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

Proposed Report

DAEN

SUBJECT: South Shore Staten Island, Fort Wadsworth to Oakwood Beach, Richmond County, New York, Coastal Storm Risk Management

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report to update the coastal storm risk management recommendations for the South Shore Staten Island (SSSI), Fort Wadsworth to Oakwood Beach Richmond County, New York. It is accompanied by the validation report of the New York District and North Atlantic Division engineers. This study is an interim response to the resolution of the U.S. House of Representatives Committee on Public Works and Transportation adopted on 13 May 1993. The Disaster Relief Appropriations Act of 2013 (hereinafter, P.L. 113-2), enacted in response to Hurricane Sandy (October 29-30, 2012). P.L. 113-2, authorized construction of a Coastal Storm Risk Management (CSRM) project for SSSI, determined by the Secretary to be feasible. A Director's Report demonstrating that the project was economically justified, technically feasible, and environmentally acceptable was signed on October 27, 2016, and approved by the Assistant Secretary of the Army for Civil Works. Section 8401 of the Water Resources Development Act (WRDA) of 2022 authorized the SSSI CSRM project for construction based upon the Directors Report (2016). Preconstruction Engineering and Design (PED) and construction activities will continue under the authority cited above.

2. The reporting officers recommend authorizing a risk management system of features that will improve life safety risk for over 30,000 people; reduce the risk of damages from coastal storms to over 7,300 residential and commercial structures; and reduce risk of damages to public infrastructure and critical facilities including a wastewater treatment plant (WWTP). The Recommended Plan is confirmed as the National Economic Development (NED) Plan identified in the 2016 Director's Report, but changes have been made to the design. The 2016 Recommended Plan included the following features:

a. Earthen levee (3,400 ft.) with crest elevation of +16.9 ft NAVD88 and crest width that ranges from 10 to 15 ft stretching from Oakwood Beach wastewater treatment plant (WWTP) to high ground northwest of Hylan Boulevard. A road closure structure will be installed along Hylan Boulevard, but the gate will only be deployed during coastal storm events severe enough to potentially flank the levee.

b. Vertical floodwall (1,800 ft.) bordering the Oakwood Beach WWTP and consisting of a H-pile supported T-shaped concrete floodwall with a top of wall elevations of +19.4 ft NAVD88; a fronting tidal wetland.

c. A buried rock seawall (22,700 ft.) along the coast with crest elevations of +19.4 ft. NAVD88.

d. The interior drainage plans include the acquisition and preservation of open space, pond excavation, construction of tide gates and gate chambers along the project alignment.

3. During PED, updated coastal modeling indicated a need to raise the seawall crest elevations to meet the selected wave overtopping threshold for the selected design water level. Changes to the Recommended Plan per the 2023 Validation Report include the following:

a. Earthen levee: crest elevation of +16.9 ft with an initial construction height of +17.7 (NAVD88) to offset long term settlement due to clay layers,

b. Vertical floodwall: increased length from 1,800 linear feet to 2,100 linear feet; a small segment near the WWTP was lowered to +17.4 from +19.4 to transition into the earthen levee at +17.7 (NAVD88),

c. Buried Seawall: raised the height from +19.4 ft to +21.4 ft (NAVD88); changed construction material from buried rock to double sheet pile,

d. Refinements to the interior drainage features.

4. The New York State Department of Environmental Conservation (NYSDEC) is the non-federal cost sharing sponsor for all features of the project. Additionally, the City of New York City (NYC) entered into an agreement as a local sponsor to NYSDEC. As a shared responsibility, the Recommended Plan is inclusive of the non-federal sponsor's additional floodplain management responsibilities and emergency response actions in conjunction with Federal Emergency Management Agency (FEMA) and state-related programs to mitigate the plan's residual risk, including potential life loss and damages to critical infrastructure. Based on October 2022 price levels, the estimated total project first cost is $2,021,357,000. The total project first cost includes the value of lands, easements, rights-of-way, relocations, and dredged material placement area improvements (LERRD). Total LERRD costs are estimated to be $189,777,000. Cost sharing is applied in accordance with the provisions of Section 103 of the Water Resources Development Act (WRDA) of 1986 (33 U.S.C. § 2213) as well as Section 8402 of WRDA 2022, as follows:

a. The federal share of the project first cost for initial construction is estimated at $1,665,414,000 and the non-federal share, which includes the cost of LERRD, is estimated at $355,943,000. Though initially cost shared at 65 percent federal and 35 percent non-federal, Section 8402 of WRDA 2022 changed the cost allocations by instructing that any costs that exceed the amounts contained in the February 2019 Project Partnership Agreement (PPA) are to be cost-shared as 90 percent federal and 10 percent non-federal.

b. The additional annual cost of operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) for the Recommended Plan is estimated to be $2,005,000. OMRR&R activities includes the annual inspections and maintenance of the project including stop-log structure, gate chambers, access ramps, sand/soil cover, along with the interior facility maintenance and equipment replacement over the 50 years period. The non-federal sponsor will be responsible for 100 percent of the cost of project OMRR&R.

