



DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, NORTH ATLANTIC DIVISION
FORT HAMILTON MILITARY COMMUNITY
302 GENERAL LEE AVENUE
BROOKLYN, NY 11252-6700

25 Jun 2019

CENAD-PD-P

MEMORANDUM FOR Commander, U.S. Army Corps of Engineers, Norfolk District,
Fort Norfolk 803 Front Street, Norfolk, VA 23510-1011

SUBJECT: Request for Approval of the Florida Keys Coastal Storm Risk Management
Feasibility Study and Environmental Impact Statement Review Plan

1. Reference Memorandum, CENAO-EX, dated 6 February 2019, subject as above.
2. The Coastal Storm Risk Management Planning Center of Expertise of the North Atlantic Division (NAD) is the lead office to execute the referenced Review Plan. The Review Plan includes Independent External Peer Review.
3. The enclosed Review Plan is approved for execution and is subject to change as study circumstances require, consistent with study development under the Project Delivery Business Process. Subsequent revisions to this Review Plan or its execution require new written approval from NAD.
4. The point of contact is Mr. Larry Cocchieri, NAD Planning Program Manager at 347-370-4571 or Lawrence.J.Cocchieri@usace.army.mil.

Encl

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KAREN J. BAKER
Programs Director



DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
FORT NORFOLK
803 FRONT STREET
NORFOLK VA 23510-1011

CENAO-EX

06 February 2019

MEMORANDUM FOR Planning Division (ATTN: CENAD-PP/Mr. Cocchieri), U.S. Army Engineer Division, North Atlantic, 302 General Lee Avenue, Brooklyn, New York 1252-6700

SUBJECT: Florida Keys Coastal Storm Risk Management Feasibility Study and Environmental Impact Statement – Submission of Review Plan

1. Enclosed for review and approval is the Review Plan for the subject study.
2. Please contact Rachel Haug, Planning Team Lead, or Kristen Mazur, Project Manager, if you have any questions or require additional information.

Encl



PATRICK V. KINSMAN, PE
Colonel, EN
Commanding

REVIEW PLAN

February 2019

Project Name: Florida Keys Coastal Storm Risk Management Study, Monroe County, Florida
P2 Number: 397427

Decision Document Type: Feasibility Report
Project Type: Single-Purpose Coastal Storm Risk Management

District: Norfolk District
District Contact: Rachel Haug, Lead Planner (757-201-7589);
Kristin Mazur, Project Manager (757-201-7257)

Major Subordinate Command (MSC): North Atlantic Division
MSC Contact:
Hank Gruber, Deputy Chief of Planning and Policy (347-370-4566)

Review Management Organization (RMO): Planning Center of Expertise for Coastal Storm
Risk Management Planning Center of Expertise (PCX-CSRМ)
RMO Contact: Larry Cocchieri, PCX-CSRМ Deputy Director (347-370-4571)

Key Review Plan Dates

Date of FCSA Execution: 9 October 2018
Date of RMO Endorsement of Review Plan: Pending
Date of MSC Approval of Review Plan: Pending
Date of IEPR Exclusion Approval: N/A
Has the Review Plan changed since PCX Endorsement? N/A
Date of Last Review Plan Revision: 25 January 2019
Date of Review Plan Web Posting: Pending
Date of Congressional Notifications: Pending

Milestone Schedule

	<u>Scheduled</u>	<u>Actual</u>	<u>Complete</u>
Alternatives Milestone:	15 January 2019	15 January 2019	Yes
Tentatively Selected Plan:	September 2019		No
Release Draft Report to Public:	November 2019		No
Agency Decision Milestone:	May 2020		No
Final Report Transmittal:	October 2020		No
Senior Leaders Briefing:	February 2021		No
Chief's Report:	September 2021		No

Project Fact Sheet

February 2019

Project Name: Florida Keys Coastal Storm Risk Management Study, Monroe County, Florida

Location: The project is located in the Monroe County, Florida.

Authority: The study authority is Public Law 84-71, June 15, 1955 which authorizes an examination and survey of the coastal and tidal areas of the eastern and southern United States, with particular reference to areas where severe damages have occurred from hurricane winds and tides.

Notwithstanding Section 105(a) of the Water Resources Development Act of 1986 (33 U.S.C. 2215(a)), which specifies the cost-sharing requirements generally applicable to feasibility studies, Title IV, Division B of the Bipartisan Budget Act of 2018, Public Law 115-123, enacted February 9, 2018 (hereinafter "BBA 2018"), authorizes the Government to conduct the Study at full Federal expense to the extent that appropriations provided under the Investigations heading of the BBA 2018 are available and used for such purpose.

Sponsor: Monroe County

Type of Study: Feasibility

SMART Planning Status: This study is 3x3x3 compliant.

