Final General Reevaluation Report
and
Final Environmental Impact Statement

on

Hurricane Protection and Beach Erosion Control

WEST ONSLOW BEACH AND NEW RIVER INLET (TOPSAIL BEACH), NORTH CAROLINA

Appendix N

Project Costs

Appendix N: Cost Engineering

1. Cost Estimates were prepared under guidance given in the Corps of Engineers Regulation ER 1110-2-1302, CIVIL WORKS COST ENGINEERING and Engineering Instructions, EI 01D010, CONSTRUCTION COST ESTIMATES.

The National Economic Development (NED) Plan estimate having the greatest net benefits is shown as well as the Locally Preferred Plan (**LPP**) estimate.

2.a. The NED TOTAL CURRENT WORKING ESTIMATE (CWE) for Initial Construction nourishment is $41,581,000 and subsequent Periodic Nourishments is $8,893,000 for each renourishment. This is also referred to as the 1550 plan referring to a dune elevation height of 15-ft and a berm width of 50-feet.

b. The **LPP** TOTAL CURRENT WORKING ESTIMATE (CWE) for Initial Construction is $31,052,000. Subsequent Periodic Nourishments are the same costs as shown above in the NED narrative above. This is also referred to as the 1250X plan referring to a dune elevation height of 12-ft and a berm width of 50-feet.

These costs have been established to be the Baseline Cost Estimate for **October 2006** price levels.

3. The CWE's are shown in the attached MCACES (Microcomputer Aided Cost Engineering System) summary sheets. The summary sheets are formatted into a Code of Accounts framework for reporting. The costs included under each Code of Accounts are described below.

4. CODE OF ACCOUNTS

CODE OF ACCOUNT 01 – LANDS AND DAMAGES: The estimated cost was furnished by the Real Estate Division, Savannah District, and is discussed in the Real Estate Appendix. A contingency of 15% was assigned to this account by the Real Estate Division.

CODE OF ACCOUNT 17 – BEACH REPLENISHMENT: This account includes the costs for mobilization and demobilization, dredging, beach fill shaping, beach tilling, dune vegetation, and dune walkover structures.

Initially, emphasis was placed on accuracy of dredging costs during evaluation of alternative plans to develop the NED Plan. The location and features of borrow areas in relation to the project, as well as historical production of dredges for similar projects, were used in conjunction with the Corps of Engineers Dredge Estimating Program (CEDEP) to determine costs and construction time periods.

CEDEP considers details of borrow area characteristics, depth of borrow, effective production time, distances from borrow sites, costs of dredge plant ownership, operating and repair, fuel consumption, and other economic adjustments for labor and equipment.

a. For Initial Construction it was determined that Borrow Area A would be most suitable for a pipeline dredge to place sand on the beach. Therefore, mobilization, demobilization of dredge equipment, pipe and beach fill equipment, as well as, dredging and beach fill average unit costs are based on a pipeline dredge with placement beginning in Reach 2 which is approximately 3 miles on average from Borrow Area A. The midpoint of the beach fill is between REACH 14 and 15, which is another 2 miles. Therefore the average pumping distance from Borrow Area A to REACH 14 and 15 is approximately 5-miles. The unit price of $6.15 per cubic yard represents the average pumping distance. A contingency of 20% would equal $7.38 per cubic yard. The longest pumping distance from Borrow Area A is approximately 7-miles. The average pumping distance for Initial Nourishment will be the same for the NED and LPP cost estimates. A contingency of 15% was used for other historical unit price costs.

NED PLAN - The initial dredging time for placement of 4,621,000 cubic yards is estimated to take approximately 5.5 months. Additional time for mobilization and set up pipe on the beach would be added to the 5.5 months. Mobilization is typically estimated at approximately 30 days prior to beginning initial placement and 30 days demobilization of pipe and equipment off the beach, as well as beach tilling. The dredging time should be able to be completed within the environmental windows from November 15 through April 30th of each year.

Locally Preferred Plan – LPP - The initial construction time for placement of 3,223,000 cubic yards is estimated to take just over 4.5 months. Additional time for mobilization, set up pipe on the beach, beach tilling, dune plantings, and walkover structures would be added to the 4.5 months.

The cubic yard (cy) quantities represent the amount of borrow material needed which accounts for overfill ratios and losses during placement on the beach.

b. For Periodic Nourishments (same for NED & LPP) it was determined that one hopper dredge with pumpout would be the most suitable method to place sand on the beach. This was based on the borrow area depths and proximity to the beach. A pumpout station located approximately 2,500 to 3,000 feet offshore was assumed. The average travel distance from borrow areas to the pumpout is approximately 4.5 miles. Once the pumpout pipe reaches shore, it was estimated placement would be 3,000 feet in each direction from a tee valve on shore. The unit price of $6.50 per cubic yard represents the average pumping costs using all borrow areas throughout the life of the project. A contingency of 20% would equal $7.80 per cubic yard. A contingency of 15% was used for other historical unit price costs.

