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

DAEN

DEC 15 2017

SUBJECT: St. Lucie County, Florida Coastal Storm Risk Management Project

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on coastal storm risk management at St. Lucie County, FL. It is accompanied by the report of the district and division engineers. This report is an interim response to the study authority contained in two resolutions by the Committee on Transportation and Infrastructure of the U.S. House of Representatives: Resolution 2634, St. Lucie County, Florida Shore Protection (11 April 2000) and Resolution 2757, St. Lucie County, Florida Shore Protection (23 July 1998). Pre-construction engineering and design activities for the project will continue under the authority cited above.

2. The reporting officers recommend a project that will contribute to economic efficiency for providing coastal storm risk management. Based on an evaluation of alternative plan costs and economic benefits the Recommended Plan is the NED plan. The non-federal sponsor, St. Lucie County, supports the NED plan.

a. The Recommended Plan includes beach and dune nourishment within the South Hutchinson Island reach. The design includes construction of a 20- foot equilibrated berm extension from the +7.0 foot 1988 North Atlantic Vertical Datum (NAVD88) contour between the R monuments R98.5 and R115+1000 feet to the Martin County line along 3.3 miles of shoreline. The project template will include a dune feature that reflects the average 2008 dune position. Tapers of a maximum length of one thousand feet will extend from the northern and southern ends of the berm extension, connecting the extension to the existing shoreline. The addition of tapers results in sand placement from R97.5to R002 along 3.7 miles of shoreline.

b. Initial construction will require approximately 422,000 cubic yards of sand, and each periodic nourishment event will require approximately 390,000 cubic yards. The periodic nourishment interval is expected to be approximately 18 years, equaling 2 periodic nourishment events in addition to initial construction over the 50-year period of Federal participation.

c. The sand source identified for the project is the St. Lucie Shoals, located approximately 3.5 miles offshore from the project. There is approximately 10.6 million cubic yards (mcy) of beach quality sand in the St. Lucie Shoal complex. This volume is more than adequate to meet the initial construction volume. The periodic nourishment volume is approximately 390,000 cubic yards every 18 years.

d. Native vegetation will be planted on areas of the existing dune disturbed by construction, as well as the newly constructed dune to stabilize the fill. It is assumed that dune planting will only

be necessary for initial construction and that vegetation will naturally grow and spread to any areas that are nourished in the future.

e. Coastal Barrier Resources System (CBRS) Unit P11 occupies a portion of the project area. In coordination with the U.S. Fish and Wildlife Service, it was determined that the portion of the project (Dollman Park) located on non-Federal public lands in P11 is compliant with the Coastal Barrier Resources Act because it meets the Section 6 (G) exception (16 U.S.C. § 3505) permitting Federal expenditures on this publically owned parcel. The non-Federal sponsor shall be responsible for all costs associated with the portion of the project located on privately-owned lands within Unit P11.

3. St. Lucie County is the non-federal cost sharing sponsor for all features. Based on FY18 price levels, the estimated total nourishment cost of the NED Plan is $53,296,000, which includes the cost of initial construction of $20,276,000 and two periodic renourishments at a total cost of $33,020,000. Periodic renourishments are planned at approximately 18-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:

a. The Federal share of the project first cost for initial construction would be approximately $7,097,000 and the non-federal share would be approximately $13,179,000, which equates to 35 percent Federal and 65 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 $725,000.

b. The Federal share of two future periodic renourishments is estimated to be $8,915,000 and the non-federal share is estimated to be $24,105,000 which equates to 27 percent Federal and 73 percent non-federal.

4. Based on a 2.75% percent discount rate and a 50-year period of analysis, the total equivalent average annual costs of the project are estimated to be $1,335,000. All project costs are allocated to the authorized purpose of coastal storm risk management. The selected plan would reduce average annual coastal storm damages by approximately $2,186,000. The equivalent average annual benefits, inclusive of recreation benefits, are estimated to be $3,007,000 with net average annual benefits of $1,672,000. The benefit to cost ratio is approximately 2.25 to 1. The project would reduce coastal damages including reduction of potential damage to a hurricane evacuation route, State Road A1A. The project would also establish at least 17,300 linear feet of suitable sea turtle and shorebird nesting habitat along 3.3 miles of shoreline.

5. Risk and uncertainty has been explicitly factored into the economic analysis of this project using 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 St. Lucie County over the 50 year project life. The project is intended to address erosion and prevent damages to structures and infrastructure; 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 St. Lucie County.

6. In accordance with the Corps Engineering Regulation (ER 1100-2-8162) 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 NED plan was formulated using the historical or low rate of sea level change. Beach-fx was used to model the performance of the NED plan for what the ER defines as intermediate and high rates of sea level rise. The benefits of the project increase significantly in the intermediate and high sea level rise scenarios, but the costs also increase. Thus, the project performance (in terms of the benefit-cost ratio) is relatively constant throughout the three scenarios. As both costs and benefits are increasing, the net benefits actually increase with increasing rates of sea-level rise. Overall, these results suggest that the NED plan is both effective and robust in all three simulated sea level rise scenarios. Adaptive management will be used including adjusting the timing of periodic renourishments and project volume requirements based on monitoring reports to compensate for any significant accelerated sea level rise beyond the historical or low 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 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 St. Lucie County, Florida is authorized in accordance with the reporting officers' recommended plan at an estimated project first cost of $53,296,000 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 requirements of Federal and state laws and policies, including Section 103

of the Water Resources Development Act (WRDA) of 1986, as amended. The non-federal sponsor would provide the non-federal cost share and all LERRD. Further, the non-federal sponsor would be responsible for all Operations, Maintenance, Repair, Replacement & Rehabilitation (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) Provide, during design, 35 percent of design costs allocated to hurricane and storm damage reduction in accordance with the terms of a design agreement entered into prior to commencement of design work for the project;

(2) Provide all lands, easements, and rights-of-way, and perform or ensure the performance of any relocations determined by the Federal Government to be necessary for the initial construction, periodic nourishment, and operation and maintenance of the project, all in compliance with applicable provisions of the Uniform Relocation and Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 U.S.C. 4601-4655) and the regulations contained in 49 C.F.R. Part 24;

(3) Provide, during construction, any additional amounts as are necessary to make their 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, and repair the completed project, or functional portion of the project, 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. Hold and save the United States free from all damages arising from the initial construction, periodic nourishment, mitigation, 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;

d. 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;

e. Assume 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;

f. Agree that 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;

g. Inform affected interests, at least yearly, of the extent of protection afforded by the project features; participate in and comply with applicable federal floodplain management and flood insurance programs; comply with Section 402 of the Water Resources Development Act of 1986, as amended (33 U.S.C. 701b-12); and publicize floodplain information in the area concerned and provide this information to zoning and other regulatory agencies for their use in adopting regulations, or taking other actions, to prevent unwise future development and to ensure compatibility with protection levels provided by the project;

h. Prevent obstruction of or encroachment on the project (including prescribing and enforcing regulations to prevent such obstructions or encroachments) including but not limited to any new development on project lands, easements, and rights-of-way or the addition of facilities which might reduce the reduce the outputs produced by the project or the level of protection it affords, or that would hinder future periodic nourishment and/or the operation and maintenance of the project;

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

j. Provide and maintain necessary access roads, parking areas, and other public use facilities, open and available to all on equal terms; and

k. 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. 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.

TODD T. SEMONITE
Lieutenant General, USA
Chief of Engineers