost portion of the south beach shoreline as part of Clean Sweep. This work was accepted as complete from the contractor as of January 25, 2005. Therefore, groin field construction will take place between January 20<sup>th</sup> and April 30<sup>th</sup>, 2005.

b. The Corps' placement of a minimum effective design beach berm width of 200' at elevation +8' NGVD along the westernmost segment of south beach within the limits of the proposed groin field. The filled beach foreshore will extend seaward therefrom at an expected slope of 20 H:1V (TYP). This work was accepted as complete from the contractor as of January 25, 2005.

4. Dredging schedule for FY 2005 Clean Sweep Beach Disposal.

a. In order to minimize the potential for impacts to the Point, the Corps required that material be removed from Baldhead Shoal Navigation Channel Reach 1, the area immediately adjacent to the Point, as the last order of dredging work for its dredging contractor.

b. In order to further minimize potential impacts associated with the Navigation Channel dredging in the vicinity of the Point, the Corps did not require its contractor to perform redundant dredging in order to meet the authorized channel width for the Baldhead Shoal Channel Reach 1.

c. Further, the Corps informed its dredging contractor of the Village's plan to install a new sand filled tube groin field and required its contractor to coordinate with the Village's groin field construction contractor in order to facilitate synchronization of the beach quality sand placement and sand filled tube groin field construction. In addition, the Village assisted the Corps' contractor in the selection of suitable temporary beach access location for equipment, personnel etc. outside the limits of the groin field if possible. The Corps required its dredging contractor to pay for and repair any damage to the new sand filled tube groin field arising from its fault or negligence.

#### 5. Project Milestones for Monitoring

The following milestones were established by the parties for (a) conducting monitoring activities in response to placement of material from the Clean Sweep – Beach Disposal contract on South Beach in FY2005 and (b) making decisions about future plans for maintenance of navigation in the vicinity of Village:

##### a. Contract Milestones:

Contract Award	September 21, 2004
Issuance of Notice to Proceed	October 26, 2004
Preconstruction Conference	October 26, 2004
Commencement of Dredging & Beach Disposal	November 16, 2004
Beach Disposal Complete (Sta.46+00 to Sta 110+00)	
Sufficient to Allow Groinfield Construction to Commence	January 21, 2005
Remaining Beach Disposal Complete	January 25, 2005

b. Post-construction Milestones: Monitoring by the Corps of the Navigation Channel will commence in March 2005 (60 days after final acceptance of the Navigation Channel). These hydrographic surveys will occur on a regular basis, with the time elapsed between surveys not to exceed 60 days. Each monitoring event will consist of a full channel survey of three channel segments: the Smith Island Channel, Baldhead Shoal Channel 1 and Baldhead Shoal Channel 2. The channel surveys for Channels 1 & 2 will extend a minimum of 250 ft beyond the east channel line or to the minimum depth for safe operation of the survey boat. The physical surveying data for each channel segment will be processed by Navigation Branch within 5 days of receipt of the data. Within 2 days thereafter, Navigation Branch will provide hardcopy and electronic files to the chiefs of the Corps' Coastal H&H Section and Design Section, and to such independent contractor as the Village may designate, for review. Within 10 calendar days of receipt, the Chief of Engineering will meet with the Corps' Project Manager and representatives from its Navigation Branch, Coastal Section and Design Section to provide an assessment of the findings. Within 3 days after this meeting, the Corps' Project Manager will provide or make available the most recent navigation survey findings to John Morris, who represents the State of

North Carolina as the non-Federal sponsor; the Cape Fear River Pilots; the Brunswick Beaches Consortium; Village of Bald Head Island and the Towns of Caswell Beach and Oak Island.. Copies of each survey will be transmitted to the Village, both to the Village Manager and to such independent contractor as the Village may designate, within 2 business days of completion. Proper representatives of the Corps shall promptly meet with the Village and/or its consultants to discuss each survey.

c. Subsequent Decision-making: There will be a meeting or meetings with the Village, the Project Delivery Team ("PDT"), and other participants as may be appropriate and feasible to determine whether the three channel segments of interest can be maintained for safe navigation for a minimum of two years without maintenance dredging. The minimum dimensions needed for safe navigation will be deemed to be a bottom width of no less than 500 feet at a depth of no less than - 42 feet MLW. In the event there is a consensus that these minimum dimensions cannot be maintained for at least two years, then the Corps, in concert with the non-Federal cost-sharing sponsor, will consider options to continued maintenance of the problem areas. Specifically, it will assess alternative means of maintaining safe navigation, to include, but not be limited to, an alignment alteration in the vicinity of Jaybird Shoal, westward of the current authorized alignment. The potential use of structures shall be considered. A consideration of alternatives to the current maintenance program will likely require preparation of an Environmental Assessment and Finding of No Significant Impact (EA/FONSI), together with a Post Authorization Change (PAC) Report. In order to accommodate the possibility that some alternative may become the preferred plan of action for the next maintenance dredging cycle in these channels, it will be necessary to commence the EA/FONSI and PAC coordination a minimum of 12 months prior to the anticipated solicitation date for the next maintenance contract. Any proposed change will be fully coordinated with the Cape Fear River Pilots, interested agencies and the public, consistent with the Corps' normal practices for coordination of such documents. Implementation of any recommended plan of action in future Federal fiscal years beyond FY2005 is contingent on the required Federal and non-Federal funds being made available in future fiscal year budgets.

6. Minimum Survey of Village Beach Erosion.

At least twice each calendar year a monitoring survey shall be performed, one by the Corps and one by the Village, to observe and record the erosion of the Village beaches and to gather data regarding the effects of any channel dredging upon the Village beaches, and the effects upon any efforts to retain sand disposed of on the beaches (e.g. the sand filled tube groin field). Following each survey, the Village and the Corps shall meet to discuss the results of those surveys and to discuss whether the measures contemplated in this agreement are effective for their desired purpose (to retain disposed of material on the shoreline, which in turn may have a side benefit of providing stabilization of the erosion area of the affected Village beaches). If the efforts contemplated by this agreement are not achieving their purpose, the Village and the Corps agree to consider additional action to achieve that purpose including, but not limited to:

a. Applying for such additional authorization and approvals as may be needed to institute further action, including permits for the construction of stabilizing structures intended to

prevent channel induced beach erosion and authorization, permits and approvals for any necessary alteration in channel alignment;

b. Seeking such additional funding as may be necessary to institute further action. The Corps agrees to implement any alternative it determines to be reasonable, and for which it has the necessary authority, funding, and permits or other approvals.

7. This agreement contemplates that further maintenance of the Navigational Channel will proceed in the manner contemplated by the Sand Management Plan, i.e. with the Village and Caswell Beach/East Oak Island receiving beach quality sand in future years as per the schedule established in the Sand Management Plan. The Village, and the Corps agree that, prior to future disposal of beach quality sand on the Village beaches pursuant to the Sand Management Plan, the Parties shall meet and confer regarding the timing, facilitation and location of such placement, so as to maximize the beneficial effect of such placement.

8. Interim Dredging.

Should it become necessary, for safety reasons, to conduct interim dredging in the vicinity of the Baldhead Shoal, the Corps agrees to notify the Village as soon as is practicable, in no event later than the date upon which such dredging work is put out for bid, but ideally as soon as surveys or other observations suggest to the Corps that such interim dredging may be necessary, and to work with the Village to conduct such interim dredging in such a manner as to minimize the negative effect of such dredging on the Village and its beaches.

9. The parties acknowledge that this is a settlement of disputed claims and that the agreement and actions set forth herein are by way of settlement and are not an admission of liability by the Corps, nor are they a limitation to the remedies that may be sought by the Village in the event of default of this agreement.

10. The Village agrees to dismiss, without prejudice, the claims contained in the Second Amended Complaint.

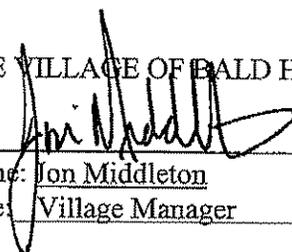
11. The Village's agreement to this settlement is contingent upon the Corps' express waiver of any and all statutes of limitation, and of any defense of laches, and defense based upon the doctrines of estoppel or res judicata as might applicable to future claims by the Village against the Corps, including renewal of the claims contained in the Second Amended Complaint filed by the Village on March 18, 2005, arising from the Corps activities in the vicinity of Bald Head Island, Jaybird Shoals, and Bald Head Shoals during the Wilmington Harbor – 96 Act Deepening Project. This waiver shall extend to and including December 31, 2010.

12. The parties agree they have been represented in these discussions by attorneys of their own choosing and that they have had adequate time to discuss this settlement with their respective attorneys.

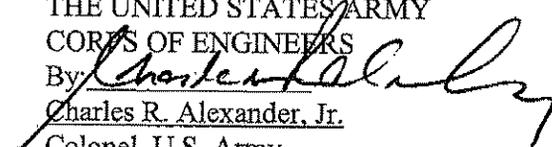
13. If any term of this Settlement Agreement is determined by a court of competent jurisdiction to be unenforceable, then the remaining terms of the Settlement Agreement which are capable of construction and capable of providing meaningful relief to the Village and to the Corps without the unenforceable term(s), shall be deemed severable and valid.

This agreement is made this the 24 day of March 2005.

