DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NORTH ATLANTIC DIVISION
FORT HAMILTON MILITARY COMMUNITY
302 JOHN WARREN AVENUE
BROOKLYN, NY 11252-6700

CENAD-PD-P (1105-2-10c) 8 May 2023

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

SUBJECT: Collier County, Florida Coastal Storm Risk Management Feasibility Study and Environmental Impact Statement

1. Reference Memorandum, CENAO-EX dated 6 March 2023, Subject: Submission of the Review Plan for Collier County Coastal Storm Risk Management Feasibility Study and Environmental Impact Statement for Approval.

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.

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Encl

REINHARD W. KOENIG, PE, SES
Programs Director
North Atlantic Division

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

CENAO-EX March 06, 2023

MEMORANDUM FOR Commander, USACE North Atlantic Division (CENAD-PD-X /Mr. Cocchieri), 301 John Warren Avenue, Fort Hamilton Community, Brooklyn, New York 11252

SUBJECT: Submission of the Review Plan for Collier County Coastal Storm Risk Management Feasibility Study and Environmental Impact Statement for Approval.

1. References: ER 1165-2-217, Review Policy for Civil Works, 1 May 2021.

2. Background: The Norfolk District developed the enclosed Review Plan, dated February 2023, for the Collier County Coastal Storm Risk Management Feasibility Study. The Review Plan has been reviewed for technical sufficiency and policy compliance by the National Planning Center of Expertise for Coastal Storm Risk Management (PCX-CSRM). The PCX-CSRM's endorsement is provided in the enclosed memorandum dated 3 February 2023.

3. Request: The Norfolk District requests that the North Atlantic Division approve the enclosed Review Plan.

4. Point of Contact: Questions should be directed to Ms. Abbegail Preddy, Planning Team Lead and Project Manager. She may be reached at Abbegail.m.Preddy@usace.army.mil or (757) 201 - 7693.

Brian P. Hallberg
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2 Encls
1. Review Plan
2. PCX Endorsement

BRIAN P. HALLBERG, PMP
COL, EN
Commanding

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NORTH ATLANTIC DIVISION
FORT HAMILTON MILITARY COMMUNITY
302 JOHN WARREN AVENUE
BROOKLYN, NY 11252-6700

CENAD-PD-P (1105-2-10c) 3 Feb 2023

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

SUBJECT: Collier County, Florida Coastal Storm Risk Management Feasibility Study

1. The National Planning Center of Expertise for Coastal Storm Risk Management (PCX-CSRM) has reviewed the Review Plan (RP) for the subject study and concurs that the RP complies with current peer review policy requirements contained in ER 1165-2-217, entitled “Civil Works Review Policy”.

2. The review was performed by Mr. Donald Cresitello, PCX-CSRM and me.

3. PCX-CSRM has no objection to RP approval by the Director, Programs Directorate, North Atlantic Division.

4. Thank you for the opportunity to assist in the preparation of the RP. PCX-CSRM is prepared to lead the Agency Technical Review for the subject study and will continue to coordinate with the PDT. For further information, please contact me at 347-370-4571.

LARRY COCCHIERI
Deputy, National Planning Center of Expertise for Coastal Storm Risk Management

REVIEW PLAN
February 2023

Project Name: Collier County, Florida Coastal Storm Risk Management Feasibility Study and Environmental Impact Statement – 3x3 Extension
P2 Number: 476674

Decision Document Type: Integrated Feasibility Report and Environmental Impact Statement

Project Type: Single-Purpose Coastal Storm Risk Management

District: Norfolk District (executing district) and Jacksonville District (supported district)
District Contact: Project Manager (Norfolk) (757) 201-7693;
Planning Technical Team Lead (757) 201-7693;
Project Manager (Jacksonville) (904) 232-3823

Major Subordinate Command (MSC): North Atlantic Division
MSC Contact: Senior Coastal Planner (347)370-4591

Review Management Organization (RMO): Planning Center of Expertise for Coastal Storm Risk Management (PCX-CSRM)
RMO Contact: PCX-CSRM Review Manager (347) 370-4571

Key Review Plan Dates

Date of RMO Endorsement of Review Plan: Pending
Date of MSC Approval of Review Plan: Pending
Date of Independent External Peer Review (IEPR) Exclusion Approval: N/A
Has the Review Plan changed since PCX Endorsement? N/A
Date of Last Review Plan Revision: N/A
Date of Review Plan Web Posting: Pending
Date of Congressional Notifications: Pending