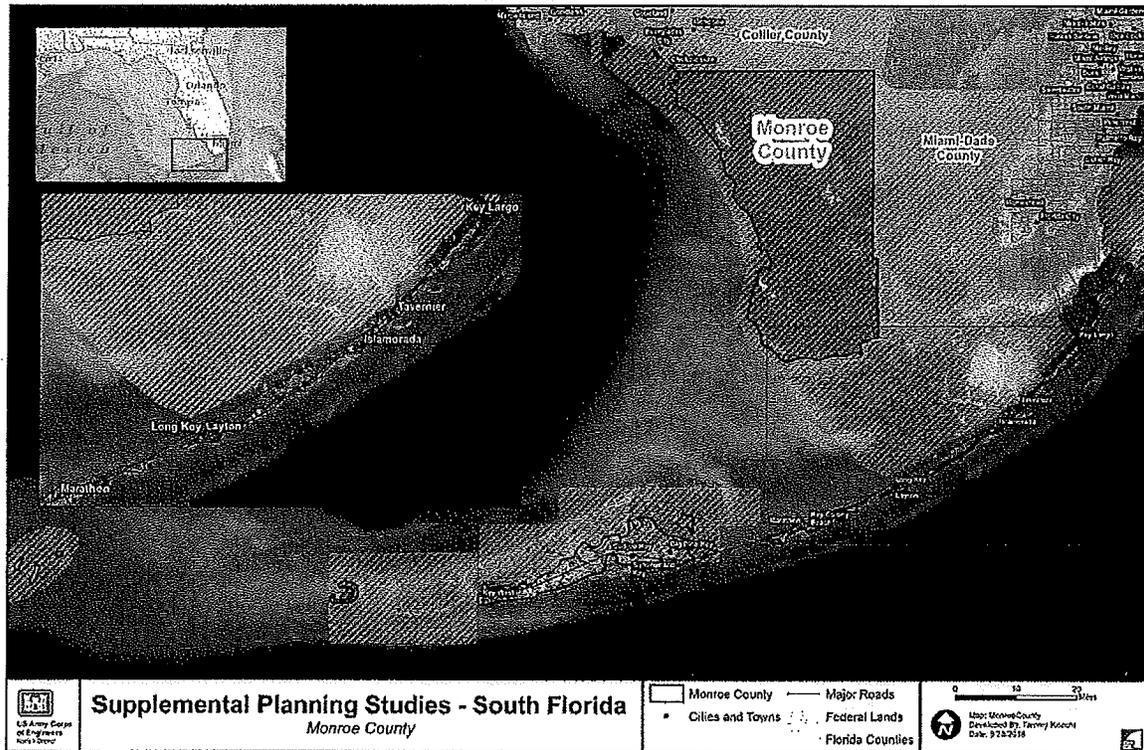
Project Area: The study area includes all of the Florida Keys, which are within Monroe County. The Florida Keys are a 123 mile long chain of islands extending into the Gulf of Mexico from the southern tip of Florida. A portion of Monroe County's land area is located on the mainland of Florida as well, but is largely Federal land within the Everglades National Park and therefore will not be included in this Civil Works study. Please reference the attached map of the study area.

Problem Statement: Impacts from recent hurricanes have highlighted the need for a collaborative evaluation of coastal storm risk management for all of the Florida Keys. Average elevation of the islands ranges from four to five feet above mean sea level to 10 or 12 feet on some of the larger islands. For this reason, all of the land surface area is vulnerable to the effects of coastal storms and there is a need for coastal storm risk management to address protection of critical infrastructure, reduction of structure damages, and evacuation route protection. Specifically, U.S. 1 has been identified as an integral component of critical infrastructure in the study area, as it provides the primary ground transportation access and thus evacuation of Florida Keys residents and tourists. Climate change effects in the Florida Keys include increasing sea levels and associated coastal flooding from regular, seasonal, or extreme tidal, wind or storm events which will continue to increase coastal storm risk within the study area.

Federal Interest: The Florida Keys are an important asset to the economic development of the United States because the islands are a major tourism destination that also hold unique environmental resources including the third largest coral reef in the world and 17 national and state parks. There is Federal interest in addressing the Keys' high levels of risk and vulnerability to coastal storms which is expected to be compounded by the combined effects of sea level change and

climate change. Analysis completed during the scoping phase indicates the potential for a variety of structural and non-structural solutions to have marked effects on resiliency and be economically justified, environmentally acceptable, and consistent with USACE policy. This interest is also echoed across the region in the South Atlantic Coastal Study (SACS) and the 13 other CSRM studies that are currently being conducted within the state of Florida.

Risk Identification: The study area will continue to be at risk of the effects of coastal storms in the future. In addition to damages to structures and critical infrastructure, there is a significant life safety component that should be considered due to the vulnerability of the population and the remoteness of the Keys, especially the lower islands. Study risks include the accurate projection of sea level rise over the period of analysis, the extremely rich environmental resources that are present within and adjacent to the study area, and the potential limited ability to use existing models to analyze conditions in the study area due to unique geologic and hydrodynamic conditions.



1. FACTORS AFFECTING THE LEVELS OF REVIEW

Scope of Review.

- Will the study likely be challenging?

This study will likely be challenging in that the study area is large and the study area conditions are very unique. Some more traditional structural coastal storm risk management measures will likely not be applicable for various reasons ranging from unique geoenvironmental/soil conditions to the amount of high quality environmental resources within and immediately adjacent to the study area.

- Provide a preliminary assessment of where the project risks are likely to occur and assess the magnitude of those risks.

