



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-RBT

MAR 11 2015

MEMORANDUM FOR Commander, Norfolk District, (CENAO-PM / Mr. Nadal),  
Fort Norfolk, 803 Front Street, Norfolk, Virginia 23150-1096

SUBJECT: Review Plan Approval for Willoughby Spit and Vicinity Coastal Storm  
Damage Reduction Project, Norfolk, Virginia

1. References:

a. Email, CENAO-PM (R. Pretlow), 15 December 2014, Subject: Willoughby-P&S  
Review Plan and ATR Request

b. EC 1165-2-214, Water Resources Policies and Authorities – Civil Works Review,  
15 December 2012

2. The enclosed Review Plan for Willoughby Spit and Vicinity Coastal Storm Damage  
Reduction Project, Norfolk, Virginia, was prepared in accordance with Reference 1.b.  
The plan outlines the review of implementation documents (design and construction) of  
all project features.

3. NAD Business Technical Division is the Review Management Organization for the  
Agency Technical Review. The Review Plan does not include Type II Independent  
External Peer Review (Safety Assurance Review) because the project does not include  
design or construction activities that involve potential hazards which pose a significant  
threat to human life.

4. The Review Plan for the Willoughby Spit and Vicinity Coastal Storm Damage  
Reduction Project is approved. The Review Plan is subject to change as 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 this office.

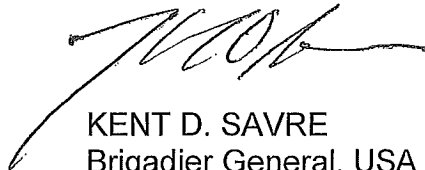
5. In accordance with Reference 1.b, Appendix B, Paragraph 6, post this approved  
Review Plan on your district website for public review and comment. NAD will similarly  
post on the Division website.

CENAD-RBT

SUBJECT: Review Plan Approval for Willoughby Spit and Vicinity Coastal Storm  
Damage Reduction Project, Norfolk, Virginia

6. The point of contact is Jeffrey Wisniewski, Sandy Lead Engineer, 347-370-4783 or  
jeffrey.wisniewski@usace.army.mil.

Encl



KENT D. SAVRE  
Brigadier General, USA  
Commanding

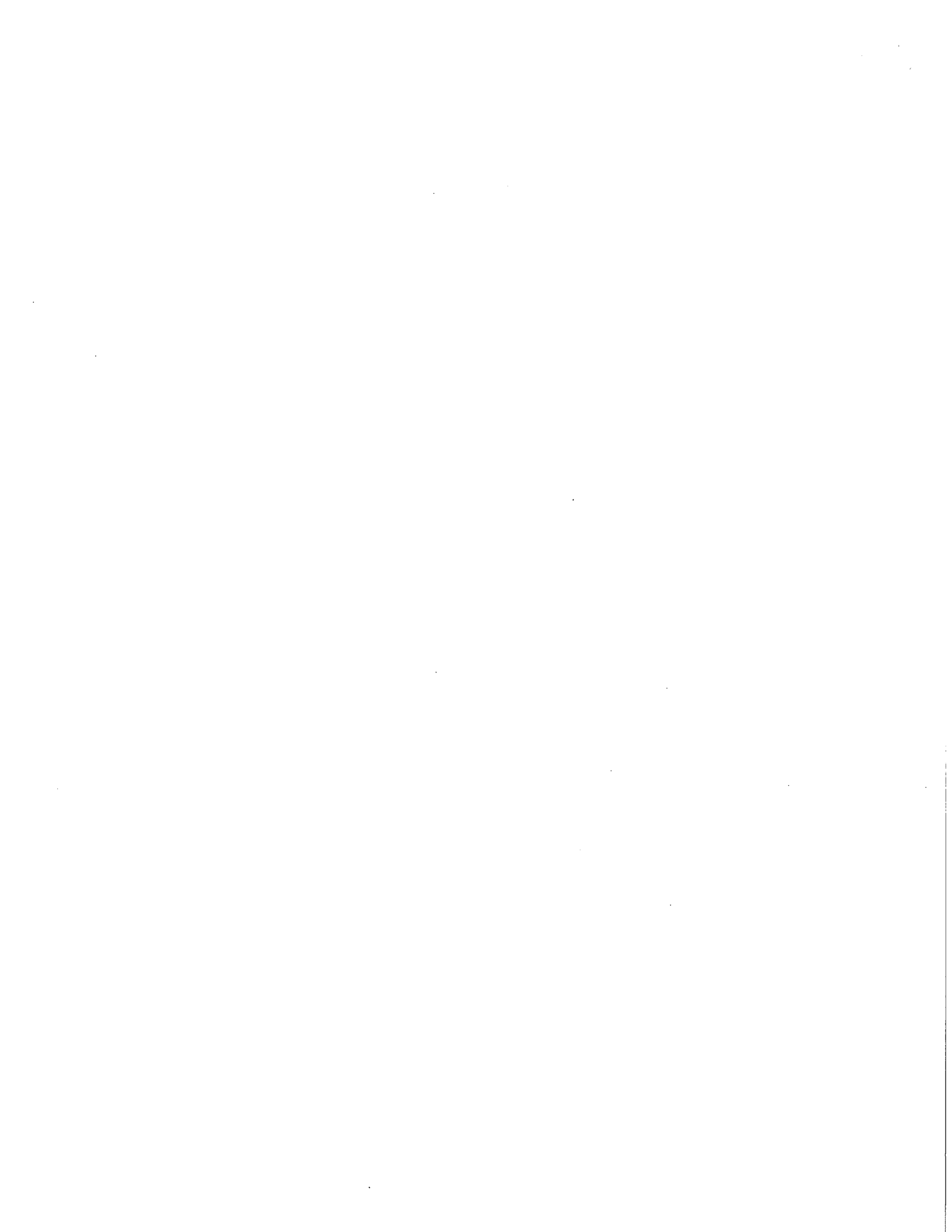
CF: (w/ encl)  
CECW-NAD-RIT (M. Voich)  
CENAO-PM (R. Pretlow)

