



DEPARTMENT OF THE ARMY
CHIEF OF ENGINEERS
2600 ARMY PENTAGON
WASHINGTON, DC 20310-2600

DAEN (1105-2-10a)

05 SEP 2014

SUBJECT: Edisto Beach, Colleton County, South Carolina, Coastal Storm Damage Reduction General Investigations Study

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on hurricane and storm damage reduction at the Town of Edisto Beach, South Carolina. It is accompanied by the report of the district and division engineers. This report is a partial response to a resolution adopted on April 22, 1988 by the Committee on Environment and Public Works of the United States Senate. The resolution requested the Secretary of the Army to study the Coast of South Carolina in its entirety in the interests of beach erosion control, hurricane protection and related purposes. Pre-construction engineering and design activities for the project will continue under the authority cited above.
2. The reporting officers recommend authorization of the National Economic Development (NED) Plan to reduce hurricane and storm damages by constructing a beach fill and limited groin extensions along the shoreline of Edisto Beach, South Carolina. The recommended plan for hurricane and storm damage reduction includes construction of a dune to an elevation of 15-foot North American Vertical Datum 1988 (NAVD 88) and top width of 15-foot beginning at the northern end of the project and extending southward along the beach for 16,530 feet. This dune would be fronted by a berm at an elevation of 7-foot NAVD 88. The first 7,740 feet of berm length would have a width of 75 feet. The width would taper to 50-foot over the remaining length of the berm. The width of each end of the berm would taper to match the existing beach profile. Beginning at the southern end, the dune would transition to an elevation of 14-foot NAVD 88 and a top width of 15-foot that extends around the end of the island for 5,290 feet. No berm would be constructed in front of this dune because the existing beach profile provides an adequate berm. There would also be constructed approximately 1,130 ft of total groin lengthening across 23 of the existing groins, with an average lengthening of approximately 50-foot within a range of 20-foot to 100-foot per groin.
3. The Town of Edisto Beach, South Carolina is the non-federal cost sharing sponsor for all features. Based on 2014 price levels, the estimated total nourishment cost of the NED Plan is \$53,871,000, which includes the project first cost of initial construction of \$21,129,000 and a total of three periodic renourishments at a total cost of \$32,742,000. Periodic renourishments are planned at 16-year intervals. Cost sharing is applied in accordance with the provisions of Section 103 of the Water Resources Development Act (WRDA) of 1986, as amended by Section 215 of WRDA 1999, as follows:

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a. The federal share of the total first cost would be about \$13,733,850 and the non-federal share would be about \$7,395,150, which equates to 65 percent federal and 35 percent non-federal. The non-federal costs include the value of lands, easements, rights-of-way, relocations and dredged or excavated material disposal areas (LERRD) estimated to be \$989,000.

b. The federal share of future periodic renourishment is estimated to be \$16,371,000 and the non-federal share is estimated to be \$16,371,000 which equates to 50 percent federal and 50 percent non-federal.

c. The Town of Edisto Beach would be responsible for the operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) of the project after construction, a cost currently estimated at about \$83,000 per year.

4. Based on a 3.5 percent discount rate and a 50-year period of analysis, the total equivalent average annual costs of the project are estimated to be \$1,501,000, including monitoring and OMRR&R. All project costs are allocated to the authorized purpose of hurricane and storm damage reduction. The selected plan would reduce average annual coastal storm damages by about \$2,894,000. The equivalent average annual benefits, which include recreation benefits, are estimated to be \$3,467,200 with net average annual benefits of \$1,966,200. The benefit to cost ratio is approximately 2.3 to 1. The project would also preserve approximately 13 acres of existing dry beach habitat and it would provide protection to approximately 22 acres of dune habitat and 14 acres of maritime forest. After construction, the project would result in a net increase of approximately 24 acres of beach habitat which could benefit various threatened species such as loggerhead sea turtles and piping plover and (proposed) rufa red knot shorebirds.

5. Risk and uncertainty has been explicitly factored into the economic analysis of this project. Chapter 6 of ER 1105-2-100, entitled "Risk-Based Analysis for Evaluation of Hydrology/Hydraulics and Economics in Shore Protection Studies" specifies the analysis requirements for shore protection projects, the fundamental requirement being that all shore protection analyses adopt a life cycle approach. A statistical risk based model, Beach-fx, was used in this study to formulate and evaluate the project in a life-cycle approach. Beach-fx integrates the engineering and economic analyses and incorporates uncertainty in both physical parameters and environmental forcing, which enables quantification of risk with respect to project evolution and economic costs and benefits of project implementation. The application of Beach-fx in this study is to estimate future without project damages and quantify the damages prevented by various storm damage reduction alternatives for Edisto Beach over the 50 year project life. The project is intended to address erosion and prevent damages to structures and contents; it is not intended to, nor will it, reduce the risk to loss of life during major storm events. Loss of life can only be prevented by residents and visitors following the local evacuation plans that are already in place. These residual risks have been communicated to the residents of Edisto Beach.

