



DEPARTMENT OF THE ARMY
CHIEF OF ENGINEERS
2600 ARMY PENTAGON
WASHINGTON, D.C. 20310-2600

12/21/2017

DAEN

SUBJECT: Ala Wai Canal Flood Risk Management Study, Oahu, Hawaii

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on flood risk management in the Ala Wai Canal watershed, within the City and County of Honolulu, Oahu, Hawaii. It is accompanied by the reports of the district and division engineers. These reports were completed under authorities granted by Section 209 of Public Law 84-874, the Flood Control Act of 1962. The law provides the authority for the Secretary of the Army "to cause surveys for flood control and allied purposes, including channel and major drainage improvements, and floods aggravated by or due to wind or tidal effects, to be made under the direction of the Chief of Engineers, in drainage areas of the United States and its territorial possessions, which include the following named localities: Harbors and rivers in Hawaii, with a view to determining the advisability of improvements in the interest of navigation, flood control, hydroelectric power development, water supply, and other beneficial water uses, and related land resources." Preconstruction engineering and design activities, if funded, would be continued under the authority provided by the Section 209 study authority cited above.

2. The reporting officers recommend authorization of a plan to reduce flood risk within the Ala Wai Canal watershed of Honolulu, Hawaii. The recommended plan consists of six in-stream debris and detention basins of varying height in the upper reaches of the watershed, one standalone debris catchment structure, three multi-purpose detention basins, floodwalls along the Ala Wai Canal averaging four feet in height and an earthen levee at the perimeter of an adjacent golf course averaging seven feet in height, two pump stations to reduce the threat of interior flooding, and a flood warning system. Unavoidable environmental impacts would be fully compensated for by modifying two existing in-stream structures to eliminate migratory passage barriers for native aquatic species. The recommended plan also includes post-construction monitoring and adaptive management for a period of five years to ensure project performance. The recommended plan is the National Economic Development Plan.

3. The State of Hawaii, Department of Land and Natural Resources (DLNR) is the non-Federal cost-sharing sponsor for all features. Based on October 2016 price levels, the estimated total first cost of the recommended plan is \$306,095,000. In accordance with the cost sharing provisions of Section 103 of the Water Resources Development Act (WRDA) of 1986, as amended (33 U.S.C. 2213), flood risk management features are cost-shared at a rate of 65 percent Federal and 35 percent non-Federal. Thus, the Federal share of the total project first costs are estimated to be \$198,962,000 and the non-Federal share is estimated at \$107,133,000. The costs of lands, easements, rights-of-way, relocations, and excavated material disposal areas is estimated to be \$17,194,000. The total cost includes \$229,000 for environmental mitigation,

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\$46,250 for environmental monitoring and adaptive management. DLNR would be responsible for the Operation, Maintenance, Repair, Replacement, and Rehabilitation (OMRR&R) of the project after construction, a cost currently estimated at \$985,000 per year. In addition to the above, DLNR would be fully responsible for performing the investigation, cleanup, and response of hazardous materials on the project sites. Currently, no hazardous material work is anticipated. Also in addition to the above, DLNR would be fully responsible for removing and relocating utilities and discharge pipelines on the project site that are non-compensable.

4. Based on a 2.875-percent discount rate and a 50-year period of analysis, the total equivalent annual costs of the project, including OMRR&R, are estimated to be \$13,117,000. The equivalent average annual benefits are estimated to be \$48,331,000 with net average annual benefits of \$35,214,000. The benefit-to-cost ratio is 3.68 to 1. The selected plan is estimated to be 99 percent reliable in protecting portions of the study area from a flood, which has a one percent chance of occurrence in any year (100-year flood). The selected plan would reduce average annual flood damages by about 90 percent and would leave average annual residual damages estimated at \$5,388,000.

5. The goals and objectives included in the Campaign Plan of the USACE have been fully integrated into the Ala Wai Canal Flood Risk Management study process. The recommended plan was developed in coordination and consultation with various Federal, State, and local agencies using a systems approach in formulating flood risk management solutions and in evaluating the impacts and benefits of those solutions. Plan formulation evaluated a wide range of non-structural and structural alternatives under USACE policy and guidelines as well as consideration of a variety of economic, social and environmental goals. The recommended plan delivers a holistic, comprehensive approach to solve water resources challenges in a sustainable manner.

6. In accordance with USACE Sea Level Change Guidance, ER 1100-2-8162, the study evaluated potential impacts of sea level change in formulating and engineering the recommended plans. The risk reduction system features proposed are based on the intermediate Relative Sea Level Rise (RSLR) projection. The equivalent average annual benefits are estimated to range from nearly \$46.2 million under the low Sea Level Change (SLC) scenario to nearly \$48.3 million under the intermediate SLC scenario. Corresponding annual net benefits range from approximately \$33 million to \$35 million, with benefit-cost ratios ranging from 3.5 to 3.68. The high SLC scenario was not evaluated for economics, but the recommended plan shows high project performance with a 99 percent conditional non-exceedance probability over a 50-year period under all SLC scenarios. An extension of the floodwall to protect against coastal flooding in the lower tidal portion of the study area was warranted to improve the resiliency of the overall system beyond the 50-year period of analysis. USACE will continue to monitor local conditions and determine if the intermediate scenario of RSLR is occurring. If observed conditions deviate from intermediate to high sea level forecasts during design or construction, reevaluation of the National Economic Development plan will be required.

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7. In accordance with USACE policy on review of decision documents, all technical, engineering and scientific work underwent an open, dynamic and vigorous review process to ensure technical quality. This included District Quality Control, Agency Technical Review (ATR), Independent External Peer Review (IEPR) and a USACE Headquarters policy and legal review. All concerns of the ATR and IEPR have been addressed and incorporated into the final report. Overall, the reviews have resulted in the improvement of the technical quality of the report.

8. Washington level review indicated that the plan recommended by the reporting officers is technically sound, economically justified, and environmentally and socially acceptable. As the report discusses, residual risk will remain with this plan in place and the report emphasizes the role of the non-Federal sponsor in addressing and communicating residual risk. The plan complies with essential elements of the U.S. Water Resources Council's Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies and complies with other administration 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 improve flood risk management in the Ala Wai Canal watershed be authorized in accordance with the reporting officers' recommended plan at an estimated first project cost of \$306,095,000 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 WRDA 1986, as amended (33 U.S.C. 2213). The non-Federal sponsor would provide the non-Federal cost-share and all lands, easements, rights-of-way, relocations, and disposal areas. 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, as well as the following:

a. Provide a minimum of 35 percent, but not to exceed 50 percent of total project costs as further specified below:

(1) Provide 35 percent of design costs in accordance with the terms of a design agreement entered into prior to commencement of design work for the project;

(2) Provide, during the first year of construction, any additional funds necessary to pay the full non-Federal share of design costs;

(3) Provide, during construction, a contribution of funds equal to 5 percent of total project costs;

(4) Provide all lands, easements, and rights-of-way, including those required for relocations, the borrowing of material, and the disposal of dredged or excavated material; perform or ensure the performance of all relocations; and construct all improvements required on lands, easements, and rights-of-way to enable the disposal of dredged or excavated material all as

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determined by the Government to be required or to be necessary for the construction, 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;

(5) Provide, during construction, any additional funds necessary to make its total contribution equal to 35 percent of total project costs;

b. Inform affected interests, at least yearly, of the extent of protection afforded by the flood risk management features; participate in and comply with applicable Federal floodplain management and flood insurance programs; comply with Section 402 of the WRDA 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 flood risk management features;

c. Prevent obstructions or encroachments on the project (including prescribing and enforcing regulations to prevent such obstructions or encroachments) such as any new developments on project lands, easements, and rights-of-way or the addition of facilities which might reduce the level of protection the project affords, hinder operation and maintenance of the project, or interfere with the project's proper function;

d. 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;

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

f. Perform, or ensure performance of, 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 construction, operation, and maintenance of the project;

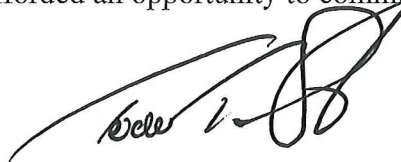
g. Assume, as between the Federal Government and the non-Federal sponsor, complete financial responsibility for all necessary cleanup and response costs of any hazardous substances regulated under CERCLA that are located in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be required for construction, operation, and maintenance of the project; and

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h. Agree, as between the Federal Government and the non-Federal sponsor, 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, repair, rehabilitate, and replace the project in a manner that will not cause liability to arise under CERCLA.