The study area will continue to be at risk of the effects of coastal storms in the future. In addition to damages to structures and critical infrastructure, there is a significant life safety component that should be considered due to the vulnerability of the population and the remoteness of the Keys, especially the lower islands. Study risks include the accurate projection of sea level rise over the period of analysis, the extremely rich environmental resources that are present within and adjacent to the study area, and the potential limited ability to use existing models to analyze conditions in the study area due to unique geologic and hydrodynamic conditions. At this point in the study, none of these risks are expected to hinder the execution of the study, but will need to be managed throughout the duration.

- Is the project likely to be justified by life safety or is the study or project likely to involve significant life safety issues?

This project is not likely to be justified by life safety alone, however it is expected to involve significant life safety issues. Due to the study area conditions, non-performance of project economics may have an impact on life safety. Climate variability, including sea level rise, will also be a major factor in the analysis completed in this study.

- Has the Governor of an affected state requested a peer review by independent experts?

The governor of Florida has not requested a peer review by independent experts.

- Will the study likely involve significant public dispute as to the project's size, nature, or effects?

There may be some public dispute as to the project's size, nature, or effects due to the unique study area conditions, regional economic considerations, and local political opinions.

- Is the project/study likely to involve significant public dispute as to the economic or environmental cost or benefit of the project?

There may be some public dispute as to the economic or environmental cost or benefit of the project due to the unique study area conditions, regional economic considerations, and local

political opinions. Environmental considerations are likely to be a key component of the study that should be actively managed throughout the study due to the rich environmental resources that exist in the study area.

- Is the information in the decision document or anticipated project design likely to be based on novel methods, involve innovative materials or techniques, present complex challenges for interpretation, contain precedent-setting methods or models, or present conclusions that are likely to change prevailing practices?

This study anticipates using the new probabilistic life cycle analysis model, G2CRM, which has been approved for use in all supplemental studies. In addition, this study will likely include natural and nature based features (NNBF), and will analyze their economic justification based on their CSRSM benefit (vs. environmental restoration). USACE approved methods for quantifying NED benefits for NNBF features are still being developed. It is also expected that some project components or the selection of the recommended plan may be evaluated for justification under the other social effects (OSE) account. G2CRM has been approved for this study.

- Does the project design require redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design/construction schedule?

Due to the unique conditions in the study area and the current expectation that the recommended plan will include NNBF, it is likely that the project design will require at least some elements of redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design/construction schedule.

- Is the estimated total cost of the project greater than \$200 million?

Yes, considering the project costs of other CSRSM projects recently completed, it is likely that this project cost will exceed \$200 million.

- Will an Environmental Impact Statement be prepared as part of the study?

Due to the significant unique environmental resources in the study area, an EIS will be completed as part of this study.

- Is the project expected to have more than negligible adverse impacts on scarce or unique tribal, cultural, or historic resources?

This project is not expected to have more than negligible adverse impacts on scarce or unique tribal or historic resources.

- Is the project expected to have substantial adverse impacts on fish and wildlife species and their habitat prior to the implementation of mitigation measures?

This project may have some adverse impacts on fish and wildlife species and/or their habitat prior to the implementation of mitigation, but at this early stage of the study, the extent of impacts are unknown.

- Is the project expected to have, before mitigation measures, more than a negligible adverse impact on an endangered or threatened species or their designated critical habitat?

This project may have some adverse impacts on endangered or threatened species and/or their designated critical habitat prior to the implementation of mitigation, but at this early stage of the study, the extent of impacts are unknown.

2. REVIEW EXECUTION PLAN

This section describes each level of review to be conducted. Based upon the factors discussed in Section 1, this study will undergo the following types of reviews:

District Quality Control. All decision documents (including data, analyses, environmental compliance documents, etc.) undergo DQC. This internal review process covers basic science and engineering work products. It fulfills the project quality requirements of the Project Management Plan.

Agency Technical Review. ATR is performed by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. These teams will be comprised of certified USACE personnel. The ATR team lead will be from outside the home MSC. If significant life safety issues are involved in a study or project a safety assurance review should be conducted during ATR.

Independent External Peer Review. Type I IEPR may be required for decision documents under certain circumstances. This is the most independent level of review, and is applied in cases that meet criteria where the risk and magnitude of the project are such that a critical examination by a qualified team outside of USACE is warranted. A risk-informed decision is made as to whether Type I IEPR is appropriate.

Cost Engineering Review. All decision documents shall be coordinated with the Cost Engineering Mandatory of Expertise (MCX). The MCX will assist in determining the expertise needed on the ATR and IEPR teams. The MCX will provide the Cost Engineering certification. The RMO is responsible for coordinating with the MCX for the reviews. These reviews typically occur as part of ATR.

Model Review and Approval/Certification. EC 1105-2-412 mandates the use of certified or approved models for all planning work to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions.

Policy and Legal Review. All decision documents will be reviewed for compliance with law and policy. ER 1105-2-100, Appendix H provides guidance on policy and legal compliance reviews. These reviews culminate in determinations that report recommendations and the supporting analyses and coordination comply with law and policy, and warrant approval or further recommendation to higher

authority by the home MSC Commander. These reviews are not further detailed in this section of the Review Plan.

Table 1 provides the schedules and costs for reviews. The specific expertise required for the teams are identified in later subsections covering each review. These subsections also identify requirements, special reporting provisions, and sources of more information.