THE VILLAGE OF BALD HEAD

By:   
Name: Jon Middleton  
Title: Village Manager

THE UNITED STATES ARMY  
CORPS OF ENGINEERS

By:   
Charles R. Alexander, Jr.  
Colonel, U.S. Army  
District Engineer, Wilmington

SIGNATURES CONTINUE ON THE FOLLOWING 2 PAGES

STATE OF NORTH CAROLINA

COUNTY OF Brunswick

I, Heather L. Hardee, a Notary Public of the County and State aforesaid, certify that Jon Middleton personally appeared before me this day and acknowledged the execution of the foregoing instrument.

WITNESS my hand and official stamp or seal, this 24 day of March, 2005.

  
Notary Public

My Commission Expires: 8-9-05

[NOTARY SEAL]

STATE OF NORTH CAROLINA

COUNTY OF New Hanover

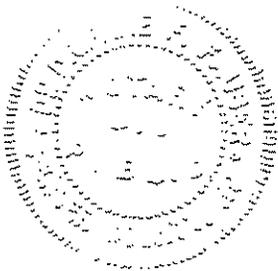
I, Diedrienne F. Fausser Jr., a Notary Public of the County and State aforesaid, certify that Charles R. Alejandro personally appeared before me this day and acknowledged the execution of the foregoing instrument.

WITNESS my hand and official stamp or seal, this 7<sup>th</sup> day of April, 2005.

Diedrienne F. Fausser  
Notary Public

My Commission Expires: 3/27/2009

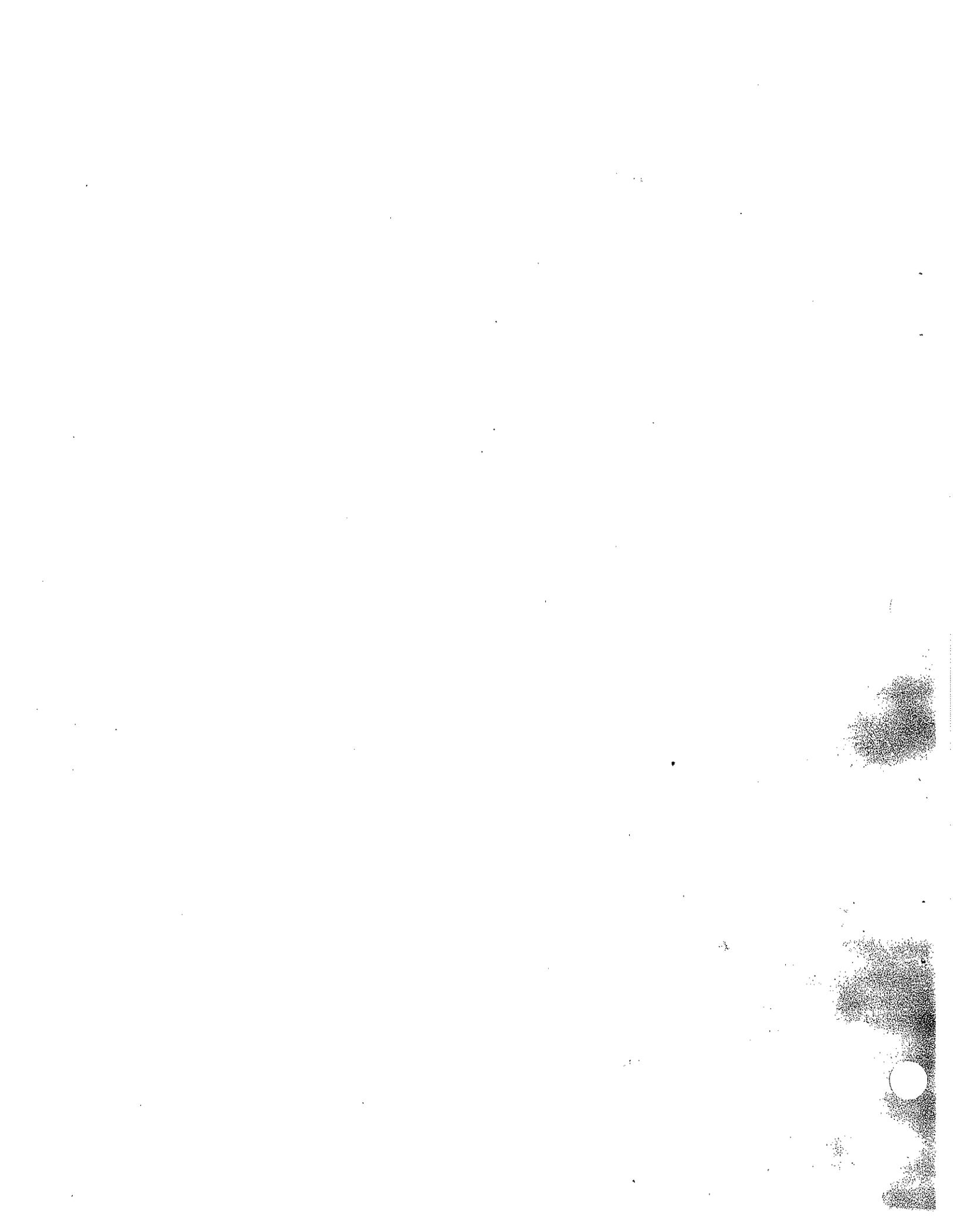
[NOTARY SEAL]



**APPENDIX A**

**SAND MANAGEMENT PLAN**

1. THE PROJECT AND THE SAND MANAGEMENT PLAN



# WILMINGTON HARBOR

## SAND MANAGEMENT PLAN OCEAN ENTRANCE CHANNELS AND INNER HARBOR FROM SNOWS MARSH THROUGH HORSESHOE SHOAL CHANNELS

1. **General.** Deepening of Wilmington Harbor will involve the removal of large quantities of material including beach quality sand. Most of the beach quality material to be removed during deepening will come from the Ocean Entrance Channels consisting of the following ranges: Baldhead Shoal; Smith Island; Baldhead – Caswell; Southport; Battery Island, and Snows Marsh seaward of station 10+00. These ranges are shown on *Figure 1*. Beach quality sands will also be removed from portions of the Inner Harbor channel extending from the upper 1000 feet of the Snows Marsh Range through the Horseshoe Shoal Range. These Inner Harbor channel ranges are also shown on *Figure 1*. A maximum of 6.0 million cubic yards of beach quality material will be removed from the lower portion of the Snows Marsh Range seaward through the Baldhead Shoal Range. Approximately 0.6 million cubic yards of beach quality material will be removed from the upper Snows Marsh Range through the Horseshoe Shoal Range. Sand management plans for these two segments of the harbor are developed below for both the new work material; i.e., the beach quality material to be removed during deepening; and future maintenance of these harbor segments that will involve the removal of littoral shoal material.

### Ocean Entrance Channels – Sand Management Plan

2. **Introduction.** The sand management plan for the ocean entrance channels addresses dredging and disposal issues associated with the realigned Baldhead Shoal Channel as well as the Smith Island, Baldhead – Caswell, Southport, Battery Island, Lower Swash, and Snows Marsh Channels. Construction of the ocean entrance channels into Wilmington Harbor will entail the removal of approximately 15.5 million cubic yards of material, up to 6.0 million cubic yards of which is beach quality sand. Beach quality sand exists throughout all of the entrance channel except the new Baldhead Shoal Channel. Within the Baldhead Shoal Channel, beach quality sand is located between stations 0+00 and 120+00. Between station 0+00 and approximately 66+00, the entire channel prism is considered to be beach quality material. Between station 66+00 and 120+00, beach quality material is layered with the material lying above elevations ranging from -30 to -41 feet MLLW. Material below these depths contains a high percentage of clay and silt and is not suitable for beach disposal. Seaward of station 120+00, the new work material contains high concentrations of silt and clay and is not suited for placement on the beach. The beach quality material will be dredged primarily from the portion of Jay Bird Shoal which overlays the west side of the realigned bar channel and from Baldhead Shoal. Baldhead Shoal forms the east boundary of the existing channel, however, the realigned bar channel will cut across the seaward portion of this shoal. The present alignment of the ocean bar channel and that of the new bar channel are shown on *Figure 1*. As shown on *Figure 1*, the new bar channel passes through the eastern side of the existing Ocean Dredged Material Disposal Site (ODMDS).

3. The Brunswick County beach towns of Bald Head Island, Caswell Beach, Oak Island, and Holden Beach have expressed an interest in receiving the beach quality material. Under Section 933 of the Water Resources Development Act of 1986 (Public Law 99-662), the Federal Government can cost share up to 50 percent of the added cost of depositing the material on the beach providing certain criteria are met. The primary requirement for Federal participation is that any added cost for placing sand on a particular beach segment must be economically justified. A base disposal plan associated with the least costly means of placing the beach quality material and a Section 933 disposal plan are discussed in the following paragraphs. In addition, a disposal plan for the annual maintenance material is presented following the disposal plan for the new work material.

#### 4. Plan Formulation – Ocean Entrance Channels New Work Material Disposal Plan.

The disposal plan for the new work material contained in the 1996 project feasibility report had all of the material from the Lower Big Island Range through the existing Baldhead Shoal Channel going to the ODMDS. It should be mentioned that the disposal plan in the feasibility report did not include consideration of the realigned Baldhead Shoal Channel. The alignment of the new Baldhead Shoal Channel came from a recommendation contained in a Value Engineering Study that demonstrated significant construction cost savings could be realized by avoiding rock in the existing Baldhead Shoal Channel. In any event, increased utilization of the existing ODMDS for disposal of maintenance and new work material has resulted in the existing ODMDS for Wilmington Harbor approaching full capacity. This combined with the passage of the realigned Baldhead Shoal Channel through the existing ODMDS has necessitated the development of a new ODMDS. The new ODMDS, which is being developed in cooperation with the Environmental Protection Agency (EPA), is located approximately 5 miles offshore of the existing ODMDS as shown on *Figure 1*. The new ODMDS is expected to be available for use by the end of 2001, consequently, the existing ODMDS must have sufficient capacity to accommodate the new work and maintenance material expected to be removed through the year 2001.