10. 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 sponsor, the State, interested Federal agencies, and other parties will be advised of any significant modifications and will be afforded an opportunity to comment further.

A handwritten signature in black ink, appearing to read "T. Semonite", with a large, stylized flourish extending from the end of the signature.

TODD T. SEMONITE
Lieutenant General, USA
Chief of Engineers



DEPARTMENT OF THE ARMY

CHIEF OF ENGINEERS
2600 ARMY PENTAGON
WASHINGTON, D.C. 20310-2600

AUG 08 2017

DAEN

SUBJECT: Galveston Harbor Channel Extension Project, Houston-Galveston Navigation Channels, Texas

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on navigation improvements for the Galveston Harbor Channel Extension project (GHCE). It is accompanied by the report of the Galveston District Engineer and the Southwestern Division Engineer. The feasibility study was conducted under the authority of Section 216 of the Flood Control Act of 1970 (33 U.S.C. 549a), which authorizes review of completed U.S. Army Corps of Engineers (Corps) navigation projects when significant changes in physical or economic conditions have occurred, and the submission of a report to Congress on the advisability of modifying the project in the overall public interest. Pre-construction engineering and design activities for this proposed project, if funded, would be continued under the authority provided by the section cited above. The existing Galveston Harbor Channel (GHC) project was authorized by Section 101(a)(30) of the Water Resources Development act (WRDA) of 1996, P.L. 104-303.

2. The reporting officers recommend authorizing a plan that will significantly contribute to the economic efficiency of commercial navigation in the region by deepening a portion of the existing GHC Project. The GHC provides for a deep-draft waterway from the Gulf of Mexico to the City of Galveston. The channel is authorized and maintained at a depth of -46 feet Mean Lower Low Water (MLLW) for 20,000 feet and -41 feet MLLW for the last 2,571 feet. Terminals at the end of the GHC handle materials that are produced by and/or used in oil and gas production activities. Existing fleet data show that the channel is operating with insufficient depth to allow access by larger vessels that would maximize economic efficiency in transporting these materials. The recommended plan:

- a. Would deepen the last 2,571 feet (from station 20+000 to station 22+571) of the channel from -41 feet to -46 feet MLLW.
- b. Includes dredging of approximately 727,000 cubic yards of new material to deepen the channel. The volume of maintenance dredging material is not expected to increase above maintenance volumes for the existing channel depths. Material would be placed in the existing upland confined placement area at Pelican Island. The Pelican Island placement area has sufficient capacity for 50 years of dredging operations of the GHC Project.
- c. Would not have any significant adverse effects so no mitigation measures or compensation measures would be required.

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- d. Is the National Economic Development (NED) plan and all features are located in Galveston County, Texas.
3. The Port of Galveston, representing the Board of Trustees of the Galveston Wharves, is the Non-Federal sponsor.
4. Project costs are allocated to the commercial navigation purpose and are in October 2016 prices.
 - a. Project First Cost. The estimated project first cost of constructing the GHCE is \$13,395,000, which includes the total cost of construction of the General Navigation Features (GNFs) as follows: \$11,490,000 for channel modification and dredged material placement; \$1,504,000 for planning, engineering and design efforts; and \$401,000 for construction management. The value of Lands, Easements, Rights-of-way and Relocations (LERRs) and the costs of utility relocations would normally be included in project first costs, but because the recommended plan does not anticipate the need for lands, easements, rights-of-way or relocations for this project, the project first costs are equivalent to the total cost of construction of the GNFs.
 - b. Estimated Federal and Non-Federal Shares. In accordance with the cost sharing provisions of Section 101(a)(1) of WRDA 1986, as amended (33 U.S.C. 2211(a)(1)), the Federal share of the total construction cost of the GNFs is 75 percent, and the non-Federal share is 25 percent, or an estimated \$10,046,000 and \$3,349,000, respectively.
 - c. Additional 10 Percent Payment. In addition to payment by the Non-Federal sponsor of its share of the total cost of construction of the GNFs during construction, the Non-Federal sponsor must pay an additional 10 percent of the cost of the GNFs in cash over a period not to exceed 30 years, with interest, in accordance with Section 101(a)(2) of WRDA 1986, as amended (33 U.S.C. 2211(a)(2)). The additional 10 percent payment without interest is estimated to be \$1,339,500. The value of LERRs and the costs of utility relocations, should they become necessary, will be credited toward this amount in accordance with Section 101(a)(3) of WRDA 1986, as amended (33 U.S.C. 2211(a)(3)).
 - d. Associated Costs. Estimated associated costs of \$1,938,000 will be the responsibility of the Non-Federal sponsor for dredging of Non-Federal berthing areas adjacent to the federal channel. There are no required aids to navigation (a U.S. Coast Guard expense) for this project improvement.
 - e. Authorized Project Cost and Section 902 Calculation. The project first cost for the purpose of calculating the maximum cost of the project pursuant to Section 902 of WRDA 1986, as amended (33 U.S.C. 2280), includes the total cost of construction the GNFs, and should they become necessary the value of LERRs and the costs of utility relocations. Accordingly, as set forth in paragraph 4.a, above, based on October 2016

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prices, the total estimated project first cost for these purposes is \$13,395,000. Based on October 2016 price levels, a discount rate of 2.875 percent, and a 50- year period of economic analysis, the project average annual benefits and costs for the GHCE are estimated at \$1,597,000 and \$585,000, respectively, with resulting net excess benefits of \$1,012,000 and a benefit-to-cost ratio of 2.7 to 1.

5. The goals and objectives included in the Campaign Plan of the Corps have been fully integrated into the GHCE study process. The recommended plan was developed in coordination and consultation with various Federal State, and local agencies using a systematic and regional approach to formulating solutions and evaluating the benefits and impacts that would result. The feasibility study evaluated navigation problems as well as opportunities for beneficial use of dredge material. Risk and uncertainty were addressed during the study by sensitivity analyses that evaluated the potential impacts of sea level change and economic assumptions as well as cost uncertainties.

6. In accordance with the Corps Engineering Circular on review of decision documents, all technical, engineering, and scientific work underwent an open, dynamic, and vigorous review process to ensure technical quality. This included an Agency Technical Review (ATR) and a Corps policy and legal review. All concerns of the ATR have been addressed and incorporated into the final report. The Corps approved an Independent External Peer Review exclusion on September 23, 2011.

7. Washington level review indicates that the project recommended by the reporting officers is technically sound, environmentally and socially acceptable, cost effective, and economically justified. The plan complies with all essential elements of the U.S. Water Resources Council's *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* and complies with other administrative and legislative policies and guidelines. The views of interested parties, including Federal, State, and local agencies were considered. During State and Agency review one letter was received from the Department of Agriculture with no objection noted.

8. I concur in the findings, conclusions, and recommendations of the reporting officers. Accordingly, I recommend that navigation improvements for the GHC be authorized in accordance with the reporting officer's recommended plan at an estimated cost of \$13,395,000, 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 101 of WRDA 1986, as amended (33 U.S.C. 2211). This recommendation is subject to the Non-Federal sponsor agreeing to comply with all applicable Federal laws and policies including that the Non-Federal sponsor must agree with the following requirements prior to project implementation.