Table 1: Levels of Review

Product(s) to undergo Review	Review Level	Start Date	End Date	Cost	Complete
Draft Feasibility Report and EIS	District Quality Control	Dec 2019	Jan 2020	\$50,200	No
Draft Feasibility Report and EIS	Agency Technical Review	March 2020	April 2020	\$100,000 ¹	No
Draft Feasibility Report and EIS	Type I IEPR	March 2020	April 2020	\$100,000	No
Draft Feasibility Report and EIS	Policy and Legal Review	March 2020	April 2020	N/A	No
Final Feasibility Report and EIS	District Quality Control	Dec 2020	Jan 2021	\$50,200	No
Final Feasibility Report and EIS	Agency Technical Review	Jan 2021	Feb 2021	\$100,000 ²	No
Final Feasibility Report and EIS	Policy and Legal Review	Feb 2021	March 2021	N/A	No

a. DISTRICT QUALITY CONTROL

The home district shall manage DQC and will appoint a DQC Lead to manage the local review (see EC 1165-2-217, section 8.a.1). The DQC Lead should prepare a DQC Plan and provide it to the

¹ Estimated cost for Draft and Final Report ATRs does not include the cost of ATR Team Lead participation in milestone meetings or other engagement/coordination beyond that directly related with those ATRs. The estimated cost for ATR of the Draft Report is based upon the following assumptions:

- ATR Team Lead – 30 hours, \$130/hour
- ATR Team – 10 Technical Disciplines, 40 hours/discipline, average \$125/hour
- RMO – 40 hours, \$143 / hour

² The estimated cost for ATR of the Final Report is based upon the following assumptions:

- ATR Team Lead – 30 hours, \$130/hour
- ATR Team – 10 Technical Disciplines, 40 hours/discipline, average \$125/hour
- RMO – 40 hours, \$143 / hour

RMO and MSC prior to starting DQC reviews. Table 2 identifies the required expertise for the DQC team.

Table 2: Required DQC Expertise

DQC Team Disciplines	Expertise Required
DQC Lead	A senior professional with extensive experience preparing Civil Works decision documents and conducting DQC. The lead may also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc).
Planning	The plan formulation reviewer should be a senior water resources planner with experience in CSRSM studies and familiarity with the SMART Planning process.
Economics	The economics reviewer should be a senior economist with experience in CSRSM studies and familiarity with Feasibility Report requirements and G2CRM. The economics DQC team member will be identified by the district.
Environmental Resources	The environmental reviewer should have expertise in evaluating the impacts associated with structural and non-structural storm surge measures as well as extensive knowledge of estuarine and coastal ecology. The reviewer should also be familiar with the environmental coordination and NEPA requirements for CSRSM studies.
Cultural Resources	Cultural resources reviewer should have expertise in evaluating the impacts associated with flood risk management (or coastal storm risk management) projects with some knowledge of both terrestrial and underwater archaeology. The reviewer should also be familiar with the environmental coordination, NEPA, National Historic Preservation Act (NHPA) Section 106 requirements.
Hydraulic Engineering	The hydraulic engineering reviewer should be knowledgeable in the field of hydraulics, have a thorough understanding of open channel dynamics, and have experience in deep draft navigation studies/projects. The reviewer should also be familiar with computer modeling techniques that will be used in the study: CH3D Numerical Modeling System, Surface Water Modeling System (SMS), TABS Multi-Dimensional Numerical Modeling -- RMA10).
Civil Engineering	The civil engineering reviewer should have expertise in roadway elevation and design and be familiar with the structural measures used in a CSRSM study.
Geotechnical Engineering	The geotechnical engineering reviewer will have an understanding of the behavior of soils, site characterization, material management, slope stability, and the analysis and placement of dredged material.
Cost Engineering	The cost engineering reviewer should have experience evaluating cost requirements for a CSRSM project and experience with the following models: Crystal Ball, CEDEP, eProUCL Version 4.00.04, and MiniTab.

Real Estate	The real estate reviewer should have expertise in the real estate requirements of CSRM projects.
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Documentation of DQC. Quality Control should be performed continuously throughout the study. A specific certification of DQC completion is required at the draft and final report stages. Documentation of DQC should follow the District Quality Manual and the MSC Quality Management Plan. An example DQC Certification statement is provided in EC 1165-2-217, on page 19 (see Figure F).

DrChecks will be used to document all DQC comments and documentation of completed DQC will be provided to the MSC, RMO and ATR Team leader prior to initiating an ATR. The ATR team will examine DQC records and comment in the ATR report on the adequacy of the DQC effort. Missing or inadequate DQC documentation can result in delays to the start of other reviews (see EC 1165-2-217, section 9).

b. AGENCY TECHNICAL REVIEW

The ATR will assess whether the analyses are technically correct and comply with guidance, and that documents explain the analyses and results in a clear manner. An RMO manages ATR. The review is conducted by an ATR Team whose members are certified to perform reviews. Lists of certified reviewers are maintained by the various technical Communities of Practice (see EC 1165-2-217, section 9(h)(1)). Table 3 identifies the disciplines and required expertise for this ATR Team.

