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DAEN

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SUBJECT: South Central Coast, Louisiana Hurricane and Storm Damage Risk Reduction

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on hurricane and storm damage risk reduction in St. Martin, St. Mary, and Iberia Parishes, south central Louisiana. It is accompanied by the report of the New Orleans District Commander. The authority for this study is H.R. Docket 2767, September 20, 2006, Southeast Coastal Louisiana, LA, which reads, *"Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, that, in accordance with section 110 of the River and Harbor Act of 1962, the Secretary of the Army is requested to survey the coast of Louisiana in Iberia, St. Martin, and St. Mary parishes with a view to determine the feasibility of providing hurricane protection and storm damage reduction and related purposes."*

2. The reporting officers recommend authorizing the National Economic Development (NED) plan to reduce hurricane and storm damage by implementing a risk management system of localized storm surge risk reduction features in Iberia, St. Martin, and St. Mary Parishes. The NED plan reduces the risk of hurricane storm damages through nonstructural measures that elevate or floodproof structures to reduce the risk of hurricane storm damages to residential, public, and commercial structures. The NED plan includes:

a. Elevation of 1,790 residential structures to a height no greater than 13 feet above grade. Elevation includes the entire structure or the habitable area of a structure to allow floodwaters to flow and recede underneath;

b. Dry floodproofing of 265 non-residential structures, including 32 public structures, to make walls, doors, windows, and other openings impermeable to water penetration up to three feet above grade; and

c. Wet floodproofing of 185 non-residential structures up to 12 feet above grade, to allow floodwaters to enter enclosed areas through vents, protecting structural stability of the building.

The risk evaluation and forecast, plan selection, and risk reduction design heights are based on the projection of an intermediate rate of relative sea level rise. The elevation of residential structures and the dry and wet floodproofing of non-residential structures

will be implemented on a voluntary participation basis. It is recommended that the NED plan be authorized for a 20-year implementation period to construct measures for eligible structures. For a structure to be considered for nonstructural floodproofing, the structure must exist prior to authorization. The NED plan has no significant adverse environmental effects; consequently, there are no compensatory environmental mitigation requirements.

3. The State of Louisiana, acting through the Coastal Protection and Restoration Authority Board (CPRAB), is the non-federal cost sharing sponsor for all features. As a shared responsibility, the recommended plan is inclusive of the CPRAB additional floodplain management responsibilities and emergency response actions in conjunction with State and Federal Emergency Management Agency (FEMA) related programs to mitigate the plans residual risk, including potential life loss and damages to critical infrastructure. Project costs are based on April 2022 price levels and are estimated to be $914,769,000.

a. The cost of construction is split 65 percent federal and 35 percent non-federal. The estimated federal and non-federal shares of the project first cost are $594,600,000 and $320,169,000 respectively. Cost sharing is applied in accordance with the provision of Section 103(c)(5) of the Water Resources Development Act of 1986, as amended (33 U.S.C. §2213(c)(5)).

b. CPRAB is responsible for providing lands, easements, rights-of-way, relocations, and placement area improvements (LERRD), including acquisition, estimated at $41,145,000 for the NED plan. CPRAB will receive credit for the costs of LERRD toward its share of project costs. Once eligible properties have been identified, CPRAB will be required to obtain temporary work area easements and additional temporary real estate rights that allow access for surveys and construction, as well as perpetual real property rights necessary for the protection of the federal investment, maintenance of project benefits, enforcement over the authorized life of the project, inspections, monitoring, and all other activities to carry out the operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) of the project. The New Orleans District is preparing a request for approval of non-standard estates for the temporary and perpetual rights for the elevations, dry floodproofing, and wet floodproofing. The approved non-standard estate documents for perpetual rights will be recorded with the appropriate Parish Clerk of Court Conveyance records.

LERRD cost estimates include administrative costs for execution of the non-standard estates and temporary work area easements between CPRAB and the landowner and estimated temporary relocation assistance costs for residential tenants. Some associated administrative requirements include obtaining rights-of-entry, title research, execution and filing of non-standard estates, and coordination and oversight of temporary relocations. Floodproofing design costs, costs of obtaining all required permits (e.g., zoning or land use approvals; environmental permits or required

certifications; historic preservation approvals; and building permits), and costs of developing floodproofing scopes of work are not incidental to acquisition of land title, so they are not LERRD requirements and are not eligible for CPRAB LERRD credit. Temporary relocations will comply with the provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act (P.L. 91-646), as amended, and the uniform regulations contained in 49 Code of Federal Regulations, Part 24, including the provision of payment of relocation assistance benefits to eligible residential tenant recipients.

c. CPRAB would be 100% responsible for the OMRR&R. These responsibilities include inspection of the elevations and floodproofing measures on properties to ensure compliance with the restrictions provided within the non-standard estate acquired by CPRAB for continued effectiveness of the measures. Total average OMRR&R annual cost is currently estimated at $382,000.