- a. Provide 25 percent of the total cost of construction of the GNFs attributable to dredging to a depth in excess of -20 feet MLLW but not in excess of -50 feet as further specified below:

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SUBJECT: Galveston Harbor Channel Extension Project, Houston-Galveston Navigation Channels, Texas

- (1) Provide 25 percent of design costs allocated by the Government to commercial navigation in accordance with the terms of a design agreement entered into prior to commencement of design work for the project;
 - (2) Provide, during construction, any additional funds necessary to make its total contribution for commercial navigation equal to 25 percent of the total cost of construction of the GNFs attributable to dredging to a depth in excess of -20 feet but not in excess of -50 feet MLLW;
- b. Provide all lands, easements, and rights-of way, including those necessary for the borrowing of material and placement of dredged or excavated material, and perform or assure performance of all relocations, including utility relocations, all as determined by the Government to be necessary for the construction or operation and maintenance of the GNFs;
 - c. Pay with interest, over a period not to exceed 30 years following completion of the period of construction of the GNF's, an additional amount equal to 10 percent of the total cost of construction of GNFs, less the amount of credit afforded by the Government for the value of any LERRs and the costs of any utility relocations provided by the Non-Federal sponsor for the GNFs. If the amount of credit afforded by the Government for the value of LERRs and the costs of utility relocations provided by the Non-Federal sponsor equals or exceeds 10 percent of the total cost of construction of the GNFs, the Non-Federal sponsor shall not be required to make any contribution under this paragraph, nor shall it be entitled to any refund for the value of LERRs and the costs of utility relocations in excess of 10 percent of the total costs of construction of the GNFs;
 - d. Provide, operate, and maintain, at no cost to the Government, the local service facilities 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 Government;
 - e. Give the 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 for the purpose of completing, inspecting, operating and maintaining the GNFs;
 - f. Hold and save the United States free from all damages arising from the construction or operation and maintenance of the project, any betterments, and the local service facilities, except for damages due to the fault or negligence of the United States or its contractors;
 - g. Perform, or ensure performance of, any investigations for hazardous substances as are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. 9601-9675, that may exist in, on, or under the lands,

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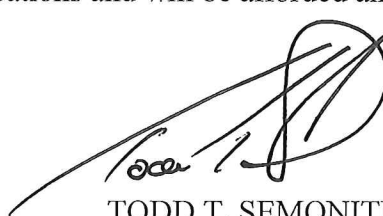
SUBJECT: Galveston Harbor Channel Extension Project, Houston-Galveston Navigation Channels, Texas

easements, or rights-of-way that the Government determines to be necessary for the construction or operation and maintenance of the GNFs. However, for lands, easements, or rights-of-way that the Government determines to be subject to the navigation servitude, only the Government shall perform such investigation unless the 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.

- h. Assume complete financial responsibility, as between the federal government and the Non-Federal sponsor, for all necessary cleanup and response costs of any hazardous substances regulated under CERCLA that are located in, on, or under lands, easements, rights-of-way that the Government determines to be necessary for the construction or operation and maintenance of the project.
- i. To the maximum extent practicable, perform its obligations in a manner that will not cause liability to arise under CERCLA.

10. 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 the Congress, the State of Texas, Port of Galveston, interested federal agencies, and other parties will be advised of any significant modifications and will be afforded an opportunity to comment.

*PROUD TO
BE ABLE TO
FINIMIZE THE CHIEFS
REPORT FOR THIS
CRITICAL PROJECT!!*



TODD T. SEMONITE
Lieutenant General, USA
Commanding



DEPARTMENT OF THE ARMY
CHIEF OF ENGINEERS
2600 ARMY PENTAGON
WASHINGTON, D.C. 20310-2600

DEC 14 2017

DAEN

SUBJECT: Mamaroneck and Sheldrake River Basins

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on flood risk management for the Mamaroneck and Sheldrake River Basins, Village of Mamaroneck, New York. It is accompanied by the report of the New York District Engineer and the North Atlantic Division Engineer. The Mamaroneck and Sheldrake River Basins, Flood Risk Management project was authorized by Section 401(a) of the Water Resources Development Act (WRDA) of 1986. This report addresses the most critical and vulnerable portion of the authorized study area in the village of Mamaroneck, which was heavily impacted by an April 2007 nor'easter. The storm produced the flood of record for the village of Mamaroneck, equivalent to the one percent flood event. It caused over \$50,000,000 in damages and impacted over 50 percent of total structures within the study area. Floodwaters peaked on the Mamaroneck River in approximately four hours and in approximately six hours on the Sheldrake River during this flood event. As such, the evacuation time for approximately 19,000 residents of the study area was severely restricted which created a high risk to life safety. Over forty percent of residents require evacuation assistance prior to floodwaters peaking including a large population of children that attend a school located within the area of the most severe flooding. Two deaths have occurred as a result of flooding in the project area in the last 25 years, most recently in 2007.

2. The reporting officers recommend authorizing a plan to reduce flood risk by the construction of retaining walls and a diversion culvert, the deepening and widening of river channels, structure elevation, and the removal/replacement of 2 vehicular bridges that constrict flood flow. The recommended plan includes approximately 7,500 linear feet of channelization (trapezoidal earthen channels) and 8,660 feet of retaining walls for the Mamaroneck and Sheldrake Rivers. The removal of existing bridges and the deepening and/or widening of both rivers would increase the flood flow channel capacity and thereby reduce water surface elevations in the village of Mamaroneck during a flood. In addition, a diversion culvert, approximately 390 linear feet in length, would bypass flood water on the Mamaroneck River downstream of the confluence, thereby avoiding significant river constrictions. Nonstructural features would include the elevation of eight (8) residential structures in the Harbor Heights neighborhood and one (1) commercial structure on the Sheldrake River within the village of Mamaroneck.

3. The recommended plan is estimated to reduce equivalent annual damages (EAD) by approximately \$2,960,000 or 87% with a residual EAD of approximately \$450,000. Annual exceedance probabilities for the village of Mamaroneck would be reduced from approximately a

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SUBJECT: Mamaroneck and Sheldrake Rivers Basin, New York

20 percent flood event to, depending on location, a 2 percent to 0.5 percent flood event. The implementation of the recommended plan will not completely eliminate the potential for loss of life; however, it may reduce the risk of loss of life by decreasing the frequency of flooding from out-of-bank flood events.

4. The recommended plan would have unavoidable impacts to historic properties, vegetation, and some wildlife habitats. A Memorandum of Agreement to account for adverse effects to historic properties has been executed with the New York State Office of Parks, Recreation and Historic Preservation, which serves at the New York State Historic Preservation Office. The affected historic properties include the Works Progress Administration-constructed retaining walls and Ward Avenue Bridge, which will be removed and replaced as part of the project. Cultural mitigation of this adverse effect includes historic property documentation of the retaining walls and bridge. As part of this mitigation, the Village of Mamaroneck Historian and the Village of Mamaroneck Historical Society will be participating in this effort as consulting parties. No significant adverse impacts to vegetation and wildlife would be expected as a result of construction with the inclusion of the following: Stormwater Pollution Prevention Plan(s), seasonal windows for tree removal and river channel work, and best management practices such as planting native vegetation and trees.

5. The New York State Department of Environmental Conservation (NYSDEC) is the non-Federal cost-sharing sponsor for the authorized project. Based on an October 2016 price level, the estimated total first cost of the recommended plan is \$82,250,000. The Federal share of the estimated first cost of initial construction is currently estimated at \$53,500,000 with a non-Federal share of \$28,750,000. The non-Federal share includes the costs of lands, easements, rights-of-way, relocations, and disposal which are estimated at \$19,150,000. The NYSDEC would also be responsible for the operation, maintenance, repair, replacement and rehabilitation (OMRR&R) of the project after construction, a cost currently estimated at \$360,000 per year.