**Final Review Plan**  
**For**  
**Willoughby Spit and Vicinity,**  
**Storm Damage Reduction Project**  
**Implementation Documents**



**US ARMY CORPS  
OF ENGINEERS  
NORFOLK DISTRICT**

**Dec 2014**



## **Table of Contents**

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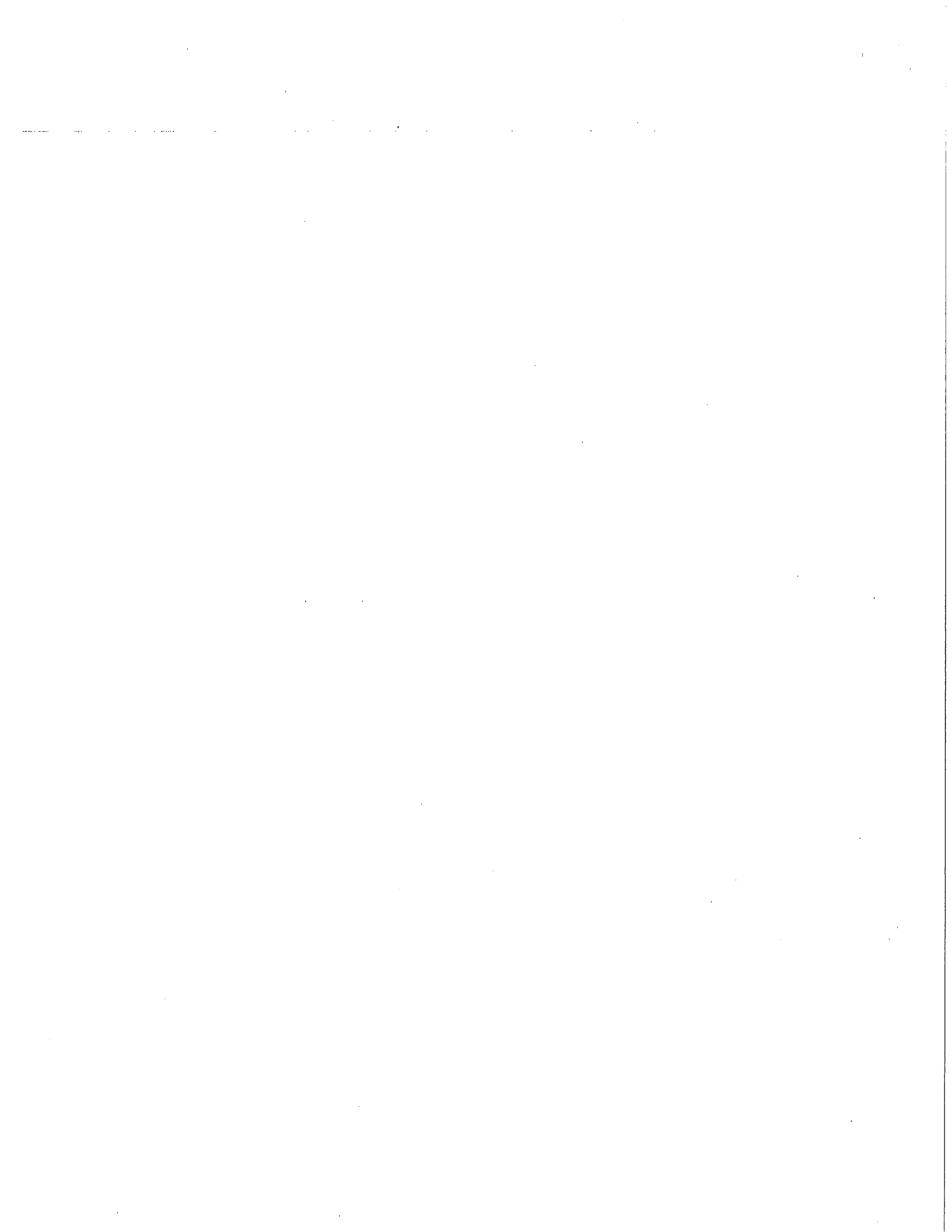
1. Purpose and Requirements .....	1
2. Review Management Organization (RMO) .....	1
3. Project Information and Background .....	1
4. District Quality Control/Quality Assurance (DQC) .....	2
5. Agency Technical Review (ATR) .....	3
6. Independent External Peer Review (IEPR) .....	5
7. Policy and Legal Compliance Review .....	7
8. Cost Engineering Directorate of Expertise (DX) Review and Certification ....	7
9. Model Certification and Approval .....	7
10. Review Schedules and Costs .....	7
11. Public Participation .....	8
12. Review Plan Approval and Updates .....	8
13. Review Plan Points of Contact .....	8

