REVIEW PLAN

COASTAL TEXAS
FEASIBILITY STUDY

U.S. Army Corps of Engineers
Galveston District

MSC Approval Date: 18 December 2015
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US Army Corps of Engineers ®

REVIEW PLAN

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TABLE OF CONTENTS

1. PURPOSE AND REQUIREMENTS

a. Purpose. This Review Plan (RP) defines the scope and level of peer review for the Coastal Texas Integrated Feasibility Report and Environmental Impact Statement. Given the complexity and large scope of this feasibility study effort, a mega study protocol will be adopted. The mega study protocol (MSP) includes a framework for executive and technical oversight and project delivery team member and reviewer qualifications, as well as communications and cost/schedule management. The MSP supplements this document, and like the RP is an addendum to the project management plan (PMP).

The feasibility study will identify critical data needs and recommend a comprehensive strategy for reducing coastal storm flood risk and providing ecosystem restoration through structural and nonstructural measures that take advantage of natural and nature-based features like barrier islands and restored coastal wetlands. Structural alternatives to be considered include improvements to existing systems (such as existing hurricane protection projects at Texas City and seawalls at Galveston, Palacios, Corpus Christi, North and South Padre Island), and the creation of new structural plans for hurricane storm damage reduction. ER alternatives to be considered include estuarine marsh restoration, beach and dune restoration, rookery island restoration, oyster reef restoration, and seagrass bed restoration.

The Project Delivery Team (PDT) has determined that the scope of the project requirements is beyond the Planning Modernization 3x3x3 rule. Therefore, a strategy was developed to scope the study and apply for an exemption from the 3x3x3. This comprehensive study needs Congressional notification to continue beyond the $6 million Federal limit set in the Water Resources Recovery and Development Act of 2014. An exemption to the 3X3X3 process was developed and approved by the Deputy Commanding General for Civil and Emergency Operations with a total study cost of $19.8 million. Approval by the Assistant Secretary for Civil Works (ASA(CW)) was received 10 November 2015. The Feasbility Cost Sharing Agreement (FCSA) was executed on 16 November 2015.

b. References

(1) Engineering Circular (EC) 1165-2-214, Civil Works Review Policy, 15 Dec 2012
(2) EC 1105-2-412, Assuring Quality of Planning Models, 31 Mar 2011
(3) Engineering Regulation (ER) 1110-1-12, Quality Management, 30 Sep 2006
(4) ER 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 Nov 2007
(5) Coastal Texas Draft Project Management Plan
(6) Coastal Texas Feasibility Mega Study Protocol

c. Requirements. This review plan was developed in accordance with EC 1165-2-214, which establishes an accountable, comprehensive, life-cycle review strategy for Civil Works products by providing a seamless process for review of all Civil Works projects from initial planning through design, construction, and operation, maintenance, repair, replacement and rehabilitation (OMRR&R). The EC outlines four general levels of review: District Quality Control/Quality Assurance (DQC), Agency Technical Review (ATR), Independent External Peer Review (IEPR), and Policy and Legal Compliance Review. In addition to these levels of review, decision documents are subject to cost engineering review and certification (per EC 1165-2-214) and planning model certification/approval (per EC 1105-2-412).

2. REVIEW MANAGEMENT ORGANIZATION (RMO) COORDINATION

The RMO is responsible for managing the overall peer review effort described in this Review Plan. The RMO for decision documents is typically either a Planning Center of Expertise (PCX) or the Risk Management Center (RMC), depending on the primary purpose of the decision document. The RMO for the peer review effort described in this Review Plan is U.S. Army Corps of Engineers (USACE) Planning Center of Expertise for Coastal Storm Risk Management (PXC-CSRM) located in the North Atlantic Division and the Ecosystem Restoration PCX located in the Mississippi Valley Division.

The RMO will coordinate with the Cost Engineering Directory of Expertise (DX) to ensure the appropriate expertise is included on the review teams to assess the adequacy of cost estimates, construction schedules and contingencies.

3. STUDY INFORMATION

a. Decision Document. The Coastal Texas study will result in an integrated Feasibility Report and Environmental Impact Statement (EIS) that will require Congressional authorization. Authorization for the study is derived from Section 4091, Water Resources Development Act (WRDA) of 2007 Public Law (P.L.) 110-114. Section 4091 states that "The Secretary shall develop a comprehensive plan to determine the feasibility of carrying out projects for flood damage reduction, hurricane and storm damage reduction, and ecosystem restoration in the coastal areas of the State of Texas." The scope provides for a comprehensive plan for the protection, conservation, and restoration of wetlands, barrier islands, shorelines, and related lands and features that protect critical resources, habitat, and infrastructure from the impacts of coastal storms, hurricanes, erosion, and subsidence.

The study fits into the overall concept of the authorization to conduct a comprehensive plan for locating and implementing opportunities for Coastal Storm Risk Management (CSRM), Flood Risk Management (FRM) and Ecosystem Restoration (ER). The purpose of the study is to develop an evaluation of CSRM, FRM, and ER opportunities along the entire Texas Coast with the completion of a programmatic assessment of the entire study area with recommendations of CSRM, FRM, and ER opportunities for the entire Texas Coast. Pursuant to the National Environmental Policy Act (NEPA), an EIS will be integrated in the FR. The approval level for the report is the Chief of Engineers, Headquarters, U.S. Army Corps of Engineers (HQUSACE).

b. Study/Project Description.