The periodic nourishment construction time for placement of 866,000 cubic yards is estimated to take approximately 60 days with one hopper dredge. Additional time for mobilization and set up of pipe/pumpout locations on the beach would be needed. Mobilization would be another 30 days and 30 days for demobilization. The construction time would be able to be completed within the environmental windows for hopper dredges from December through March.

Beach fill consists of shaping the dredged material to the required cross section, dune and berm, while simultaneously pumping material onto the beach. Beach fill shaping costs are included as part of the hopper dredging unit price.

The costs for Beach Tilling were based on historical costs for similar projects. The costs for Dune Vegetation were based on historical pricing and discussions with North Carolina extension services. The price for Dune Walkover Structures was based on detailed cost estimates used for similar structures and historical costs on similar projects.

A contingency was included to represent unanticipated conditions or uncertainties not known at the time the estimate was developed. There is a better than average level of confidence in the dredge pricing, because of the detailed geotechnical investigations of borrow areas, similarities of other beach nourishment projects, and the historical costs for similar projects. A contingency of 20% used for dredge unit price costs and 15% for other historical unit costs for ACCOUNT 17.

CODE OF ACCOUNT 30 – PLANNING, ENGINEERING AND DESIGN: The costs included in this account were furnished by those responsible for performing each activity. This account includes plans and specifications, field investigations and surveys, cost estimates, engineering during construction, and project management. A 20% contingency was assigned to this account.

CODE OF ACCOUNT 31 – CONSTRUCTION MANAGEMENT – This account includes supervision and administration of the contracts by construction management, hydrologic surveys during construction, contracting personnel and project management during construction. A 20% contingency was assigned to this account.

W.Onslow Beach, 1550 Topsail, NC
INITIAL CONSTRUCTION
SUMMARY OF COSTS
CURRENT WORKING ESTIMATE (CWE)
CODE OF ACCOUNTS

Designed By: USACE - WILMINGTON DISTRICT
Estimated By: CESAW-TS-EE

Prepared By: John C. Caldwell
CESAW-TS-EE

Preparation Date: 09/07/07
Effective Date of Pricing: 10/01/06

Sales Tax: 0.00%

	QUANTY	UOM	CONTRACT	CONTINGN	TOTAL COST	UNIT
1 Summary of Initial Construction						
1.01 LANDS AND DAMAGES			1,379,000	207,000	1,586,000	
1.17 BEACH REPLENISHMENT - INITIAL			32,081,000	6,349,000	38,429,000	
1.30 PLANNING, ENGINEERING & DESIGN			930,000	186,000	1,116,000	
1.31 CONSTRUCTION MANAGEMENT			375,000	75,000	450,000	
TOTAL Summary of Initial Construction			34,765,000	6,816,000	41,581,000	

	QUANTY	UOM	CONTRACT	CONTINGN	TOTAL COST	UNIT
1 Summary of Initial Construction						
1.01 LANDS AND DAMAGES						
1.01. B LANDS AND DAMAGES			1,350,000	203,000	1,553,000	
1.01. R REAL ESTATE LAND PAYMENTS			29,000	4,000	33,000	
TOTAL LANDS AND DAMAGES			1,379,000	207,000	1,586,000	
1.17 BEACH REPLENISHMENT - INITIAL						
1.17.01 MOB AND DEMOB			2,230,000	450,000	2,680,000	
1.17.02 DREDGING and BEACH PLACEMENT	4621000	CY	28,419,000	5,684,000	34,103,000	7.38
1.17.03 TILLING	68.00	ACR	41,000	6,000	47,000	690.00
1.17.04 DUNE VEGETATION	71.00	ACR	568,000	85,000	653,000	9200.00
1.17.05 DUNE WALKOVER STRUCTURES	23.00	EA	823,000	123,000	946,000	41130
TOTAL BEACH REPLENISHMENT - INITIAL			32,081,000	6,349,000	38,429,000	
1.30 PLANNING, ENGINEERING & DESIGN						
1.30. A ENGINEERING			720,000	144,000	864,000	
1.30. B ENVIRONMENTAL			10,000	2,000	12,000	
1.30. C PROJECT MGT			200,000	40,000	240,000	
TOTAL PLANNING, ENGINEERING & DESIGN			930,000	186,000	1,116,000	
1.31 CONSTRUCTION MANAGEMENT						
1.31. A CONSTRUCTION MGT & NAVIG SURVEYS			375,000	75,000	450,000	
TOTAL CONSTRUCTION MANAGEMENT			375,000	75,000	450,000	
TOTAL Summary of Initial Construction			34,765,000	6,816,000	41,581,000	