5. The remaining capacity of the existing ODMDS was estimated assuming that the area could be filled to an average elevation of 26 feet below mean lower low water (mllw). All future placement of dredge material in the existing ODMDS will take place west of the new channel alignment. In addition, no material would be placed in a 2,500-foot wide corridor parallel to and west of the new entrance channel in order to reduce the chance deposited material will move into and shoal the new channel (see *Figure 1*). The size of the corridor through the ODMDS is needed to prevent the return of deposited material into the channel and was based on the distance between the western toe of the existing ODMDS and the existing ocean entrance channel, which, as shown on *Figure 1*, is about 2,500 feet. Based on these assumptions, the remaining capacity of the existing ODMDS is approximately 17.8 million cubic yards.

6. Deepening of the Wilmington Harbor project is scheduled to begin in May 2000 with the award of a contract to construct the offshore portion of the Baldhead Shoal Channel seaward of station 120+00. The material to be removed from this segment of the new channel, which totals about 6.6 million cubic yards, contains significant quantities of silt and clay and will have to be deposited in the existing ODMDS. The contract for the

landward segment of Baldhead Shoal Channel and the other ocean entrance channels, which will include up to 6.0 million cubic yards of beach quality sand and 2.8 million cubic yards of material not suited for placement on the beach, will be awarded near the end of calendar year 2000. Work on the inner portions of the project from upper Snows Marsh Range to Horseshoe Shoal Range that contains 0.6 million cubic yards will also be performed in early 2001. The economic and engineering viability of options for the disposal of the beach quality material to be removed from upper Snows Marsh to Horseshoe Shoal is presented later in the section of this report entitled "Inner Harbor - Sand Management Plan." Finally, a contract for removal of rock and other sediments from the Big Island Range will be awarded in 2000 as a test to help determine contract scopes for rock removal from other sections of the harbor. All of the material from the Big Island Range (approximately 2.2 million cubic yards) will be deposited in the ODMDS. In summary, construction of the deeper channel between 2000 and 2001 will involve the removal of approximately 18.2 million cubic yards of material with all of this material scheduled to be placed in the existing ODMDS.

7. During the new ocean entrance channel construction period, periodic maintenance of the existing ocean entrance channel will have to continue as will the maintenance of the interior portions of the harbor. This maintenance material, which averages around 800,000 cubic yards per year from the entrance channel and 300,000 cubic yards from the interior channels, is normally placed in the ODMDS. In addition to the Wilmington Harbor maintenance material, material removed for maintenance of the Military Ocean Terminal at Sunny Point (MOTSU) is also normally placed in the ODMDS. Maintenance of MOTSU averages 1 million cubic yards per year. Thus, the combined volume of new work and maintenance material to be removed from Wilmington Harbor and MOTSU between 2000 and 2001 could total 22.4 million cubic yards, exceeding the remaining capacity of the existing ODMDS by more than 4.6 million cubic yards.

8. **Base Disposal Plan-New Work Material.** With the capacity of the existing ODMDS insufficient to accommodate the dredged material disposal volume requirements through 2001, the logical solution is to place up to 6.0 million cubic yards of beach quality material on adjacent beaches. The only other option would be to delay the construction of the harbor deepening project by at least one year which is not acceptable to the State of North Carolina, the project sponsor. Placement of up to 6.0 million cubic yards of new work material on the beach would reduce the volume of material to be placed in the existing ODMDS through the year 2001 to 16.4 million cubic yards, effectively depleting the remaining capacity of the existing ODMDS. Once the new ODMDS becomes operational, all future dredge material requiring ocean disposal will be placed in the new area.

9. The disposal of up to 6.0 million cubic yards of new work beach quality material would be distributed along 16,000 feet on Bald Head Island and 25,000 feet on Oak Island-Caswell Beach. Deposition on Bald Head Island would occur along 2,000 feet of West Beach, which faces the Cape Fear River Entrance, and along 14,000 feet of South Beach. Disposal on Oak Island-Caswell Beach would begin at the west boundary of the Fort Caswell Baptist Assembly grounds and proceed west. The 25,000-foot disposal area on Oak Island-Caswell Beach would extend the fill to the east end of the sea turtle habitat area

with input a beach...

on Oak Island. These disposal areas are shown on Figure 2. The sea turtle habitat, which is basically a beach fill with a small dune feature to prevent nesting sea turtles from crossing into the ocean front road, will be constructed under authority of Section 1135 of the Water Resources Development Act of 1986. Construction of the sea turtle habitat will be completed in April 2001. The combined total of new work material to be deposited on Bald Head Island under the base plan would be 2,580,000 cubic yards. The balance of the new work beach quality material (up to 3,420,000 cubic yards) would be equally distributed along the 25,000-foot disposal area on Oak Island-Caswell Beach. The base plan beach fill placement characteristics associated with placement of up to 6.0 million cubic yards of new work material are presented in *Table 1*. Based on the characteristics of the sediment to be removed, about 83 percent of the dredged material is expected to remain in place. The lower placement rates used on West Beach and at the west end of South Beach are intended to reduce the possibility of increased sediment transport from the disposal area back into the navigation channel. Following initial adjustments, the deposited material will begin to erode at a rates comparable to or slightly faster than the erosion rates experienced on the existing beach. The base disposal plan addresses provisions for the disposal of up to 6.0 million cubic yards of beach quality material, however, the maximum volume may be reduced by 20 to 30 percent depending on the final quantitative and qualitative sand analysis and actual dredging operations associated with the dredging contractors decisions to obtain the total allowable overdepth.

**Table 1**  
**Base Plan Beach Disposal Characteristics**

Location	Length along Shoreline (feet)	Disposal Rate (cubic yds per ft)	Initial Placement Width Range (feet)	Adjusted Placement Width Range (feet)	Initial Placement Volume (cubic yds)	Net In-place Volume (cubic yds)
Bald Head Island	16,000				2,580,000	
West Beach	2,000	120	190 to 210	95 to 105	240,000	200,000
South Beach	2,000	120	190 to 210	95 to 105	240,000	200,000
South Beach	12,000	175	280 to 300	140 to 150	2,100,000	1,734,000
Oak Is - Caswell Beach	25,000	137	220 to 240	110 to 120	3,420,000	2,839,000
Totals	41,000				6,000,000	4,973,000

10. **Section 933 Disposal Plan – New Work Material.** The Brunswick County beach towns of Bald Head Island, Caswell Beach, Oak Island, Holden Beach, Ocean Isle, and Sunset Beach formed the Brunswick County Consortium for the purpose of working together to assure that the beach quality material is placed on the beach. Since Ocean Isle has received approval for a Federal Storm Damage Reduction Project, it is not vying for any of the Wilmington Harbor material. Construction of the Ocean Isle project is scheduled to begin in 2000. As mentioned above, a segment of Oak Island, lying between East 26<sup>th</sup> Street and East 58<sup>th</sup> Street, has been approved for a Section 1135 sea turtle habitat. The length of shoreline included in the sea turtle habitat consist of an 8,900-foot main section and 1,600-foot transitions on each end of the main fill. Construction of the sea turtle habitat will involve the removal of about 1.6 million cubic yards of material from an existing upland dredged material disposal area located adjacent to the Atlantic Intracoastal Waterway (AIWW). The expected in place volume resulting from this project is 1.34 million cubic yards. Within the main portion of the sea turtle habitat, the placement rate will be approximately 130 cubic yards/foot of beach. Accordingly, no material from the Wilmington Harbor project will be placed in the main portion of the sea turtle habitat. Some harbor material will be placed in the habitat transition areas to make up the difference in the volume that will be placed under Section 1135 and the rate of fill proposed under Section 933. This volume difference is around 25,000 to 30,000 cubic yards. As discussed below, disposal of material from the Wilmington Harbor project along Oak Island could occur at rates varying from 78 to 110 cubic yards/foot of beach. While these placement rates are less than the placement rate within the main portion of the Sea Turtle Habitat project, the relative protrusion in the shoreline resulting from the sea turtle project would be less than that which would have been produced in the absence of the harbor material. The reduction in the relative seaward protrusion of the shoreline within the habitat area resulting from the placement of the harbor material on the beach would also reduce the expected rate of loss from the habitat project due to end losses.