**Attachment 1: Team Rosters**

**Attachment 2: Sample Statement of Technical Review**

**Attachment 3: List of Acronyms**

**Attachment 4: MFR on Risk Informed Assessment of Significant Threat to  
Human Life by CENAO EC, Engineering Division**



## 1. PURPOSE AND REQUIREMENTS

- a. **Purpose.** This Review Plan defines the scope and level of review for the implementation documents for the Willoughby Spit Storm Damage Reduction Project. Implementation documents include Plans and Specifications (P&S) and a Design Documentation Report (DDR). This Review Plan defines the scope and level of review for the Project.
- b. **References.**
1. EC 1165-2-214, Civil Works Review Policy, 15 December 2012
  2. ER 1110-2-1150, Engineering and Design for Civil Works Projects, 31 Aug 1999
  3. ER 1110-1-12, Engineering and Design Quality Management, 21 Jul 2006 as revised through 31 March 2011
  4. Public Law (PL) 113-2, "Disaster Relief Appropriations Act, 2013"
  5. ER 1100-2-8162, Incorporating Sea Level Change in Civil Works Programs, 31 Dec 2013
  6. ER 415-1-11- Biddability, Constructability, Operability, Environmental, and Sustainability (BCOES) Reviews
- c. **Requirements.** This Review Plan was developed in accordance with EC 1165-2-214, which establishes an accountable, comprehensive, life-cycle review strategy for projects 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, and Policy and Legal Compliance Review.

## 2. REVIEW MANAGEMENT ORGANIZATION (RMO) COORDINATION

The RMO is responsible for managing the overall review effort described in this Review Plan. The RMO for implementation documents is the Major Subordinate Command (MSC), (per EC 1165-2-214). Therefore, the RMO for the review effort described in this Review Plan is the North Atlantic Division.

## 3. PROJECT INFORMATION AND BACKGROUND

- a. **Implementation Documents.** This Review Plan has been prepared for the implementation documents for the Willoughby Spit Storm Damage Reduction Project. The purpose of these documents is to provide a record of final design for the beach berm. Approval of the implementation documents is at the District Command level. The Plans and Specifications for the implementation documents will be developed in one phase.

- b. **Project Description.** This project is authorized by the Water Resources Development Act of 1986. A Hurricane Sandy Limited Reevaluation Report for the Willoughby Spit Storm Damage Reduction Project was approved by the North Atlantic Division on 4 March 2014. The Authorized Project provides for reduction of storm damages from coastal erosion and flooding caused by high surge events through a reinforced berm. The City of Norfolk is the non-Federal sponsor for this project. The implementation documents reflect post- Hurricane Sandy conditions.
- c. **Factors Affecting the Scope and Level of Review.** The focus of this Review Plan is on the implementation documents (DDR, plans, and specifications) for the Willoughby Spit Storm Damage Reduction Project. An assessment of the need for a Type II Independent External Peer Review, Safety Assurance Review, is documented in Section 6 of this Review Plan. This assessment by the members of the Hydraulic and Hydrology Section of the Engineering Branch with concurrence by the Norfolk District Chief of Engineering and Construction Division considered life safety and other factors including whether the project includes redundancy, resiliency, and robustness; and whether the project has unique construction sequencing. This assessment was conducted for the Authorized Willoughby Spit Storm Damage Reduction Project and includes all components of the project.

