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

DAEN

JUL 15 2025

SUBJECT: Surf City, Onslow and Pender Counties, North Carolina, Coastal Storm Risk Management

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on coastal storm risk management recommendations for the Surf City, Onslow and Pender Counties, North Carolina, Coastal Storm Risk Management Project. It is accompanied by the Integrated General Re-evaluation Report (GRR) and Environmental Assessment (EA) of the Wilmington District and South Atlantic Division engineers. This study is an interim response to the authorization in Section 7002(3) of the Water Resources Reform and Development Act (WRRDA) of 2014. The authorization provided that the Secretary of the Army identify a plan to reduce risks associated with beach erosion, storm surge and wave attack from severe coastal storms and sea level change. Preconstruction engineering and design (PED) activities will continue under current authorities.

2. The reporting officers recommend authorizing a risk management system of features that will reduce the risk of coastal storm damages to residential and commercial structures, public infrastructure, and critical facilities. The Recommended Plan is the National Economic Development (NED) plan and Total Net Benefits Plan. The Recommended Plan includes the following:

a. A sand berm and dune system measuring approximately 6.3 miles, constructed along the existing shoreline. The dune will have approximately 1V5H slope on the landward side and 1V10H slope on the seaward side, and a crest elevation of 14 feet North Atlantic Vertical Datum 1988 (NAVD 88). The berm, seaward of the dune, will be approximately 50 feet wide with a crest of 6 feet (NAVD 88). For reference, at the time of this report the NAV88 datum is +0.16’ relative to mean sea level at the Wilmington gauge Station #8658120.

b. A 1,000-feet transition sand berm on the northern end of the project. This transition extends into the town limits of North Topsail Beach.

c. Dune vegetation and 40 public walkover structures.

d. The periodic renourishment intervals will be every six years, resulting in a total of seven nourishment events over a 50–year period (i.e., 2027–2076).

3. The town of Surf City is the non-federal cost sharing sponsor for all features of the project. In addition to the Recommended Plan, this study acknowledges and relies upon the non-federal sponsor's additional floodplain management responsibilities and emergency response actions in conjunction with state and Federal Emergency Management Agency (FEMA) related programs to mitigate the plan's residual risk including potential life loss and damages to critical infrastructure. Based on October 2024 price levels, the estimated total project first cost is $560,917.000, which includes $198,613,000 for initial construction and a total cost of $362,304,000 for an estimated seven future periodic nourishments over 50 years. The total project first cost estimate includes the real estate estimate of $1,333,000, a part of which is the value of lands, easements, rights-of-way, relocations (LERR) estimated to be $356,500. The current project plan requires approximately 56 Standard Perpetual Beach Storm Damage Reduction Easements within the boundaries of Surf City and 15 Standard Perpetual Beach Storm Damage Reduction Easements within the boundaries of North Topsail Beach for construction and operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) to support a public beach, a dune system, and other erosion control and storm damage reduction measures. Cost sharing is applied in accordance with the provisions of Section 103 of the Water Resources Development Act of 1986 (33 U.S.C. § 2213), as follows:

a. The federal share of the project first cost for initial construction is estimated at $121,750,000 and the non-federal share, which includes the cost of LERR, is estimated at $76,863,000 which equates to 61.3 percent federal and 38.7 percent non-federal.

b. The federal share of the project first cost for periodic nourishments is estimated at $171,007,000 and the non-federal share is estimated at $191,297,000 which equates to 47.2 percent federal and 52.8 percent non-federal.

c. The additional annual cost of OMRR&R for the Recommended Plan is estimated to be $100,000. OMRR&R activities include inspections and dune vegetation maintenance. The non-federal sponsor will be responsible for 100 percent of the cost of project OMRR&R.

4. Based on a 3.00 percent discount rate and a 50-year period of analysis, the equivalent average annual benefits, including incidental recreation benefits, are estimated at $23,447,000 and equivalent average annual costs are estimated at $9,203,000, with equivalent average annual net benefits of $14,244,000 and a benefit-to-cost ratio of 2.5 to 1. All project costs are allocated to the authorized purpose of coastal storm risk management.

5. The report fully describes the risks to property and life safety associated with major coastal storms for the town of Surf City and its residents. However, the long-term performance of the project, not unlike other beach fill projects with similar coastal characteristics, is dynamic and uncertain. Significant sources of uncertainty include the future frequency and intensity of coastal storms and the rate of relative sea-level change. If coastal storms are more frequent and/or intense, or if the rate of relative sea-level change is greater than assumed, the corresponding increase in beach nourishment frequency and sand volumes could substantially increase the project cost.

The Recommended Plan would greatly reduce these risks, but not eliminate future damages. Residual risk would remain for wind-related risks and damages along the Atlantic Intercoastal Waterway. The Recommended Plan reduces expected annual damages by approximately 90 percent relative to the without project conditions. The residual risk, along with the potential consequences, has been communicated to the town of Surf City and will become a requirement of any future communication. The Recommended Plan is not intended to, nor will it, reduce the risk to loss of life during major storm events. The only certain method to prevent loss of life is by residents and visitors following existing local evacuation plans and leaving the area prior to significant storm events.