Milestone Schedule

	Scheduled	Actual	Complete
FCSA Executed:		10/09/18	Yes
3x3 Exemption Signed:		08/03/22	Yes
Tentatively Selected Plan (TSP):	10/18/23		No
Release Draft Report to Public:	12/18/23		No
Agency Decision Milestone (ADM):	04/10/24		No
Final Report Transmittal:	02/21/25		No
State and Agency Review Start:	04/18/25		No
Chief's Report:	08/01/25		No

Project Fact Sheet
February 2023

Project Name: Collier County, Florida Coastal Storm Risk Management Feasibility Study, Collier County, Florida.

Location: The project is located in Collier County, Florida in the Cities of Naples and Marco Island.

Authority: The study authority is Section 4033 of Water Resources Development Act of 2007 (P.L. 110-114). Whereby the Secretary shall conduct a study to determine the feasibility of carrying out a project for hurricane and storm damage reduction and flood damage reduction in the vicinity of Vanderbilt, Park Shore, and Naples beaches, Collier County, Florida.

Sponsor: Collier County

Type of Study: Feasibility

SMART Planning Status: The project was approved for a 3x3x3 policy exemption in the amount of an additional three years and $2.97M (six years and $5.97M total) on August 3, 2022. It is anticipated that the extended study, now to be completed with a signed Chief's Report in August 2025, will be compliant with the 3x3x3 policy exemption.

Project Area: The Collier County Coastal Storm Risk Management Feasibility Study is a single-purpose Coastal Storm Risk Management (CSRM) project located in southwest Florida (Figure 1). Collier County is located on the lower west coast of Florida, approximately 120 miles south of the entrance to Tampa Bay, adjacent to the Gulf of Mexico and about 100 miles northwest of Key West. Naples is the largest city located along the shoreline in the county. Collier County is comprised of nearly 200 square miles of landmass and roughly 300 square miles of water. It is the largest county in Florida by land area and fourth largest by total area (land and water). The estimated population for 2017 was nearly 373,000, which includes a dense population of people who require more time and assistance for evacuation. A large portion of the southeast section of the county lies within the Big Cypress National Preserve, and the southern coastal section of the county is home to parts of the Everglades National Park.

Problem Statement: The primary problem to be addressed by this study is that coastal storm events and their damage mechanisms such as beach erosion, wave action, and storm surge threaten economic damage and loss of residential and commercial structures, environmental resources, critical infrastructure, life safety, and general economic livelihood in Collier County. The problem can further be broken down into more specific components, including:

- Structures (commercial and residential) in Collier County are vulnerable to damage from inundation caused by storm surge.
- Critical infrastructure in Collier is vulnerable to damage from inundation caused by storm surge.
- The reduced evacuation efficiency and structure inundation caused by coastal storm events creates life safety risks to the population of Collier County.
- There are environmental resources that are unique to the study area that are vulnerable to the effects of coastal storms.

- Beach dune and berm erosion due to storm surge results in property loss and economic damages in Collier County shoreline communities

Federal Interest: Collier County experiences elevated levels of risk and vulnerability to coastal storms and their associated economic damages. Interest is predicated upon USACE strategy to study risks and vulnerabilities, as well as opportunities to increase resiliency, in coastal communities to enable local governments such as Collier County to make risk-informed decisions. This interest is illustrated across the region by the initiation of the South Atlantic Coastal Study (SACS) and 13 other CSRM studies within the State of Florida. There appears to be a variety of structural and nonstructural solutions that will have marked effects on resiliency and are economically justified, environmentally acceptable, and consistent with USACE policy.

Goals and Objectives: The Federal objective of water and related land resources project planning is to contribute to national economic development consistent with protecting the nation's environment, pursuant to national environmental statutes, applicable executive orders, treaties, and other Federal planning requirements. The primary goal of this study is to recommend a holistic suite of CSRM measures that will manage the risk of damages due to coastal storm events in Collier County. This recommendation will be consistent with USACE CSRM mission area policies, applicable executive orders, and other Federal planning requirements.
The following objectives helped guide plan formulation to achieve study goals:

- Manage coastal storm risk and associated damages and economic losses from wave action and flood inundation due to coastal storm surge to vulnerable residential structures, including single-family homes, and non-residential commercial structures in Collier County over the 50-year period of analysis.
- Manage the risk of damage to critical infrastructure caused by storm surge inundation associated with coastal storms in Collier County over the 50-year period of analysis.
- Manage the risk of damage and impacts to existing environmental resources and features in Collier County over the 50-year period of analysis.
- Manage the risk to human life, health, and safety to the population in Collier County that is caused by the inundation of development and critical infrastructure that is associated with coastal storm events over the 50-year period of analysis.