6. Based on a 2.875% discount rate for Fiscal Year 2017 and a 50-year period of analysis, the total average annual costs of the project are estimated to be \$3,650,000, including OMRR&R. The recommended plan has primary outputs based on flood risk management. The total average annual benefits are estimated to be \$3,820,000. The net average annual benefits are approximately \$170,000. The benefit-to-cost ratio (BCR) is 1.05 to 1.

7. The goals and objectives included in the Campaign Plan of the U.S. Army Corps of Engineers (USACE) have been fully integrated into the Mamaroneck and Sheldrake River Basins, Village of Mamaroneck, New York, Flood Risk Management study process. The recommended plan has been designed to avoid or minimize environmental impacts while maximizing future safety and economic benefits to the community. As flood waters can elevate up to a depth of 8 feet within 4 hours, as reported during the April 2007 flood event, evacuation, transportation and emergency services can be extremely limited if not impossible as seen by the two deaths that have already occurred in the village of Mamaroneck. Critical facilities such as schools, daycares, hospitals, emergency services and senior care centers are located within the 1% floodplain and are at the

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SUBJECT: Mamaroneck and Sheldrake Rivers Basin, New York

greatest risk for such a rapid evacuation. The risk to life safety is significant for this socially vulnerable population. The study team organized and participated in stakeholder meetings and public workshops throughout the process and worked with local groups to achieve a balance of project goals and public concerns through the modernization of the Civil Works planning program and processes. The study report fully describes flood risk associated with the village of Mamaroneck and risks that will not be reduced; these residual risks have been communicated to the state of New York, Westchester County, and the residents of the village of Mamaroneck.

8. In accordance with EC 1165-2-214, Civil Works Review, all technical, engineering and scientific work underwent an open, dynamic and vigorous review process to ensure technical quality. This included an Agency Technical Review (ATR), a Type I Independent External Peer Review (IEPR) and a Headquarters USACE policy and legal review. All concerns of the ATR have been addressed and incorporated in the final report. The ATR comments helped to more clearly communicate the information that was provided in the report. The IEPR was managed by Battelle Memorial Institute. 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. A safety assurance review, Type II IEPR, will be conducted during the design phase of the project.

9. 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. During the State and Agency Review, a letter was received from the U.S. Department of the Interior on 23 May 2017 stating that they had no comments to submit.

10. I concur in the findings, conclusions, and recommendations of the reporting officers. Accordingly, I recommend that the plan to reduce flood damage in the Village of Mamaroneck, New York, be authorized in accordance with the reporting officers' recommended plan at an estimated cost of \$82,250,000 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 laws and policies, including Section 103 of P.L. 99-662, WRDA 1986, as amended (33 U.S.C. 2213). These requirements include, but are not limited to, the following items of local cooperation from the non-Federal sponsor:

a. Provide a minimum of 35 percent, but not to exceed 50 percent, of total flood risk management costs as further specified below:

DAEN

SUBJECT: Mamaroneck and Sheldrake Rivers Basin, New York

(1) Pay, during construction, 5 percent of total flood risk management costs.

(2) Provide all lands, easements, and rights-of-way, including those required for relocations, the borrowing of material, and the disposal of dredged or excavated material, and perform or ensure the performance of all relocations, as determined by the government to be required for the construction, operation, and maintenance of the project.

(3) During construction, pay any additional funds necessary to make its total contribution equal to at least 35 percent of total flood risk management costs.

b. Inform affected interests, at least yearly, of the extent of protection afforded by the flood risk management features; participate in and comply with applicable Federal floodplain management and flood insurance programs; comply with Section 402 of P.L. 99-662, the WRDA 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 flood risk management features.

c. Prevent obstructions or encroachments on the project (including prescribing and enforcing regulations to prevent such obstructions or encroachments) such as any new developments on project lands, easements, and rights-of-way or the addition of facilities which might reduce the level of protection the flood risk management features afford, hinder operation and maintenance of the project, or interfere with the project's proper function.

d. Keep the recreation features, and access roads, parking areas, and other associated public use facilities, open and available to all on equal terms.

e. Operate, maintain, repair, rehabilitate, and replace 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.

f. Hold and save the United States free from all damages arising from the construction, operation, maintenance, repair, rehabilitation, and replacement of the project, except for damages due to the fault or negligence of the United States or its contractors.

g. Perform, or ensure performance of, 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), P.L. 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 construction, operation, and maintenance of the project.

DAEN

SUBJECT: Mamaroneck and Sheldrake Rivers Basin, New York

h. Assume, as between the Federal Government and the non-Federal sponsor, complete financial responsibility for all necessary cleanup and response costs of any hazardous substances regulated under CERCLA that are located in, on, or under lands, easements, or rights-of-way required for construction, operation, and maintenance of the project.

i. Agree, as between the Federal Government and the non-Federal sponsor, 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, repair, rehabilitate, and replace the project in a manner that will not cause liability to arise under CERCLA.

11. 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 sponsor, the state, interested Federal agencies, and other parties will be advised of any significant modifications and will be afforded an opportunity to comment further.

A handwritten signature in black ink, appearing to read "Todd T. Semonite", is written over the typed name.

TODD T. SEMONITE
Lieutenant General, USA
Chief of Engineers



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

DAEN

DEC 07 2017

THE SECRETARY OF THE ARMY

SUBJECT: Sabine Pass to Galveston Bay, Texas, Coastal Storm Risk Management and Ecosystem Restoration Study

1. I submit for transmission to Congress my report on Coastal Storm Risk Management (CSRM) and Ecosystem Restoration (ER) within six counties of the upper Texas coast (Orange, Jefferson, Chambers, Harris, Galveston, and Brazoria Counties). It is accompanied by the report of the Galveston District Engineer and the Southwestern Division Engineer. These reports are a partial response to a resolution from the Committee on Environment and Public Works dated June 23, 2004, entitled "Coastal Texas Protection and Restoration Study." The resolution requested that this study be undertaken to "develop a comprehensive plan for severe erosion along coastal Texas for the purposes of shoreline erosion and coastal storm damages, providing for environmental restoration and protection, increasing natural sediment supply to coast, restoring and preserving marshes and wetlands, improving water quality, and other related purposes to the interrelated ecosystem along the coastal Texas area." The project area was hit by a Category 4 hurricane, Hurricane Harvey, on August 25, 2017. At the time of signature of this Report of the Chief of Engineers damage assessments are still underway. Early reports indicate extensive flooding and damages across the project area in addition to the loss of 10 lives in Orange County and four lives in Jefferson County. Preconstruction engineering and design (PED) activities, if funded, would be continued under the authorities provided by the resolution cited above.

2. The reporting officers' recommendation for the upper Texas coastal region encompassing the six counties along 120 miles of coastline include authorization of a plan to reduce the risks of tropical storm surge impacts in Orange, Jefferson and Brazoria Counties through the construction of structural measures and the continuation of the study of the Galveston region (Galveston, Harris, and Chambers Counties) for CSRM. Continuation of the study of ER alternatives assessed in the six counties will be conducted under the comprehensive Coastal Texas Protection and Restoration feasibility study. The recommended plan was developed utilizing a region-wide systems approach to achieve the full range of benefits, although the CSRM plans are separable and able to function individually. The plan includes (i) increasing the level of performance and resiliency of the existing Port Arthur and Vicinity Hurricane Flood Protection (HFPP) project in Jefferson County, Texas (the Port Arthur and Vicinity CSRM Plan); (ii) the construction of a new levee/floodwall system (the Orange 3 CSRM Plan) along the edge of the Sabine and Neches River floodplains from Orange, Texas to the vicinity of Orangefield, Texas that is approximately 26.7-miles; and (iii) increasing the level of performance and resiliency of the existing Freeport and Vicinity HFPP project in Brazoria County, Texas (the Freeport and Vicinity CSRM Plan).