Implementation risks include:

a. Dredge contractor availability. The commercial dredging industry is dynamic, and the availability of dredging contractors at any given time is uncertain. Dredging contractor unavailability at the planned initial construction period and subsequent beach nourishment periods could delay implementation and benefit accrual. Special construction contracting mechanisms may be considered to manage this risk.

b. Presence of rock and/or cemented sands. Due to limited subsurface investigations, the actual volume of rock and/or cemented sands within the designated offshore borrow sites is uncertain. Additional subsurface investigations will be performed during the PED phase to reduce that uncertainty. If the volume of rock and/or cemented sands is greater than currently assumed, the effort to separate that additional volume from sand suitable for beach fill could significantly increase the project cost.

c. Presence of munitions and explosives of concern (MEC). The project is within the limits of a U.S. Army training facility known as Camp Davis. Established in 1941, Camp Davis was used as an Anti-Aircraft Training Center at Holly Ridge, North Carolina, with several ranges and supporting facilities on Topsail Island and the mainland.

A probability assessment to estimate the potential to encounter MEC was completed by the U.S. Army Corps of Engineers (USACE) Baltimore District Environmental and Munition Design Center based on existing information. To address the probability of encountering MEC, an action plan has been developed and incorporated into the project. This plan provides for screening borrow material, identification of MEC, and disposal under the supervision of an USACE Ordnance and Explosive Safety Specialist. This plan may be adjusted as presence of MEC within the project borrow areas is better understood.

6. Implementation strategies for the Recommended Plan would be a shared responsibility conducted in coordination with the non-federal sponsor, and FEMA to cost effectively reduce risk from coastal storms.

7. The study evaluated potential impacts of sea level change in formulating and engineering the Recommended Plan. To address this uncertainty, project performance was assessed at the intermediate rate of sea level change as it offered the best balance between equally likely scenarios. In recognition of the uncertainty presented by sea level change, adaptation capacity has been incorporated into the final feasibility-level design to maximize the overall usefulness of the system over the life of the project by including redundancy and robustness in the design, so that they are adaptable to future conditions including the high-rate sea level change. The USACE will continue to monitor local conditions and determine if the intermediate scenario of sea level change is reasonably representative of observed conditions. As provided in the Adaptation Strategy if observed conditions exceeding the intermediate sea level change projection and, or increased rates of erosion are identified during design or construction, adaptation measures will be considered to ensure the project functions, as intended.

8. All compliance with required applicable cultural resource and environmental laws and regulations for this phase of the study has been completed.

9. In accordance with USACE policy on the review of decision documents, all technical, engineering, and scientific work underwent an open, dynamic, and rigorous review process. The comprehensive review process included District Quality Control Review, Agency Technical Review, and Headquarters Policy and Legal Compliance review to confirm the planning analyses, alternative design and safety, and the quality of decisions. Washington-level review indicates that the plan recommended by the reporting officers complies with all essential elements of the U.S. Water Resources Council's Economic and Environmental Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies, as well as other administrative and legislative policies and guidelines. The views of interested parties,

including federal, state, and local agencies, were considered and all comments from public reviews have been addressed and incorporated into the final report documents where appropriate.

10. Actions deferred to PED include an assessment of adverse effects to historic properties from the proposed pump-out stations and submerged pipelines, per the Section 106 Programmatic Agreement signed 13 March 2025.

11. USACE decision documents recognize cost risk and uncertainty surrounding implementation. All cost estimates will carry a degree of uncertainty. The estimated total project first cost for the Recommended Plan at the 80% confidence interval is estimated at $198,613,000 for initial construction and $362,304,000 for future periodic nourishments. This project carries a degree of uncertainty such that if the main drivers described below are realized, the first cost for the Recommended Plan could increase to approximately $237,172,000 for initial construction and $465,004,000 for future periodic nourishments. The Recommended Plan has various construction and non-construction components. These construction components range from 80 to 90 percent in project definition for initial construction and 40 to 50 percent in project definition for future periodic nourishments. The overall Recommended Plan is at 35 percent design for initial construction and 35 percent design for future periodic nourishments. Based on the recommended project design of the construction components and scope definition of the non-construction components, the total project cost is designated as a Class 3 estimate. The total project first cost includes a contingency value of $48,941,000, which is approximately 32.7 percent of the estimated base project cost of $149,672,000 for initial construction and a contingency value of $77,025,000, which is approximately 27 percent of the estimated base project cost of $285,279,000 for periodic nourishments. The cost contingencies are intended to cover cost and schedule increases due to the identified project risks and their probability of occurrence. Changes to assumptions or the basis of design can result in additional risks not currently identified. For the Recommended Plan initial construction project first costs, the currently known major uncertainty drivers are market conditions and fuel price fluctuations. For future nourishment costs as the project moves into renourishment phases, the USACE will focus risk management and mitigation on the primary cost and other significant risk drivers to the extent within USACE control. However, there still exists the potential for other unanticipated and uncontrollable changes in environmental or economic conditions that could further increase the total project first cost for future nourishments beyond the current estimate.

