



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

CENAD-PD-PP

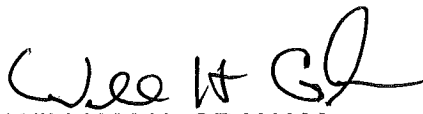
OCT 3 2016

MEMORANDUM FOR Commander, Norfolk District, Fort Norfolk 893 Front Street  
Norfolk, VA 23510-1011

SUBJECT: Review Plan Approval for City of Norfolk Coastal Storm Risk Management  
Feasibility Study

1. Reference Memorandum, CENAO-EX, 22 September 2016, subject as above.
2. The Coastal Storm Risk Management Planning Center of Expertise of the North Atlantic Division 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 Management Business Process. Subsequent revisions to this Review Plan or its execution require new written approval from the NAD Commander.
4. The point of contact is Mr. Larry Cocchieri, NAD Planning Program Manager, at 347-370-4571 or Lawrence.J.Cocchieri@usace.army.mil.

Encl

  
WILLIAM H. GRAHAM  
Brigadier General, USA  
Commanding



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

CENAO-EX

SEP 22 2016

MEMORANDUM FOR Commander, North Atlantic Division, (CENAD-PD-CS/  
Mr. Ricciardi), Fort Hamilton Military Community, 302 General Lee Avenue,  
Brooklyn, NY 11252-6700

Subject: City of Norfolk Virginia Coastal Storm Risk Management Feasibility Study  
(P2 No. 397427) Study Review Plan

1. References:

- a. EC 1165-2-214 Civil Works Review, 15 Dec 12
- b. ECB 2016-9 Civil Works Review, 4 Mar 16


2. The City of Norfolk Coastal Storm Risk Management (CSRM) Feasibility Study requires a study review plan. The National Planning Center for Coastal Storm Risk Management has reviewed and endorsed the enclosed review plan, including updates.

3. The subject study is funded for the first year of study and no additional funds will be required until fiscal year 2017.

4. The Norfolk District requests review and approval of the study review plan dated 15 Sep 16.

5. If you have any questions regarding the feasibility study or the project review plan, please contact Doug Stamper, Project Manager, at [douglas.h.stamper@usace.army.mil](mailto:douglas.h.stamper@usace.army.mil) or (757) 201-7861.

Encl

  
JASON E. KELLY, PMP  
Colonel, EN  
Commanding

## **REVIEW PLAN**

**City of Norfolk Coastal Storm Risk Management Feasibility Study  
North Atlantic Coast Comprehensive Study Focus Area**

**Norfolk District**

**MSC Approval Date: Pending  
Last Revision Date: 15 September 2016**



**US Army Corps  
of Engineers ®**

**REVIEW PLAN**

**City of Norfolk Coastal Storm Risk Management, Virginia  
Feasibility Study**

**TABLE OF CONTENTS**

1. PURPOSE AND REQUIREMENTS .....3  
2. REVIEW MANAGEMENT ORGANIZATION COORDINATION.....3  
3. STUDY INFORMATION .....3  
4. DISTRICT QUALITY CONTROL.....6  
5. AGENCY TECHNICAL REVIEW.....6  
6. INDEPENDENT EXTERNAL PEER REVIEW .....9  
7. POLICY AND LEGAL COMPLIANCE REVIEW.....12  
8. COST ENGINEERING REVIEW .....12  
9. MODEL CERTIFICATION AND APPROVAL.....12  
10. REVIEW SCHEDULES AND COSTS.....14  
11. PUBLIC PARTICIPATION .....14  
12. REVIEW PLAN APPROVAL AND UPDATES .....14  
13. REVIEW PLAN POINTS OF CONTACT.....15  
ATTACHMENT 1: TEAM ROSTERS .....16  
ATTACHMENT 2: STATEMENT OF TECHNICAL REVIEW FOR DECISION DOCUMENTS.....18  
ATTACHMENT 3: REVIEW PLAN REVISIONS .....19  
ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS.....20

## 1. PURPOSE AND REQUIREMENTS

a. **Purpose.** This plan defines the scope and level of peer review for the Norfolk Coastal Storm Risk Management feasibility report.