DAEN

SUBJECT: Sabine Pass to Galveston Bay, Texas, Coastal Storm Risk Management and Ecosystem Restoration Study

3. Based on October 2017 price levels, the estimated project first cost of the recommended plan, which includes three separable elements, is \$3,318,772,000. All construction work will be cost shared in accordance with the cost sharing provisions of Section 103 of the Water Resources Development Act (WRDA) of 1986, as amended (33 U.S.C. 2213). The Federal share of the project first costs of the hurricane and storm damage risk reduction features is estimated to be \$2,157,202,000 (65 percent) and the total non-Federal share is estimated to be \$1,161,570,000 (35 percent). The total cost of non-Federal contribution of lands, easements, rights-of-way, relocations, and dredged or excavated material disposal areas (LERRDs) is estimated to be \$52,451,000. The total annual cost of Operation, Maintenance, Repair, Replacement and Rehabilitation (OMRR&R) of the project is currently estimated to be \$5,585,000 per year. The OMRR&R estimate includes \$41,000 per year for monitoring of the environmental mitigation component after the commencement of OMRR&R. Based on a 2.75 percent discount rate and a 50-year period of analysis, the total equivalent average annual costs of the three separable elements for the project are estimated to be \$141,799,000 including OMRR&R. Additionally, the non-Federal sponsors would be fully responsible for removing and relocating utilities and discharge pipelines on the project site that are non-compensable, at a total cost estimated to be \$128,320,000. The equivalent average annual benefits for the three separable elements are estimated to be \$452,633,000 with net average annual benefits of \$310,834,000. The recommended plan is the National Economic Development plan.

a. The first element of the recommended plan is the Port Arthur and Vicinity CSRM Plan.

(1) The Port Arthur and Vicinity CSRM Plan would raise approximately 5.5 miles of the existing 27.8 miles of earthen levee to elevations ranging from 14.4 to 17.2 feet North American Vertical Datum (NAVD 88), and construct or reconstruct approximately 5.7 miles of floodwall to elevations ranging from about 14.4 to 19.4 feet NAVD 88. A separate 1,830 feet of new earthen levee would be constructed in the Port Neches area northwest of the existing northern terminus. Additionally, 26 vehicle closure structures would be replaced and erosion protections would be added.

(2) The existing Port Arthur HFPP local sponsor, Jefferson Country Drainage District No. 7, will be the non-Federal cost-sharing sponsor for the Port Arthur and Vicinity CSRM Plan. Based on October 2017 price levels, the estimated project first cost of the recommended plan is \$744,865,000. All construction work will be cost shared in accordance with the cost sharing provisions of Section 103 of WRDA 1986, as amended. The Federal share of the project first costs of the hurricane and storm damage risk reduction features is estimated to be \$484,162,000 (65 percent) and the total non-Federal share is estimated to be \$260,703,000 (35 percent). The non-Federal contribution of LERRDs for the improvements associated with the Port Arthur and Vicinity CSRM Plan would be about \$8,376,000. The non-Federal sponsor's cost for removing and relocating utilities and discharge pipelines associated with the Port Arthur and Vicinity CSRM Plan that are non-compensable would be about \$38,544,000. The non-Federal sponsor would be responsible for the OMRR&R of the project after construction. OMRR&R is currently estimated at \$199,000.

DAEN

SUBJECT: Sabine Pass to Galveston Bay, Texas, Coastal Storm Risk Management and Ecosystem Restoration Study

(3) Based on a 2.75 percent discount rate and a 50-year period of analysis, the total average annual costs of the project are estimated to be \$29,757,000, including OMRR&R. The recommended plan would reduce average annual coastal storm damages by about 76 percent and would leave average total equivalent annual residual damages estimated at \$42,604,000. The equivalent average annual benefits for Port Arthur and Vicinity CSRM Plan is estimated to be \$139,106,000 with net average annual benefits of \$109,349,000, which results in a BCR of approximately 4.7 to 1. The recommended plan is the National Economic Development plan.

b. The second element of the recommended plan is the Orange 3 CSRM Plan.

(1) This element includes 15.6 miles of newly constructed levee ranging from 12.0 to 17.5 feet NAVD 88 in elevation and 10.7 miles of newly constructed floodwalls and gates ranging from 13.5 to 16 feet NAVD 88. Seven pump stations, 56 drainage structures, and 32 closure gates located at road and railway crossings would be constructed to mitigate interior flooding during surge events. Finally, two navigable sector gates with adjacent vertical lift floodgates for normal channel flows would be constructed in Adams and Cow Bayous to reduce surge penetration. Unavoidable direct and indirect environmental impacts to 2,409 acres of forested wetlands and estuarine marsh associated with the Orange 3 CSRM Plan would be fully compensated by the implementation of the mitigation plan. Monitoring and adaptive management of the mitigation areas will be conducted until the mitigation measures have been demonstrated to be successful.

(2) Orange County, Texas will be the non-Federal cost-sharing sponsor for the Orange 3 CSRM Plan. Based on October 2017 price levels, the estimated first cost of the recommended Orange 3 CSRM Plan is \$1,967,826,000. All construction work will be cost shared in accordance with the cost sharing provisions of Section 103 of WRDA 1986, as amended. The Federal share of the first costs of the hurricane and storm damage risk reduction features is estimated to be \$1,279,087,000 (65 percent) and the total non-Federal share is estimated to be \$688,739,000 (35 percent). The non-Federal contribution of LERRDs for the newly constructed levee/floodwall system associated with the Orange 3 CSRM Plan would be about \$33,199,000. The non-Federal sponsor's cost for removing and relocating utilities and discharge pipelines associated with the Orange 3 CSRM Plan that are non-compensable would be about \$62,387,000. The non-Federal sponsor would be responsible for OMRR&R of the project after construction. OMRR&R is currently estimated at \$4,663,000.

(3) Based on a 2.75 percent discount rate and a 50-year period of analysis, the total average annual costs of the Orange 3 CSRM Plan are estimated to be \$87,268,000, including OMRR&R. The recommended plan would reduce average annual coastal storm damages by about 64 percent and would leave average total equivalent annual residual damages estimated at \$60,496,000. The equivalent average annual benefits for Orange 3 CSRM Plan is estimated to be \$105,919,000 with net average annual benefits of \$18,651,000, which results in a benefit-cost ratio (BCR) of approximately 1.2 to 1. The recommended plan is the National Economic Development plan.

DAEN

SUBJECT: Sabine Pass to Galveston Bay, Texas, Coastal Storm Risk Management and Ecosystem Restoration Study

c. The third element of the recommended plan is the Freeport and Vicinity CSRM Plan.

(1) The recommended Freeport and Vicinity CSRM Plan would raise approximately 13.1 miles of the existing earthen levee system and construct or reconstruct approximately 5.5 miles of floodwall, improving approximately 43 percent of the existing 43-mile long system. Final elevations would range from 15.8 to 23.8 feet NAVD 88. Navigable sector gates would be installed in the Dow Barge Canal to reduce surge penetration in that area. Ten vehicle closure structures at road and railroad crossings would be replaced and erosion protection would be added. Other project features include raising and reconstructing the Highway 332 crossing, installation of four drainage structures, including one at the head of the Dow Barge Canal, and raising the floodwall at Port Freeport's Berth 5 dock.