5. Based on a 2.5 percent discount rate and a 50-year period of analysis, the equivalent average annual benefits are estimated at $87,988,000 and equivalent average annual costs are estimated at $74,155,000, with equivalent average annual net benefits of $13,833,000 and a benefit-to-cost ratio (BCR) of 1.2 to 1. All project costs are allocated to the authorized purpose of coastal storm risk management.

6. Along with managing the risk of flood damages, the project will protect critical facilities and decrease life loss risk. Critical infrastructure in the study area includes the Staten Island Railway (SIR), schools which served as shelter in the aftermath of Hurricane Sandy, fire and law enforcement stations and the Staten Island University Hospital (SIUH). In terms of life safety, Staten Island experienced 23 storm-related deaths on during Hurricane Sandy, more than in any other borough, with 22 occurring on the East and South Shores of Staten Island.

7. The +21.4 ft-NAVD88 height of the seawall would reduce flood damages from a coastal storm corresponding to a still water elevation up to a 0.3% annual exceedance probability (AEP) in 2032 and a 0.6% AEP event in 2082 utilizing median values and an intermediate rate of sea level rise. The construction of the seawall would allow its elevation to be raised to adapt to changing conditions. The recommended plan reduces expected annual damages by approximately 81.3 percent relative to the without project conditions, but residual risk would remain. The residual risk, along with the potential consequences, has been communicated to the non-federal sponsor and will become a requirement of any communication and evacuation plan. 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 study area prior to significant storm events. These residual risks have been communicated to the State of New York, the City of New York, and the residents of Staten Island.

8. The South Shore of Staten Island Project has been developed with consideration of climate change, and specifically, relative sea-level change (RSLC). While the plan developed in the feasibility phase was formulated based upon the low rate of RSLC, the validation study used the intermediate RSLC to optimize the design. To understand the potential uncertainty, a project performance was analyzed against low, intermediate, and high RSLC over a 100-year period. This sensitivity analysis led to the recognition of the need to incorporate adaptation capacity into the design to maximize the overall usefulness of the system over the life of the project by including redundancy and robustness. Therefore, the design allows for the construction of a 3-ft high parapet wall along the length of the seawall, extending the height of the T-wall structure by 3 feet, and increasing the height of the levee by 3 feet. The foundations for these structures have

been designed to account for this future modification including the increased loading. USACE will continue to monitor local conditions and determine if trigger conditions have been met. When the trigger condition is met, USACE would seek additional authorization in a future decision document to modify the project as described.

9. All compliance with required applicable environmental laws and regulations has been completed. USACE analyzed the effects of the design changes to the recommended plan on the environmental resources in the project area and determined them within the range of impacts documented in the 2016 Final Environmental Impact Statement (FEIS) and Record of Decision (ROD). Per 40 CFR 1502.9(d)(4), a supplemental NEPA document is not required. This environmental review is documented in a Memorandum for the Record (MFR) within Appendix B of the validation report.

10. 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.

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 percent confidence level is $2,021,357,000. This project carries a degree of uncertainty such that if the main drivers described below are realized, the first cost for the Recommend Plan could increase to approximately $2,482,088,000. The range of costs is based on a Class 3 level of technical information and design reflecting a 20 percent level of project definition with the level of the design for the seven segments ranging from 10 to 100 percent. The $2,021,357,000 total project first cost estimate includes a contingency value of $614,976,000 which includes real estate contingency and is approximately 45 percent of the estimated base project cost of $1,359,855,000. Since this project is in PED, the project also has $46,525,721 in sunk costs. The cost contingencies are intended to cover cost and schedule increase due to the identified project risks and their probability of occurrence. All cost estimates carry some degree of uncertainty including the following main drivers: 1) delay in the completion of remediation of the Hazardous, Toxic and Radioactive Waste (HTRW) material within Great Kills Park may increase costs; 2) the non-federal sponsor may request a change in the alignment of the project because there is already a signed PPA determining the extents of the project; 3) switching from supplemental funds to general funds could increase costs and schedule by altering the consistency of funding; 4) market condition may cause variation in major material costs and bid assumptions; 5) limited geotechnical information may lead to an increase in costs and schedule. As the project moves into the next phases, 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 beyond the current estimate and/or necessitate changes in the project's design.

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 the updated coastal storm risk management improvements for South Shore Staten Island (SSSI), Richmond County, New York, be authorized in accordance with the reporting officers' Recommended Plan at an estimated cost of $2,021,357,000 for continued construction, with such modifications as in the discretion of the Chief of Engineers may be advisable. My recommendation is subject to cost sharing and other applicable requirements of Federal laws, regulations, and policies. 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 the percentage of construction costs in accordance with Section 103 of WRDA 1986, Section 8402 of WRDA 2022, and any further related legislation, as further specified below:

1. Provide, during design, the percentage of design costs in accordance with Section 103 of WRDA 1986 (33 U.S.C. § 2213), Section 8402 of WRDA 2022, and any further related legislation with the terms of a design agreement entered into 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 the percentage of construction costs in accordance with Section 103 of WRDA 1986 , Section 8402 of WRDA 2022, and any further related legislation;

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. 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;

f. 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;

g. 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;

h. 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;

i. 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

j. 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.

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