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6. In accordance with the Corps Engineering Circular (EC 1165-2-212) on sea level change, the study performed a sensitivity analysis to evaluate the effects that different rates of sea level change could have on the recommended plan. The plan was formulated using a historical or low rate of sea level change since the decision is not expected to be sensitive to changes in sea level. The sensitivity analyses used additional accelerated rates, which includes what the EC defines as intermediate and high rates. The analysis found that the influence of current sea level change on the project is relatively low as compared to other factors causing erosion (waves, currents, winds and storms). The magnitude of the short-term storm induced erosion during hurricane events have a much greater affect along the beaches than those indicated by the natural long term shoreline trends. The recommended plan is based on Beach-fx simulations that incorporated the observed rate of sea level change. Adaptive management will be used including monitoring and adding additional volume of sand during renourishments to compensate for any significant accelerated sea level rise beyond the current observed rate should it become necessary.

7. In accordance with the Corps Engineering Circular (EC 1165-2-214) on review of decision documents, all technical, engineering and scientific work underwent an open, dynamic and rigorous review process to ensure technical quality. This included District Quality Control review, Agency Technical Review (ATR), Major Subordinate Command (MSC) review and a Corps Headquarters policy and legal review. All concerns of the ATR have been addressed and incorporated into the final report. The requirement to perform Independent External Peer Review (IEPR) was waived by HQUSACE since there was no Environmental Impact Statement (EIS) for the study; it had negligible adverse impacts to the environment and is not controversial. All comments from the above referenced reviews have been addressed and incorporated into the final documents. Overall, the reviews resulted in improvements to the technical quality of the report.

8. Washington level review indicates that the project recommended by the reporting officers is technically sound, environmentally and socially acceptable, and economically justified. The plan complies with all essential elements of the 1983 U.S. Water Resources Council's Economic and Environmental Principles and Guidelines for Water and Land Related Resources Implementation studies and complies with other administrative and legislative policies and guidelines. Also the views of interested parties, including federal, state and local agencies have been considered.

9. I concur in the findings, conclusions and recommendations of the reporting officers. Accordingly, I recommend that the plan to reduce hurricane and storm damages for Edisto Beach, South Carolina is authorized in accordance with the reporting officers' recommended plan at an estimated total nourishment cost of \$53,871,000, which includes the project first cost of \$21,129,000 of initial construction and a total of three periodic nourishments at a total cost of \$32,742,000, with such modifications as in the discretion of the Chief of Engineers may be advisable. My recommendation is subject to cost sharing, financing and other applicable

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requirements of federal and state laws and policies, including Section 103 of WRDA 1986, as amended by Section 215 of WRDA 1999. The non-federal sponsor would provide the non-federal cost share and all LERRD. Further, the non-federal sponsor would be responsible for all OMRR&R. This recommendation is subject to the non-federal sponsor agreeing to comply with all applicable federal laws and policies.

a. Provide 35 percent of initial project costs assigned to hurricane and storm damage reduction plus 100 percent of initial project costs assigned to protecting undeveloped private lands and other private shores which do not provide public benefits and 50 percent of periodic nourishment costs assigned to hurricane and storm damage reduction plus 100 percent of periodic nourishment costs assigned to protecting undeveloped private lands and other private shores which do not provide public benefits and as further specified below:

(1) Enter into an agreement which provides, prior to construction, 35 percent of design costs;

(2) Provide, during construction, any additional funds needed to cover the non-federal share of design costs;

(3) Provide all lands, easements, and rights-of-way, and perform or ensure the performance of any relocation determined by the federal government to be necessary for the initial construction, periodic nourishment, operation, and maintenance of the project;

(4) Provide, during construction, any additional amounts as are necessary to make its total contribution equal to 35 percent of initial project costs assigned to hurricane and storm damage reduction plus 100 percent of initial project costs assigned to protecting undeveloped private lands and other private shores which do not provide public benefits and 50 percent of periodic nourishment costs assigned to hurricane and storm damage reduction plus 100 percent of periodic nourishment costs assigned to protecting undeveloped private lands and other private shores which do not provide public benefits.