The study area consists of the entire Texas Gulf Coast from the mouth of the Sabine River to the mouth of the Rio Grande, and includes the Gulf and tidal waters, barrier islands, estuaries, coastal wetlands, rivers and streams and adjacent areas that make up the interrelated ecosystem along the coast of Texas. The study area encompasses 18 coastal counties along the Gulf Coast and bayfronts. The study area has been divided into four regions loosely based on major bay systems and habitats. An overview of the four regions is shown in Table 1 and Figure 1.

Table 1. Geographic breakdown of four coastal regions.

Region #	Region Name	Description	Counties
1	Sabine Pass to Galveston Bay	Mouth of Sabine River at the Texas-Louisiana border to west side of Galveston Bay	Orange, Jefferson, Chambers, Harris, Galveston, and Brazoria
2	Matagorda Bay	Entire Matagorda Bay system from the Brazoria-Matagorda County line to eastern edge of San Antonio Bay	Matagorda, Jackson, Victoria, and Calhoun
3	Corpus Christi Bay	San Antonio Bay to Baffin Bay	Aransas, Refugio, San Patricio, Nueces, and Kleberg
4	Padre Island	Southern edge of Baffin Bay to the Texas-Mexico border	Kenedy, Willacy, and Cameron

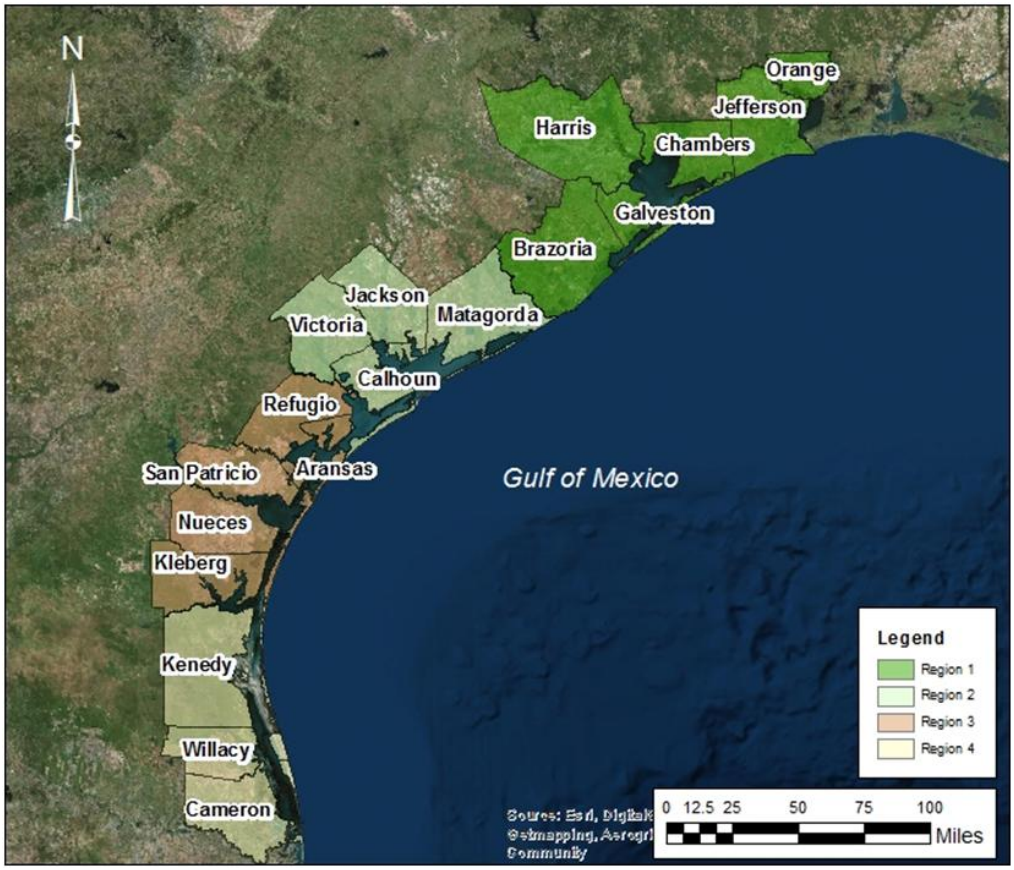

Figure 1. Project Location Map

The Texas coastal zone contains several large cities at risk during storm events including the nation's fourth largest city (Houston). The coastal region is home to approximately 6.1 million people. Mineral production has a value of nearly $1 billion per year and commercial fisheries generate another $156 million. Agriculture in the less populated counties generates approximately $500 million of product per year. The value of goods exported from Texas ports in 2011 was $251 million, more than that from all other states.

This initial plan for this study was prepared in compliance with USACE planning modernization 3x3x3 guidelines. Therefore, a scope was developed for completion of the study that would evaluate the final array of structural and non-structural alternatives in the extensive study area for $3 million.