### b. References

- (1) Engineer 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) Engineer 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) Project Management Plan (PMP) for study, under development
- (6) District Quality Control (DQC) Review of Civil Works Products, Standard Operating Procedures U.S. Army Corps of Engineers Norfolk District, Feb 2016
- (7) North Atlantic Coastal Program Focus Area Investigations Program Management Plan, U.S. Army Corps of Engineers National Planning Center for Coastal Storm Risk Management, 5 Feb 2016

c. **Requirements.** This plan was developed under EC 1165-2-214, which establishes an accountable, comprehensive, life-cycle review strategy for Civil Works products. It provides 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: DQC /Quality Assurance, Agency Technical Review (ATR), Independent External Peer Review (IEPR), and Policy and Legal Compliance Review. In addition to these reviews, 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 COORDINATION

The Review Management Organization (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 the National Planning Center for Coastal Storm Risk Management (CSRMC-PCX).

The RMO will coordinate with the Civil Works Engineering and Agency Technical Review Mandatory Center of Expertise (MCX) to ensure the appropriate expertise is included on the review teams to assess the adequacy of cost estimates, construction schedules and contingencies.

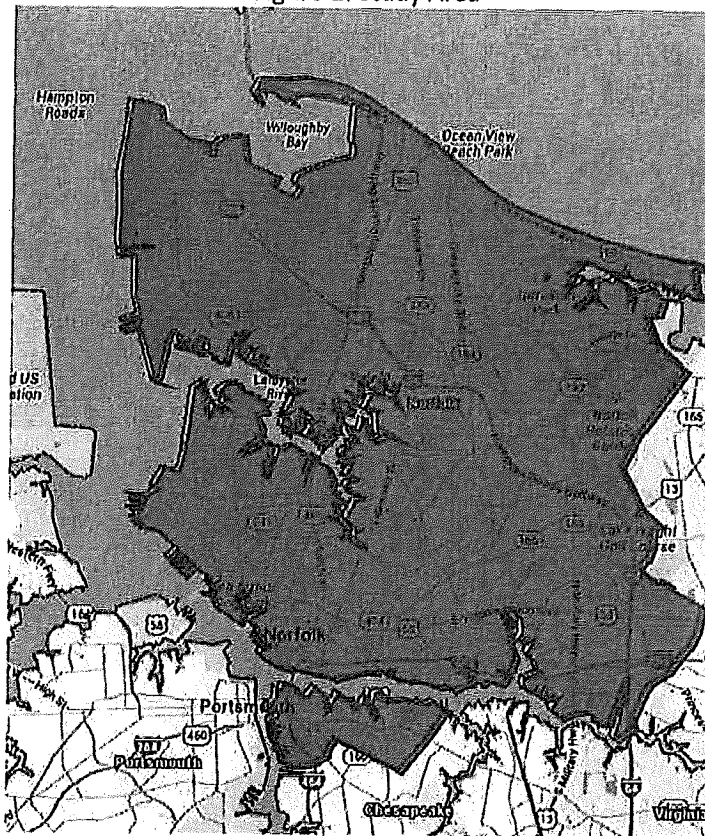
## 3. STUDY INFORMATION

a. **Decision Document.** A feasibility report will be prepared for the City of Norfolk, VA Coastal Storm Risk Management Study. The feasibility report will be submitted to the U.S. Army Corps of Engineers (USACE) Headquarters and ultimately to the Chief of Engineers for final approval and recommendation for authorization by Congress. At this time, it is expected that a programmatic

Environmental Impact Statement (EIS) will be prepared in conjunction with the feasibility report in order to meet the requirements of the National Environmental Policy Act (NEPA).

- b. **Study/Project Description.** Historical storms including Hurricane Sandy have impacted the city of Norfolk. In response to the storm, USACE is investigating solutions that will reduce future coastal storm risk in ways that support the long-term resilience and sustainability of the coastal ecosystem and surrounding communities, and reduce the economic costs and risks associated with large-scale flood and storm events. In support of this goal, USACE completed the North Atlantic Coast Comprehensive Study (NACCS) which identified nine high risk areas on the Atlantic coast for an in-depth analysis based on preliminary analyses. Norfolk has been identified as one of these nine areas of high risk, or Focus Areas, that warrants an in-depth investigation into potential coastal storm risk management solutions. The Norfolk Focus Area is located on the Chesapeake Bay, a location that has been identified as one of the highest risk areas for relative sea level rise in the country (Figure 1).