11. The shoreline segments that could receive material from Wilmington Harbor as a result of the Section 933 study include: 16,000 feet on Bald Head Island; 25,000 feet on Caswell Beach and the east end of Oak Island; 25,600 feet on the west end of Oak Island lying west of the sea turtle habitat; and 10,600 feet on the east end of Holden Beach. This represents a total shoreline length of 77,200 feet. These shoreline segments are shown on *Figure 2*. The distribution of available beach quality sand along the Brunswick County beaches will depend on the final results of the Section 933 study, analysis of project engineering and economic constraints, and the desires of the project sponsor and the Brunswick County consortium. To account for variations in sand placement along the Brunswick County beaches under the section 933 authority, *Table 2* presents the maximum beach fill disposal characteristics associated with the maximum beach fill for each beach segment resulting from the various possible distributions of beach quality material. Although the final distribution of the beach quality material for the Section 933 work along the Brunswick County beaches has not been determined, the total placement will not exceed 6.0 million cubic yards. Six million cubic yards of beach quality material to be removed from the channel equates to 5.0 million cubic yards of in place sand on the beach based on a retention rate of 83 percent discussed previously. Following the initial adjustments, erosion of the fill material will occur at rates equal to or slightly higher than the historic erosion

rates. The Section 933 disposal plan addresses provisions for the disposal of up to 6.0 million cubic yards of beach quality material, however, the maximum volume may be reduced by 20 to 30 percent depending on the final quantitative and qualitative sand analysis and actual dredging operations associated with the dredging contractors decisions to obtain the total allowable overdepth.

**Table 2**  
**MAXIMUM**  
**Section 933 Disposal Characteristics**

Location	Length along Shoreline (feet)	Disposal Rate (cubic yds per ft)	Initial Placement Width Range (feet)	Adjusted Placement Width Range (feet)	Initial Placement Volume (cubic yds)	Net In-place Volume (cubic yds)
Bald Head Island	16,000				2,200,000	1,826,000
West Beach	2,000	120	190 to 210	95 to 105	240,000	200,000
South Beach	2,000	120	190 to 210	95 to 105	240,000	200,000
South Beach	12,000	143	220 to 240	110 to 120	1,720,000	1,426,000
Oak Island	50,500				4,740,000	3,933,000
East Oak Island - Caswell Beach	25,000	110	170 to 190	85 to 95	2,750,000	2,283,000
West Oak Island - Caswell Beach	25,600	78	120 to 140	60 to 70	1,990,000	1,650,000
Holden Beach	10,600	78	120 to 140	60 to 70	830,000	690,000

### **Inner Harbor – Snows Marsh Range to Horseshoe Shoal Range Sand Management Plan**

12. **Introduction.** The sand management plan for the inner harbor addresses dredging and disposal issues associated with the Snows Marsh and Horseshoe Shoal channels. An estimated 0.6 million cubic yards of beach quality material will be removed from this

portion of the project. Disposal islands 3 and 4, located near the intersection of Horseshoe and Snows Marsh channels, are at maximum capacity and contain an estimated 1.3 million cubic yards of beach quality material. Maintenance material removed from this area is predominately sand of beach quality. Existing maintenance dredging operations in this area utilizes the offshore disposal area. The removal of the existing material from disposal islands 3 and 4 in conjunction with the new work dredging will facilitate placement of future maintenance material in islands 3 and 4. Future maintenance material placed in islands 3 and 4 would be used to nourish adjacent beaches.

**13. Plan Formulation.** The disposal plan for material presented in the June 1996 Cape Fear-Northeast Cape Fear Rivers project feasibility report proposed the placement of all dredge material from these channel reaches in the offshore disposal area. Subsequent investigations of material characteristics have shown that this material is of beach quality and this valuable resource would be best utilized to meet nourishment needs of the nearby beaches. Placement options for the 0.6 million cubic yards of new work material from the navigation channel includes potential placement of this material on Carolina Beach, Kure Beach, or Fort Fisher for 7,000 feet south of the southern terminus of the rock revetment. Placement options for the new work material from the navigation channel combined with pump out of islands 3 and 4 includes provisions for placement of 1.9 million cubic yards of material on adjacent beaches including Carolina Beach, Kure Beach, the Fort Fisher area, Bald Head Island, or Caswell Beach. Final placement decisions for the new work and maintenance material associated with the inner harbor from the Snows Marsh reach through the Horseshoe Shoal reach will assure that the dredge material disposal occurs in the least costly, environmentally acceptable manor, consistent with engineering requirements established for the project.

### **Maintenance Material Disposal Plan**

**14. Plan Formulation.** Maintenance of the Wilmington Harbor Entrance Channel has historically required the removal of between 850,000 to 1,000,000 cubic yards of material each year. The maintenance material has normally been deposited in the ODMDS. Of the total volume removed each year, about 300,000 to 400,000 cubic yards has been littoral material derived from the adjacent beaches on Oak Island and Bald Head Island. This volume of littoral sediment constitutes 40 to 50 percent of the gross littoral transport along the Brunswick County beaches. Littoral material deposits in the bar channel primarily as a result of the eastward movement of Jay Bird Shoal and the westward movement of Bald Head Shoal into the channel area. The littoral sands generally deposit in channel reaches between channel stations 0+00 and 120+00. Seaward of station 120+00, the shoal material consist primarily of riverine silts and clays. While the new ocean bar channel will have an alignment different from the existing bar channel, shoaling patterns in the new channel, particularly in the vicinity of Jay Bird Shoal and Bald Head Shoal, are expected to be similar to the existing channel. The rate of shoaling of littoral sand in the new channel is estimated to be 545,000 cubic yards per year. The higher rate of deposition of littoral material in the new bar channel compared to the existing is due to channel modifications that would widen the channel to the west along the Smith Island Range and portions of the Baldhead Shoal range and cut across the seaward portions of Bald Head Shoal, as shown

on *Figure 1*. The volume of riverine silts and clays that will shoal the seaward portions of the new entrance channel are projected to be 538,000 cubic yards per year or about the same as that which occurs in the existing entrance channel.

15. The dredged material disposal plan for the entrance channel maintenance material was developed in accordance with U.S. Army Corps of Engineers policy with regard to the disposal of dredged material from Federal navigation channels. The Corps policy is contained in 33 CFR Parts 335-338 reads as follows:

**“It is the Corps’ policy to regulate the discharge of dredged material from its projects to assure that dredged material disposal occurs in the least costly, environmentally acceptable manner, consistent with engineering requirements established for the project.”**

The policy further states:

**“The least costly alternative, consistent with sound engineering practices and selected through the 404(b)(1) guidelines or ocean disposal criteria, will be designated the Federal standard for the proposed project.”**

(Note: Section 404 guidelines of the Clean Water Act apply to beach nourishment, island creation, or construction of underwater berms whereas ocean disposal is covered by the Ocean Dumping Act.)

Finally, with specific reference to the disposal of maintenance material, the policy states (33 CFR Part 337.9):

**“(a) District engineers should identify and develop dredged material disposal management strategies that satisfy the long-term (greater than 10 years) needs for Corps projects. Full consideration should be given to all practicable alternatives including upland, open water, beach nourishment, within banks disposal, ocean disposal, etc.”**

16. The Federal policy notwithstanding, the State of North Carolina adopted a set of policies in 1992 designed to insure that beach quality sand not be removed from the active beach system. The U.S. Department of Commerce, pursuant to the Federal Coastal Zone Management Act of 1972, has incorporated these policies into the North Carolina Coastal Management Program. As a result, the State of North Carolina includes these policies in its consistency review of Federal activities. In 1993, the North Carolina General Assembly enacted a statute that put the coastal management policy into law. While there is continuing legal debate over the applicability of the State Law to Federal projects, the Federal Government is required to be consistent with the State’s coastal management program to the maximum extent practicable. Accordingly, the disposal plan for the maintenance material removed from the Wilmington Harbor entrance channel will attempt to satisfy these State requirements.

17. Based on the Corps policy given above, three factors were considered in the development of a dredged material disposal plan for maintenance of the harbor entrance, namely; engineering requirements of the project, environmental impacts, and cost. These factors are discussed below.

18. **Engineering Requirements.** The construction and maintenance of a deep ocean entrance channel through a tidal inlet will have the same impact on the movement of littoral sediment past the entrance as stabilizing structures such as jetties. However, the impacts of a dredge channel on the adjacent shorelines are generally more subtle than the impacts associated with stabilizing structures. In the case of stabilizing structures, there is usually a visible build-up of material adjacent to the updrift structure with corresponding erosion downdrift of the opposite structure. These impacts are normally clearly visible and measurable within distances of thousands of feet of the structures. Navigation projects that include stabilizing structures are generally formulated to include some means to bypass sand from one side of the entrance to the other in order to prevent project induced erosion on the adjacent beaches. Dredged channels, on the other hand, do not cause material to build-up on one side of the inlet or the other, rather, the impact of sediment removal from the dredged channel tends to be diffused throughout the impacted area. Since this diffusion process can extend over miles of shoreline, the erosive impact of the sediment removed from the navigation channel and its deposition outside the active littoral zone is difficult to detect in the short term since the magnitude of the impact may be of the same order as normal temporal fluctuations in the shoreline position. Also, where stabilizing structures generally have a well-defined impact on the predominant downdrift beach, channel projects affect both sides as material is deposited in the navigation channel from both the updrift and downdrift beaches.

19. The Wilmington Harbor project, historically, has not included the disposal of littoral sands on the adjacent beaches or in the active littoral zone. This has been primarily due to the maintenance practices that were established with the inception of the project over 100 years ago. Dredging technology that existed during the early history of the project dictated maintenance procedures and dredged material disposal practices. In this regard, hopper dredges, with hopper doors that opened by swinging down, were highly efficient in removing shoal material from channels but were restricted by their loaded drafts and swinging hopper doors to depositing the dredged material in relatively deep water. As a result, the "Federal Standard" for maintaining navigation projects, like Wilmington Harbor, became the cost and impacts associated with hopper dredging and ocean disposal of the dredged material in water depths of 30 feet or more.