Inventory and Forecast: Since 1851, Collier County has been repetitively impacted by large storms. On average they have been hit by a tropical cyclone every 2-3 years, including 33 hurricanes, 20 of which were Category 3 or greater, and the most recent storm causing significant damage being Hurricane Irma in 2017 and Hurricane Ian in 2022. The feasibility study will address the coastal storm risk within the city and then formulate plans to reduce the impacts to human life, health, and safety and the damage to structures, critical infrastructures, and the natural environment.

Measures and Alternatives: The previous three-year study for Collier CSRM formulated and evaluated an array of alternatives that included different combinations of structural measures, nonstructural measures, and beach renourishment. The purpose of the approved 3x3 exemption and resulting three-year study extension is to further refine and formulate the array of alternatives and arrive at a solution that is comprehensive, environmentally acceptable and compliant, and economically justified.

Risk Identification: The extent of coastal storm risk in Collier County poses a risk to the life, health, and safety of the local population. Sea level change is a key uncertainty in this study, and the PDT will manage the associated risk by continuing to use the USACE Intermediate sea level rise curve. Residual risk will also be a significant consideration as the team moves forward with formulation of the measures and alternatives; if structural measures are screened out during the process of reformulation, the increase of residual risk will need to be communicated with the sponsor and discussed in the final feasibility report.

DOCUMENTATION OF RISKS AND ISSUES

1. FACTORS AFFECTING THE LEVELS AND SCOPES OF REVIEWS

Mandatory IEPR Triggers.

- Is the estimated total project cost, including mitigation, greater than $200 million? **Yes**
- Has the Governor of an affected state requested a peer review by independent experts? **No**
- Has the Chief of Engineers determined the project study is controversial due to significant public dispute over the size, nature or effects of the project or the economic or environmental costs or benefits of the project (including but not limited to projects requiring an Environmental Impact Statement)? **No**

Level and Scope of Review.

- Will the study likely be challenging? Yes. Because of the integration of both the back-bay and coastal areas in the study scope, two economic models are required to accurately forecast economic benefits. The team anticipates that there may be some challenges with formulating and recommending any alternatives including structural measures based on local controversy from the first study period. The non-Federal sponsor has indicated they are not willing to support any recommended plan that includes structural features; the USACE team will continue to formulate for the most feasible and comprehensive recommended plan/NED plan that provides coastal storm risk management solutions for the County that are environmentally acceptable/compliant, engineeringly sound, and economically justified.
- Provide a preliminary assessment of where the project risks are likely to occur and assess the magnitude of those risks. Sea level change is a source of risk and uncertainty. There is risk and uncertainty related to the public perception of the study given the controversy regarding the structural measures and their environmental impacts. There is considerable risk that the nonfederal sponsor will not support the recommended plan if it includes any structural measures. There is also significant risk that any structural measures included in the recommended plan will not be able to obtain environmental compliance at feasibility level of design based on environmental agencies' hesitations to provide compliance for structural features novel to south Florida. If the updated RP does not contain any structural measures, there will be considerably more residual risk for the County compared to the original RP because of its reduced coastal storm surge protection benefits and risk management.
- Is the project likely to be justified by life safety or is the study or project likely to involve significant life safety issues? No, the project is not anticipated to be justified by life safety. The existing approved NED exception for a structural measure included in the previous RP on the basis of hurricane resiliency, evacuation, and life safety will be revisited in formulation. The primary justification for the study will be economic damages to structures, but life safety issues will continue to be an important consideration.
- 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? Yes. The previous RP contains structural features that are not novel to USACE but are novel to this region of Florida. The novelty of these features results in unique challenges for achieving environmental compliance at a feasibility level of design. Any structural features that move forward for construction as a result of this study

would set a precedent for structural measures use in the state of Florida and in other federal projects.