Figure 1. Study Area



The City of Norfolk, VA, Coastal Storm Risk Management Study is a comprehensive investigation of coastal storm risk management problems and solutions in the city of Norfolk. The study will consider past, current, and future coastal storm risk management and resilience planning initiatives and projects underway by the non-federal sponsor, the city of Norfolk, USACE, and other Federal, State, and local agencies. This study was authorized by Resolution of the Senate Committee on Environment and Public Works dated July 25, 2012.

*“Resolved by the Committee on Environment and Public Works of the United States Senate, That the Secretary of the Army is requested to review the report of the Chief of Engineers on beach erosion and hurricane protection for Norfolk, VA, dated April 17, 1984, and other pertinent reports, to include existing flood risk management studies and engineering reports to determine whether any modifications of the recommendations contained therein are advisable in the interest of flood damage reduction in the vicinity of Norfolk, VA.”*

**c. Factors Affecting the Scope and Level of Review.**

- The study is not expected to be challenging other than the fact that a large study area will likely result in a large array of different project alternatives which are expected to vary across different areas of the city. The city of Norfolk is bordered by the Chesapeake Bay to the North and the Elizabeth River to the west and there are other additional smaller creeks and bodies of water within the city limits, which leads to varying coastal risk across the city. A holistic/systems approach will be used to mesh various measures into one cohesive and comprehensive plan, but it is likely that this will be accomplished only after technical and political challenges are met;
- The city of Norfolk has been identified as one of the most vulnerable communities on the Atlantic coast to the effects of relative sea level rise, the combined effect of land subsidence and sea level rise. Per Engineer Regulation 1100-2-8162, Incorporating Sea Level Change in Civil Works Programs, USACE evaluates three sea level rise scenarios as part of the planning process and there are additional relative sea level rise estimates that have been completed by various academic institutions and government agencies available for the study area, but there is no single, projection of relative sea level rise that can be used to guarantee a coastal storm risk management project will remain effective throughout the entire 50 year period of analysis. As a result, the recommended project must be adaptable in order to remain effective throughout the period of analysis;
- Implementation of a coastal storm risk management project could potentially reduce flood related risks to human life/safety; however, the recommended project will be selected based on economic analysis in combination with other considerations such as whether the project is acceptable, engineeringly feasible, and complete. The overall study will focus on coastal storm risk management measures along with comprehensive solutions across multiple disciplines including, but not limited to, relocation, fortification, living shorelines, natural and nature based infrastructure, beach nourishment, bulkheads, storm surge barriers and hardened structures. Non-performance or design exceedance of these measures may result in risks to life safety;
- There has not been a request by the Governor of Virginia for a peer review by independent experts;
- The project is not expected to involve significant public dispute as to the size, nature, or effects of the project. The city of Norfolk, its residents, and stakeholders recognize the need for the study as a way to address the coastal flooding that has been affecting the city more significantly every year and thus support the study and are anticipating the recommended project;
- The project is not expected to involve significant public dispute as to the economic or environmental costs and benefits of the project. The city of Norfolk, its residents, and stakeholders recognize the need for the study as a way to address the coastal flooding that has been affecting the city more significantly every year and thus support the study and are anticipating the recommended project;
- The information in the decision document or anticipated project design is not likely to be based on novel methods, involve the use of 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; and

- At this early stage, it is unknown to what degree the project design will require redundancy, resiliency, robustness, unique construction sequencing, and/or a reduced or overlapping design construction schedule.

- 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 include: participation by the city of Norfolk's resilience office on the project delivery team (PDT), GIS analysis and support, and additional team members to cover areas of expertise not present at the Norfolk District, such as landscape architect and urban planner. Other analysis and products may be provided as in-kind services, but they have not been identified at this early point in the study.

#### 4. DISTRICT QUALITY CONTROL

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 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. Documentation of completed DQC should be provided to the MSC, PCX and ATR Team leader prior to initiating ATR.

- a. **Documentation of DQC.** Per District Quality Control Review of Civil Works Products, Standard Operating Procedures U.S. Army Corps of Engineers Norfolk District, Feb 2016, DQC comments will be documented using ProjNet DrChecks and will be included in a final DQC report.
- b. **Products to Undergo DQC.** DQC will be performed for the Draft Feasibility Report (including NEPA and supporting documentation) and the Final Feasibility Report (including NEPA and supporting documentation). Additional DQC of key technical and interim products may occur depending on the study needs. These products include: surveys and mapping, hydrology and hydraulics, geotechnical work, economic, environmental, cultural, and social inventories, annual damages and benefits estimates, cost estimates, etc.
- c. **Required DQC Expertise.** The DQC team will mirror the disciplines of the PDT.