Table 3: Required ATR Team Expertise

ATR Team Disciplines	Expertise Required
ATR Lead	A senior professional with extensive experience preparing Civil Works decision documents and conducting ATR. The lead should have the skills to manage a virtual team through an ATR. The lead may serve as a reviewer for a specific discipline (such as planning).
Planning	The plan formulation reviewer should be a senior water resources planner with experience in CSRM studies and familiarity with the SMART Planning process.
Economics	The economics reviewer(s) should be a senior economist with experience in coastal storm risk management studies and familiarity with Feasibility Report study requirements and G2CRM. Typically, two economics reviewers are required, one to review the Economics Appendix and the other to review inputs/outputs of G2CRM modeling. The economics ATR team members will be identified by the Coastal PCX.
Environmental Resources	The environmental reviewer should have expertise in estimating the impacts associated with structural and non-structural storm surge measures as well as extensive knowledge of estuarine and coastal ecology. The reviewer should also be familiar with environmental coordination and NEPA requirements for CSRM studies.
Cultural Resources	The cultural resources reviewer should have expertise in evaluating the impacts associated with CSRM projects as well as extensive

	knowledge of terrestrial and some knowledge of underwater archaeology. The reviewer should also be familiar with environmental coordination, NEPA, and NHPA Section 106 requirements.
Hydraulic Engineering	The hydraulic engineering reviewer should be an expert in the field of hydraulics and have a thorough understanding of open channel dynamics and have experience in deep draft navigation studies/projects. The reviewer should also be familiar with computer modeling techniques that will be used in the study: CH3D Numerical Modeling System, Surface Water Modeling System (SMS), TABS Multi-Dimensional Numerical Modeling – RMA10).
Civil Engineering	The civil engineering reviewer should have expertise in roadway elevation and design and be familiar with the structural measures used in a CSRSM study.
Geotechnical Engineering	The reviewer will have expertise in the behavior of soils, site characterization, material management, slope stability, and the analysis and disposal of dredged material.
Cost Engineering	The cost engineering reviewer will be identified by the MCX and have expertise in evaluating cost requirements for a CSRSM project and in using the following models: Crystal Ball, CEDEP, eProUCL Version 4.00.04, and MiniTab.
Real Estate	The real estate reviewer should have expertise in the real estate requirements of CSRSM projects.
Climate Preparedness and Resilience CoP Reviewer	A member of the Climate Preparedness and Resiliency Community of Practice (CoP) will participate in the ATR review.
Risk and Uncertainty	For decision documents involving hydrologic, hydraulic, and/or coastal related risk management measures, include a subject matter expert in multi-discipline flood risk analysis to ensure consistent and appropriate identification, analysis, and written communication of risk and uncertainty.

Documentation of ATR. DrChecks will be used to document all ATR comments, responses and resolutions. Comments should be limited to those needed to ensure product adequacy. If a concern cannot be resolved by the ATR team and PDT, it will be elevated to the vertical team for resolution using the EC 1165-2-217 issue resolution process. Concerns can be closed in DrChecks by noting the concern has been elevated for resolution. The ATR Lead will prepare a Statement of Technical Review (see EC 1165-2-217, Section 9), for the draft and final reports, certifying that review issues have been resolved or elevated. ATR may be certified when all concerns are resolved or referred to the vertical team and the ATR documentation is complete.

c. INDEPENDENT EXTERNAL PEER REVIEW

(i) Type I IEPR.

Type I IEPR is managed outside of the USACE and conducted on studies. Type I IEPR panels assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, economic analysis, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, models used in the evaluation of environmental impacts of proposed projects, and biological opinions of the project study.

Decision on Type I IEPR. The decision document meets the mandatory triggers for Type 1 IEPR described in paragraph 11.d.(1) and Appendix D of EC 1165-2-214. Based on the scale, complexity, and high visibility of the study, a completion of Type I IEPR is anticipated. Type I IEPR is appropriate considering the following factors apply to this study:

- A Type I IEPR is mandatory if there is a significant threat to human life. This project will require IEPR because the critical infrastructure features including fire stations, airports, hospitals, etc. are at risk to the effects of coastal storms. Critical transportation routes, specifically U.S. Route 1, is at risk to coastal storms and there have been instances of storm surge and erosion affecting evacuation before/during storms and the timely return of residents after the evacuation is lifted post-storm. Utilities including water, wastewater, electricity, phone, etc. are at risk to the effects of coastal storms and are essential for human health and safety.

Products to Undergo Type I IEPR. The full draft report and EIS will undergo IEPR.

Required Type I IEPR Panel Expertise. Panels will consist of independent, recognized experts from outside of the USACE in disciplines representing a balance of areas of expertise suitable for the review being conducted. Table 4 lists the required panel expertise.