- Does the project design require redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design/construction schedule? Yes. The previous array of alternatives that is being reformulated and reevaluated contains combinations of beach nourishment, structural measures, and nonstructural measures. With such a large study area and project recommendation, the construction phase may have to occur over a time frame of five to ten years. This provides unique challenges for quantifying when benefits will begin accumulating, and may affect the beach nourishment cycles and schedule over the fifty-year period of analysis.
- Is the project expected to have more than negligible adverse impacts on scarce or unique tribal, cultural, or historic resources? No. Tribal, cultural, and/or historic resources are not expected to significantly impact plan formulation and/or selection; however, it may be possible to consider characteristics of historic properties within decision criteria for formulation of a nonstructural alternative dependent on data availability. While historic properties could be adversely impacted per Section 106 and significantly impacted from a NEPA impact analysis context, the uncertainty of impacts will remain moderate to high until surveys are conducted during PED Phase. Impacts to tribal, cultural, and historic resources are most likely to be associated with structural measures in a Recommended Plan; nonstructural measures pose much less risk to these resources in a Recommended Plan.
- Is the project expected to have substantial adverse impacts on fish and wildlife species and their habitat prior to the implementation of mitigation measures? Structural measures such as storm surge barriers across inlets would likely present significant impacts to aquatic ecosystems (e.g., temporary: water quality, hydrodynamics, sediment transport; permanent: mangroves, dune vegetation, hydrodynamics, local bathymetry) and would likely require mitigation for impacts to mangrove wetlands and dune vegetation. If beach nourishment is included, it also has the potential to impact aquatic resources such as hard bottom which may also require mitigation via construction of artificial reefs. However, if the recommended plan is primarily composed of nonstructural measures, then there will likely be minimal impact on the fish and wildlife in the study area.
- 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? Structural measures such as storm surge barriers across inlets could impact the aquatic ecosystem and would likely require mitigation. Some of surge barrier impacts to resources such as degraded water quality and mangrove habitat loss may indirectly impact T&E species such as wood stork. Direct impacts from operation / closure of surge barriers without mitigative design measures are possible to T&E species (e.g., West Indian manatee, smalltooth sawfish, sea turtle spp.) via impingement, crushing, or restriction of movement through inlets. If beach nourishment is included, it also has the potential to impact aquatic resources such as wetlands, hard bottom, and T&E spp. foraging, migration, and nesting (particularly sea turtle spp.), and may also require mitigation. Both the offshore dredging and sand placement components of beach nourishment measures pose potential impacts to sea turtles and sea turtle Critical Habitat. However, if the recommended plan is primarily composed of nonstructural measures, then there will likely be minimal impact on the fish and wildlife in the study area.

Assessment of the District Chief of Engineering. The District Chief of Engineering evaluated risks in the previous three years of the Collier CSRM study and determined there is a significant threat to human life associated with the study or failure of the project. A determination as to whether there is a significant threat to human life associated with the study or failure of the project based on an updated RP will be made once plan formulation is complete and more detail is known about the need for Safety Assurance Review.

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. The integrated feasibility report and EIS (analyses and products that are developed during the feasibility study including but not limited to cost estimates, economic and engineering modeling, environmental compliance documentation, etc.) will undergo DQC. This internal review process covers basic science and engineering work products. It fulfils the project quality requirements of the Project Management Plan.

Agency Technical Review. ATR will be 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 there are floodwalls or other structural measures proposed that require a Potential Failure Mode Analysis (PFMA), then that will be completed during the study phase if necessary. A Safety Assurance Review will be completed during the Preconstruction Engineering and Design (PED) phase if the recommended plan includes infrastructure that would pose a life safety risk.

Independent External Peer Review. IEPR is required for this decision document. 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. Certain criteria dictate mandatory performance of IEPR, and other considerations may lead to a discretionary decision to perform IEPR. For this study, a risk-informed decision has been made that IEPR is appropriate. The information in Section 1 – Factors Affecting the Scope of Review – informed the decision to conduct IEPR.

Cost Engineering Review. All decision documents will be coordinated with the Cost Engineering Mandatory of Expertise (MCX). The MCX assisted 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 occur as part of ATR.

Policy and Legal Review. All decision documents will be reviewed for compliance with law and policy. ER 1105-2-100, Appendix H, and Director's Policy Memorandum 2019-01, both provide 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.

Public Review. The district will post the Review Plan and approval memo on the district internet site. Public comment on the adequacy of the Review Plans will be accepted and considered. Additional

public review will occur when the report and environmental compliance document(s) are released for public and agency comment.