(2) The existing Freeport Harbor Flood Protection Project local sponsor, the Velasco Drainage District, will be the non-Federal cost-sharing sponsor for the Freeport and Vicinity CSRM Plan. Based on October 2017 price levels, the estimated project first cost of the recommended plan is \$606,313,000. All construction work will be cost shared. In accordance with the cost sharing provisions of Section 103 of WRDA 1986, as amended, the Federal share of the project first costs of the hurricane and storm damage risk reduction features is estimated to be \$393,953,000 (65 percent) and the total non-Federal share is estimated to be \$207,660,000 (35 percent). The non-Federal contribution of LERRDs for the improvements associated with the Freeport and Vicinity CSRM Plan would be about \$10,876,000. The non-Federal sponsor's cost for removing and relocating utilities and discharge pipelines associated with the Freeport and Vicinity CSRM Plan that are non-compensable would be about \$27,389,000. The non-Federal sponsor would be responsible for the OMRR&R of the project after construction. OMRR&R is currently estimated at \$723,000.

(3) Based on a 2.75 percent discount rate and a 50-year period of analysis, the total average annual costs of the Freeport Harbor CSRM Plan are estimated to be \$24,774,000, including OMRR&R. The recommended plan would reduce average annual coastal storm damages by about 66 percent and would leave average total equivalent annual residual damages estimated at \$107,006,000. The equivalent average annual benefits for Freeport and Vicinity CSRM Plan is estimated to be \$207,608,000 with net average annual benefits of \$182,834,000, which results in a BCR of approximately 8.4 to 1. The recommended plan is the National Economic Development plan.

d. The recommended plan is intended to prevent damages to structures and content and critical infrastructure from coastal storm surge and waves. It should be noted, however, that reducing the risk of loss of life during major storm events can only be achieved by adhering to existing procedures for evacuation of residents and visitors well before expected hurricane landfall, thus removing people from harm's way. This study recommends continuation of the evacuation policy both with and without the project.

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SUBJECT: Sabine Pass to Galveston Bay, Texas, Coastal Storm Risk Management and Ecosystem Restoration Study

4. In accordance with USACE Sea Level Change (SLC) Guidance, Engineer Regulation (ER) 1100-2-8162, the study evaluated potential impacts in SLC in its plan formulation and engineering of the recommended plan. Three levels of Relative Sea Level Change (RSLC) were considered for both the without-project and with-project conditions. The risk reduction system has been designed to provide a risk reduction against a 1 percent annual chance exceedance probability storm event based on the 2070 intermediate RSLC forecast condition. In recognition of the uncertainty presented by sea level rise, adaptation capacity has been incorporated into the final feasibility-level design to maximize the systems' overall usefulness over the life of the project. The adaptability will allow for limited overtopping of wave and minor still water overtopping that would then be mitigated for using interior drainage features or height increases to the floodwall if required. The equivalent average annual benefits are estimated to range from nearly \$55,000,000 to \$164,000,000 under the low SLC scenario, \$104,000,000 to \$203,000,000 under the intermediate SLC scenario, and to nearly \$157,000,000 to \$291,000,000 under the high SLC scenario. Corresponding annual net benefits for the recommended plan range from approximately \$16,000,000 to \$178,000,000 with BCRs ranging from 1.2 to 8.2. The recommended plan also shows high project performance with a 99 percent conditional non-exceedance probability over a 50-year period under all SLC scenarios.

5. The goals and objectives included in the Campaign Plan of the USACE have been fully integrated into the Sabine Pass to Galveston Bay study process. The recommended plan was developed in coordination and consultation with various Federal, state, and local agencies using a systematic and regional approach to formulating solutions and evaluating the benefits and impacts that would result. The feasibility study evaluated shoreline erosion and coastal storm damage problems as well as opportunities for environmental restoration and protection. Risk and uncertainty were addressed during the study by sensitivity analysis that evaluated the potential impacts of sea level change and economic assumptions as well as cost uncertainties.

6. In accordance with the USACE Engineer 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, Major Subordinate Command review, Independent External Peer Review, Public Review, and a USACE Headquarters policy and legal review. 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.

7. 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.

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SUBJECT: Sabine Pass to Galveston Bay, Texas, Coastal Storm Risk Management and Ecosystem Restoration Study

8. Federal implementation of the project would be subject to the non-Federal sponsors agreeing in a binding written agreement to comply with applicable Federal laws and policies, and to perform the following non-Federal obligations, including, but not limited, to the following:

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

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

(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 or the 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 the total contribution equal to 35 percent of initial project costs assigned to hurricane and storm damage reduction, and 100 percent of initial project 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 portion 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. Inform affected interests, at least annually, of the extent of protection afforded by the project; 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;

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

e. Give the Federal Government a right to enter, at reasonable times and in a reasonable manner, upon property that the non-Federal sponsors own or control for access to the project for

DAEN

SUBJECT: Sabine Pass to Galveston Bay, Texas, Coastal Storm Risk Management and Ecosystem Restoration Study

the purpose of completing, inspecting, operating, maintaining, repairing, rehabilitating, or replacing the project;

f. Hold and save the United States 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 United States or its contractors;

g. Perform, or ensure performance of, 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 construction, 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 sponsors with prior specific written direction, in which case the non-Federal sponsors shall perform such investigations in accordance with such written direction;

h. Assume, as between the Federal Government and the non-Federal sponsors, complete financial responsibility for all necessary cleanup and response costs of any hazardous substances regulated under CERCLA that are located in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be required for construction, operation, and maintenance of the project; and

i. Agree, as between the Federal Government and the non-Federal sponsors, that the non-Federal sponsors shall be considered the operator of the project for the purpose of CERCLA liability, and to the maximum extent practicable, operate, maintain, repair, rehabilitate, and replace the project in a manner that will not cause liability to arise under CERCLA.

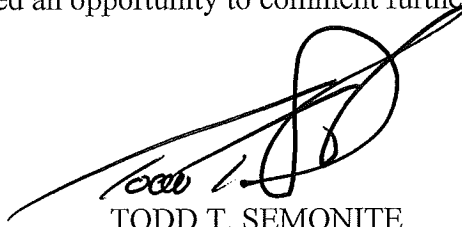
9. I concur in the findings, conclusions, and recommendations of the reporting officers. Accordingly, I recommend that the plan to reduce the risks of tropical storm surge impacts in Orange, Jefferson and Brazoria Counties, Texas be authorized in accordance with the reporting officers' recommended plan at an estimated project first cost of \$3,318,772,000, 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 WRDA 1986, as amended.

10. 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.

DAEN

SUBJECT: Sabine Pass to Galveston Bay, Texas, Coastal Storm Risk Management and Ecosystem Restoration Study

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 state, interested Federal agencies, and other parties will be advised of any significant modifications and will be afforded an opportunity to comment further.

A handwritten signature in black ink, appearing to read "TODD T. SEMONITE", with a large, stylized circular flourish extending from the end of the signature.

TODD T. SEMONITE
Lieutenant General, USA
Chief of Engineers



DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
CIVIL WORKS
108 ARMY PENTAGON
WASHINGTON DC 20310-0108

DEC 05 2016

Honorable Joseph R. Biden, Jr.
President of the Senate
U.S. Capitol Building, Room S-212
Washington, DC 20510-0012

Dear Mr. President:

The Secretary of the Army recommends modifying the total project first cost of the authorized Savannah Harbor Expansion Project, Savannah, Georgia to increase the total project first cost from \$706,000,000 (October 2014 price levels) to \$973,443,000 (October 2016 price levels). The increase in the authorized cost is necessary because the total project costs are projected to exceed the maximum allowed by section 902 of the Water Resources Development Act (WRDA) of 1986. The enclosed November 2016 Post Authorization Change Report / Limited Reevaluation Report (PACR/LRR) explains the cost increase.