#### 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, which will be the CSR-M-PCX and the NACFA Command Center, 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 certified senior USACE personnel and may be supplemented by outside experts as appropriate. The ATR team lead has been identified to be located at



the NACFA Command Center. This is an exception to the policy described in EC 1165-2-214 that requires the ATR lead shall be from outside of the home MSC, which has USACE concurrence.

- a. **Products to Undergo ATR.** ATR will be performed for the Draft Feasibility Report (including NEPA and supporting documentation) and the Final Feasibility Report (including NEPA and supporting documentation). Additional ATR of key technical and interim products may occur depending on the study needs and the requirements of the vertical team. These products include: surveys and mapping, hydrology and hydraulics, geotechnical work, economic, environmental, cultural, and social inventories, annual damages and benefits estimates, cost estimates, etc.
- b. **Required ATR Team Expertise.** It is estimated that the ATR team should consist of eleven reviewers from disciplines that mirror those of the study PDT. It will be important that the reviewers have experience with coastal storm risk management and flood risk management studies. The initial assessment of what expertise is needed was based on the PMP and the factors affecting the scope and level of review outlined in Section 3 of this review plan. The CSRM-PCX, in cooperation with the PDT, vertical team, and other appropriate centers of expertise, will determine the final make-up of the ATR team. The ATR lead will follow the requirements outlined in the "ATR Lead Checklist" developed by the RMO. In addition to the ATR team, the USACE Climate Preparedness and Resilience Community of Practice would be consulted and participate in review of the tentatively selected plan. Further, external peer review from an interrelated subject matter expert would also be consulted and participate in the review of the tentatively selected plan. The following table lists the disciplines needed.

ATR Team Members/Disciplines	Expertise Required
ATR Lead	The ATR Lead should be a senior planning professional with extensive experience preparing Civil Works decision documents and conducting ATR. The lead should 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).
Plan Formulation	The Planning reviewer should be a senior water resources planner with experience in the formulation aspect of CSRM and FRM studies.
Economics	The Economics reviewer should be a senior level economist with experience in evaluating the benefits and costs associated with a CSRM study, including the use of HEC-FDA and BeachFX.
Environmental Resources	The Environmental Resources reviewer should be a senior scientist with experience in ecosystem restoration opportunities associated with CSRM studies, especially tidal wetland enhancement. They should also have expertise in NEPA compliance.
Cultural Resources	The Cultural Resources reviewer should be a senior archaeologist.
Hydraulic/Hydrologic Engineering	The Hydraulic/Hydrologic Engineering reviewer should be an expert in the field of hydraulics and hydrology and have a thorough understanding and knowledge of the development of

	flow and stage frequency curves, open channel dynamics, enclosed channel systems, application of detention/retention basins, application of levees and flood walls, interior drainage, nonstructural solutions involving flood warning systems and flood proofing, etc. and/or computer modeling techniques that will be used such as HEC-RAS and HEC-HMS.
Coastal Engineering	The Coastal Engineering reviewer should be a senior engineer with experience with coastal storm risk management investigations and projects. The coastal engineer should also be an expert in the field of coastal storm modeling, specifically SBEACH, STWAVE, and ADCIRC.
Risk Analysis	The risk analysis reviewer will be experience 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.
Geotechnical Engineering	The Geotechnical Engineering reviewer should be a senior geotechnical engineer familiar with the geotechnical requirements of structural and nonstructural CSRM measures.
Civil Engineering	The Civil Engineering reviewer should be a senior civil engineer familiar with structural and nonstructural CSRM measures.
Cost Engineering	The Cost Engineering reviewer should be a senior cost engineer. This position may need to be filled by a cost engineer from the MCX.
Real Estate	The Real Estate reviewer should be an expert in real estate acquisition and appraisals.
International Coastal Engineer	All focus area feasibility study investigations will include an internal coast engineer participating as an external peer reviewer.

c. **Documentation of ATR.** ProjNet 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 been 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 to then assess whether further specific concerns may exist. The ATR documentation in ProjNet 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 1165-2-214, ER 1110-1-12 or ER 1105-2-100, Appendix H, as appropriate. Unresolved concerns can be closed in ProjNet 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 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 AFB, draft report, and final report. A sample Statement of Technical Review is included in Attachment 2.