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

Table 1: Collier County Coastal Storm Risk Management – Levels of Review

Product(s) to undergo Review	Review Level	Site Visit	Start Date	End Date	Cost	Complete
Economic Model Area Delineation / Assumptions	Targeted ATR	No	MAR 2023	JUN 2023	$15,000	No
Draft Feasibility Report and EIS	District Quality Control	No	OCT 2023	NOV 2023	$35,000	No
Draft Feasibility Report and EIS	Agency Technical Review	No	NOV 2023	DEC 2023	$50,000	No
Draft Feasibility Report and EIS	IEPR, Scoping (Corps costs)	N/A	OCT 2023	OCT 2023	$10,000	No
Draft Feasibility Report and EIS	IEPR, Contractor Review	N/A	NOV 2023	FEB 2023	$100,000	No
Draft Feasibility Report and EIS	Policy and Legal Review	No	JAN 2024	FEB 2024	n/a	No
Final Feasibility Report and EIS	District Quality Control	N/A	NOV 2024	DEC 2024	$25,000	No
Final Feasibility Report and EIS	Agency Technical Review	N/A	JAN 2025	FEB 2025	$25,000	No
Final Feasibility Report and EIS	Policy and Legal Review	N/A	FEB 2025	APR 2025	n/a	No

A. District Quality Control

The home district will manage DQC and will appoint a DQC Lead to manage the local review (see ER 1165-2-217, Chapter 4). Table 2 identifies the required expertise for the DQC team. The DQC Team members should not be involved in the production of any of the products reviewed.

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.).
Plan Formulation	A senior water resources planner with experience in CSRM studies and familiarity with feasibility study requirements and the SMART Planning process.
Economics	The economics reviewer should be a senior economist with experience in CSRM studies and familiarity with feasibility study requirements and BEACH-FX. The economics DQC team member will be identified by the CSRM-PCX.
Environmental Resources	The environmental reviewer should have expertise in evaluating the impacts associated with CSRM and dredging projects as well as extensive knowledge of estuarine and coastal ecology. The reviewer should also be familiar with the environmental coordination and NEPA requirements for CSRM projects.
Cultural Resources	Cultural resources reviewer should have expertise in evaluating the impacts associated with CSRM and dredging projects as well as extensive knowledge of underwater archaeology. The reviewer should also be familiar with the environmental coordination and NEPA/National Historic Preservation Act (NHPA) requirements for CSRM projects.
Hydraulic/Hydrologic Engineering	The Hydraulic/Hydrologic Engineering reviewer should be familiar in the field of hydraulics and hydrology and have a thorough understanding and knowledge of the development of flow and stage frequency curves, application of floodwalls and interior drainage analysis, as well as computer modeling techniques that will be used such as HEC-HMS & HEC-RAS.
Coastal Engineering	The Coastal Engineering review should have experience with coastal storm risk management investigations and projects. The reviewer should have a thorough understanding of wave dynamics and coastal processes. The coastal engineer should also be familiar in the field of coastal modeling specifically models such as with S-BEACH, GENCADE and other coastal computer modeling tools and techniques.
Geotechnical Engineering	The Geotechnical Engineering reviewer should be familiar with the geotechnical requirements of the structural measures and beach nourishment borrow sources.
Structural Engineering	The Structural Engineering reviewer should be familiar with the structural requirements of the structural measures.
Cost Engineering	The cost engineering reviewer should have experience evaluating cost requirements and experience with the Abbreviated Risk Analysis, Cost and Schedule Risk Analysis (Crystal Ball) and CEDEP models.
Operations	The project design reviewer should have experience in the dredging operations, design, construction, and maintenance, including development of plans, surveying, mapping, and volumetric computations.
Real Estate	The real estate reviewer should have expertise in the real estate requirements of CSRM projects and preparation of Real Estate Plans.

Documentation of DQC. Quality Control will be performed continuously. A specific certification of DQC completion will be prepared at the draft and final report stages. Documentation of DQC will follow the District Quality Manual and the MSC Quality Management Plan. Dr. Checks will be used for documentation of DQC comments. An example DQC Certification statement is provided in ER 1165-2-217, Appendix D.

Documentation of completed DQC will be provided to the MSC, RMO and ATR Team leader. Documentation available at the time of ATR will be made available to the ATR Team. The team will examine DQC records and comment in the ATR report on the adequacy of the DQC effort.