The USACE Galveston District (SWG) developed an option for completing the study in a manner that has moderate risk and requested an exemption from the 3x3x3 guidelines to complete this study. The recommendation was to pursue a $19.8 million comprehensive assessment of the study area with implementable plans for construction. The exemption request was approved by USACE Headquarters on 30 September 2015. The exemption was approved by ASA(CW) in 10 November 2015 with FCSA execution expected on 16 November 2015. Given the complexity and geographic scale, the feasibility study will be managed as a mega study with additional requirements as described in the MSP.

c. Factors Affecting the Scope and Level of Review. The peer review will focus on:

- Review of the planning process and criteria applied
- Review of the methods of preliminary analysis and design
- Compliance with client, program and NEPA requirements
- Completeness of preliminary design and support documents
- Spot checks for interdisciplinary coordination

The following paragraphs discuss specific factors that will help determine the appropriate scope and level of review.

Based on baseline information on significant environmental resources in the project area and impacts identified to date, it is anticipated that an EIS will be needed to identify and compare the environmental impacts of implementable alternatives.

The project design includes design of hurricane levee systems and development of features along the existing levee systems which are anticipated to require redundancy, resiliency, and/or robustness to prevent failure during storm events. Additionally, there are life safety concerns which must be addressed so the project will likely involve features that could be a concern to human life/safety assurance. At a minimum the safety assurance factors described in EC 1165-2-214 including, but not necessarily limited to, the consequences of non-performance on project economics, the environmental and social well-being (public safety and social justice); residual risk; uncertainty due to climate variability, etc. will need to be addressed in the study with the inclusion of an assessment of life safety by the Galveston District Chief of Engineering on whether there is a significant threat to human life associated with the project (per EC 1165-2-214 Frequently Ask Question 3.j.)

Other factors considered affecting the scope and level of review:

- The project involves no new science and follows an established institutional process. Consequently, the project is not expected to encounter any technical, institutional, or social challenges.
- The Governor of Texas is not requesting a peer review by independent experts.
- The project is expected to cause significant public dispute with regard to its size, nature, or effects.
- The project is expected to cause significant public dispute with regard to its economic or environmental costs and benefits.
- The project design will involve precedent-setting methods, use innovative materials, or change prevailing practices.

d. In-Kind Contributions. Products and analyses provided by non-Federal sponsors as in-kind services are subject to DQC, ATR, and IEPR. The in-kind products and analyses to be provided by the non-Federal sponsor may include: Components of the EIS, economic analysis, and Real Estate Plan as well as technical assistance, public outreach/stakeholder engagement efforts, geotechnical data collection, and structural analyses.

4. DISTRICT QUALITY CONTROL (DQC)

All decision documents (including supporting data, analyses, environmental compliance documents, etc.) shall undergo DQC. DQC is an internal review process of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Management Plan (PMP). The home district shall manage DQC. Documentation of DQC activities is required and should be in accordance with the Quality Manual of the District and the home MSC. There are 2 layers of DQC planned. First layer is made up of senior or subject matter experts who are ATR certified within or outside the home District who are not directly involved in this study. The second layer of DQC is made up of supervisors or section chiefs of the respective disciplines from Galveston District. DQC qualification standards are described in the MSP.

a. Required DQC Level 1 Team Expertise.

DQC Team Members/Disciplines	Expertise Required
DQC Lead	The DQC lead should be a Sub-CoP certified ATR reviewer and a senior professional with extensive experience in preparing Civil Works decision documents and conducting ATR. The lead should also have the necessary skills and experience to lead a virtual team through the DQC process. The DQC lead may also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc).
Planning	The Planning reviewer should be certified by the Plan Formulation Sub-CoP as a senior water resources planner with experience in CSRM and ER studies.
Economics	Economics reviewer should be certified by the Economic Sub-CoP as a senior economist with experience in conducting benefits and costs analyses associated with CSRM projects.
Environmental Resources	The Environmental Resources reviewer should certified by the Environmental Sub-CoP and have a strong background in

	coastal ecosystems, as well as Federal and Texas environmental laws and regulations.
Ecological Modeling	The single-use approval to use the Wetland Value Assessment (WVA) model includes a requirement for an experienced WVA ATR reviewer in a similar coastal area.
Coastal Engineering	Coastal Engineering reviewer should have extensive experience with CSRM and ER projects.
Geotechnical (estuarine and coastal)	The geotechnical engineering reviewer should have experience in CSRM and ER.
Real Estate	The Real Estate (RE) reviewer should have knowledge in reviewing RE Plans for feasibility studies with CSRM and ER features, and be selected from the enterprise level RE CoP list of approved and qualified reviewers.
Cost Engineering/Estimating	The Cost Engineering/Estimating reviewer should be a reviewer with experience in CSRM and ER.
Risk Reviewer	The risk analysis reviewer will be experienced with performing and presenting risk analyses in accordance with ER 1105-2-101 and other related guidance, including familiarity with how information from the various disciplines involved in the analysis interact and affect the results. This review can be combined with either the Economics or H&H reviews.
Hydrology & Hydraulic Engineering	Team member should be an H&H subject matter expert, demonstrate experience in the field of urban and coastal hydrology and hydraulics, and have a thorough understanding of levee systems, the effects of management practices, high impact of urban development on hydrology, the use of levees and floodwalls within the space constraints of an urban environment, the use of non-structural systems as they apply to flood proofing, warning systems, and evacuation, and the use of HEC computer modeling systems. The individual should be a certified professional engineer (PE).
Structural Engineering	Team member should have a thorough understanding of structural measures to include, but not be limited to, retaining walls, pump stations, gate structures, bridges and culverts, utility penetrations, and stoplog and sandbag gaps. The individual should be a certified PE.