## **6. INDEPENDENT EXTERNAL PEER REVIEW**

Independent External Peer Review (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.**

- The decision document meets the mandatory triggers for Type I IEPR described in Paragraph 11.d.(1) and Appendix D of EC 1165-2-214; and also is appropriate considering the following factors apply to this study:
  - the consequences of non-performance on project economics, the environmental and social well-being (public safety and social justice);
  - whether the product is likely to contain influential scientific information or highly influential scientific assessment; and
- The proposed project does not meet the criteria for conducting Type II IEPR described in Paragraph 2 of Appendix D of EC 1165-2-214 and Safety Assurance will be addressed during the Type I IEPR per Paragraph 2.c.(3) of Appendix D of EC 1165-2-214.

**b. Products to Undergo Type I IEPR.** Type I IEPR should be performed for the entire decision document (including supporting documentation) at the draft report stage. The IEPR should be coordinated in the beginning phase of the study. Safety Assurance will be addressed during the Type I IEPR.

**c. Required Type I IEPR Panel Expertise.** The IEPR panel will 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 table below lists the suggested disciplines.

IEPR Panel Member Disciplines	Expertise Required
Plan Formulation	The Panel Member should be from academia, a public agency, a non-governmental entity, or an Architect-Engineer or Consulting Firm with a minimum of 10 years demonstrated experience in public works planning with a Master's Degree in a relevant field. Direct experience working for or with USACE is highly preferred but not required. The panel member shall have a minimum of five years' experience directly dealing with the USACE six-step planning process, which is governed by ER 1105-2-100, Planning Guidance Notebook. Panel Member must be very familiar with USACE plan formulation process, procedures, and standards as it relates to hurricane and coastal storm risk management projects.
Economics	The panel member should be from academia, a public agency, a non-governmental entity, or an Architect-Engineer or

	<p>Consulting Firm with a minimum of 10 years demonstrated experience in public works planning, with a minimum MS degree or higher in economics. Five years' experience related to the use of HEC-FDA software is required. Familiarity with BeachFX software is desired. Two years' experience in reviewing federal water resource economic documents justifying construction efforts is required. In addition, the panel member should have experience related to regional economic development, and be capable of evaluating traditional National Economic Development plan benefits associated with hurricane and coastal storm risk management projects.</p>
Biology/Ecology	<p>The panel member should be a scientist from academia, a public agency, a non-governmental entity, or an Architect-Engineer or Consulting Firm with a minimum 10 years demonstrated experience in evaluation and conducting National Environmental Policy Act (NEPA) impact assessments, including cumulative effects analyses. The panel member should also be familiar with all NEPA Environmental Assessment requirements as well as have experience with the Endangered Species Act, essential fish habitat, and the Marine Mammals Protection Act. The panel member should have particular knowledge of construction impacts on marine and terrestrial ecology of coastal regions of the mid-Atlantic coast of North America. The panel member should have a minimum of a Master's Degree or higher in an appropriate field of study. Active participation in related professional societies is encouraged.</p>
Coastal Engineering	<p>The panel member should be a registered professional engineer with a minimum of 10 years' experience in coastal and hydraulic engineering, or a professor from academia with extensive background in coastal processes and hydraulic theory and practice, with a minimum Master's Degree or higher in engineering. Active participation in related professional societies is encouraged. The panel member should be familiar with USACE application of risk and uncertainty analyses in hurricane and coastal storm risk management projects. The panel member should also be familiar with standard USACE coastal, hydrologic, hydraulic computer models. In addition, familiarity with the SBEACH, GENESIS, STWAVE, and ADCIRC computer applications/model is desired. The panel member should be capable of addressing the USACE Safety Assurance Review (SAR) requirements.</p>

- d. **Documentation of Type I IEPR.** The IEPR panel will be selected and managed by an 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 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 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.

## **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 REVIEW AND CERTIFICATION**

All decision documents shall be coordinated with the Cost Engineering Mandatory Center of Expertise (MCX), located in the Walla Walla District. The MCX 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 MCX will also provide the Cost Engineering MCX certification. The RMO is responsible for coordination with the Cost Engineering MCX.