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. The RMO will manage the ATR. The review will be 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 ER 1165-2-217, Chapter 5.5.3). Table 3 identifies the disciplines and required expertise for this ATR Team (also see Attachment 1 - the ATR Team roster.

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).
Plan Formulation	A senior water resources planner with experience in CSRM studies and familiarity with feasibility study requirements and the SMART Planning process.
Economics	The economics reviewer(s) should be a senior economist with experience in CSRM studies and familiarity with feasibility study requirements and BEACH-FX. Typically, two economics reviewers are required, one to review the Economics Appendix and the other to review inputs/outputs of BEACH-FX modeling.
Environmental Resources	The environmental reviewer should have expertise in estimating the impacts associated with CSRM and dredging projects as well as extensive knowledge of estuarine and coastal ecology. The reviewer should also be familiar with environmental coordination and NEPA requirements for CSRM projects.
Cultural Resources	The cultural resources reviewer should have expertise in evaluating the impacts associated with CSRM and dredging projects as well as extensive knowledge of underwater archaeology. The reviewer should also be familiar with environmental coordination and NEPA/NHPA requirements for CSRM projects.
Hydraulic/Hydrologic Engineering	The Hydraulic/Hydrologic Engineering reviewer should be familiar in the field of hydraulics and hydrology and have a thorough understanding and knowledge of the development of flow and stage

	frequency curves, application of floodwalls and interior drainage analysis, as well as computer modeling techniques that will be used such as HEC-HMS & HMS-RAS.
Coastal Engineering	The Coastal Engineering review should have experience with coastal storm risk management investigations and projects. The reviewer should have a thorough understanding of wave dynamics and coastal processes. The coastal engineer should also be familiar in the field of coastal modeling specifically models such as with S-BEACH, GECADE, and other coastal computer modeling tools and techniques.
Geotechnical Engineering	The Geotechnical Engineering reviewer should be familiar with the geotechnical requirements of the structural measures and beach nourishment borrow sources.
Structural Engineering	The Structural Engineering reviewer should be familiar with the structural requirements of the structural measures.
Cost Engineering	The cost engineering reviewer should have experience evaluating cost requirements for all types of measures that may be recommended in a CSRM study including nonstructural, structural, and natural and nature based features (NNBFs) 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 DDN projects and preparation of Real Estate Plans.
Climate Preparedness and Resilience CoP Reviewer	A member of the Climate Preparedness and Resiliency (CPR) CoP certified reviewer will participate on the ATR team.
Risk and Uncertainty	The risk and uncertainty reviewer should be a subject matter expert in multi-discipline risk analysis to ensure consistent and appropriate identification, analysis, and written communication of risk and uncertainty and ensure all requirements of ER 1105-2-101 are met.

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. All members of the ATR team will use the four-part comment structure (see ER 1165-2-217, Chapter 5). If a concern cannot be resolved by the ATR team and PDT, it will be elevated to the vertical team to resolve using the issue resolution process in ER 1165-2-217, chapter 5.9. Concerns will be closed in DrChecks by noting the concern has been elevated. The ATR Lead will prepare a Statement of Technical Review (see ER 1165-2-217, chapter 5.11 and Appendix D), for the draft and final reports, certifying that review issues have been resolved or elevated. ATR will be certified when all concerns are resolved or referred to the vertical team and the ATR documentation is complete.

C. Independent External Peer Review

IEPR is managed outside of the USACE and conducted on studies. The IEPR panel will 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 IEPR. IEPR will be performed because the study will address life risk associated with coastal storms and the cost of the recommended plan is expected to exceed $200M. Please refer to Section I of this review plan for more information on the factors that led to the determination that IEPR should be performed.

Products to Undergo IEPR. The full draft report will undergo IEPR.

Required 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. An Outside Eligible Organization (OEO) manages the IEPR as per section 6.8 of ER 1165-2-217. Table 4 lists the required panel expertise.