b. For so long as the project remains authorized, operate, maintain, repair, rehabilitate, and replace the project or functional portions of the project, including any mitigation features, at no cost to the federal government, in a manner compatible with the project's authorized purposes and in accordance with applicable federal and state laws and regulations and any specific directions prescribed by the federal government.

c. Give the federal government a right to enter, at reasonable times and in a reasonable manner, upon property that the non-federal sponsor, now or hereafter, owns or controls for access to the project for the purpose of inspecting, operating, maintaining, repairing, replacing,

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rehabilitating, or completing the project. No completion, operation, maintenance, repair, replacement, or rehabilitation by the federal government shall relieve the non-federal sponsor of responsibility to meet the non-federal sponsor's obligations, or to preclude the federal government from pursuing any other remedy at law or equity to ensure faithful performance.

d. Hold and save the United States free from all damages arising from the initial construction, periodic nourishment, operation, maintenance, repair, replacement, and rehabilitation of the project and any project-related betterments, except for damages due to the fault or negligence of the United States or its contractors.

e. Perform, or cause to be performed, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Public Law 96-510, as amended, 42 U.S.C. 9601-9675, that may exist in, on, or under lands, easements, or rights-of-way that the federal government determines to be required for the initial construction, periodic nourishment, operation, and maintenance of the project; however, for lands that the federal government determines to be subject to the navigation servitude, only the federal government shall perform such investigations unless the federal government provides the non-federal sponsor with prior specific written direction, in which case the non-federal sponsor shall perform such investigations in accordance with such written direction.

f. Assume, as between the federal government and the non-federal sponsor, complete financial responsibility for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way that the federal government determines to be necessary for the initial construction, periodic nourishment, operation, or maintenance of the project;

g. Agree that, as between the federal government and the non-federal sponsor, the non-federal sponsor shall be considered the operator of the project for the purpose of CERCLA liability, and to the maximum extent practicable, operate, maintain, and repair the project in a manner that will not cause liability to arise under CERCLA.

h. Comply with Section 402 of the WRDA 1986, as amended (33 U.S.C. 701b-12), which requires the non-federal interest to participate in and comply with applicable federal floodplain management and flood insurance programs, prepare a floodplain management plan within one year after the date of signing a Project Cooperation Agreement, and implement the plan not later than one year after completion of construction of the project.

i. Provide the non-federal share of that portion of the costs of mitigation and data recovery activities associated with historic preservation, that are in excess of one percent of the total

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amount authorized to be appropriated for the project, in accordance with the cost sharing provisions of the agreement.

j. Agree to participate in and comply with applicable federal floodplain management and flood insurance programs.

k. Prevent obstructions of or encroachment on the project (including prescribing and enforcing regulations to prevent such obstructions or encroachments) which might reduce the level of protection it affords, hinder operation and maintenance or future periodic nourishment, or interfere with its proper function, such as any new developments on project lands or the addition of facilities which would degrade the benefits of the project.

l. Not less than once each year, inform affected interests of the extent of protection afforded by the project.

m. Publicize floodplain information in the area concerned and provide this information to zoning and other regulatory agencies for their use in preventing unwise future development in the floodplain, and in adopting such regulations as may be necessary to prevent unwise future development and to ensure compatibility with protection levels provided by the project.

n. For so long as the project remains authorized, the non-federal sponsor shall ensure continued conditions of public ownership, access, and use of the shore upon which the amount of federal participation is based.

o. Provide, keep and maintain the recreation features, and access roads, parking areas, and other associated public use facilities, open and available to all on equal terms.

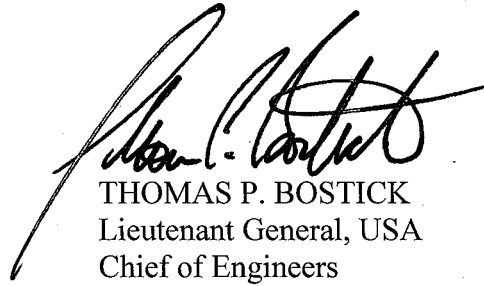
p. At least twice annually and after storm events, perform surveillance of the beach to determine losses of nourishment material from the project design section and provide the results of such surveillance to the federal government.

10. The recommendations contained herein reflect the information available at this time and current departmental policies governing formulation of individual projects. These recommendations do not reflect program and budgeting priorities inherent in the formulation of national civil works construction program nor the perspective of higher review levels within the executive branch. Consequently, the recommendations may be modified before they are transmitted to the Congress as proposals for authorization and implementation funding.

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However, prior to transmittal to the Congress, the non-federal sponsor, the state, interested federal agencies and other parties will be advised of any modifications and will be afforded an opportunity to comment further.



THOMAS P. BOSTICK
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