## **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 USACE 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 Model Description and How It Will Be Used in the Study	Certification / Approval Status
Beach-fx, version 1.1.6	Beach-fx is a new analytical framework for evaluating the physical performance and economic benefits and costs of shore stabilization 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.	Certified
HEC-FDA, version 1.4	HEC-FDA will be used to calculate flood damages associated with residential and non-residential structures, their contents, and vehicles. HEC-FDA performs an integrated hydraulic engineering and economic analysis during the formulation and evaluation of flood risk management alternative plans (EM 1110-2-1619, ER 1105-2-101).	Certified

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

Model Name and Version	Brief Model Description and How It Will Be Used in the Study	Approval Status
MII	MII is the second generation of the Micro-Computer Aided Cost Estimating System. It is a detailed cost estimating software application.	Cost Engineering Approved
Crystal Ball	Per ECB No. 2007-17, cost risk analysis methods will be used for the development of contingency for the total project cost estimate. Crystal Ball software is approved for use to conduct the total project cost and schedule risk analysis	Cost Engineering Approved
ADCIRC	System of computer programs used for prediction of storm surge and flooding.	EN CoP Approved
STWAVE	Steady state spectral WAVE, half-plane model for nearshore wind-wave growth and propagation	EN CoP Approved

## 10. REVIEW SCHEDULES AND COSTS

- a. **ATR Schedule and Cost.** The ATR team will be integrated into the PDT team throughout the study process and will participate at milestone meetings and other critical coordination for the study. The total ATR budget for the study is estimated at approximately \$218,000 at this time. Each ATR, should be conducted according to the following schedule: 2 weeks for the ATR team to review the report and provide comments, 2 weeks for the PDT to coordinate and provide responses to comments, and 2 weeks for backcheck and ATR closeout. The study schedule is as follows:

Milestone	Scheduled Date
FCSA Execution	3 Feb 2016 (Act.)
Alternatives Milestone	21 Oct 2016
Tentatively Selected Plan	3 Aug 2017
Draft Report for Public Review	03 Oct 2017
Agency Decision Milestone	6 Mar 2018
Civil Works Review Board	18 Oct 2018
Chief of Engineer's Report	31 Jan 2019

- b. **Type I IEPR Schedule and Cost.** IEPR will be performed for the entire decision document. It is anticipated that the review will not exceed 12 weeks. Total estimated costs (including IEPR contract, PDT comment response labor, IWR contracting office processing, and PCX management) for the IEPR is \$200,000 at this time.
- c. **Model Certification/Approval Schedule and Cost.** Only approved models will be used in this study.

## 11. PUBLIC PARTICIPATION

A workshop was held on 24 March 2016 at the start of the study where feedback was gathered from over 100 stakeholders on the problems, opportunities, objectives, constraints, and potential measures for study. An initial NEPA scoping meeting was also held where the public was able to learn more about the study and provide comments. The feasibility report will be made available for public review per NEPA requirements. The Norfolk District will have a web page for this study where documents and important study information will be posed for the public. The city of Norfolk will also distribute information and documents as appropriate and necessary to enhance public outreach and public review of the study products requiring public review.

## 12. REVIEW PLAN APPROVAL AND UPDATES

The North Atlantic Division Commander is responsible for approving this Review Plan. The Commander's approval reflects vertical team input (district, MSC, RMO, and HQUSACE) as to the appropriate scope and level of review for the decision document. The Review Plan is a living document and may change as the study progresses. The home district is responsible for keeping the 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 scope and/or level of review changes) should be re-approved by the



MSC Commander following the process used to initially approve 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 plan can be directed to the following points of contact:

- Doug Stamper, Project Manager
- Henry Gruber, North Atlantic Division
- Roselle Henn, Coastal Storm Risk Management Planning Center of Expertise