Table 4: Required Type I IEPR Panel Expertise

IEPR Panel Member Disciplines	Expertise Required
Economics	The panel member should be from academia, a public agency, a non-governmental entity, or an Architect-Engineer or Consulting Firm with a minimum of 10 years demonstrated experience in public works planning, with a minimum MS degree or higher in Economics. Familiarity with BeachFX software and G2CRM modeling is desired. Two years' experience in reviewing federal water resource economic documents justifying construction efforts is required. In addition, the panel member should have experience related to regional economic development, and be capable of evaluating traditional National Economic Development plan benefits associated with hurricane and coastal storm risk management projects.
Environmental	The Environmental Panel Member should have experience in coastal storm risk management and coastal watersheds. The panel member should be a scientist from academia, a public

	<p>agency, a non-governmental entity, or an Architect-Engineer or Consulting Firm with a minimum 10 years demonstrated experience in evaluation and conducting National Environmental Policy Act (NEPA) impact assessments, including cumulative effects analyses. The panel member should also be familiar with all NEPA Environmental Assessment requirements as well as have experience with the Endangered Species Act, essential fish habitat, and the Marine Mammals Protection Act. The panel member should have particular knowledge of construction impacts on marine and coastal regions. The panel member should have a minimum of a Master's Degree or higher in an appropriate field of study.</p>
Engineering	<p>The Engineering Panel Member should be a registered professional engineer with a minimum of 10 years' experience in coastal and hydraulic engineering, or a professor from academia with extensive background in coastal processes and hydraulic theory and practice, with a minimum Master's Degree or higher in engineering. Active participation in related professional societies is encouraged. The panel member should be familiar with USACE application of risk and uncertainty analysis in hurricane and coastal storm risk management projects.</p>
Planning	<p>The Planning Panel Member should be from academia, a public agency, a non-governmental entity, or an Architect-Engineer or Consulting Firm with a minimum of 10 years demonstrated experience in public works planning with a Master's Degree in a relevant field. Direct experience working for or with USACE is highly preferred but not required. The panel member should have a minimum of five years' experience directly dealing with the USACE six-step planning process, which is governed by ER 1105-2-100, Planning Guidance Notebook. Panel Member must be very familiar with USACE plan formulation process, procedures, and standards as it relates to coastal storm risk management projects.</p>

Documentation of Type I IEPR. The IEPR Team will submit a final Review Report no later than 60 days after the end of the draft report public comment period. USACE shall consider all recommendations in the Review Report and prepare a written response for all recommendations. The final decision document will summarize the Review Report and USACE response and will be posted on the internet.

(ii) Type II IEPR.

The second kind of IEPR is Type II IEPR. These Safety Assurance Reviews are managed outside of the USACE and are conducted on design and construction for hurricane, storm and flood risk management projects or other projects where existing and potential hazards pose a significant threat to human life. A Type II IEPR Panel will be convened to review the design and construction activities before construction begins, and until construction activities are completed, and periodically thereafter on a regular schedule.

Decision on Type II IEPR. There are many uncertainties related to existing and potential hazards from storm surge. Therefore, this report will most likely require a Type II IEPR because there are many existing and potential hazards to human life associated with coastal storm surge.

d. MODEL CERTIFICATION OR APPROVAL

EC 1105-2-412 mandates the use of certified or approved models for all planning activities to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. Planning models are any models and analytical tools used to define water resources management problems and opportunities, to formulate potential alternatives to address the problems and take advantage of the opportunities, to evaluate potential effects of alternatives and to support decision making. The use of a certified/approved planning model does not constitute technical review of a planning product. The selection and application of the model and the input and output data is the responsibility of the users and is subject to DQC, ATR, and IEPR.

Table 5: Planning Models. The following models may be used to develop the decision document:

Model Name and Version	Brief Model Description and How It Will Be Used in the Study	Certification / Approval
Generation 2 Coastal Risk Model (G2CRM)	G2CRM is a Probabilistic Life Cycle Analysis (PLCA) model developed by ERDC that provides incorporation of quantified uncertainty in the driving forces, physical system, and system response. The model is designed for the evaluation of CSRMs projects involving static protective measures. G2CRM is able to perform event-driven Monte Carlo simulation of environmental forcing (storms), estimate event-based damages, and protective system response, over the project life cycle.	Certified for One Time Use
Gridded Surface Subsurface	GSSHA is a multidimensional modeling technology that uniformly couples overland, surface, and subsurface flow for accurate watershed simulation. It is a physics-based,	Certified

Hydrologic Analysis (GSSHA)	distributed, hydrologic, sediment and constituent fate and transport model that features two-dimensional overland flow and groundwater and one-dimensional stream flow and soil moisture, fully dynamic pipe networks for urban and agricultural drainage systems, wetland peat layer hydrodynamics and several in-stream weir and culvert models, lakes, detention basins, levees, rating and rule curve releases, boundary conditions for hurricane storm surge or levee breach inundation modeling, full coupling among groundwater, vadoze zone, streams, and overland flow, and full-Gt-coupled groundwater to surface-water interaction to model Hortonian and non-Hortonian basins. GSSHA can be used as an episodic or continuous model where soil surface moisture, groundwater levels, stream interactions, and constituent fate are continuously simulated. The fully coupled groundwater to surface-water interaction allows GSSHA to model basins in both arid and humid environments. The model simulates sediment and constituent fate and transport in shallow soils, overland flow planes, streams, and channels.	
Uniform Mitigation Assessment Method (UMAM)	An assessment method to determine the amount of mitigation needed to offset adverse impacts to wetlands and other surface waters and to award and deduct mitigation bank credits. UMAM provides a standardized procedure for assessing the ecological functions provided by wetlands and other surface waters, the amount that those functions are reduced by a proposed impact, and the amount of mitigation necessary to offset that loss. This standardized methodology is also used to determine the degree of improvement in ecological value of proposed mitigation bank activities. UMAM evaluates functions through consideration of an ecological community's current condition, hydrologic connection, uniqueness, location, fish and wildlife utilization, time lag and mitigation risk.	Not Yet Certified
Regional Economic System (RECONS)	A regional economic impact modeling tool that estimates jobs, income, sales, and value added associated with Corps Civil Works and ARRA spending, as well as stemming from effects of additional economic activities (for example, water transportations, tourism spending, etc) at more than 1,400 Corps project areas.	Certified