**4. DISTRICT QUALITY CONTROL/QUALITY ASSURANCE (DQC) AND BIDDABILITY, CONSTRUCTABILITY, OPERABILITY, ENVIRONMENTAL, AND SUSTAINABILITY (BCOES) REVIEW**

All implementation documents 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 Norfolk District will manage the DQC and BCOES reviews.

- a. **Documentation of DQC and BCOES Reviews.** DQC and BCOES will be documented through the use of DrChecks and DQC/ BCOES certificates.
- b. **Products to Undergo DQC and BCOES.** All applicable documents will undergo DQC and BCOES reviews.
- c. **Required DQC and BCOES Expertise.** DQC and BCOES reviews will be performed by the appropriate staff members in the Norfolk District that are not involved in the development of implementation documents. The required disciplines for review are listed on page 6. The DQC and BCOES reviews supplement the reviews provided by the Project Delivery Team during the course of completing the DDR and P&S.

**5. AGENCY TECHNICAL REVIEW (ATR)**

ATR is mandatory for all implementation documents. 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. ATR is managed within USACE by the designated RMO and is conducted by a qualified team from outside the Norfolk 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. The ATR team lead will be from outside the home MSC.

a. **Products to Undergo ATR.** The products that will undergo ATR are the DDR and the Plans and Specifications.

b. **Required ATR Team Expertise**

ATR Team Members/ Disciplines	Expertise Required
ATR Lead	The ATR lead should be a senior professional with extensive experience in preparing Civil Works implementation 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.
Environmental Resources	Team member will have independently completed EA/EIS's and be well versed in the NEPA process, will have participated in partnerships with other environmental resource agencies, will have experience with identifying and resolving environmental issues in a coastal ecosystem, and will have experience with Section 106 actions and documentation.
Coastal Engineering	Team member will be an expert in the field of coastal processes and have a thorough understanding of sediment transport, application of wave forces and water levels over the likely range of storm return periods, beach fill design including renourishment, determination of risk due to sea level rise, and design of dune systems. The team member will be a licensed professional engineer.

**Required ATR Team Expertise (Cont'd)**

ATR Team Members/ Disciplines	Expertise Required
Civil Engineering	Team member will be an expert in the field of civil engineering, especially in the review of coastal projects. The team member will be a licensed professional engineer.
Construction Manager	Team member will be a construction manager with 10 years experience in the management of coastal projects. Team member will have experience as an Administrative Contracting Officer of both beach fill placement projects and construction of coastal structures. Team member will be a licensed professional engineer.

- 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 been properly followed;
- (3) The significance of the concern--indicate the importance of the concern with regard to its potential impact on the plan components, efficiency, effectiveness, implementation responsibilities, safety, Federal interest, or public acceptability; and
- (4) The probable specific action needed to resolve the concern--identify the actions 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. Unresolved concerns can be closed in DrChecks with a notation that the concern has been elevated to the vertical team for resolution.

- d. **Review Report.** 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:
- (1) Identify the documents reviewed and the purpose of the review.
  - (2) Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer.
  - (3) Include the charge to the reviewers.
  - (4) Describe the nature of their review and their findings and conclusions.
  - (5) Identify and summarize each unresolved issue (if any), and
  - (6) Identify and summarize each ATR comment, the PDT response, a brief summary of the pertinent points in the follow on discussion, including any vertical coordination, and the agreed upon resolution.
- e. **ATR Certification.** ATR will 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 for the implementation documents. A sample Statement of Technical Review is included in Attachment 2.

## 6. INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

An IEPR may be required for implementation 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:

- a. **Type I IEPR.** Type I IEPRs 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.
- b. **Type II IEPR.** Type II IEPRs, or Safety Assurance Reviews (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.
- c. **Decision on IEPR.**
  - (1) Type I IEPR's are conducted on project studies and reports. Since this Review Plan deals with implementation documents, a Type I IEPR is not applicable.
  - (2) Type II Independent External Peer Review, Safety Assurance Review, is required by EC 1165-2-214 for hurricane and storm risk management and flood risk management projects, as well as other projects where existing and potential hazards pose a significant threat to human life.
  - (3) Based on a risk informed assessment (attached memorandum dated 3 Dec 2014- Attachment 4), Norfolk District Chief, Engineering and Construction Division determined that there is not a significant threat to human life associated with the Willoughby Spit Storm Damage Reduction Project. Therefore, a Type II IEPR is not required for this contract.
- d. **Products to Undergo IEPR.** Not applicable.
- e. **Required IEPR Panel Expertise.** Not applicable.

f. **Documentation of IEPR.** Not applicable.