20. The early establishment of the "Federal Standard" for maintenance of Wilmington Harbor did not consider the overall impacts of removing littoral sediment from the littoral system. This was due in part to the limited coastal development that existed when the projects were first constructed, but also due to lack of sufficient scientific understanding of coastal processes and the sand sharing system associated with tidal inlets and adjacent beaches. Years of research by the U.S. Army Corps of Engineers and practical knowledge gained from the operation of the numerous coastal navigation projects around the country has resulted in the realization that littoral material must be conserved. Natural supplies

from rivers and streams are not replenishing littoral sediments, particularly on the East Coast of the United States. Thus, the removal of a cubic yard of littoral sediment from a tidal entrance or inlet with deposition outside the active littoral zone of the beach will ultimately cause a cubic yard deficit somewhere within the sand sharing system affected by that particular entrance or inlet. The impact of the removal of littoral sediment from the active littoral zone through channel maintenance is identified as a major cause of man-induced erosion in the U.S. Army Corps of Engineers Shore Protection Manual. From an engineering perspective, the primary requirement for the Wilmington Harbor maintenance program, apart from assuring that the channel remains open year-round, is to prevent project induced erosion of the adjacent beaches by conserving the limited natural resource, sand, through deposition directly on the adjacent beaches.

21. Wave transformation/sediment transport studies were conducted by the Coastal and Hydraulics Laboratory (CHL), U.S. Army Corps of Engineers, Engineer Research and Development Center, for the Wilmington District, to determine the theoretical rate of longshore sediment transport moving toward the Cape Fear River Entrance. The results of this study are reported in reference 3.

22. The results of the sediment transport analysis for the existing condition near the Cape Fear River entrance found that sediment transport potential to the east off Caswell Beach is 270,000 cubic yards per year while a comparable rate to the west off Bald Head Island is about 527,000 cubic yards per year. Combining these two transport rates results in a gross transport of littoral sediment moving into the entrance of 797,000 cubic yards per year. In terms of percentages, approximately 66 percent of the sediment shoaling the entrance channel comes from Bald Head Island while 34 percent is derived from Caswell Beach. In order to maintain the sediment balance on both islands, littoral material removed from the entrance channel will be placed back on the beach from whence it came. Accordingly, two out of every three cubic yards of littoral shoal material removed from the entrance channel will be placed back on Bald Head Island and the remaining cubic yard placed on East Oak Island-Caswell Beach. The disposal locations on each island will be based on the results of annual beach profile monitoring surveys. In general, the material will be placed primarily along portions of South Beach and West Beach on Bald Head Island and on East Oak Island-Caswell Beach beginning at a point just east of the Carolina Power and Light Company cooling water discharge canal.

23. The distribution of littoral shoal material between Bald Head Island and East Oak Island - Caswell Beach given above will be accomplished by placing material from two consecutive maintenance operations on Bald Head Island with the third operation involving placement on Oak Island-Caswell Beach. Historically, littoral sediment shoaling in the entrance channel has been the highest in the Smith Island Range as a result of the eastward encroachment of Jay Bird Shoal into the channel. In 1991, a 50-foot channel widener was constructed along the west side of the Smith Island Range and was effective in trapping east moving sediment off of Jay Bird Shoal but was not large enough to significantly increase the time between maintenance dredging operations. In 1996, the widener was increased to 100 feet, which increased the maintenance cycle for this segment of the entrance channel to approximately every two years. The design of the deeper

channel into Wilmington Harbor includes a 150-foot channel widener west of the Smith Island Range, as shown on *Figure 1*. Consequently, maintenance dredging of the Smith Island Range and the landward end of the Baldhead Shoal Range should only be required every two years. Based on a two year maintenance cycle, 1,090,000 cubic yards of littoral material will be placed on Bald Head Island in year 2 and year 4 following the initial deepening of the harbor with this same volume placed on Oak Island-Caswell Beach during the 6<sup>th</sup> year following channel deepening. This disposal cycle is planned for the life of the project. The equivalent annual deposition of material would be 363,000 cubic yards per year to Bald Head Island and 182,000 cubic yards per year to Oak Island-Caswell Beach.

24. **Environmental Impacts.** The dredged material disposal plan for the new work material and that for the sandy maintenance material would not only improve the condition of the beaches adjacent to the harbor entrance but would maintain the beaches in a more stable condition. The wider more stable beaches, particularly along Bald Head Island and the East Oak Island-Caswell Beach disposal areas, would provide improved sea turtle nesting habitat compared to the present condition of these beaches. Even in their present state, the shorelines of East Oak Island, Caswell Beach, and Bald Head Island provide some of the most important sea turtle nesting habitat in North Carolina. In this regard, statistics compiled by the North Carolina Wildlife Resources Commission over the last 6 years (1994 to 1999 inclusive) show that approximately 33 percent of the sea turtle nest in North Carolina occurred on these three beaches. This relative high percentage of the total statewide nests is even more impressive given that these beaches constitute only 5 percent of the entire shoreline of North Carolina.

25. The disposal of material on the beach will have some short term negative impacts including the temporary increase in turbidity during the disposal operation and the smothering or otherwise displacement of organisms that live in or near the beach foreshore. Turbidity caused by the disposal operation normally does not persist more than one or two tidal cycles (12 to 24 hours) following the cessation of the disposal operation. With regard to the smothering or displacement of the nearshore organisms, studies by the University of Virginia for the U.S. Fish and Wildlife Service on Pea Island have shown that the organisms generally return to the area in about one year. The disposal plan for the maintenance material discussed above would involve the placement of material on Bald Head Island in intervals of 2, 4, and 8 years while disposal on Oak Island-Caswell Beach would occur in 6 year intervals. Thus, the nearshore organisms would not be completely eliminated from the area as a result of the disposal operation. In summary, the positive environmental impacts associated with the deposition of the littoral shoal material on the beach versus depositing it in an ocean disposal site far outweigh the negative impacts.

26. **Cost.** The "Federal Standard" for constructing and maintaining navigation channels focuses on the least costly method of disposing the material, even though policy dictates that the environmental and engineering requirements must also be considered. With respect to the disposal plan for the new work entrance channel material, the limited capacity of the existing ODMDS dictates that the beach quality material be placed on the adjacent beaches, otherwise, the construction of the deeper project would have to be

delayed by about a year. Even if the project were to be delayed a year to allow ocean disposal of the beach quality material, cost comparisons indicate that beach disposal would still be the most cost effective disposal option.

27. **Maintenance Material Disposal.** Even if beach disposal of the maintenance material resulted in some additional cost, the Corps of Engineers, under authority of Section 207 of the Water Resources Development Act of 1996, can elect to use a slightly more costly disposal method if there are overriding environmental and erosion control benefits associated with the more costly disposal scheme.

28. Future disposal of maintenance material in the ocean will be in the new ODMDS located 5 miles farther offshore than the existing ODMDS. This additional haul distance almost doubles the cost of ocean disposal. As a result, beach disposal of the beach quality maintenance material becomes the least costly option, particularly if maintenance of the beach quality material is only required every two years. While the intent of the sand management plan is to return littoral material to the beach, the primary purpose of the project is to provide safe navigation through the ocean entrance into Wilmington Harbor. In this regard, there may be occasions during the life of the project when problem shoals occur in the entrance channel between normal 2-year maintenance cycle. In order to prevent disruption of navigation, these shoals must be removed in an expedient manner. If the size of these problem shoals are small (for example less than 100,000 cubic yards), mobilization and demobilization of an ocean certified pipeline dredge may not be economical. Therefore, on these occasions, removal of the shoals could be accomplished with a hopper dredge with disposal of the material in the ODMDS. In any event, a comparison of the cost for ocean disposal versus beach disposal of the littoral material is provided in *Table 3*. This cost comparison is made over a 6 year period which corresponds to the time period associated with the sand sharing formula between Bald Head Island and Oak Island-Caswell Beach.

29. **Summary.** The sand management plan developed for the new work beach quality material and maintenance material to be removed from the entrance channels into Wilmington Harbor includes the following:

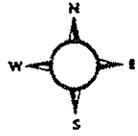
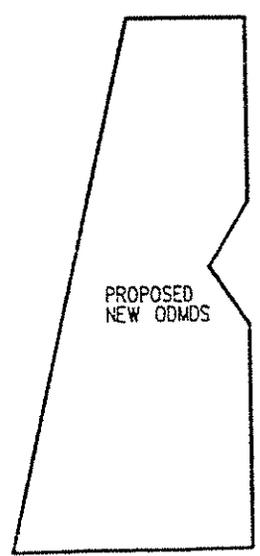
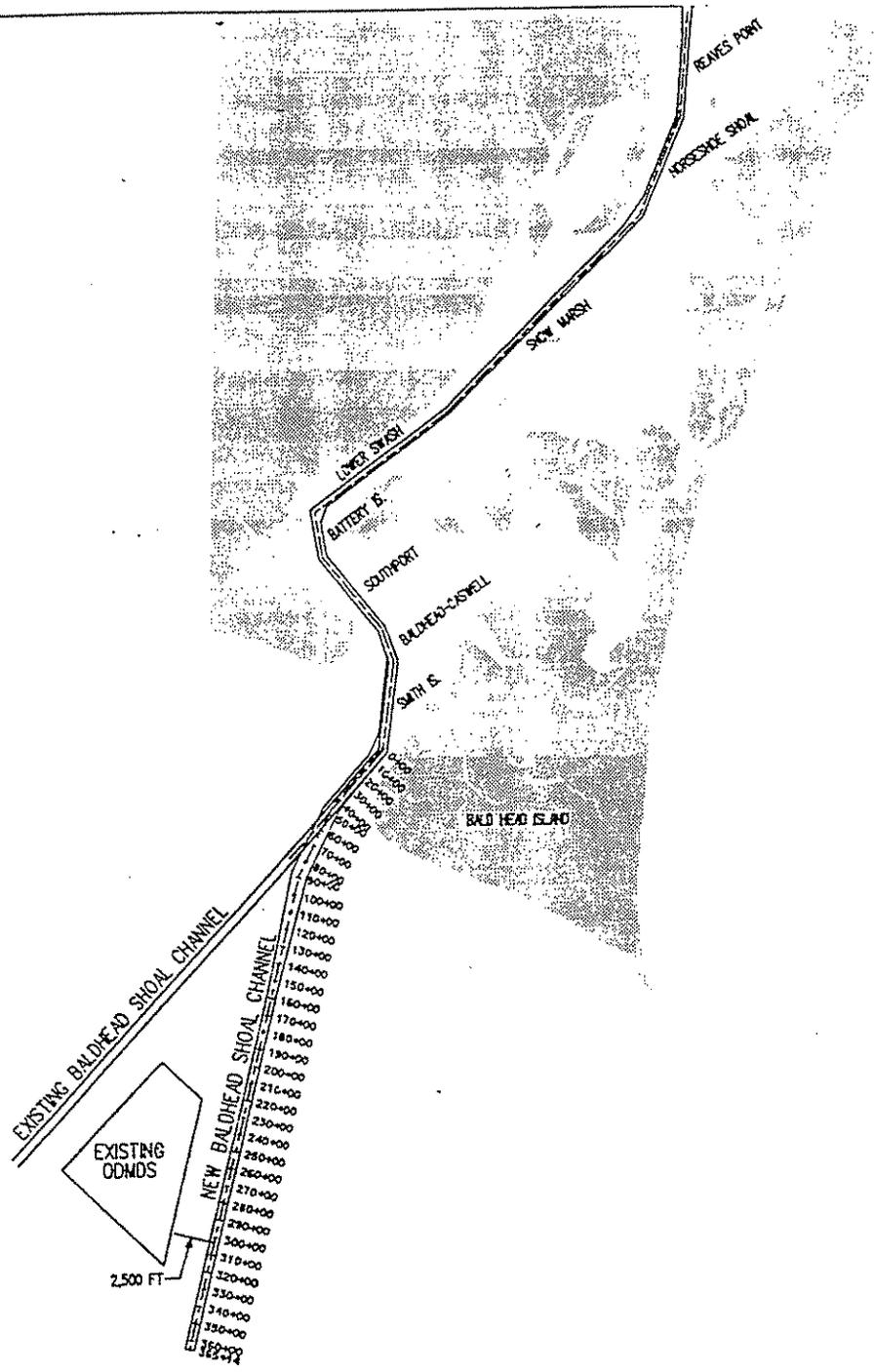
- (a) Disposal of the new work beach quality material on Bald Head Island and Oak Island-Caswell Beach.
- (b) In the absence of Section 933, up to 2,580,000 cubic yards of the new work material would be placed on Bald Head Island and up to 3,420,000 on Oak Island-Caswell Beach.
- (c) Under Section 933, the material would be distributed along Bald Head Island, Caswell Beach, Oak Island, and Holden Beach.
- (d) Beach quality maintenance material will be deposited directly on Bald Head Island and Oak Island-Caswell Beach with Bald Head Island receiving 2 yards for every yard placed on Oak Island-Caswell Beach.

**Table 3**  
**Cost Comparison – Ocean Disposal versus Beach Disposal**  
**Ocean Entrance Channel Maintenance Material**

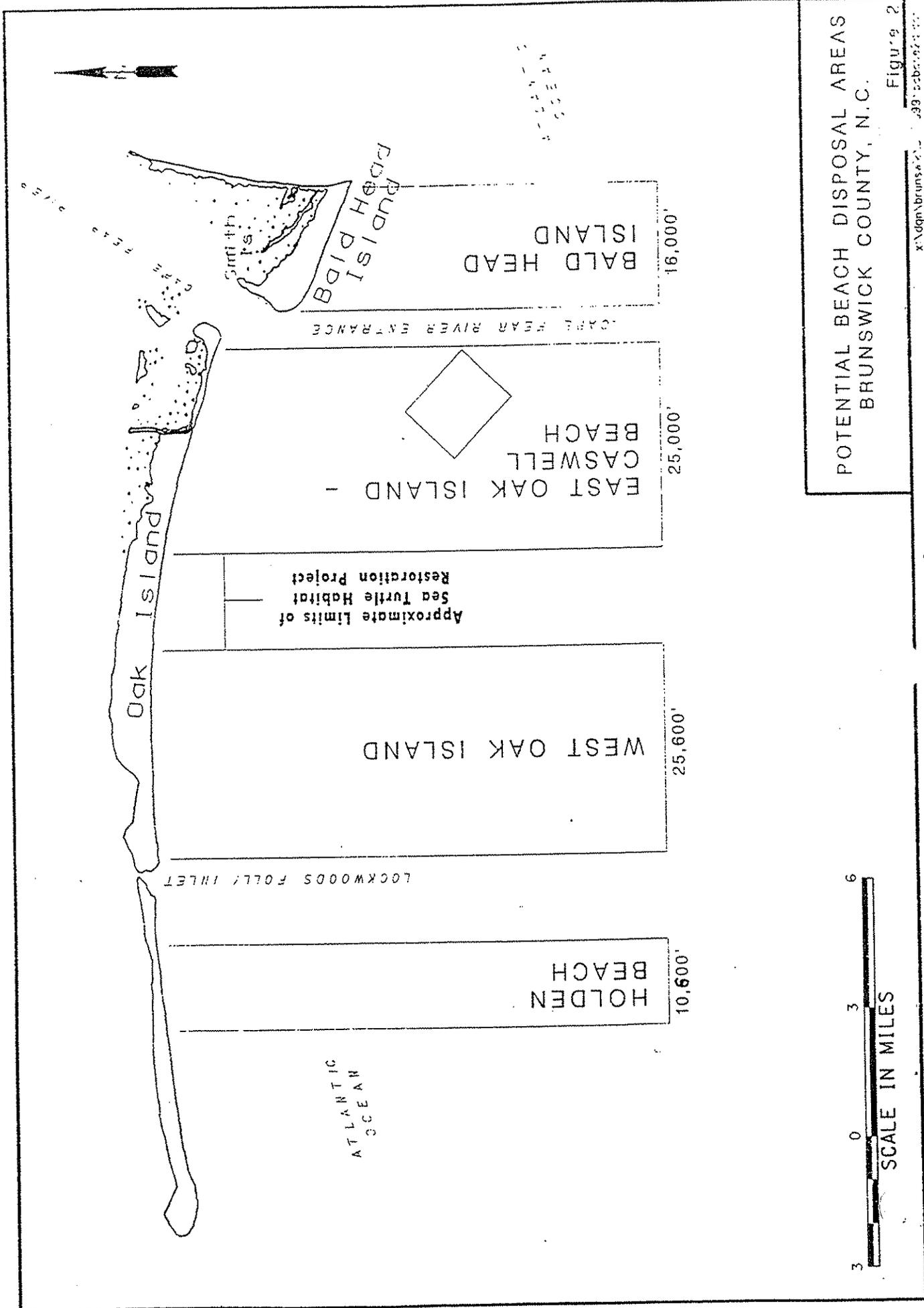
Item	Quantity	Unit	Unit Cost	Cost
<b>Beach &amp; Ocean Disposal – Maintenance Material</b>				
<b>Year 1: Hopper Dredge Silt &amp; Clay</b>				
Mob & Demob Hopper	1	job	\$331,000	\$331,000
Dredging w/ Ocean Disposal	538,000	CY	\$4.00	\$2,152,000
<b>Total Year 1 Dredging Cost</b>				<b>\$2,483,000</b>
<b>Year 2: Hopper Dredge Silt &amp; Clay</b>				
Mob & Demob Hopper	1	job	\$331,000	\$331,000
Dredging w/ Ocean Disposal	538,000	CY	\$4.00	\$2,152,000
Mob & Demob Pipeline Dredge	1	job	\$948,000	\$948,000
Dredging-Disposal on Bald Head	1,090,000	CY	\$3.10	\$3,379,000
<b>Total Year 2 Dredging Cost</b>				<b>\$6,810,000</b>
<b>Year 3: Hopper Dredge Silt &amp; Clay</b>				
Mob & Demob Hopper	1	job	\$331,000	\$331,000
Dredging w/ Ocean Disposal	538,000	CY	\$4.00	\$2,152,000
<b>Total Year 3 Dredging Cost</b>				<b>\$2,483,000</b>
<b>Year 4: Hopper Dredge Silt &amp; Clay</b>				
Mob & Demob Hopper	1	job	\$331,000	\$331,000
Dredging w/ Ocean Disposal	538,000	CY	\$4.00	\$2,152,000
Mob & Demob Pipeline Dredge	1	job	\$948,000	\$948,000
Dredging-Disposal on Bald Head	1,090,000	CY	\$3.10	\$3,379,000
<b>Total Year 4 Dredging Cost</b>				<b>\$6,810,000</b>
<b>Year 5: Hopper Dredge Silt &amp; Clay</b>				
Mob & Demob Hopper	1	job	\$331,000	\$331,000
Dredging w/ Ocean Disposal	538,000	CY	\$4.00	\$2,152,000
<b>Total Year 5 Dredging Cost</b>				<b>\$2,483,000</b>
<b>Year 6: Hopper Dredge Silt &amp; Clay</b>				
Mob & Demob Hopper	1	job	\$331,000	\$331,000
Dredging w/ Ocean Disposal	538,000	CY	\$4.00	\$2,152,000
Mob & Demob Pipeline Dredge	1	job	\$1,275,000	\$1,275,000
Dredging-Disposal on Oak Island-Caswell	1,090,000	CY	\$4.60	\$5,014,000
<b>Total Year 6 Dredging Cost</b>				<b>\$8,772,000</b>
<b>Total 6-Year Dredging Cost</b>				<b>\$29,841,000</b>