EC 1105-2-412 does not cover engineering models used in planning. The responsible use of well-known and proven USACE developed and commercial engineering software will continue. The professional practice of documenting the application of the software and modeling results will be followed. The USACE Scientific and Engineering Technology Initiative has identified many engineering models as preferred or acceptable for use in studies. These models should be used when

appropriate. The selection and application of the model and the input and output data is still the responsibility of the users and is subject to DQC, ATR, and IEPR.

Table 6: Engineering Models. These models may be used to develop the decision document:

Model Name and Version	Brief Model Description and How It Will Be Used in the Study	Approval Status
Surface-Water Modeling System (SMS), Version 12.3	The Surface Water Modeling System (SMS) is a comprehensive environment for one and two-dimensional models dealing with surface water applications. Hydrodynamic models include CMS-Flow and ADCIRC. The hydrodynamic models cover a range of applications including river flow analysis, rural and urban flooding, estuary and inlet modeling, and modeling of large coastal domains. Additional functionalities include advection/diffusion (RMA4) and sediment transport (FESWMS). Wave models in SMS include CMS-Wave, STWAVE, BOUSS2D, and CGWAVE and include both spectral and wave transformational models. The Particle Tracking Model (PTM) tracks particles added to the water column to help evaluate sediment transport and environmental impacts. It also includes a shoreline change model GENCADE.	HH&C CoP Approved
HEC-HMS (Hydrologic Modeling System)	This system simulates the complete hydrologic processes of dendritic watersheds. It includes many traditional hydrologic analysis procedures such as event infiltration, unit hydrographs, and hydrologic routing. It includes procedures for continuous simulation including evapotranspiration, snowmelt, and soil moisture accounting. Advanced capabilities are provided for gridded runoff simulation using the linear quasi-distributed runoff transform (ModClark). Supplemental analysis tools are provided for parameter estimation, depth-area analysis, flow forecasting, erosion and sediment transport, and nutrient water quality.	HH&C CoP Approved
HEC-RAS (River Analysis System)	This program provides the capability to perform one-dimensional steady and unsteady flow river hydraulics calculations. The program will be used for steady flow analysis to evaluate the future without and with-project conditions along the PC.	HH&C CoP Approved
Abbreviated Risk Analysis, Cost Schedule Risk Analysis	Cost risk analyses identify the amount of contingency that must be added to a project cost estimate and define the high risk drivers. The analyses will include a narrative identifying the risks or uncertainties. During the alternatives evaluation, the PDT will assist the cost engineer in defining confidence/risk levels associated with the project features within the abbreviated risk	Civil Works Cost Engineering and Agency Technical Review MCX mandatory

	analysis. For the Class 3 estimate, an evaluation of risks will be performed using Crystal Ball Cost Schedule Risk Analysis for construction costs over \$40 million or the Abbreviated Risk Analysis for projects under \$40 million.	
MII	MII is the second generation of the Micro-Computer Aided Cost Estimating System. It is a detailed cost estimating software application.	Cost Engineering Approved
Crystal Ball	This model will be used to account for risk and uncertainty of alternatives and the recommended plan	Enterprise
@Risk	This model will be used to account for risk and uncertainty of alternatives and the recommended plan	Enterprise
CEDEP	Corps-proprietary, Excel add-on for Cost Engineering; used to estimate costs of alternatives and the recommended plan	Enterprise
eProUCL Version 4.00.04	Statistical software used to estimate costs of alternatives and the TSP	Enterprise
MiniTab	Statistical software used to estimate costs of alternatives and the TSP	Enterprise
ArcGIS	Used to visually represent alternatives and the TSP	Enterprise

e. POLICY AND LEGAL REVIEW

Policy and legal compliance reviews for draft and final planning decision documents are delegated to the MSC (see Director's Policy Memorandum 2018-05, paragraph 9).

(i) Policy Review.

The policy review team is identified through the collaboration of the MSC Chief of Planning and Policy and the HQUSACE Chief of the Office of Water Project Review. The team is identified in Attachment 1 of this Review Plan. The makeup of the Policy Review team will be drawn from Headquarters (HQUSACE), the MSC, the Planning Centers of Expertise, and other review resources as needed.

- The Policy Review Team will be invited to participate in key meetings during the development of decision documents as well as SMART Planning Milestone meetings. These engagements may include In-Progress Reviews, Issue Resolution Conferences or other vertical team meetings plus the milestone events.
- The input from the Policy Review team should be documented in a Memorandum for the Record (MFR) produced for each engagement with the team. The MFR should be distributed to all meeting participants.
- In addition, teams may choose to capture some of the policy review input in a risk register if appropriate. These items should be highlighted at future meetings until the issues are resolved. Any key decisions on how to address risk or other considerations should be documented in an MFR.