b. Documentation of DQC. DQC is the review of basic science and engineering work products focused on fulfilling the project quality requirements. It is managed by the Galveston District and may be conducted by staff within and outside the home district as long as they are not doing the work involved in the study, including contracted work that is being reviewed. Basic quality control tools include a Quality Management Plan (QMP) providing for seamless review, quality checks and reviews, supervisory reviews, Project Delivery Team (PDT) reviews, etc. Additionally, the PDT is responsible for a complete reading of the report to assure the overall integrity of the report, technical appendices and the recommendations before approval by the District Commander. For the Coastal Texas study, non-PDT members and/or supervisory staff will conduct this review for major draft and final products. The Major Subordinate Command (MSC)/District QMP addresses the

conduct and documentation of this fundamental level of review. District Quality Control will be documented using the Dr. Checks review software/website whenever possible.

5. AGENCY TECHNICAL REVIEW (ATR)

ATR is mandatory for all decision documents (including supporting data, analyses, environmental compliance documents, etc.). The objective of ATR is to ensure consistency with established criteria, guidance, procedures, and policy. The ATR will assess whether the analyses presented are technically correct and comply with published USACE guidance, and that the document explains the analyses and results in a reasonably clear manner for the public and decision makers. ATR is managed within USACE by the designated RMO and is conducted by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. ATR teams will be comprised of senior USACE personnel and may be supplemented by outside experts as appropriate per the MSP. The ATR team lead will be from outside the home MSC. ATR qualification standards are described in the MSP.

a. Products to Undergo ATR. The product to undergo ATR will be the Draft Intergrated Feasibility Report and EIS and the Final Intergrated Feasibility Report and EIS . ATR is required for this study and will focus on the following:

(1) Review of the planning process,
(2) Review of the economics analysis,
(3) Review of the engineering analysis,
(4) Review of anticipated environmental impacts and proposed mitigation, and
(5) Completeness of study and support documentation.

Additional ATR of key technical and interim products, milestone documentation, and In-Progress Review (IPR) documentation will also occur throughout the study. Technical products that support subsequent analyses will also be reviewed and include: surveys & mapping, hydrology & hydraulics, geotechnical investigations, economic, environmental, cultural, and social inventories, annual damage and benefit estimates, and cost estimates.

b. Required ATR Team Expertise.

ATR Team Members/Disciplines	Expertise Required
ATR Lead	The ATR lead should be a Sub-CoP certified ATR reviewer and a senior professional with extensive experience in preparing Civil Works decision documents and conducting ATR. The lead should also have the necessary skills and experience to lead a virtual team through the ATR process. The ATR lead may also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc).
Planning	The Planning reviewer should be certified by the Plan Formulation Sub-CoP as a senior water resources planner with experience in CSRM and ER studies.
Economics	Economics reviewer should be certified by the Economic Sub-CoP as a senior economist with experience in conducting benefits and costs analyses associated with CSRM projects.
Environmental Resources	The Environmental Resources reviewer should certified by the Environmental Sub-CoP and have a strong background in

	coastal ecosystems, as well as Federal and Texas environmental laws and regulations.
Ecological Modeling	The single-use approval to use the Wetland Value Assessment (WVA) model includes a requirement for an experienced WVA ATR reviewer in a similar coastal area.
Coastal Engineering	Coastal Engineering reviewer should have extensive experience with CSRM and ER projects.
Geotechnical (estuarine and coastal)	The geotechnical engineering reviewer should have experience in CSRM and ER.
Real Estate	The Real Estate (RE) reviewer should have knowledge in reviewing RE Plans for feasibility studies with CSRM and ER features, and be selected from the enterprise level RE CoP list of approved and qualified reviewers.
Cost Engineering/Estimating	The Cost Engineering / Estimating reviewer should be a reviewer with experience in CSRM and ER.
Risk Reviewer	The risk analysis reviewer will be experienced with performing and presenting risk analyses in accordance with ER 1105-2-101 and other related guidance, including familiarity with how information from the various disciplines involved in the analysis interact and affect the results. This review can be combined with either the Economics or H&H reviews.
Hydrology & Hydraulic Engineering	Team member should be an H&H subject matter expert, demonstrate experience in the field of urban and coastal hydrology and hydraulics, and have a thorough understanding of levee systems, the effects of management practices, high impact of urban development on hydrology, the use of levees and floodwalls within the space constraints of an urban environment, the use of non-structural systems as they apply to flood proofing, warning systems, and evacuation, and the use of HEC computer modeling systems. The individual should be a certified professional engineer (PE).
Structural Engineering	Team member should have a thorough understanding of structural measures to include, but not be limited to, retaining walls, pump stations, gate structures, bridges and culverts, utility penetrations, and stoplog and sandbag gaps. The individual should be a certified PE.