<b>Ocean Disposal of All Maintenance Material</b>				
Yearly Hopper Dredge Cost for Ocean				
Disposal of all Maintenance Material				
Mob & Demob	1	job	\$331,000	\$331,000
Dredging w/ Ocean Disposal	1,083,000	CY	\$4.40	\$4,765,200
<b>Total Annual Dredging Cost</b>				\$5,096,200
<b>Total 6-Year Dredging Cost</b>				<b>\$30,577,200</b>

Date Revised: 02/04/00-sv



WILMINGTON HARBOR  
 SAND MANAGEMENT PLAN  
 BALDHEAD SHOAL ALIGNMENTS  
 FIG. 1



POTENTIAL BEACH DISPOSAL AREAS  
BRUNSWICK COUNTY, N.C.

Figure 2





NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

DIVISION OF COASTAL MANAGEMENT

RECEIVED EXECUTIVE OFFICE

June 15, 2000

2000 JUN 26 A 11: 03

JAMES B. HUNT JR. GOVERNOR

BILL HOLMAN SECRETARY

DONNA D. MOFFITT DIRECTOR

Colonel James W. DeLony
District Engineer
U.S. Army Corps of Engineers
Wilmington District
P.O. Box 1890
Wilmington, NC 28402-1890

Action: PM-C
CF: DE
DX
DP
TS
OC

REFERENCE: DCM00-14 EA and CD - Preconstruction Modifications of Authorized Improvements, Wilmington Harbor 96 Project

Dear Col. DeLony:

On May 17, 2000 the State of North Carolina completed its review, pursuant to 15 CFR 930 Subpart C - Consistency for Federal Activities, of the referenced document describing proposed modifications to the authorized Wilmington Harbor 96 Project in New Hanover and Brunswick Counties, North Carolina. The Corps of Engineers submitted the document to the state on February 17, 2000, and the project was assigned the number DCM00-14 for our review purposes.

During the course of our review several environmental concerns were raised by state agencies regarding potential impacts on the resources of the coastal zone. These comments were forwarded to the Corps for its consideration. As the consistency deadline was approaching, we extended our original consistency deadline 15 days, pursuant to 15 CFR 930.41, at the end of March. On April 10, 2000, our review was again extended to allow concerned state agencies to review the Corps' responses to comments on the Environmental Assessment (EA). The Division of Coastal Management received the Corps' responses on May 3 and again solicited comments from concerned state agencies.

The modifications that the Wilmington District Corps of Engineers seeks authorization for are as follows:

- 1. Construction and maintenance of the Wilmington Harbor entrance channel along a new alignment across the ocean bar.
2. Backfilling the abandoned channel length with dredged material not suited for beach or littoral zone disposal.



MAILING: 1638 MAIL SERVICE CENTER, RALEIGH, NORTH CAROLINA 27600-1638

PHYSICAL: 2728 CAPITAL BLVD., RALEIGH, NC 27604

PHONE: 919-733-2293 FAX: 919-733-1495

AN EQUAL OPPORTUNITY / AFFIRMATIVE ACTION EMPLOYER - 50% RECYCLED / 10% POST-CONSUMER PAPER

DENR TOLL FREE HOTLINE: 1-877-623-6748

Handwritten initials

Col. James W. DeLony

June 15, 2000

Page 2

3. Placement of material dredged from the new channel alignment and other portions of the project on area beaches in New Hanover and Brunswick Counties.
4. Establishment of a comprehensive plan for dredging and disposal operations for each portion of the harbor, including hopper dredge with overflow.
5. Utilization of blast pressure criteria to measure impacts of blasting on aquatic resources and the elimination of the bubble curtain during blasting operations.
6. Placement of dredged material that does not go to the old channel, the littoral zone, the beaches, or other existing disposal sites, into the Offshore Dredged Material Disposal Site (ODMDS).

The Corps proposes to construct the new entrance channel alignment and place all suitable material on the nearby beaches over an approximately eighteen month period covering two winter seasons and one summer season. Turtle monitoring and shorebird surveys of affected beaches will be conducted. Details of the disposal operations for construction and maintenance of the channel are documented in a Sand Management Plan (SMP). In addition, the Corps has clarified details of the placement, timing, costs, and amount of sand to be deposited on the beaches of Bald Head Island, Caswell Beach, Oak Island, and Holden Beach in a letter dated June 9, 2000 from Colonel James W. DeLony, District Engineer, to the mayors of the respective beach towns. We understand that disposal of dredged material from construction and maintenance of the project will be conducted according to the SMP and letter, as agreed to by the NC Division of Water Resources, the Brunswick County beach communities and the Corps of Engineers. We also understand that the use of hopper dredge with overflow will be limited to times of year and reaches of the project in which impacts on coastal resources will be minimized.

Based upon our review of the EA and the Corps of Engineers' response to comments, we do not disagree with your determination that the proposed construction and changes in harbor maintenance procedures are consistent with the North Carolina Coastal Management Program to the maximum extent practicable, provided that the project is performed according to the EA (including the Sand Management Plan and other appendices) and the Corps' responses to comments from the EA, and to Colonel DeLony's letter of June 9, 2000 (including attachments), and that the conditions below are met.

Col. James W. DeLony

June 15, 2000

Page 3

1. Principal amongst the issues raised were potential impacts on sea turtles, shore and water birds, beach and benthic infauna, fisheries, and water quality parameters. It is extremely important that the impacts of this multifaceted project be well documented in order to evaluate the effects on these resources and on the overall coastal environment. The Corps of Engineers will pursue an integrated monitoring plan to address the resources noted in the first sentence of this paragraph, and will coordinate all monitoring efforts with the appropriate state agencies. This will include but not be limited to the North Carolina Division of Coastal Management, the Wildlife Resources Commission, the Division of Marine Fisheries, and the Division of Water Quality. We understand that the Corps intends to initiate monitoring coordination with the resource agencies in June of 2000.
2. As additional mitigation for impacts on fisheries resources, a fish passage structure will be constructed at Lock and Dam 1 on the Cape Fear River. In addition, fish passage alternatives for Lock and Dams 2 and 3 will be investigated. The Corps of Engineers and, as the Wilmington Harbor Project Sponsor, the State of North Carolina, have agreed to these actions.
3. The placement, timing, costs, and amount of sand to be deposited on Bald Head Island, Caswell Beach, Oak Island, and Holden Beach, both during construction and future maintenance; monitoring; and response to impacts shall be in accordance with Col. DeLony's letter of June 9, 2000, to the mayors of the respective towns receiving the sand (attached and incorporated by reference). If the towns, Corps, and project sponsor's representative mutually agree to modifications to the SMP or Col. DeLony's June 9, 2000 letter, those modifications shall be submitted to the North Carolina Division of Coastal Management for a determination of whether another consistency review is necessary on the modifications.
4. The state must have the opportunity to review the project, including monitoring results, to determine if it continues to be consistent with the North Carolina Coastal Management Program in two situations: 1) After five years from the date of this letter, and 2) before any subsequent modifications for future maintenance or other requests to modify the Wilmington Harbor 96 Project are considered. The Corps shall request this review and provide documentation of impacts (or lack thereof) on the coastal resources of concern.

Col. James W. DeLony

June 15, 2000

Page 4

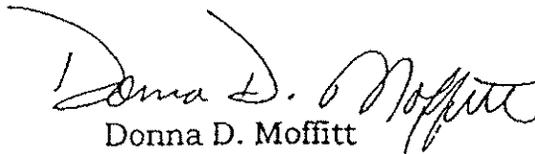
5. If in the future the Corps considers requesting authorization to conduct hopper dredging with over flow or to place maintenance dredge spoil on a beach, outside of the established time periods or locations, a separate consistency review will be required for each of these activities.

While the State of North Carolina supports beach nourishment and the placement of suitable spoil material on the beaches, we remain concerned about the short term and long term impacts on the biologic and ecologic resources of the coast. We maintain that the best time for such beach nourishment and renourishment is outside of the period of peak impacts on infauna, sea turtles, and fisheries. The State discourages individuals and agencies from seeking authorization to perform work outside established moratoria, and caution that our response is not to be interpreted as a precedent assuring authorization for future renourishment or disposal of sand on beaches outside of established dredging and disposal moratoria. We understand that summer beach disposal is necessary only during the construction phase of the project and that maintenance of the harbor channels will be conducted within established biological time frames.

Finally, with the increasing number of beach disposal and renourishment projects, much of the state's southern coast beaches will be in the placement or recovery phases in any given year. To this end, the Division of Coastal Management requests that the Corps consider combining the monitoring studies and environmental considerations of this project, the Wrightsville Beach, Carolina Beach, Kure Beach projects, and all of the Brunswick County Beaches projects to achieve a more comprehensive and cumulative impact analysis. Although these projects are separate in authorization and funding, we feel that concurrent studies could provide beneficial insights on impacts to resources from beach disposal and nourishment along this extended reach of shoreline.