Section 7002 of the Water Resources Reform and Development Act of 2014, modified the project and increased the total project cost to \$706,000,000. The authorized project was based on the National Economic Development plan and deepens the project from the existing -42 feet mean lower low water (MLLW), 32.7 mile long shipping channel to -47 feet MLLW. When completed, the project will address deep draft navigation inefficiencies in the marine transportation of goods through Savannah Harbor. The completed project is expected to provide about \$296.8 million annually in transportation cost savings.

The maximum cost for the authorized project, adjusted for allowable inflation in accordance with section 902, is \$894,402,000 (October 2016 price levels). Based on cost increases described in the PACR, the revised current project estimate is \$973,000,000 and the fully funded estimated project first cost is \$1,019,000,000. The increases in cost are due to several factors, as follows:

- a. \$98 million due to increases in awarded construction contracts over the original feasibility level estimates;
- b. \$66 million due to out-year design and construction changes;
- c. \$25 million due to schedule related increases in Planning, Engineering, Design, Construction Management and Environmental Monitoring costs;
- d. \$4 million due to an increase in the estimated cost for acquiring mitigation lands, due to current market conditions;
- e. \$5 million due to increases in recovery costs for the CSS Georgia; and

f. \$69 million for an update in the project contingency related to cost and schedule risk from 19% to 24.2%.

In accordance with the cost sharing provisions of section 101(a)(1) of the Water Resources Development Act of 1986, as amended, the Federal share of the updated project first cost is estimated at \$677,613,600 and the non-Federal share is \$295,829,400. To date, \$115,327,000 in Federal and \$269,685,000 in non-Federal funds have been provided. The Federal funding provided to date includes \$20,000,000 in the Continuing Resolution Authority for FY2017.

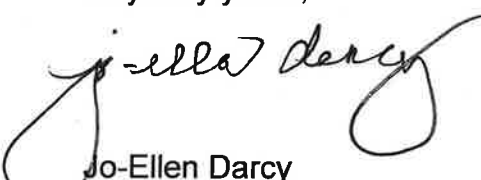
At the October 2016 price level, a 2.875% percent discount rate, and a 50-year period of economic analysis, the Corps estimates the total equivalent annual costs to be \$44,911,000 and total equivalent annual benefits to be \$327,241,000. The net total equivalent annual benefits are estimated at \$282,329,000 and the benefit-to-cost ratio is 7.3 to 1.

Since the PACR only addresses changes in the total project cost, no additional environmental compliance actions were required. There have also been no major changes to the project's environmental circumstances or considerations since the project was authorized.

An Independent External Peer Review (IEPR) was not completed for the Savannah Harbor Expansion Project PACR/LRR. The Director of Civil Works for Corps, Headquarters approved an IEPR exclusion request for the PACR/LRR.

The Office of Management and Budget (OMB) advises that there is no objection to the submission of the report to Congress. However, OMB also noted that the Corps will need to revise the report to provide a detailed analysis of the costs and benefits of this project prior to consideration in future budgets. A copy of OMB's letter, dated December 2, 2016, is enclosed. I am providing a copy of this transmittal and the OMB letter to the Subcommittee on Transportation and Infrastructure of the Senate Committee on Environment and Public Works, and the Subcommittee on Energy and Water Development of the Senate Committee on Appropriations. I am also providing an identical letter to the Speaker of the House of Representatives.

Very truly yours,



Jo-Ellen Darcy
Assistant Secretary of the Army
(Civil Works)

Enclosures



DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
CIVIL WORKS
108 ARMY PENTAGON
WASHINGTON DC 20310-0108

DEC 05 2016

Honorable Paul Ryan
Speaker of the House of Representatives
U.S. Capitol Building, Room H-232
Washington, DC 20515-0001

Dear Mr. Speaker:

The Secretary of the Army recommends modifying the total project first cost of the authorized Savannah Harbor Expansion Project, Savannah, Georgia to increase the total project first cost from \$706,000,000 (October 2014 price levels) to \$973,443,000 (October 2016 price levels). The increase in the authorized cost is necessary because the total project costs are projected to exceed the maximum allowed by section 902 of the Water Resources Development Act (WRDA) of 1986. The enclosed November 2016 Post Authorization Change Report / Limited Reevaluation Report (PACR/LRR) explains the cost increase.

Section 7002 of the Water Resources Reform and Development Act of 2014, modified the project and increased the total project cost to \$706,000,000. The authorized project was based on the National Economic Development plan and deepens the project from the existing -42 feet mean lower low water (MLLW), 32.7 mile long shipping channel to -47 feet MLLW. When completed, the project will address deep draft navigation inefficiencies in the marine transportation of goods through Savannah Harbor. The completed project is expected to provide about \$296.8 million annually in transportation cost savings.

The maximum cost for the authorized project, adjusted for allowable inflation in accordance with section 902, is \$894,402,000 (October 2016 price levels). Based on cost increases described in the PACR, the revised current project estimate is \$973,000,000 and the fully funded estimated project first cost is \$1,019,000,000. The increases in cost are due to several factors, as follows:

- a. \$98 million due to increases in awarded construction contracts over the original feasibility level estimates;
- b. \$66 million due to out-year design and construction changes;
- c. \$25 million due to schedule related increases in Planning, Engineering, Design, Construction Management and Environmental Monitoring costs;
- d. \$4 million due to an increase in the estimated cost for acquiring mitigation lands, due to current market conditions;
- e. \$5 million due to increases in recovery costs for the CSS Georgia; and

f. \$69 million for an update in the project contingency related to cost and schedule risk from 19% to 24.2%.

In accordance with the cost sharing provisions of section 101(a)(1) of the Water Resources Development Act of 1986, as amended, the Federal share of the updated project first cost is estimated at \$677,613,600 and the non-Federal share is \$295,829,400. To date, \$115,327,000 in Federal and \$269,685,000 in non-Federal funds have been provided. The Federal funding provided to date includes \$20,000,000 in the Continuing Resolution Authority for FY2017.

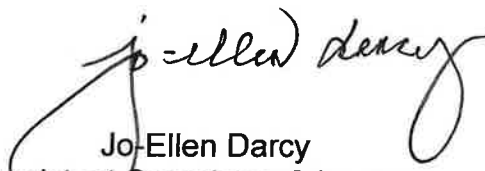
At the October 2016 price level, a 2.875% percent discount rate, and a 50-year period of economic analysis, the Corps estimates the total equivalent annual costs to be \$44,911,000 and total equivalent annual benefits to be \$327,241,000. The net total equivalent annual benefits are estimated at \$282,329,000 and the benefit-to-cost ratio is 7.3 to 1.

Since the PACR only addresses changes in the total project cost, no additional environmental compliance actions were required. There have also been no major changes to the project's environmental circumstances or considerations since the project was authorized.

An Independent External Peer Review (IEPR) was not completed for the Savannah Harbor Expansion Project PACR/LRR. The Director of Civil Works for Corps, Headquarters approved an IEPR exclusion request for the PACR/LRR.

The Office of Management and Budget (OMB) advises that there is no objection to the submission of the report to Congress. However, OMB also noted that the Corps will need to revise the report to provide a detailed analysis of the costs and benefits of this project prior to consideration in future budgets. A copy of OMB's letter, dated December 2, 2016, is enclosed. I am providing a copy of this transmittal and the OMB letter to the Subcommittee on Water Resources and Environment of the House Committee on Transportation and Infrastructure, and the Subcommittee on Energy and Water Development of the House Committee on Appropriations. I am also sending an identical letter to the President of the Senate.