c. Documentation of ATR. DrChecks review software will be used to document all ATR comments, responses and associated resolutions accomplished throughout the review process. Comments should be limited to those that are required to ensure adequacy of the product. The four key parts of a quality review comment will normally include:

(1) The review concern – identify the product's information deficiency or incorrect application of policy, guidance, or procedures;
(2) The basis for the concern – cite the appropriate law, policy, guidance, or procedure that has not be properly followed;

(3) The significance of the concern – indicate the importance of the concern with regard to its potential impact on the plan selection, recommended plan components, efficiency (cost), effectiveness (function/outputs), implementation responsibilities, safety, Federal interest, or public acceptability; and
(4) The probable specific action needed to resolve the concern – identify the action(s) that the reporting officers must take to resolve the concern.

In some situations, especially addressing incomplete or unclear information, comments may seek clarification in order to then assess whether further specific concerns may exist.

The ATR documentation in DrChecks will include the text of each ATR concern, the PDT response, a brief summary of the pertinent points in any discussion, including any vertical team coordination (the vertical team includes the district, RMO, MSC, and HQUSACE), and the agreed upon resolution. If an ATR concern cannot be satisfactorily resolved between the ATR team and the PDT, it will be elevated to the vertical team for further resolution in accordance with the policy issue resolution process described in either ER 1110-1-12 or ER 1105-2-100, Appendix H, as appropriate. Unresolved concerns can be closed in DrChecks with a notation that the concern has been elevated to the vertical team for resolution.

At the conclusion of each ATR effort, the ATR team will prepare a Review Report summarizing the review. Review Reports will be considered an integral part of the ATR documentation and shall:

- Identify the document(s) reviewed and the purpose of the review;
- Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
- Include the charge to the reviewers;
- Describe the nature of their review and their findings and conclusions;
- Identify and summarize each unresolved issue (if any); and
- Include a verbatim copy of each reviewer's comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

ATR may be certified when all ATR concerns are either resolved or referred to the vertical team for resolution and the ATR documentation is complete. The ATR Lead will prepare a Statement of Technical Review certifying that the issues raised by the ATR team have been resolved (or elevated to the vertical team). A Statement of Technical Review should be completed, based on work reviewed to date, for the TSP, draft report, and final report. A sample Statement of Technical Review is included in Attachment 2.

6. INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

IEPR may be required for decision documents under certain circumstances. IEPR is the most independent level of review, and is applied in cases that meet certain criteria where the risk and magnitude of the proposed project are such that a critical examination by a qualified team outside of USACE is warranted. A risk-informed decision, as described in EC 1165-2-214, is made as to whether IEPR is appropriate. IEPR panels will consist of independent, recognized experts from outside of the USACE in the appropriate disciplines, representing a balance of areas of expertise suitable for the review being conducted. There are two types of IEPR:

- Type I IEPR. Type I IEPR reviews are managed outside the USACE and are conducted on project 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. Type I IEPR will cover the entire decision document or action and will address all underlying engineering, economics, and environmental work, not just one aspect of the study. For decision documents where a Type II IEPR (Safety Assurance Review) is anticipated during project implementation, safety assurance shall also be addressed during the Type I IEPR per EC 1165-2-214.

- Type II IEPR. Type II IEPR, or Safety Assurance Review (SAR), are managed outside the USACE and are conducted on design and construction activities for hurricane, storm, and flood risk management projects or other projects where existing and potential hazards pose a significant threat to human life. Type II IEPR panels will conduct reviews of the design and construction activities prior to initiation of physical construction and, until construction activities are completed, periodically thereafter on a regular schedule. The reviews shall consider the adequacy, appropriateness, and acceptability of the design and construction activities in assuring public health safety and welfare.

a. Decision on IEPR. Due consideration was given to Paragraph 15 of EC 1165-2-214 as well as Appendix D of the same EC. The scope of the draft Feasibility Report and study requires a Type I IEPR. Because of public safety concerns associated with CSRM, we anticipate the need for Type II IEPR review during PED as well. Safety Assurance will also be addressed during the Type I IEPR per Paragraph 2.c.(3) of Appendix D of EC 1165-2-214.

b. Mandatory IEPR Triggers. EC 1165-2-214 identifies four mandatory triggers for Type I IEPRs:
- Project is a significant threat to human life.
- Where the estimated total cost of the project, including mitigation costs, is greater than $200 million.
- Where the Governor of an affected State requests a peer review by independent experts.
- Where the Director of Civil Works (DCW) or the Chief of Engineers (CE) determines that the project study is controversial due to significant public dispute over either the size, nature, or effects of the project or the economic or environmental costs or benefits of the project.

c. Products to Undergo Type I IEPR. IEPR will be conducted for the Draft Integrated Feasibility Report and Environmental Impact Statement and supporting documentation.

d. Required Type I IEPR Panel Expertise. At minimum, the panel should include the necessary expertise to assess the engineering, environmental, and economic adequacy of the decision document as required by EC 1165-2-214, Appendix D. The PDT has made an initial assessment of what expertise is needed based on the PMP and the factors affecting the scope and level of review outlined in the review plan. It is expected that coordination with the PCX and the Outside Eligible Organization (OEO) will determine the final participants on the panel.