12. In full consideration of the risks as documented in the preceding paragraphs in this report, I concur in the findings, conclusions, and recommendation of the reporting officers. Accordingly, I recommend that coastal storm risk management improvements

for Surf City, North Carolina be authorized in accordance with the reporting officers' Recommended Plan at an estimated cost of $198,613,000 for initial construction and $362,304,000 for future periodic nourishments, with such modifications as in the discretion of the Chief of Engineers may be advisable. Federal implementation of the project for coastal storm risk management includes, but is not limited to, the following items of local cooperation to be undertaken by the non-federal sponsor in accordance with applicable federal laws, regulations, and policies:

a. Provide 35 percent of construction costs for initial construction of the project and 50 percent of construction costs for periodic nourishment allocated by the Federal government to coastal storm risk management; 100 percent of construction costs for initial construction and periodic nourishment allocated by the Federal government to beach improvements with exclusively private benefits; 100 percent of construction costs for initial construction and periodic nourishment allocated by the Federal government to improvements and other work located within the Coastal Barrier Resources System that the Federal government has determined are ineligible for Federal financial participation; and 100 percent of construction costs for initial construction and periodic nourishment allocated by the Federal government to the prevention of losses of undeveloped private lands, as further specified below:

1. Provide, during design, 35 percent of design costs in accordance with the terms of a design agreement entered prior to commencement of design work for the project.

2. Provide all lands, easements, rights-of-way, and placement areas and perform all relocations determined by the Federal government to be required for the project.

3. Provide, during construction, any additional contribution necessary to make its total contribution equal to at least 35 percent of construction costs for initial construction and 50 percent of construction costs for periodic nourishment.

b. Prevent obstructions or encroachments on the project (including prescribing and enforcing regulations to prevent such obstructions or encroachments) that might reduce the level of coastal storm risk reduction the project affords, hinder operation and maintenance of the project, or interfere with the project's proper function;

c. Inform affected interests, at least yearly, of the extent of risk reduction afforded by the project; participate in and comply with applicable Federal floodplain management and flood insurance programs; prepare a floodplain management plan for the project to be implemented not later than one year after completion of construction of the project;

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 the project;

d. Operate, maintain, repair, rehabilitate, and replace the project or functional portion thereof at no cost to the Federal government, in a manner compatible with the project's authorized purposes and in accordance with applicable Federal laws and regulations and any specific directions prescribed by the Federal government;

e. At least annually and after storm events, at no cost to the Federal government, perform surveillance of the project to determine losses of material and provide results of such surveillance to the Federal government;

f. For shores, other than Federal shores, protected using Federal funds, ensure the continued public use of, and access to, such shores by all on equal terms in a manner compatible with the authorized purpose of the project;

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

h. Give the Federal government a right to enter, at reasonable times and in a reasonable manner, upon property that the non-Federal sponsor owns or controls for access to the project to inspect the project, and, if necessary, to undertake work necessary to the proper functioning of the project for its authorized purpose;

i. Hold and save the Federal government free from all damages arising from design, construction, operation, maintenance, repair, rehabilitation, and replacement of the project, except for damages due to the fault or negligence of the Federal government or its contractors;

j. Perform, or ensure performance of, any investigations for hazardous, toxic, and radioactive wastes (HTRW) that are determined necessary to identify the existence and extent of any HTRW regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. 9601-9675, and any other applicable law, that may exist in, on, or under real property interests that the Federal government determines to be necessary for construction, operation and maintenance of the project;

k. Agree, as between the Federal government and the non-federal sponsor, to be solely responsible for the performance and costs of cleanup and response of any

HTRW regulated under applicable law that are located in, on, or under real property interests required for construction, operation, and maintenance of the project, including the costs of any studies and investigations necessary to determine an appropriate response to the contamination, without reimbursement or credit by the Federal government;

l. Agree, as between the Federal government and the non-federal sponsor, that the non-federal sponsor shall be considered the owner and operator of the project for the purpose of CERCLA liability or other applicable law, and to the maximum extent practicable shall carry out its responsibilities in a manner that will not cause HTRW liability to arise under applicable law; and

m. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended, (42 U.S.C. 4630 and 4655) and the Uniform Regulations contained in 49 C.F.R Part 24, in acquiring real property interests necessary for construction, operation, and maintenance of the project including those necessary for relocations, and placement area improvements; and inform all affected persons of applicable benefits, policies, and procedures in connection with said act.

13. The recommendation contained herein reflects the information available at this time and current departmental policies governing formulation of individual projects. It does not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program or the perspective of higher review levels within the Executive Branch. Consequently, the recommendation may be modified before it is transmitted to the Congress as a proposal for authorization and implementation funding. However, prior to transmittal to Congress, the non-federal sponsor, interested federal agencies, and other parties will be advised of any significant modifications and will be afforded an opportunity to comment further.

WILLIAM H. GRAHAM JR.
Lieutenant General, USA
Chief of Engineers