Table 4: Required IEPR Panel Expertise

IEPR Panel Member Disciplines	**Expertise Required**
Plan Formulation	The planner must have demonstrated experience serving as a water resources planner for CSRM projects and applying USACE plan formulation processes, procedures, and standards to CSRM projects and dredged material placement plans.
Economics	The economist must have at least a bachelor's degree in economics. The reviewer must have demonstrated experience in performing economic evaluations for CSRM projects; in applying USACE procedures and standards for CSRM economic analyses; and in formulating and evaluating alternative plans for CSRM projects. Knowledge/experience with tools employed for economic analysis, risk analysis, and trade/fleet forecasts is required.
Environmental Resources	The reviewer must have demonstrated experience directly related to water resources environmental evaluation and NEPA compliance for CSRM projects. Additionally, the panel member should be an expert in compliance requirements of environmental laws, policies, and regulations, including the fish and wildlife coordination act and the endangered species act.
Hydraulics, Hydrology & Coastal (HH&C) Engineer	The reviewer should be an expert in the field of coastal hydrology and hydraulics and have a thorough understanding of coastal storm wave dynamics and have experience in CSRM studies/projects. The reviewer should also be familiar with computer modeling techniques that were used for calculating benefits on CSRM studies. A registered professional engineer is recommended with applicable modelling and design experience.
Geotechnical Engineer	The geotechnical engineer must have demonstrated engineering experience or combined equivalent of education and experience in geo-civil design and geotechnical evaluation of CSRM projects. The panel member must be a registered professional engineer from academia, a public agency, or an A-E or consulting firm, with a MS degree or higher in geotechnical engineering. Candidate must have demonstrated experience related to USACE geotechnical practices for design and construction of CSRM projects. The panel member should have experience in geotechnical risk analysis. Active participation in related professional engineering and scientific societies is encouraged.

Documentation of IEPR. The OEO 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.

D. Safety Assurance Review

Safety Assurance Reviews are managed outside of the USACE and are conducted on design and construction products for hurricane, storm and flood risk management projects, or other projects where existing and potential hazards pose a significant threat to human life. In some cases, significant life safety considerations may be relevant to planning decisions. These cases may warrant the development of relevant charge questions for consideration during reviews such as ATR or IEPR. In addition, if the characteristics of the recommended plan warrant a Safety Assurance Review, a panel will be convened to review the design and construction activities before construction begins, and until construction activities are completed, on a regular schedule.

Decision on Safety Assurance Review. Detail the determination regarding whether or not to conduct Safety Assurance Review in the design and construction phases. Also describe whether or not safety assurance review should be considered in earlier independent reviews such as ATR or IEPR. If insufficient detail is known about the need for Safety Assurance Review, include a statement noting that a decision will be made later.

E. 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

Model Name and Version	Brief Model Description and How It Will Be Used in the Study	Certification / Approval
Beach-fx, version 1.1.12 with SBEACH CDAS Version 4.03	Beach-fx is an analytical framework for evaluating the physical performance and economic benefits and costs of coastal storm risk management projects, particularly, beach nourishment along sandy shores. Beach-fx has been implemented as an event-based Monte Carlo life cycle simulation tool that is run on desktop computers.	Approved for use; undergoing recertification to be completed by end of the study
G2CRM version 0.4.564	G2CRM is used to evaluate coastal storm risk management alternatives in the back bays recommended in the study with a focus on problematic lifecycle issues like the impact of climate change and avoidance of repetitive damages. The model will allow for use of readily available data from existing sources and corporate databases and integration with GIS. A wide variety of outputs will be used for estimating damages and costs, characterizing and communicating risk, and reporting detailed model behavior in both the FWOP and with-project conditions studied.	Approved for use; undergoing certification to be completed by the end of the study.

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
SBEACH version 4.03	SBEACH is a numerical simulation model for predicting beach, berm, and dune erosion due to storm waves and water levels. It has potential for many applications in the coastal environment and has been used to determine the fate of proposed beach fill alternatives under storm conditions and to compare the performance of different beach fill cross-sectional designs.	HH&C CoP Approved
Surface-Water Modeling System (SMS), version 13.1	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.	HH&C CoP Approved

	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. It is anticipated that GENCADE, CMS-Flow, CMS-Wave, STWAVE, and ADCIRC may all be used during this study.	
HEC-HMS (Hydrologic Modeling System), version 4.10	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 evapo-transpiration, 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), version 6.3	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 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.	Civil Works Cost Engineering and Agency Technical Review MCX mandatory
CEDEP	Corps-proprietary, Excel add-on for Cost Engineering; used to estimate costs of alternatives and the recommended plan	Civil Works Cost Engineering and Agency Technical Review MCX mandatory
ArcGIS, version 10.8.2	Used to visually represent alternatives and the TSP	Enterprise

F. Policy and Legal Compliance Review

Policy and legal compliance reviews for draft and final planning decision documents have been delegated to the MSC (see Director's Policy Memorandum 2019-01).

(i) Policy Review.