IEPR Panel Members/Disciplines	Expertise Required
Civil Works Planner	minimum of 10 years of demonstrated experience in public works planning with a Masters degree in a related field. The reviewer should be very familiar with USACE civil works planning policies, methodologies and procedures.
Economics	The Economics Panel Member should have experience in water resource economic evaluation or review, working directly for or with USACE, and have experience with CSRM. The reviewer should also have experience reviewing federal water resource economic documents justifying construction efforts, an understanding of social well-being and regional economic development, and an understanding of traditional natural economic development benefits.
Environmental (Ecology)	The Ecology Panel Member should have experience in describing and evaluating the complex relationships and dynamics of coastal ecosystems and experience assessing the consequences of altering environmental conditions.
Environmental (NEPA Impact Assessment)	The NEPA Impact Assessment Panel Member should have experience in evaluating and conducting NEPA impact assessments, conducting cumulative effects analyses, as well as experience with complex multi-objective public. The reviewer should work projects with competing trade-offs and have experience in determining the scope and appropriate methodologies for impact assessment and analyses for a variety of projects with high public and interagency interest. The reviewer should also have experience determining the scope and appropriate methodologies for impact assessment and analyses for projects having impacts to nearby sensitive habitats.
Coastal Engineering	The coastal engineering reviewer should have extensive experience in estuarine systems and be familiar with USACE applications of standard USACE hydrologic and hydraulic computer models.
Geotechnical (estuarine and coastal)	The geotechnical (estuarine and coastal) engineering reviewer should have geotechnical studies and design of flood control works including channel modifications, an understanding of traditional natural economic development benefits, and be familiar with geotechnical practices used in Texas site investigation planning and implementation including modification of channels, minimizing environmental impacts, coastal processes, and geomorphology.

e. Documentation of Type I IEPR. The IEPR panel will be selected and managed by an Outside Eligible Organization (OEO) per EC 1165-2-214, Appendix D. Panel comments will be compiled by the OEO and should address the adequacy and acceptability of the economic, engineering and environmental methods, models, and analyses used. IEPR comments should generally include the same four key

parts as described for ATR comments in Section 4.d above. The OEO will prepare a final Review Report that will accompany the publication of the final decision document and shall:

- Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
- Include the charge to the reviewers;
- Describe the nature of their review and their findings and conclusions; and
- Include a verbatim copy of each reviewer's comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

The final Review Report will be submitted by the OEO no later than 60 days following the close of the public comment period for the draft decision document. USACE shall consider all recommendations contained in the Review Report and prepare a written response for all recommendations adopted or not adopted. The final decision document will summarize the Review Report and USACE response. The Review Report and USACE response will be made available to the public, including through electronic means on the internet.

If IEPR of interim products are performed, these reviews should be documented in interim Review Reports. The interim Review Reports will be incorporated into the final Review Report. The official USACE response to the IEPR panel recommendations will be provided to the final Review Report only. Initial responses to IEPR panel recommendations will be developed and documented by the PDT and provided to the vertical team for consideration in developing the official USACE response. The use of DrChecks to document the IEPR comments and initial District responses is not required, but its use may be negotiated with the OEO.

7. POLICY AND LEGAL COMPLIANCE REVIEW

All decision documents will be reviewed throughout the study process for their compliance with law and policy. Guidance for policy and legal compliance reviews is addressed in Appendix H, ER 1105-2-100. These reviews culminate in determinations that the recommendations in the reports 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. DQC and ATR augment and complement the policy review processes by addressing compliance with pertinent published Army policies, particularly policies on analytical methods and the presentation of findings in decision documents.

8. COST ENGINEERING DIRECTORY OF EXPERTISE (DX) REVIEW AND CERTIFICATION

All decision documents shall be coordinated with the Cost Engineering DX, located in the Walla Walla District. The DX will assist in determining the expertise needed on the ATR team and Type I IEPR team (if required) and in the development of the review charge(s). The DX will also provide the Cost Engineering DX certification. The RMO is responsible for coordination with the Cost Engineering DX.

9. MODEL CERTIFICATION AND 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, for the purposes of the EC, are defined as any models and analytical tools that planners use 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 the planning product. 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 (if required).

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 and the professional practice of documenting the application of the software and modeling results will be followed. As part of the USACE Scientific and Engineering Technology (SET) Initiative, many engineering models have been identified as preferred or acceptable for use on Corps studies and these models should be used whenever 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 (if required).

a. Planning Models. The following planning models are anticipated to be used in the development of the decision document:

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Certification / Approval Status
Existing approved species Habitat Suitability Index (HSI) models (e.g. red drum, brown/white shrimp, etc.), the Oyster Habitat Suitability Index Model, or other appropriate model certified/approved by the Ecosystem PCX	The PDT will use the species HSI models to quantify impacts and mitigation and or ecosystem restoration benefits for the focused array of alternatives.	Red Drum HSI (approved); White/Brown Shrimp HSI (approved); Oyster Habitat Suitability Index Model (approved)
HEC-FDA 1.4	Performs an integrated hydrologic engineering and economic analysis during the formulation and evaluation of flood risk management plans. Utilizes risk analysis procedures for formulating and evaluating flood risk management measures (EM 1110-2-1619, ER 1105-2-101) and also assists in analyzing the economics of flood risk management projects. HEC-FDA will be utilized by the PDT to identify the TSP and to to calculate damages and benefits for residential and non-residential structures, their contents, and vehicles.	Certified
HEC-FIA 3.0	Analyzes flood event consequences calculates damages to structures and contents, losses to agriculture, and estimates	not a Corps certified model but accepted for use

	the potential for life loss. The PDT will use HEC-FIA to screen down to the final array of alternatives in conjuction with ADCIRC to determine height of surge flooding and Census data derived from HAZUS MH 2.1. HEC-FIA will also be used to estimate the potential for life loss.	
RECONS	Regional economic impact modeling tool developed to provide estimates of regional economic impacts associated with USACE spending. It is the only USACE certified Regional Economic Development (RED) model for agency wide use. The PDT will utiize this model to quantify potential secondary benefits.	Approved for use
Beach FX 1.1.6	Beach-*fx* evaluates the physical performance and economic benefits and costs of shore protection projects in a life cycle framework. It will be utilized for any damageable elements that may be impacted by erosion, inundation, and wave attack.	Approved for use

b. Engineering Models. The following engineering models are anticipated to be used in the development of the decision document:

Model Name and Version	**Brief Description of the Model and How It Will Be Applied in the Study**	**Approval Status**
Mii - cost estimating models	Cost Engineering's model for developing cost.	Cost Engineering Approved Model
Crystal Ball Risk Based Analysis	Cost Engineering's model for determining risk in cost estimating.	Cost Engineering Approved Model
ADCIRC	System of computer programs used for prediction of storm surge and flooding	
CMS-Wave	Spectral wave transformation numerical model, part of Coastal Modeling System (CMS)	
STWAVE	Steady State spectral WAVE, half-plane model for nearshore wind-wave growth and propagation	
HEC-RAS v4.1	Performs one-dimensional hydraulic calculations for a full network of natural and constructed channels	
HEC-HMS v3.5	Simulates the complete hydrologic processes of dendritic watershed systems	

10. REVIEW SCHEDULES AND COSTS

a. ATR Schedule and Cost. The estimated cost for ATR is $184,000 including the participation of the ATR Lead in milestone conferences and the Agency Decision Milestone (ADM) meeting to address the ATR process and any significant and/or unresolved ATR concerns. Focussed technical reviews on

read-aheads involving, at a minimum, the ATR lead, as well as economics, environmental, and coastal engineering reviewers will occur prior to the TSP milestone. The future ATR will require identification of a review team. Additional review standards and deliverables are described in the MSP.

Estimated schedule for ATR of the draft Integrated Feasibility Report and EIS

ATR Review of Draft Reports	June/July 2018
Public Review of Draft Reports	June/July 2018
ATR Certification of Draft Reports	August 2018
ATR Certification of Final Reports	July/August 2020

b. Type I IEPR Schedule and Cost. The cost for IEPR is estimated to be $400,000. The PCX for Coastal Storm Damage Reduction will identify someone independent from the PDT to scope the IEPR and develop an Independent Government Estimate. The Galveston District will provide funding to the IEPR panel. IEPR will be conducted prior to the Civil Works Review Board/Agency Decision Milestone.

TASK	Date
IEPR Initiation	June 2018
IEPR Certification	August 2018
IEPR backcheck/followup Initiation	July 2020
IEPR backcheck/followup Certification	August 2020
Chief of Engineer's IEPR Summary Report	November 2020

c. Model Certification/Approval Schedule and Cost. All models anticipated to be used are already approved or certified.

11. PUBLIC PARTICIPATION

The Texas GLO has developed an overview of issues affecting the Texas coast, entitled "The Texas Coast: Shoring Up Our Future". This document identifies the issues of concern as wetland/habitat loss, water quality and quantity, impact to fish and wildlife, impact to marine resources, Gulf beach/dune erosion, bay shoreline erosion, flooding and storm surge, tourism/local economy, along with other less significant issues. This publication was used as a starting point in identifying problems and opportunities along the entire Texas coast.

Additionally, a series of scoping meetings were held along the upper Texas coast as a part of the Sabine Pass to Galveston Bay feasibility study. Meetings were held in Seabrook, Beaumont, Freeport, and Galveston in February and March 2012 to gather ideas for CSRM and ER opportunities in Region 1 of the study area. The information collected at these meetings is also being used in this feasibility study.

During the reconnaissance study, separate scoping meetings were held in Palacios, Corpus Christi, and South Padre Island in August 2014 to collect similar information for the remainder of the Texas coast. These meetings requested input from the counties identified in Regions 2, 3, and 4 of the study area. An additional meeting was held in the League City to update the public in Region 1 to the activities for this reconnaissance study. Additional scoping efforts will be undertaken to verify the opportunities previously identified and identify an additional opportunities that have not been included in the previous scoping activities.