**7. POLICY AND LEGAL COMPLIANCE REVIEW**

All implementation documents will be reviewed for their compliance with law and policy. DQC facilitates the policy review processes by addressing compliance with pertinent published Army policies, particularly policies on analytical methods and the presentation of results in implementation documents.

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

This is not applicable since a decision document requiring Congressional authorization is not being prepared.

**9. MODEL CERTIFICATION AND APPROVAL**

Not applicable since this project is in the Preconstruction Engineering and Design Phase and this relates to the use of certified or approved models for planning activities.

**10. REVIEW SCHEDULES AND COSTS**

a. **ATR Schedule and Cost.** The schedule and costs budgeted for ATR reviews are as follows:

(1) Submittal of 90% Plans and Specifications (Contract A): 14-Nov-2014

(2) Kickoff meeting: 19-Dec-2014

(3) Review start: 22-Dec-2014

(4) Back-check start: 15-Jan-2015

(5) Report: 21-Jan-2015

(6) Certificate: 30-Jan-2015

(7) Budgeted ATR costs: \$20,000

b. **IEPR Schedule and Cost.** Not applicable

c. **Model Certification/ Approval Schedule and Cost.** Not applicable

**11. PUBLIC PARTICIPATION**

As significant changes or developments occur, the District will present this information to the City of Norfolk and the applicable municipal entities. Any significant comments or concerns raised by the Project Delivery Team that will include our non-Federal sponsors and stakeholders will be brought to the attention of the ATR panel.

**12. REVIEW PLAN APPROVAL AND UPDATES**

The North Atlantic Division Commander, or his representative, 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 implementation documents. Like the PMP, the Review Plan is a living document and may change as the engineering and design progresses. The home district is responsible for keeping the Review Plan up to date. 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.

**13. REVIEW PLAN POINTS OF CONTACT**

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

- Mark Hudgins, NAO, EN Technical Lead, 757-201-7107
- Robert Pretlow, NAO, Project Manager, 757-201-7385
- Jeffrey Wisniewski, Lead Engineer, NAD Sandy Coastal Management Division, 347-370-4783