If you have any questions regarding our findings, conditions, or recommendations, please contact Ms. Caroline Bellis, Division of Coastal Management, at (919) 733-2293. Thank you for your consideration of the North Carolina Coastal Management Program.

Sincerely,

  
Donna D. Moffitt

Col. James W. DeLony  
June 15, 2000  
Page 5

Attachment

cc: Bob Stroud, Division of Coastal Management, Wilmington  
Franklin McBride, NC Wildlife Resources Commission  
Bennett Wynne, NC Wildlife Resources Commission  
Ruth Boettcher, NC Wildlife Resources Commission  
Fritz Rohde, NC Division of Marine Fisheries  
Mike Street, NC Division of Marine Fisheries  
John Dorney, Division of Water Quality  
Frank Yelverton, US Army Corps of Engineers  
John Meshaw, US Army Corps of Engineers



DEPARTMENT OF THE ARMY  
WILMINGTON DISTRICT, CORPS OF ENGINEERS  
P.O. BOX 1890  
WILMINGTON, NORTH CAROLINA 28402-1890

IN REPLY REFER TO

June 9, 2000

Project Management Branch

Honorable Freeman A. Berne  
Mayor of the Village of Bald Head Island  
Post Office Box 3009  
Baldhead Island, North Carolina 28461

Honorable Harry Simmons  
Mayor of Caswell Beach  
707 Caswell Beach Road  
Caswell Beach, North Carolina 28465

Honorable Joan Altman  
Mayor of Oak Island  
4601 East Oak Island Drive  
Oak Island, North Carolina 28465

Honorable James W. Lowell  
Mayor of Holden Beach  
110 Rothschild Street  
Holden Beach, North Carolina 28462

Dear Mayors:

After years of effort by many, it is a pleasure to see the various elements of the Wilmington Harbor Navigation project (hereinafter the "Project") coming together. As we approach the decision point for the Finding of No Significant Impact (FONSI), I want to bring everyone up to date on the status of our plan to place beach quality sand excavated for the project on Bald Head Island, Caswell Beach, Oak Island, and Holden Beach.

As you know, the details of our plan are presented in the Environmental Assessment, in particular, Appendix A - Sand Management Plan, in the Wilmington Harbor Monitoring Plan, and in the Section 933 Evaluation Report. The shoreline segments recommended to receive sand are the Village of Bald Head Island (up to 16,000 linear feet), Caswell Beach (up to 25,000 linear feet), Oak Island (up to 25,600 linear feet), and Holden Beach (up to 10,600 linear feet). This represents a maximum shoreline length of 77,200 linear feet.

Bald Head Island will be the site of initial beach disposal associated with construction. This site, along with the easternmost 25,000 linear feet of Caswell Beach-Oak Island, represents the least cost alternative of disposal available to the Project; accordingly, placement will be accomplished at Project cost and at no cost to the Village of Bald Head Island.

RECEIVED

JUN 16 2000

COASTAL MANAGEMENT

AM. 2

Placement will be according to the March 31, 2000 memorandum from Erik J. Olsen, consultant to the Village of Bald Head Island referencing the Village of Bald Head Island Beach Disposal Plan (2000/2001) (enclosed and incorporated by reference) to the U.S. Army Corps of Engineers, Wilmington District (hereinafter "Corps").

Once disposal has begun at the Village of Bald Head Island, fill operations will continue until the estimated minimum of 1,536,000 cubic yards of sand in the channel prism allocated to the Village of Bald Head Island (based on channel surveys conducted in October and December 1999) have been dredged and placed on the beach in accordance with the March 31, 2000 memorandum. Assuming a potential effective reduction of 20 percent in the gross fill dredged, the final in-place fill volume is expected to range between 1,228,000 cubic yards and 1,536,000 cubic yards.

Project construction beach disposal operations at the Village of Bald Head Island will be performed along both West Beach and South Beach, as indicated by the March 31, 2000 memorandum. The Village of Bald Head Island will provide all requisite easements necessary to construct the template(s) provided for by the March 31, 2000 memorandum.

Once the placement of beach quality sand at the Village of Bald Head Island is complete, placement along approximately 25,000 linear feet of shoreline at the easternmost end of Caswell Beach-Oak Island will be accomplished. Placement will be made in accordance with the template agreed to by the Corps, NCDENR, and the communities of Caswell Beach and Oak Island. The final in-place fill volume is expected to range between 1,451,000 cubic yards and 1,814,000 cubic yards. Since this reach comprises the balance of the least cost alternative for disposal available to the Project, placement will be at Project cost and at no cost to those communities. All requisite easements will be provided by the communities at no cost to the Project.

Under the provisions of the draft Section 933 report, the remaining beach quality sand will be placed along approximately 25,600 linear feet of the westernmost shoreline of Oak Island and along approximately 10,600 linear feet of the eastern shoreline of Holden Beach. Placement will be made in accordance with the template agreed to among the Corps, NCDENR, and the affected beach communities and cost shared at the rate of 65 percent Federal (currently estimated at \$6,500,000) and 35 percent non-Federal (currently estimated at \$3,500,000). The final in-place fill volume along the cost shared reach of Oak Island is expected to range between 1,272,000 cubic yards and 1,590,000 cubic yards. The final in-place fill volume along the cost shared reach of Holden Beach is expected to range between 528,000 cubic yards and 660,000 cubic yards. The communities will provide all required easements at no cost to the Project.

After construction of the Smith Island and Bald Head Island Shoal portions of the project, the U.S. Army Corps of Engineers will conduct periodic maintenance dredging of the navigation channels. The disposal of all beach quality dredged material will be accomplished in accordance with the Environmental Assessment of Preconstruction Modifications of Authorized Improvements, Wilmington Harbor, North Carolina, dated February 2000 and its Sand Management Plan (Appendix A), and the Wilmington Harbor Monitoring Plan (enclosed and incorporated by reference). The associated disposal will be as called for therein, namely:

- Year 2: Placement at Bald Head Island (estimated @ 1Mcy)
- Year 4: Placement at Bald Head Island (estimated @ 1 Mcy)
- Year 6: Placement at Caswell Beach and easternmost end of Oak Island (estimated @ 1 Mcy).

This disposal cycle is planned for the life of the project. As provided on page 8 of the Environmental Assessment and on page 12 of the sand management plan, in some cases problem shoaling involving small quantities of sand may develop in the channel between regular dredging events, making use of a pipeline dredge unfeasible and the sand may need to be deposited in the ocean disposal area.

Prior to each disposal operation at either the Village of Bald Head Island, or Caswell Beach, or the easternmost shoreline of Oak Island, the community receiving the sand may provide advance guidance to the Corps regarding placement distributions and fill template design. The Corps will follow that guidance to the maximum extent practicable.

The Corps will conduct a monitoring program as referred to in the Environmental Assessment and Sand Management Plan, and as set out in the Wilmington Harbor Monitoring Plan, which is enclosed and incorporated by reference. An annual report will be prepared, as described in the Monitoring Plan. The Corps will use this monitoring data to evaluate and adjust the Sand Management Plan, as determined necessary, after coordination with interested parties.

All initial and future disposal activities at the Village of Bald Head Island, Caswell Beach, and easternmost Oak Island, (as described in the Environmental Assessment and its Sand Management Plan, and in the Wilmington Harbor Monitoring Plan) will be at no cost to either community.

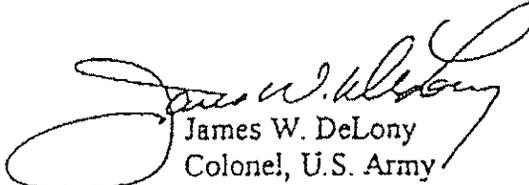
If the Project causes significant adverse effects on adjacent beaches, the Corps and the Sponsor will respond by adjusting the Sand Management Plan, after consultation with interested parties. If the Project causes significant adverse effects that cannot be dealt with by

modifications to the Sand Management Plan, the Corps and the Sponsor will promptly seek and use their best efforts to implement appropriate corrective measures, such as additional nourishment, subject to consistency review.

Our current schedule for execution of the FONSI is June 14, 2000. Our current schedule for our higher headquarters approval of the draft Section 933 Evaluation Report is July 31, 2000. We expect to award a contract to construct the inshore reaches of the Ocean Bar entrance channel on or about November 15, 2000. We are moving prudently but aggressively to make this important Project a reality.

The support of the members of the Brunswick Beaches Consortium and our Project sponsor represented by Mr. John Morris in optimizing this unique opportunity for nourishing your beaches has been wise, energetic, and timely. We salute your efforts and look forward to continued close coordination through to the successful completion and operation of the Project and the associated beneficial use of beach quality sand.

Sincerely,



James W. DeLony  
Colonel, U.S. Army  
District Engineer

Enclosures

Copies Furnished:

Mr. John N. Morris, Director  
Division of Water Resources  
North Carolina Department of Environment  
and Natural Resources  
1611 Mail Service Center  
Raleigh, North Carolina 27699-1611

Ms. Donna D. Moffitt, Director  
Division of Coastal Management  
North Carolina Department of  
Environment and Natural Resources  
1638 Mail Service Center  
Raleigh, North Carolina 27699-1638