It is anticipated that the public will not be asked to nominate potential peer reviewers. Public participation will also include public meetings to present the draft integrated report and a public review and comment period for the Draft Integrated Feasibility Report and EIS. Significant public comments will be provided to the reviewers prior to certification. The comments received during the public review of the draft report and their responses will be included in the final Integrated Feasibility Report and EIS. A public review will also be held on the final report.

12. REVIEW PLAN APPROVAL AND UPDATES

The Southwestern Division Commander is responsible for approving this Review Plan. The Commander's approval reflects vertical team input (involving district, MSC, RMO, and HQUSACE members) as to the appropriate scope and level of review for the decision document as modified by the MSP. Like the PMP, the Review Plan is a living document and may change as the study progresses and the MSP is finalized. The home district is responsible for keeping the Review Plan up to date. Minor changes to the review plan since the last MSC Commander approval are documented in Attachment 3. Significant changes to the Review Plan (such as changes to the scope and/or level of review) should be re-approved by the MSC Commander following the process used for initially approving the plan. The latest version of the Review Plan, along with the Commanders' approval memorandum, should be posted on the Home District's webpage. The latest Review Plan should also be provided to the RMO and home MSC.

13. REVIEW PLAN POINTS OF CONTACT

Public questions and/or comments on this review plan can be directed to the following points of contact:

- Mr. Travis Creel, Planning contact at (504) 862-1071or travis.j.creel@usace.army.mil
- Mr. Saji Varghese, Southwestern Division at (469) 487-7069 or saji.varghese@usace.army.mil
- Mr. Larry Cocchieri, Deputy Director, PCX-CSRM at (347) 370-4571 or lawrence.j.cocchieri@usace.army.mil
- Mr. Greg Miller, Operational Director, PCX-ECO at 540-862-2310 or gregory.b.miller@usace.army.mil

ATTACHMENT 1: TEAM ROSTERS (Removed Prior to Posting on Webpage)

ATTACHMENT 2: SAMPLE STATEMENT OF TECHNICAL REVIEW FOR DECISION DOCUMENTS

COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the *<type of product>* for *<project name and location>*. The ATR was conducted as defined in the project's Review Plan to comply with the requirements of EC 1165-2-214. During the ATR, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions, methods, procedures, and material used in analyses, alternatives evaluated, the appropriateness of data used and level obtained, and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing US Army Corps of Engineers policy. The ATR also assessed the District Quality Control (DQC) documentation and made the determination that the DQC activities employed appear to be appropriate and effective. All comments resulting from the ATR have been resolved and the comments have been closed in DrChecks[sm].

SIGNATURE _____ _____

Name Date
ATR Team Leader
Office Symbol/Company

SIGNATURE _____ _____

Name Date
Project Manager
Office Symbol

SIGNATURE _____ _____

Name Date
Architect Engineer Project Manager[1]
Company, location

SIGNATURE _____ _____

Name Date
Review Management Office Representative
Office Symbol

CERTIFICATION OF AGENCY TECHNICAL REVIEW

Significant concerns and the explanation of the resolution are as follows: *Describe the major technical concerns and their resolution.*

As noted above, all concerns resulting from the ATR of the project have been fully resolved.

SIGNATURE _____ _____

Name Date
Chief, Engineering Division
Office Symbol

SIGNATURE _____ _____

Name Date
Chief, Planning Division
Office Symbol

[1] Only needed if some portion of the ATR was contracted

ATTACHMENT 3: REVIEW PLAN REVISIONS

Revision Date	Description of Change	Page / Paragraph Number

9

ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS

Term	Definition	Term	Definition
AFB	Alternative Formulation Briefing	NED	National Economic Development
ASA(CW)	Assistant Secretary of the Army for Civil Works	NER	National Ecosystem Restoration
ATR	Agency Technical Review	NEPA	National Environmental Policy Act
CSRM	Coastal Storm Risk Management	O&M	Operation and maintenance
DPR	Detailed Project Report	OMB	Office and Management and Budget
DQC	District Quality Control/Quality Assurance	OMRR&R	Operation, Maintenance, Repair, Replacement and Rehabilitation
DX	Directory of Expertise	OEO	Outside Eligible Organization
EA	Environmental Assessment	OSE	Other Social Effects
EC	Engineer Circular	PCX	Planning Center of Expertise
EIS	Environmental Impact Statement	PDT	Project Delivery Team
EO	Executive Order	PAC	Post Authorization Change
ER	Ecosystem Restoration	PMP	Project Management Plan
FDR	Flood Damage Reduction	PL	Public Law
FEMA	Federal Emergency Management Agency	QMP	Quality Management Plan
FRM	Flood Risk Management	QA	Quality Assurance
FSM	Feasibility Scoping Meeting	QC	Quality Control
GRR	General Reevaluation Report	RED	Regional Economic Development
Home District/MSC	The District or MSC responsible for the preparation of the decision document	RMC	Risk Management Center
HQUSACE	Headquarters, U.S. Army Corps of Engineers	RMO	Review Management Organization
IEPR	Independent External Peer Review	RTS	Regional Technical Specialist
ITR	Independent Technical Review	SAR	Safety Assurance Review
LRR	Limited Reevaluation Report	USACE	U.S. Army Corps of Engineers
MSC	Major Subordinate Command	WRDA	Water Resources Development Act