**ATTACHMENT 1: TEAM ROSTERS**

**Project Delivery Team Roster**

<b>Discipline</b>	<b>Name</b>
Project Manager	Doug Stamper
Plan Formulation (PTTL)	Rachel Haug
Environmental	David Schulte
Environmental	Kathy Purdue
Economics	Brian Maestri, Colin Rawls
Flood Plain Management	Faraz Ahmed
Flood Plain Management	Robert Tajan, City of Norfolk
Cultural Resources	John Haynes
GIS	Jason O'Neal
GIS	Kyle Spencer, City of Norfolk
Engineering (ETTL)	Mark Hudgins
Hydrology & Hydraulics	Alicia Farrow
Geotechnical	Jane Bolton
Structural	Drew Johnson
Civil	Amy Ballard
Civil, Storm Water	John White, City of Norfolk
Civil, Storm Water	Scott Smith, City of Norfolk
Value Engineer	TBD
Cost Engineer	Mike Hall
Real Estate	Tom Gulihur
Operations	TBD
Regulatory	TBD
Construction	TBD
Resource Management	Christy Alexander
Contracting	TBD
District Counsel	Greg McDonough
PAO	Mark Haviland
NAD POC	Hank Gruber
NAD Command Center	Dave Robbins
Landscape Architect	TBD, City of Norfolk
Urban Designer	TBD, City of Norfolk
Resilience	Katerina Oskarsson, City of Norfolk
Resilience	Christine Morris, City of Norfolk

**ATR Team Roster**

<b>Discipline</b>	<b>Name</b>	<b>Phone</b>	<b>Email</b>
ATR Lead	David Robbins		
Plan Formulation	TBD		
Economics	TBD		
Environmental Resources	TBD		
Cultural Resources	TBD		
H&H Engineering	TBD		
Coastal Engineering	TBD		
Civil Engineering	TBD		
Real Estate	TBD		
Cost Engineering	TBD		
Geotechnical Engineering	TBD		

**IEPR Team Roster**

<b>Discipline</b>	<b>Name</b>	<b>Phone</b>	<b>Email</b>
IEPR Lead	Anastasiya Hernandez		
Plan Formulation	pending	pending	pending
Economics	pending	pending	pending
Coastal Engineering	pending	pending	pending
Environmental/NEPA	pending	pending	pending
Civil Engineering	pending	pending	pending

**ATTACHMENT 2: 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 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 closed in ProjNet DrChecks<sup>SM</sup>.

SIGNATURE

Name

ATR Team Leader

Office Symbol/Company

Date

SIGNATURE

Name

Project Manager

Office Symbol

Date

SIGNATURE

Name

Architect Engineer Project Manager<sup>1</sup>

Company, location

Date

SIGNATURE

Name

Review Management Office Representative

Office Symbol

Date

**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

Chief, Engineering Division

Office Symbol

Date

SIGNATURE

Name

Chief, Planning Division

Office Symbol

Date

<sup>1</sup> Only needed if some portion of the ATR was contracted

**ATTACHMENT 3: REVIEW PLAN REVISIONS**

<b>Revision Date</b>	<b>Description of Change</b>	<b>Page / Paragraph Number</b>

**ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS**

<b>Acronym</b>	<b>Definition</b>	<b>Acronym</b>	<b>Definition</b>
ASA(CW)	Assistant Secretary of the Army for Civil Works	NER	National Ecosystem Restoration
ATR	Agency Technical Review	NEPA	National Environmental Policy Act
CSDR	Coastal Storm Damage Reduction	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
EA	Environmental Assessment	OEO	Outside Eligible Organization
EC	Engineer Circular	OSE	Other Social Effects
EIS	Environmental Impact Statement	PCX	Planning Center of Expertise
EO	Executive Order	PDT	Project Delivery Team
ER	Ecosystem Restoration	PAC	Post Authorization Change
ER	Engineer Regulation	PMP	Project Management Plan
FEMA	Federal Emergency Management Agency	PL	Public Law
FRM	Flood Risk Management	QMP	Quality Management Plan
GRR	General Reevaluation Report	QA	Quality Assurance
Home District/MSD	The District or MSD responsible for preparing the decision document	QC	Quality Control
HQUSACE	Headquarters, U.S. Army Corps of Engineers	RED	Regional Economic Development
IEPR	Independent External Peer Review	RMC	Risk Management Center
LRR	Limited Reevaluation Report	RMO	Review Management Organization
MCX	Mandatory Center of Expertise	RTS	Regional Technical Specialist
MSC	Major Subordinate Command	SAR	Safety Assurance Review
NACCS	North Atlantic Coast Comprehensive Study	USACE	U.S. Army Corps of Engineers
NACFA	North Atlantic Coast Focus Area	WRDA	Water Resources Development Act
NED	National Economic Development	WRRDA	Water Resources Reform and Development Act