The policy review team will be selected 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 may 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 will be documented in a Memorandum for the Record (MFR) produced for each engagement with the team. The MFR will 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 will 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 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.

DISCLAIMER: This information is distributed solely for the purpose of pre-dissemination review under applicable information quality guidelines. It does not represent and may not be construed to represent any agency determination or policy.

ATTACHMENT 1: TEAM ROSTERS

PROJECT DELIVERY TEAM			
Name	Office	Position	Phone Number
Abbe Preddy	CENAO-PMC	Planning Technical Team Lead and Project Manager	757-201-7693
Richard Klein	CENAO-PMC	Chief, Programs and Civil Works Branch	757-201-7243
Kim Koelsch	CENAO-WRP-R	Planning Resources Chief	757-201-7539
Michelle Hamor	CENAO-WRP	Planning and Policy Chief	757-201-7491
Kathy Perdue	CENAO-WRP-E	Environmental Team Lead	757-201-7218
Zach Martin	CENAO-WRP-E	Environmental Analysis Chief	757-201-7210
Susan Miller	CENAO-WRP-E	Cultural Resources	757-201-7008
Jennifer Spencer	CENAO-WRP-R	Lead Economist	757-201-7102
Addie Gregory	CENAO-WRP-R	Economics	757-201-7837
Doug Hessler	CENAO-WRO-G	GIS	757-201-7113
Bryan Adkins	CELRH-EC-TC	Cost Engineering	304-399-6914
Kiara Flores Rios	CESAJ-ENG-S	Geotechnical Engineer	904-232-1375
Candice Miranda	CENAO-ECT-H	Design Technical Lead	757-201-7101
TBD	CENAO-ECE-S	Structural Engineer	-
Ellen Cava	CENAO-ECT-H	Hydraulics and Hydrology	757-201-7101
Son Vo	CENAO-ECE-C	Civil Engineering	757-201-7513
John Everett	CENAO-OC	Office of Counsel	757-201-7513
Alicia Barrette	CENAO-RE	Real Estate	757-201-7822
Krista Rice	CENAO-PMCO	Program Management Support	757-201-7803
Kenneth Washington	CENAO-PMCO	Program Management Support	757-201-7088
Ashleigh Fountain	CESAJ-PD-D	Project Management Support	904-232-3823
Will Reilly	CESAJ-END-W	Engineering Support	904-232-1126
Angela Dunn	CESAJ-PD-E	Environmental Analysis and Cultural Resources Support	904-232-2336
Gary McAlpin	Collier County, FL	Non-Federal Sponsor	239-252-5342

DISTRICT QUALITY CONTROL			
Name	Office	Position	Phone Number
Kim Koelsch	CENAO-WRP-R	DQC Lead	757-201-7539
TBD		Plan Formulation	
TBD		Economics	
TBD		Environmental Resources	
TBD		Cultural Resources	
TBD		Hydraulic Engineering	
TBD		Geotechnical Engineering	
TBD		Cost Engineering	
TBD		Operations	
TBD		Real Estate	

AGENCY TECHNICAL REVIEW			
Name	Office	Position	Phone Number
Daria Mazey	CESPN-PM	ATR Lead	415-503-6573
TBD		Plan Formulation	
TBD		Economics	
TBD		Economics - HarborSym	
TBD		Environmental Resources	
TBD		Cultural Resources	
TBD		Hydraulic Engineering	
TBD		Geotechnical Engineering	
TBD		Cost Engineering	
TBD		Operations	
TBD		Real Estate	
TBD		CPR CoP Certified Reviewer	

POLICY AND LEGAL COMPLIANCE REVIEW			
Name	Office	Position	Phone Number
Valerie Cappola	CENAD-PD-P	Review Manager and Environmental	347-370-4557
Saji Varghese	CESWD-PDP	Plan Formulation	469-487-7069
Jeff Strahan	CECW-PC	Economics	202-761-8643
Chandra Pathak	CENAD-RB-T	Engineering and Construction	347-370-4668
Patty Bolton	CENAD-RB-T	Cost Engineering	347-370-4682
Jodi McDonald	CENAD-PD-OR	Operations	347-370-4556
Carlos Gonzalez	CENAD-PD-RE	Real Estate	347-370-4529
Suzanne Kimble	CECC-NAD	Counsel	347-370-4527
Jessica Podoski	CEPOH-EC-T	Climate Change and SLR	808-835-4146