(ii) Legal Review.

Representatives from the Office of Counsel will be assigned to participate in reviews. Members may participate from the District, MSC and HQUSACE. The MSC Chief of Planning and Policy will coordinate membership and participation with the office chiefs.

- In some cases legal review input may be captured in the MFR for the particular meeting or milestone. In other cases, a separate legal memorandum may be used to document the input from the Office of Counsel.
- Each participating Office of Counsel will determine how to document legal review input.

3. FUTURE REVIEWS

At this early phase of the study, we are unsure what future reviews will be required.

ATTACHMENT 1: TEAM ROSTERS

PROJECT DELIVERY TEAM			
Name	Office	Position	Phone Number
Kristen Mazur	CENAO-PMC	Project Manager	757-201-7257
Rachel Haug	CENAO-WRP-R	Planning Technical Team Lead	757-201-7589
Jennifer Shunfenthal	CENAO-WRP-R	Plan Formulation	757-201-7063
Kim Koelsch	CENAO-WRP-E	Environmental	757-201-7837
John Haynes	CENAO-WRP-E	Cultural Resources	757-201-7008
Michael Berner	CENAE-PDE	Economics	978-318-8959
Rachel Schwaab	CENAO-WRP-F	Flood Plain Management	757-201-7050
Matt Schulze	CENAO-ECE-S	Engineering Technical Team Lead	757-201-7706
Trent Elder	CENAO-ECE-G	Geotechnical Engineering	757-201-7080
Candice Miranda	CENAO-ECE-H	Hydrology and Hydraulics	757-201-7869
Sherry Jean	CENAO-ECE-E	Cost Engineering	757-201-7823
TBD	CENAO-ECE-C	Civil Engineering	
Stacey Nolan	CENAO-RE	Real Estate	757-201-7697
Tammy Knecht	CENAO-WR-OG	GIS	757-201-7825
Christy Alexander	CENAO-RMA	Resource Management	757-201-7325
Matt Donaldson	CENAO-OC	Office of Counsel	757-201-7867
Patrick Bloodgood	CENAO-PA	Public Affairs Officer	757-201-7881
TBD		Contracting	
Lawrence Skaggs	CECW-PC	Planning Mentor	904-251-4769
Rhonda Haag	Monroe County (NFS)	Director of Sustainability and Projects	305-453-8774

DISTRICT QUALITY CONTROL TEAM			
Name	Office	Position	Phone Number
TBD		DQC Lead	
TBD		Plan Formulation	
TBD		Economics	
TBD		Environmental Resources	
TBD		Cultural Resources	
TBD		Hydraulic Engineering	
TBD		Civil Engineering	

TBD		Geotechnical Engineering	
TBD		Cost Engineering	
TBD		Real Estate	

AGENCY TECHNICAL REVIEW TEAM			
Name	Office	Position	Phone Number
TBD		ATR Lead	
TBD		Plan Formulation	
TBD		Economics	
TBD		Economics – G2CRM	
TBD		Environmental Resources	
TBD		Cultural Resources	
TBD		Hydraulic Engineering	
TBD		Civil Engineering	
TBD		Geotechnical Engineering	
TBD		Cost Engineering	
TBD		Real Estate	
TBD		Risk and Uncertainty	
TBD		CPR CoP Certified Reviewer	

VERTICAL TEAM			
Name	Office	Position	Phone Number
Ray Wimbrough	CECW-NAD	RIT Program Manager	202-761-4056
Joe Vietri	CENAD-PD-P	MSC Chief of Planning and Policy	347-370-4570
Hank Gruber	CENAD-PD-P	MSC Deputy chief of Planning and Policy	347-370-4566
Jason Allmon	CENAD-PD-C	Program Manager/DST	347-370-4567
Larry Cocchieri	CENAD-PX-X	Deputy Director, PCX-CSR	347-370-4571
Jeremy LaDart	CECW-PC	Economist	202-734-1861
Rena Weichenberg	CENAD-PD-P	Environmental Team Lead	347-370-4568
Donald Cresitello	CENAD-PD-P	Senior Coastal Planner	347-370-4591
Michael Grove	CENAD-PD-RE	Realty Specialist	347-370-4777
Ralph Lamoglia	CENAD-RB-T	Civil Engineer	347-370-4599
George Nieves	CENAD-PSD-O	Chief, Operations Division	347-370-4556

Susanne Kimble	CECC-NAD	Assistant Division Counsel	347-370-4527
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POLICY REVIEW TEAM			
Name	Office	Position	Phone Number
Jeremy LaDart	CECW-PC	Economist	202-734-1861
Rena Weichenberg	CENAD-PD-P	Review Manager/Environmental Team Lead	347-370-4568
Donald Cresitello	CENAD-PD-P	Senior Coastal Planner	347-370-4591
Michael Grove	CENAD-PD-RE	Realty Specialist	347-370-4777
Ralph Lamoglia	CENAD-RB-T	Civil Engineer	347-370-4599
George Nieves	CENAD-PSD-O	Operations Program Manager	347-370-4556
Susanne Kimble	CECC-NAD	Assistant Division Counsel	347-370-4527
Jessica Podoski	CEPOH-EC-T	Climate CoP	(808) 835-4146