**TEAM ROSTERS****District Project Delivery Team**

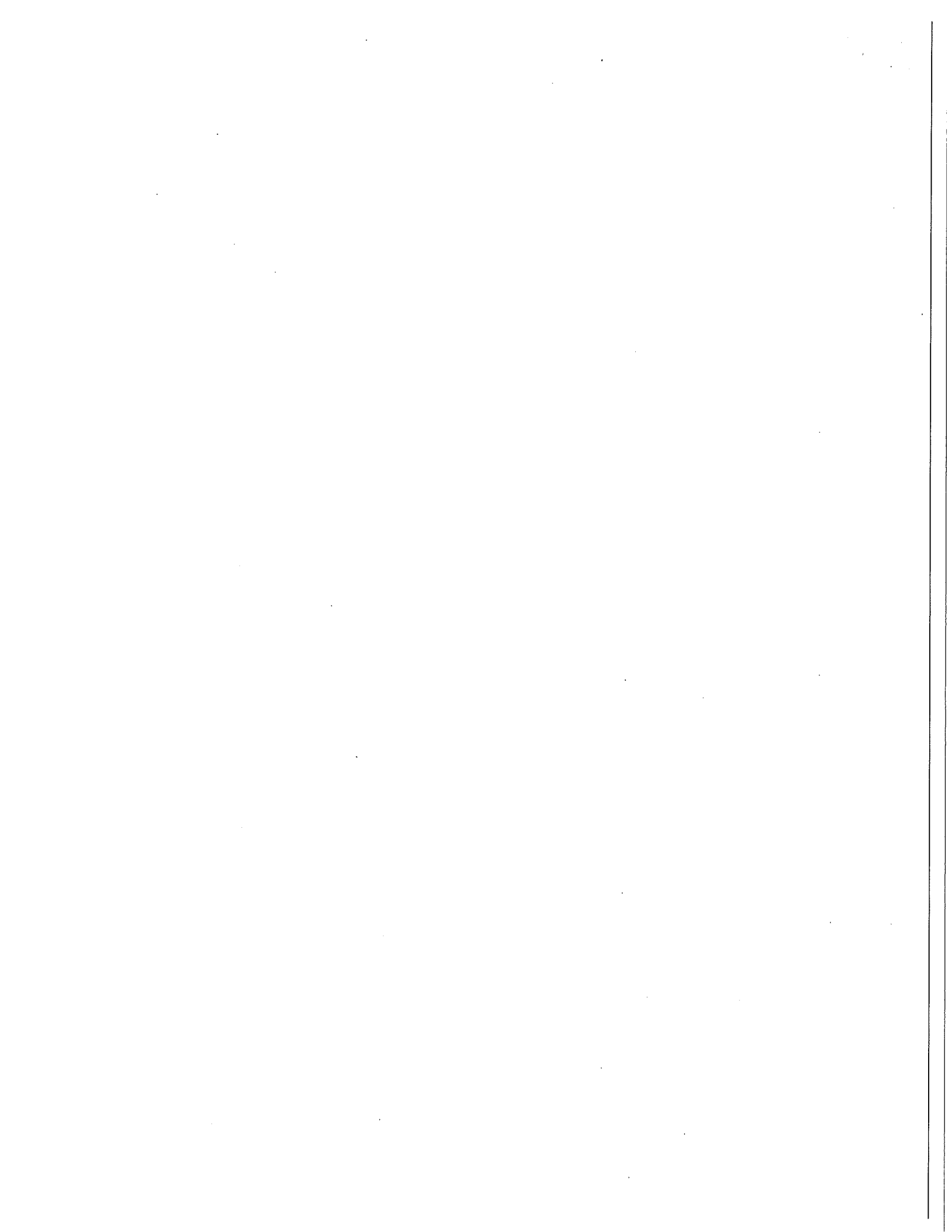
<b>Responsibility</b>	<b>Name</b>	<b>Contact</b>
Technical Manager	Mark Hudgins	757-201-7102
Project Manager	Robert Pretlow	757-201-7385
Project Planner	Rachel Haug	757-201-7589
Coastal Engineer	Owen Reece	757-201-7772
Civil Engineer	Alicia Farrow	757-201-7869
Environmental Resources	Janet Cote	757-201-7837
Construction	Elmslie Smith	757-201-7687

**ATR Team**

<b>Name</b>	<b>Role</b>	<b>Review District</b>
TBD	ATR Lead	TBD
TBD	Civil Engineer	TBD
TBD	Coastal Engineer	TBD
TBD	Environmental Resources	TBD
TBD	Construction Manager	TBD

**Vertical Team**

<b>Name</b>	<b>Role</b>	<b>Phone Number</b>	<b>E-mail Address</b>
Richard Klein, P.E.	NAO-PM-R; Chief, Programs and Civil Works Branch	757-201-7243	<a href="mailto:richard.l.klein@usace.army.mil">richard.l.klein@usace.army.mil</a>
Gregory Steele, P.E.	NAO-WR-P; Chief, Planning and Policy Branch	757-201-7764	<a href="mailto:gregory.c.steele@usace.army.mil">gregory.c.steele@usace.army.mil</a>
Terry Deglandon, R.A.	NAO-CE-E; Chief, Engineering Branch	757-201-7220	<a href="mailto:terry.l.deglandon@usace.army.mil">terry.l.deglandon@usace.army.mil</a>
Michael Roach, P.E.	NAO-EC-C; Chief, Construction Branch	804-892-3999	<a href="mailto:michael.roach@usace.army.mil">michael.roach@usace.army.mil</a>
Jeff Wisniewski, P.E.	NAD, Lead Engineer, Sandy Coastal Management Division	347-370-4783	<a href="mailto:Jeffrey.wisniewski@usace.army.mil">Jeffrey.wisniewski@usace.army.mil</a>





## SAMPLE STATEMENT OF TECHNICAL REVIEW

### 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 1165-2-209. 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<sup>sm</sup>.