d. The total project cost includes an estimated cost of $14,723,000 to assess project impacts and potential archeological mitigation on properties listed in or eligible for listing on the National Register of Historic Places or properties having religious and cultural significance to Tribes, including sites that may contain human remains or associated cultural items in accordance with a programmatic agreement between the New Orleans District, CPRAB, and the Louisiana State Historic Preservation Officer. The programmatic agreement was coordinated with federally recognized Tribes that may have sites of religious and cultural significance on or off Tribal Lands as defined in 36 CFR § 800.16(x). This coordination included the Alabama-Coushatta Tribe of Texas, the Choctaw Nation of Oklahoma, the Coushatta Tribe of Louisiana, the Chitimacha Tribe of Louisiana, the Jena Band of Choctaw Indians, the Mississippi Band of Choctaw Indians, the Muscogee (Creek) Nation, the Seminole Nation of Oklahoma, the Seminole Tribe of Florida, and the Tunica-Biloxi Tribe of Louisiana (collectively referenced as "Tribes"). There are no other environmental mitigation and monitoring or adaptive management requirements for the project.

4. Based on a 2.25 percent discount rate and a 50-year period of analysis, the equivalent average annual benefits and costs are estimated at $45,130,000 and $31,048,000 respectively under the intermediate sea level scenario. The project is estimated to provide annual net benefits of $14,082,000 and a benefit-to-cost ratio of 1.45 to 1. All project costs are allocated to the authorized purpose of hurricane and storm damage risk reduction.

5. A risk and uncertainty analysis that incorporated key economic, hydraulic and sea level change parameters was performed for the feasibility study. Flood risk to people, critical infrastructure, and structures at any location in a floodplain is the function of the flood hazard at the location and their exposure and vulnerability to the flood hazard. The analysis identified and assessed the risk for structures in the 0.04 AEP (25-year floodplain) predicted to occur in 2025 as the NED plan. The NED plan reduces but does

not eliminate future damages, and residual risk would remain. Coastal storm damages are reduced by approximately 50 percent in the location of the NED plan, and by approximately 17 percent across the entire study area. Average total equivalent annual residual damages are $45,130,000 (fiscal year 2022). The plan has a range of risk reduction (performance levels) for residential, public, and commercial structures due to the design constraints and local terrain variability. Residential elevations are limited to 13 feet above grade due to wind shear, and commercial standards limit wet floodproofing improvements to 12 feet above first floor elevations and dry floodproofing to three feet above first floor elevation based on design standards. The average risk reduction for residential structures will accommodate approximately a 397-year storm event. Depending on the structure, wet floodproofing non-residential structures up to the maximum 12 feet above grade for the structure reduces risk for a 71-year storm event on average. Depending on the structure, dry floodproofing non-residential structures up to three feet above grade reduces risk for a 37-year storm event on average. Performance is based on future conditions anticipated in 2075 under the intermediate Relative Sea Level Rise (RSLR) scenario. Risk communication during feasibility included extensive public engagement, including the development and release of a supplemental draft feasibility report for public and agency input to ensure full public awareness of risk and opportunity to comment on changes to the recommended plan provided in the first draft feasibility report.

6. The residual risk, along with the potential consequences, has been communicated to CPRAB and will become a requirement of any communication and evacuation plan. The NED plan is not intended to, nor will it, reduce the risk to loss of life during a major storm. The only certain method to prevent loss of life is by residents and visitors following existing local evacuation plans and leaving the study area prior to significant storm events. Additional actions by CPRAB may reduce the residual risk through floodplain management plan updates to adopt, implement, and enforce enhanced building and housing code requirements, land use and zoning regulations, and other developmental controls for new construction aimed at reducing flood risk and flood damage in the future in conjunction with the NED plan. Through collaboration with non-federal partners and in consideration of other study and stakeholder interests, further analysis was conducted on the NED plan to reduce residual risk through content protection measures for the 185 commercial structures proposed for wet floodproofing that are in a high-risk hazard zone and dependent on waterways for their operations. Consistent with FEMA guidance, these measures included pre-storm transportation contracts to mobilize the content off site to high ground or elevation methods within the commercial structures to raise the contents above six feet to reduce damages. It was found that the content protection measures may reduce residual damages up to 40%. However, these measures to solely protect contents rather than structures are not implementable by the U.S. Army Corps of Engineers (USACE) under Section 73 of the Water Resources Development Act of 1974, as amended (P.L. 93-251). These measures may, however, be implemented by other federal, state or local entities, as well as individual property owners, to further reduce flood risk.

7. Implementation strategies for the risk management system would be a shared responsibility conducted by USACE in coordination with CPRAB and FEMA to cost effectively reduce the consequences from flooding. The implementation strategy for the NED plan would reduce the risk through a series of risk reduction increments that either could be implemented simultaneously, where the entire project is implemented in an expedited manner or implemented sequentially, where measures are implemented on a rolling incremental basis. The implementation of the NED plan includes elevation of residential structures and the floodproofing of non-residential structures on a voluntary participation basis that utilizes best practices to reduce risk to the most vulnerable communities first along with public structures that provide critical life safety services. Various implementation strategies to identify efficient risk reduction increments were considered for the NED plan, including:

- clustering based on low-income or environmental justice communities and public structures that function as critical infrastructure for public safety and storm response and recovery;

- clustering construction for individual structures that would rank efficiency first;

- clustering based on willing property owners that exhibit the highest risk for flood damages; and

- clustering based on first-come, first-served approach which would help ensure that resources would be used effectively by focusing on properties that have owner support for the flood proofing measures.