Very truly yours,



Jo-Ellen Darcy
Assistant Secretary of the Army
(Civil Works)

Enclosures



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

AUG 08 2017

DAEN

SUBJECT: St. Johns County, Florida - South Ponte Vedra Beach, Vilano Beach, and Summer Haven Reaches - 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. Johns County, Florida. It is accompanied by the report of the district and division engineers. This report is an interim response to House Resolution 2646 adopted June 21, 2000 by the Committee on Transportation and Infrastructure of the United States House of Representatives. The resolution requested the Secretary of the Army, acting through the Chief of Engineers, *"to survey the shores of St. Johns County, Florida, with particular reference to the advisability of providing beach erosion control works in the area north of St. Augustine Inlet, the shoreline in the vicinity of Matanzas Inlet, and adjacent shorelines, as may be necessary in the interest of hurricane protection, storm damage reduction, beach erosion control, and other related purposes."* 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 National Economic Development (NED) plan. The non-federal sponsor, St. Johns County, supports the NED plan.

a. The recommended plan includes beach and dune nourishment within the Vilano Beach reach and a small portion of the South Ponte Vedra Beach reach. The design includes construction of a 60- foot equilibrated berm extension from the +8.0 foot 1988 North Atlantic Vertical Datum contour between the R monuments R103.5 and R116.5 along 2.6 miles of shoreline. The project template will include a dune feature that reflects the average 2015 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 R102.5 to R117.5 along 3 miles of shoreline.

b. Initial construction will require approximately 1,310,000 cubic yards of sand, and each periodic nourishment event will require approximately 866,000 cubic yards. The periodic nourishment interval is expected to be approximately 12 years, equaling an estimated 3 periodic nourishment events in addition to initial construction over the 50-year period of federal participation.

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c. The sand source identified for the project is the St. Augustine Inlet system, located adjacent to the project area to the south. There is approximately 6.5 million cubic yards (MCY) of beach quality sand in the inlet system. This volume is more than adequate to meet the initial construction volume. The periodic nourishment volume is approximately 866,000 cubic yards every 12 years. The Florida Department of Environmental Protection's inlet management plan for St. Augustine Inlet states a bypassing objective of 278,000 cubic yards per year of which one third should go to beaches to the north. One third of the bypassing objective is 92,666 cubic yards per year. Over 12 years, 1.1 MCY would be available to meet the 866,000 cubic yard need for a periodic nourishment event.

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. A portion of the project is located in the Coastal Barrier Resource System (CBRS) unit P04A. In accordance with the Coastal Barrier Resources Act (CBRA), no federal funds will be expended for this portion of the project. The cost share for this area is a non-federal responsibility for both initial construction and periodic nourishment.

3. St. Johns County is the non-federal cost sharing sponsor for all features. Based on Fiscal Year 17 price levels, the estimated total nourishment cost of the NED Plan is \$78,417,000, which includes the project first cost of initial construction of \$24,834,000 and three periodic nourishments at a total cost of \$53,583,000. The three periodic nourishments are estimated to occur at 12-year intervals. Since the final nourishment is estimated to occur at year 36 following initial construction, the estimated cost of periodic nourishments accounts for approximately two years' worth of additional volume being placed during that final nourishment. 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 \$5,712,000 and the non-federal share would be approximately \$19,122,000, which equates to 23 percent federal and 77 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 \$943,000.

b. The federal share of future periodic nourishment is estimated to be \$9,484,000 and the non-federal share is estimated to be \$44,099,000 which equates to 17.7 percent federal and 82.3 percent non-federal.

c. Operation, Maintenance, Repair, Rehabilitation, and Replacement (OMRR&R) costs are estimated to be \$35,000 annually. OMRR&R costs are a 100% non-federal responsibility.

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SUBJECT: St. Johns County, Florida - South Ponte Vedra Beach, Vilano Beach, and Summer Haven Reaches - Coastal Storm Risk Management Project

4. Based on a 2.875 percent discount rate and a 50-year period of analysis, the total equivalent average annual costs of the project are estimated to be \$2,031,000. 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 \$1,961,000. The equivalent average annual benefits, inclusive of recreation benefits, are estimated to be \$2,653,000 with net average annual benefits of \$622,000. The benefit to cost ratio is approximately 1.3 to 1. The project would reduce coastal damages including reduction of damage to a key piece of critical infrastructure, State Road (SR) A1A. In addition to functioning as a hurricane evacuation route, SR A1A also serves as a primary post storm emergency response and recovery route for the area. Thus, protection of A1A could potentially reduce loss of life pre- and post hurricane. The project would also establish at least 3.2 acres of beach habitat that will provide suitable nesting habitat for federally threatened and endangered species such as loggerhead, green, Kemp's ridley, hawksbill, and leatherback sea turtles and piping plover and rufa red knot shorebirds along approximately 3 miles of shoreline.

5. Risk and uncertainty has been explicitly factored into the economic analysis of this project. 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. Johns 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. Johns 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 nourishments 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

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SUBJECT: St. Johns County, Florida - South Ponte Vedra Beach, Vilano Beach, and Summer Haven Reaches - Coastal Storm Risk Management Project

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 was waived by Corps Headquarters since there was no Environmental Impact Statement 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. Johns County, Florida is authorized in accordance with the reporting officers' recommended plan at an estimated project first cost of \$78,417,000 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 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% of design and initial construction costs assigned to coastal storm risk management plus 100% of costs assigned to protecting areas within the CBRS when such costs are not excepted from the CBRA's limitation on federal expenditures and 100% of the costs assigned to protecting undeveloped private lands and other private shores which do not provide public benefits; and 50% of periodic nourishment costs assigned to hurricane and storm damage reduction, plus 100% of periodic nourishment costs assigned to protecting areas within the CBRS when such costs are not excepted from the CBRA's limitation on federal expenditures and 100% of 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;

2) Provide all lands, easements, and rights-of-way, perform or ensure the performance of any relocations, and provide all relocation assistance 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

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SUBJECT: St. Johns County, Florida - South Ponte Vedra Beach, Vilano Beach, and Summer Haven Reaches - Coastal Storm Risk Management Project

Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 U.S.C. 4601-4655) and the regulations contained in 49 CFR Part 24.;

- 3) Pay, during construction, any additional amounts necessary to make its contribution equal to 35% of initial project costs assigned to hurricane and storm damage reduction, plus 100% of initial project costs assigned to protecting undeveloped private lands and other private shores which do not provide public benefits; and 50% of periodic nourishment costs assigned to hurricane and storm damage reduction, plus 100% of periodic nourishment costs assigned to protecting undeveloped private lands and other private shores which do not provide public benefits;
- b. 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 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, operation, maintenance, repair, replacement, and rehabilitation of the projects, except for damages due to the fault or negligence of the United States or its contractors;
- d. Perform, or ensure performance of, 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, 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;
- f. Agree, as between the federal government and the non-federal sponsor, 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;

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SUBJECT: St. Johns County, Florida - South Ponte Vedra Beach, Vilano Beach, and Summer Haven Reaches - Coastal Storm Risk Management Project

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

h. Inform affected interests, at least annually, of the extent of risk reduction afforded by the project; participate in and comply with applicable federal floodplain management and flood insurance programs; comply with Section 402 of WRDA 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 the project;


i. For shores, other than federal shores, protected using federal funds, ensure continued conditions of public use of such shores compatible with the authorized purpose of the project;

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 annually, and after storm events, perform surveillance of the project, at no cost to the government, to determine losses of material 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 the 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 significant modifications and will be afforded an opportunity to comment further.

*PROUD TO BE
ABLE TO FINALIZE
THE "CHIEF'S REPORT"
ON THIS CRITICAL
PROJECT!*


TODD T. SEMONITE
Lieutenant General, USA
Chief of Engineers



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 R97.5 to 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

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

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

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

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

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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

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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 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.

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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.

A handwritten signature in black ink, appearing to read "TODD T. SEMONITE", is written over a horizontal line.

TODD T. SEMONITE
Lieutenant General, USA
Chief of Engineers