*SIGNATURE*

\_\_\_\_\_  
Name

\_\_\_\_\_  
Date

ATR Team Leader

Office Symbol/Company

*SIGNATURE*

\_\_\_\_\_  
Name

\_\_\_\_\_  
Date

Project Manager

Office Symbol

*SIGNATURE*

\_\_\_\_\_  
Name

\_\_\_\_\_  
Date

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

Company, location

### SAMPLE STATEMENT OF TECHNICAL REVIEW (Cont'd)

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

Architect Engineer Principal

Office Symbol

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

**ACRONYMS AND ABBREVIATIONS**

<u>Term</u>	<u>Definition</u>	<u>Term</u>	<u>Definition</u>
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
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
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/MSD	The District or MSC responsible for the preparation of the decision document	RMC	Risk Management Center

**ACRONYMS AND ABBREVIATIONS (Cont'd)**

<u>Term</u>	<u>Definition</u>	<u>Term</u>	<u>Definition</u>
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



Reply to  
Attention of

DEPARTMENT OF THE ARMY  
US ARMY CORPS OF ENGINEERS  
NORFOLK DISTRICT  
FORT NORFOLK  
803 FRONT STREET  
NORFOLK VA 23510-1096

December 8, 2014

CENAO-EC-ED

MEMORANDUM FOR RECORD

SUBJECT: Willoughby Spit and Vicinity Coastal Storm Damage Reduction Project, Norfolk, Virginia --Risk Informed Assessment of Significant Threat to Human Life

1. **Project Information and Description.** The comprehensive coastal storm damage reduction project for the 7.3-mile Chesapeake Bay shoreline of the City of Norfolk, Virginia, extending from the tip of Willoughby Spit to Little Creek Inlet, is described in the Final Hurricane Sandy Limited Reevaluation Report, dated February 2014. This congressionally authorized project consists of a Federal component and a non-Federal, City of Norfolk, component. The Federal component provides for the initial construction and periodic nourishment of a protective beach berm, where needed, along the entire shoreline over the 50-year life of the project. The non-Federal component provides for the continued maintenance of the existing dune system by the City at local expense throughout the life of the project. Additionally, the City would continue to operate the existing storm warning system and temporary evacuation program to remove local residents from the project area well in advance of a major coastal storm. A Review Plan has been prepared for the implementation documents.
  
2. **Risk Informed Assessment.** In accordance with EC 1165-2-214, Civil Works Review dated 15 December 2012; a risk informed assessment was made as to whether there may be significant threat to human life from the authorized flood risk management project if constructed. The key Factors are shown in Table 1 (enclosed). The key factors considered are:
  - a. The Willoughby Spit and Vicinity Coastal Storm Damage Reduction Project components provide reduction in storm damage by reducing wave-induced property damage and reducing shoreline storm erosion.
  
  - b. Failure of the shore protection component of the project would most likely be from gradual erosion followed by a significant coastal storm event. The City of Norfolk has the resources to monitor the shore protection component of the project if there is erosion that reduces the features of the project (berm width and height). The Corps

and the City have capabilities to maintain the shore protection project features over the life of the project.

- c. Furthermore, traditional and proven design features and traditional and proven construction materials and methodologies will be used. All elements in construction that may pose a risk are identified and methodologies are in place to reduce the human life safety risk to low.

**3. Determination.** Based on a risk informed assessment which considered life safety factors, I have determined that there is not a significant threat to human life associated with the Willoughby Spit and Vicinity Coastal Storm Damage Reduction Project. Accordingly, it is recommended that a Type II IEPR, Safety Assurance Review, is not warranted.

Encl



MATTHEW T. BYRNE, P.E.  
Chief, Engineering & Construction Division

**Table 1: Risk Assessment for Significant Threat to Life Safety,  
Willoughby Spit and Vicinity Coastal Storm Damage Reduction Project**

No.	Risk Factor (Significant Threat to Life Safety)	Risk Magnitude (H/M/L)	Basis of Concern	Risk Assessment
1	Land Use Adjacent to the Project	Low	The project area encompasses mainly residential development with some commercial corridors.	Land use is primary residential, single family homes. Risk Assessment details are provided in 1c below.
1a	Population Density	Low	Population density includes mainly suburban residential development, with some areas of higher density development.	The area landward of the project area has a suburban population density that is both seasonal and permanent. Construction of shore protection features, such as the beach berm, will not increase the risk of flooding/ inundation over pre- project conditions. Construction of the beach berm does not create a risk of sudden catastrophic failure.
1b	Critical Facilities Affected (Schools, hospitals, emergency vehicle and evacuation routes)	Medium	Critical facilities in the project area include several public elementary schools located on side streets that ultimately connected with Ocean View Avenue, the designated evacuation route out of the area prior to major coastal storms.	Construction of the berm as part of the beach erosion control project will increase the protection of the evacuation route. The construction of the beach berm does not create a risk of sudden catastrophic failure

**Table 1: Risk Assessment for Significant Threat to Life Safety,  
Willoughby Spit and Vicinity Coastal Storm Damage Reduction Project  
(Cont'd)**