8. 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 plan. To address this uncertainty, project performance was assessed at the intermediate rate of sea level rise as it offered the best balance between equally likely scenarios (i.e., the historic rate of sea level rise continuing indefinitely and the high rate including accelerated rates of change caused by warming temperatures and accelerated ice melt). In recognition of the uncertainty presented by sea level rise, adaptation capacity has been incorporated into the final feasibility-level design to maximize the overall usefulness of the system over the life of the project by including redundancy and robustness in the design, so they are adaptable to future conditions including the high rate of sea level rise. Therefore, the NED plan elevates a majority of residential structures to a height of 13 feet above grade and applies the maximum dry or wet floodproofing available for non-residential structures. Consequently, equivalent annual damages would not increase significantly if assessed under the high (+3.4 feet) sea level rise condition. An increase in stages due to higher-than-assumed sea level would increase the equivalent annual damages and residual risks, as the NED plan for residential elevations is constrained by the 13-foot height limit. The only remaining option for nonstructural mitigation in a high rate of sea level rise condition would be to

reconsider acquisition of residential structures and relocation of the residents. USACE will continue to monitor local conditions and determine if the intermediate scenario of sea level rise is reasonably representative of observed conditions. If observed conditions significantly exceeding the intermediate projection are identified during design or construction, reevaluation of the NED plan will be required.

9. In accordance with USACE policy on the review of decision documents, all technical, engineering, and scientific work underwent an open, dynamic, and rigorous review process. The comprehensive review process included District Quality Control review, Agency Technical Review, Type I Independent External Peer Review (IEPR), and Major Subordinate Command and headquarters policy and legal compliance review to confirm the planning analyses, alternative design and safety, and the quality of decisions. The IEPR comments identified several elements of the project where additional analyses needed to be leveraged or better characterized and places where clarification of future project actions and objectives needed to be documented or revised. Risk and uncertainty associated with the implementation of the recommended plan were identified, which will require further evaluation during preconstruction engineering and design. This would include ongoing coordination with Tribal interests in accordance with the cultural resources Programmatic Agreement and coordination with CPRAB to secure the real estate interests through the acquisition of a non-standard estate to be approved by USACE, Director of Real Estate.

10. Washington-level review indicates 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 Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies and complies with other administrative and legislative policies and guidelines. Also, the views of interested parties, including federal, Tribal, state, and local agencies and the public have been considered.

11. I concur with the findings, conclusions, and recommendations of the reporting officers. Accordingly, I recommend the plan to reduce hurricane and storm damage risk in St. Martin, St. Mary, and Iberia Parishes in south central Louisiana be authorized in accordance with the recommended plan of the reporting officers at an estimated cost of $914,769,000 with such modifications as in the discretion of the Chief of Engineers may be advisable. My recommendation is subject to cost sharing and other applicable requirements of federal laws, regulations, and policies. Federal implementation of the project for hurricane and storm damage risk reduction includes, but is not limited to, the following required items of local cooperation to be undertaken by the non-federal sponsor in accordance with applicable federal laws, regulations, and policies:

a. Provide 35 percent of construction costs, as further specified below:

i. Provide, during design, 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;

ii. Provide all real property interests, including placement area improvements, and perform all relocations determined by the Federal government to be required for the project;

iii. Provide, during construction, any additional contribution necessary to make its total contribution equal to at least 35 percent of construction costs;

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

c. Inform affected interests, at least yearly, of the extent of risk reduction afforded by the project; participate in and comply with applicable federal floodplain management and flood insurance programs; prepare a floodplain management plan for the project to be implemented not later than one year after completion of construction of the project; and publicize floodplain information in the area concerned and provide this information to zoning and other regulatory agencies for their use in adopting regulations, or taking other actions, to prevent unwise future development and to ensure compatibility with the project;

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

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

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

g. Perform, or ensure performance of, any investigations for hazardous, toxic, and radioactive wastes (HTRW) that are determined necessary to identify the existence and extent of any HTRW regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. 9601-9675, and any other

applicable law, that may exist in, on, or under real property interests the Federal government determines to be necessary for construction, operation, and maintenance of the project;

h. Agree, as between the Federal government and the non-federal sponsor, to be solely responsible for the performance and costs of cleanup and response of any HTRW regulated under applicable law that are located in, on, or under real property interests required for construction, operation, and maintenance of the project, including the costs of any studies and investigations necessary to determine an appropriate response to the contamination, without reimbursement or credit by the Federal government;

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

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

12. 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 Congress as a proposal for authorization and additional funding. However, prior to transmittal to Congress, the non-federal sponsor, interested federal agencies, and other parties will be advised of any significant modifications and will be afforded an opportunity to comment further.

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