W. Onslow Beach, Topsail, NC
PERIODIC NOURISHMENT
SUMMARY OF COSTS
CURRENT WORKING ESTIMATE (CWE)
CODE OF ACCOUNTS

Designed By: USACE - WILMINGTON DISTRICT
Estimated By: CESAW-TS-EE

Prepared By: John C. Caldwell
CESAW-TS-EE

Preparation Date: 09/07/07
Effective Date of Pricing: 10/01/06

Sales Tax: 0.00%

	QUANTY	UOM	CONTRACT	CONTINGN	TOTAL COST	UNIT
2 Summary of Periodic Nourishment						
2.17 BEACH REPLENISHMENT - PERIODIC			6,568,000	1,497,000	8,065,000	
2.30 PLANNING, ENGINEERING & DESIGN			520,000	78,000	598,000	
2.31 CONSTRUCTION MANAGEMENT			200,000	30,000	230,000	
TOTAL Summary of Periodic Nourishment			7,288,000	1,605,000	8,893,000	

	QUANTY	UOM	CONTRACT	CONTINGN	TOTAL COST	UNIT
2 Summary of Periodic Nourishment						
2.17 BEACH REPLENISHMENT - PERIODIC						
2.17.01 MOB AND DEMOB			930,000	370,000	1,300,000	
2.17.02 DREDGING and BEACH PLACEMENT	866000	CY	5,620,000	1,124,000	6,744,000	7.79
2.17.03 TILLING	30.00	ACR	18,000	3,000	21,000	690.00
TOTAL BEACH REPLENISHMENT - PERIODIC			6,568,000	1,497,000	8,065,000	
2.30 PLANNING, ENGINEERING & DESIGN						
2.30. A ENGINEERING			410,000	62,000	472,000	
2.30. B ENVIRONMENTAL			10,000	2,000	12,000	
2.30. C PROJECT MGT			100,000	15,000	115,000	
TOTAL PLANNING, ENGINEERING & DESIGN			520,000	78,000	598,000	
2.31 CONSTRUCTION MANAGEMENT						
2.31. A CONSTRUCTION MGT & NAVIG SURVEYS			200,000	30,000	230,000	
TOTAL CONSTRUCTION MANAGEMENT			200,000	30,000	230,000	
TOTAL Summary of Periodic Nourishment			7,288,000	1,605,000	8,893,000	

Local Plan- 1250X,Topsail , NC
INITIAL CONSTRUCTION
SUMMARY OF COSTS
CURRENT WORKING ESTIMATE (CWE)
CODE OF ACCOUNTS

Designed By: USACE - WILMINGTON DISTRICT
Estimated By: CESAW-TS-EE

Prepared By: John C. Caldwell
CESAW-TS-EE

Preparation Date: 09/07/07
Effective Date of Pricing: 10/01/06

Sales Tax: 0.00%

	QUANTY UOM	CONTRACT	CONTINGN	TOTAL COST	UNIT
1 Sum Initial Placement-Local Plan					
1.01 LANDS AND DAMAGES		1,379,000	207,000	1,586,000	
1.17 BEACH REPLENISHMENT - INITIAL		23,299,000	4,601,000	27,900,000	
1.30 PLANNING, ENGINEERING & DESIGN		930,000	186,000	1,116,000	
1.31 CONSTRUCTION MANAGEMENT		375,000	75,000	450,000	
TOTAL Sum Initial Placement-Local Plan		25,983,000	5,069,000	31,052,000	

	QUANTY	UOM	CONTRACT	CONTINGN	TOTAL COST	UNIT
1 Sum Initial Placement-Local Plan						
1.01 LANDS AND DAMAGES						
1.01. B LANDS AND DAMAGES			1,350,000	203,000	1,553,000	
1.01. R REAL ESTATE LAND PAYMENTS			29,000	4,000	33,000	
TOTAL LANDS AND DAMAGES			1,379,000	207,000	1,586,000	
1.17 BEACH REPLENISHMENT - INITIAL						
1.17.01 MOB AND DEMOB			2,230,000	450,000	2,680,000	
1.17.02 DREDGING and BEACH PLACEMENT	3223000	CY	19,821,000	3,964,000	23,785,000	7.38
1.17.03 TILLING	68.00	ACR	41,000	6,000	47,000	690.00
1.17.04 DUNE VEGETATION	48.00	ACR	384,000	58,000	442,000	9200.00
1.17.05 DUNE WALKOVER STRUCTURES	23.00	EA	823,000	124,000	947,000	41168
TOTAL BEACH REPLENISHMENT - INITIAL			23,299,000	4,601,000	27,900,000	
1.30 PLANNING, ENGINEERING & DESIGN						
1.30. A ENGINEERING			720,000	144,000	864,000	
1.30. B ENVIRONMENTAL			10,000	2,000	12,000	
1.30. C PROJECT MGT			200,000	40,000	240,000	
TOTAL PLANNING, ENGINEERING & DESIGN			930,000	186,000	1,116,000	
1.31 CONSTRUCTION MANAGEMENT						
1.31. A CONSTRUCTION MGT & NAVIG SURVEYS			375,000	75,000	450,000	
TOTAL CONSTRUCTION MANAGEMENT			375,000	75,000	450,000	
TOTAL Sum Initial Placement-Local Plan			25,983,000	5,069,000	31,052,000	

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