No.	Risk Factor (Significant Threat to Life Safety)	Risk Magnitude (H/M/L)	Basis of Concern	Risk Assessment
1c	Types of structures in the flood plain	Low	Land use in the project area is comprised of 74% residential, 12% commercial-retail-restaurant-institutional, and 14% mixed use, open space/recreational, and vacant. There are approximately 1,000 structures in the project area which are located along the Chesapeake Bay immediately north of Ocean View Avenue.	Most of the structures within the floodplain are currently in a VE zone. These structures will be at a lower risk to damage by waves after the construction of the beach berm. The beach berm itself is not a project element that is at risk of catastrophic failure, and the existence of a beach berm will not change the conditions under which homes are evacuated. The other residential structures in the project area that are in the floodplain are in the floodplain of Pretty Lake.
2	Inundation of protected side due to project failure	Low	Following completion of the line of protection, the project will be subject to risk due to catastrophic failure of any portion of the berm.	Completion of the berm component alone does not have a risk of inundation due to sudden catastrophic failure.
3	Shoreline Storm Erosion	Low	Coastal storms often result in significant shore erosion over short time periods which can undermine structures	Construction of the shore protection component will increase berm width, height, and volume which will lessen the risk of storm erosion because of increased berm width.
4	Wave Attack	Low	Overtopping of the berm by waves during high water level events can result in damage to structures from direct wave impact.	Construction of the shore protection component will increase berm width, which will lessen the risk of damage due to wave attack.



**Table 1: Risk Assessment for Significant Threat to Life Safety,  
Willoughby Spit and Vicinity Coastal Storm Damage Reduction Project  
(Cont'd)**

No.	Risk Factor (Significant Threat to Life Safety)	Risk Magnitude (H/M/L)	Basis of Concern	Risk Assessment
5	Use of unique or non-traditional design methods	Low	Unique or non-traditional design methods may be poorly understood or inadequately designed and may be more subject to failure than proven design methods.	Engineering for the project elements employed accepted methods in accordance with COE guidance. No innovative or precedent setting methods or models were used.
6	Use of unique or non-traditional design features	Low	Unique or non-traditional design features may be poorly understood or inadequately designed and may be more subject to failure than proven design features.	Design of the shore protection component features fall within prevailing practice and include only time-tested design features (e.g. berm).
7	Use of unique or non-traditional construction materials or methods	Low	Unique or non-traditional construction materials or methods may be poorly understood or executed inadequately resulting in a project feature that may be more subject to failure than those built with proven materials and methods.	All materials and construction techniques used for the shore protection component are in common practice.
8	Does the project have unique construction sequencing or a reduced or overlapping design/construction schedule?	Low	Unique or accelerated construction sequencing may lead to poor quality work, leading to greater possibility of future project failure.	The shore protection component does not have any accelerated design or construction scheduling. Sufficient time is available for completion of construction including all environmental shut-down windows.

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(Cont'd)

No.	Risk Factor (Significant Threat to Life Safety)	Risk Magnitude (H/M/L)	Basis of Concern	Risk Assessment
9	Inherent risk with construction methods; MEC in borrow sites	Low	The offshore borrow site for beach fill is known to contain munitions and explosives of concern (MEC). MEC may be taken up into the dredge and possibly be placed on the beach within the sand fill, and may explode at some future time.	Methods have been developed to eliminate the danger of picking up MEC from the borrow site into the dredge, and/ or pumping MEC onto the project site. These controls consist of screens placed on the drag head and on the pump-out to prevent uptake of MEC.
10 Does the project design require:				
10a	Redundancy	Low	Failure of one critical element would result in sudden, catastrophic damage. Duplication of critical components of the protective system is required to increase the reliability of the system.	Construction of the shore protection components greatly reduces the risk to human life and property relative to the existing condition, which is seriously eroded. Nonperformance of the shore protection segment would result in flood levels, erosion, and/or wave forces less than or equal to those present under existing conditions.
10b	Resiliency	Low	Erodible structures are reduced in volume over time, providing less protective capacity.	The shore protection segment of the project includes resiliency in the form of regular beach renourishment, and post-storm emergency berm rehabilitation.

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Willoughby Spit and Vicinity Coastal Storm Damage Reduction Project  
(Cont'd)**

No.	Risk Factor (Significant Threat to Life Safety)	Risk Magnitude (H/M/L)	Basis of Concern	Risk Assessment
10c	Robustness	Low	Natural events can occur that are greater than the optimized project design, and may lead to project failure lead to project failure.	Berm designs are adaptable to changes in water level due to climate change (sea level rise), with opportunities to incorporate additional volume and/or berm elevation as part of regularly scheduled renourishment operations.

