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

JUN 18 2015

CENAD-RBT

MEMORANDUM FOR Commander, New York District, (CENAN-EN / Mr. Connolly), 26 Federal Plaza, New York, NY 10278-0090

SUBJECT: Review Plan Approval for Raritan Bay and Sandy Hook Bay, New Jersey, Hurricane and Storm Damage Reduction Project, Port Monmouth Phase II

1. References:

a. Email, CENAN-EN (S. Rice McDonnell), 2 February 2015, Subject: RE: Port Monmouth RP comments by JDC

b. Memorandum, CEIWR-RMC, Risk Management Center Endorsement – Raritan Bay and Sandy Hook Bay, New Jersey, Hurricane and Storm Damage Reduction Project, Port Monmouth Phase II Flood Risk Management Features, Review Plan, 31 March 2015

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

2. The enclosed Review Plan for Raritan Bay and Sandy Hook Bay, New Jersey, Hurricane and Storm Damage Reduction Project, Port Monmouth Phase II, was prepared in accordance with Reference 1.b. The plan outlines the review of implementation documents (design and construction) of all project features.

3. Risk Management Center (RMC) is the Review Management Organization for the Agency Technical Review. The Review Plan includes Type II Independent External Peer Review (Safety Assurance Review). A risk-informed assessment determined the project includes design or construction activities which may involve potential hazards and pose a significant threat to human life.

4. The Review Plan for Port Monmouth Phase II 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.

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

WILLIAM H. GRAHAM
Colonel, EN
Commanding

Encl

CF: (w/ encl)
CECW-NAD-RIT (M. Voich)
CENAN-EN (S. Rice McDonnell)

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
RISK MANAGEMENT CENTER
12596 WEST BAYAUD AVE., SUITE 400
LAKEWOOD, CO 80228

REPLY TO
ATTENTION OF

CEIWR-RMC

31 March 2015

MEMORANDUM FOR: Commander, New York District, ATTN: CENAN-EN-S

SUBJECT: Risk Management Center Endorsement – Raritan Bay and Sandy Hook Bay, New Jersey, Hurricane and Storm Damage Reduction, Port Monmouth Phase II Flood Risk Management Components, Review Plan

1. The Risk Management Center (RMC) has reviewed the Review Plan (RP) for – Raritan Bay and Sandy Hook Bay, New Jersey, Hurricane and Storm Damage Reduction, Port Monmouth Phase II Flood Risk Management Components, dated 30 January 2015, and concurs that this RP complies with the current peer review policy requirements outlined in EC 1165-2-214 "Civil Works Review Policy", dated 15 December, 2012.

2. This review plan was prepared by New York District, reviewed by NAD, and the RMC, and all review comments have been satisfactorily resolved. For this project a Type II IEPR will be performed.

3. The RMC endorses this document to be approved by the MSC Commander. Upon approval of the RP, please provide a copy of the approved RP, a copy of the MSC Commander's approval memorandum to the RMC Senior Review Manager (rmc.review@usace.army.mil).

4. Thank you for the opportunity to assist in the preparation of this RP. Please coordinate all aspects of the Agency Technical Review and the Independent External Peer Review (as appropriate) efforts defined in the RP. For further information, please contact me at 601-631-5896

Sincerely,

Dustin C. Herr, P.E.
Review Manager
Risk Management Center

CF:
CEIWR-RMC (Mr. Snorteland)
CENAD-DQM (Division Quality Manager)

CENAN-EN-S 30 January 2015

MEMORANDUM FOR Commander, North Atlantic Division ATTN: Sandy Coastal Management Division

SUBJECT: Review Plan for Raritan Bay and Sandy Hook Bay, New Jersey, Hurricane and Storm Damage Reduction, Port Monmouth Phase II Flood Risk Management Components

1. Reference is made to the following:
   a. CENAN-EN-S memorandum dated 24 September 2014, subject as above which transmitted the Review Plan.
   b. Review comments on the Review Plan from the USACE Risk Management Center transmitted via e-mail on 27 October 2014.

2. Enclosed are the responses to comments and the revised Review Plan for approval.

Encl
Review Plan

ARTHUR J. CONNOLLY, P.E.
Chief, Engineering Division

CF:
C, CENAN-PL
C, CENAN-PP

Review Plan for
Raritan Bay and Sandy Hook Bay, New Jersey
Hurricane and Storm Damage Reduction
Port Monmouth Phase II
Flood Risk Management Components

New York District
U.S. Army Corps of Engineers

MSC Approval Date

Table of Contents

1. PURPOSE AND REQUIREMENTS

a. Purpose. This Review Plan defines the scope and level of peer review for the Phase II flood risk management components of the overall Raritan Bay and Sandy Hook Bay, Hurricane and Storm Damage Reduction, Port Monmouth, New Jersey project. This Review Plan describes the scope of review for the current phase of work and is included in the Project Management Plan (P2 #40339).

b. References

(1) EC 1165-2-214, Civil Works Review, 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, 31Jul 2006, as revised through 31 Mar 2011
(4) ER 415-1-11 – Biddability, Constructability, Operability, Environmental and Sustainability (BCOES) Reviews, 1 Jan 2013
(5)) ER 1100-2-8162, Incorporating Sea Level Change in Civil Works Programs, 31 Dec 2013
(6) WRDA 2007 H. R. 1495 Public Law 110-114, 8 Nov 2007
(7) Public Law (PL) 113-2, the "DISASTER RELIEF APPROPRIATIONS ACT, 2013"(4)ER 1110-2-1150, Engineering and Design for Civil Works Projects, 31 Aug 1999

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) and BCOES (Biddability, Constructability, Operability, Environmental and Sustainability), Agency Technical Review (ATR), Independent External Peer Review (IEPR), and Policy and Legal Compliance Review.

2. REVIEW MANAGEMENT ORGANIZATION (RMO) COORDINATION

The USACE Risk Management Center (RMC) is the Review Management Organization (RMO) for this project. Contents of this review plan have been coordinated with the RMC and the North Atlantic Division (NAD), the Major Subordinate Command (MSC). In-Progress Review (IPR) team meetings with the RMC, NAD, and HQ will be scheduled on an "as needed" basis to discuss programmatic, policy, and technical matters. This review plan will be updated for each new project phase as necessary. NAD Sandy Lead Engineer will assist the RMC with management of the ATR and IEPR reviews and development of the draft ATR and IEPR "charges".

3. PROJECT INFORMATION

a. **Implementation Documents.** This Review Plan has been prepared for Design Documentation Reports (DDR), Engineering Documentation Reports (EDR) as needed, plans and specifications (P&S) for the flood risk management components of the Raritan Bay and Sandy Hook Bay Hurricane and Storm Damage Reduction, Port Monmouth, New Jersey project. The purpose of these documents is to provide a record of final design for the flood risk management components. Approval of the implementation documents are at the District Command level.

b. **Project Description.** A Feasibility Report and Environmental Impact Statement for the Port Monmouth project were completed in June 2000 and the Chief of Engineers Report was signed on 29 December 2000. Construction of the Port Monmouth project was authorized under Section 101 of the Water Resources Development Act of 2000. The Record of Decision was signed on 28 May 2008.

A Hurricane Sandy Limited Reevaluation Report (HSLRR) was approved in December 2013. As part of the HSLRR, it was determined that the updated Port Monmouth project cost would exceed the maximum project cost limit established by Section 902 of the Water Resources Development Act of 1986. However, in accordance with Disaster Relief Appropriations Act of 2013 (P.L 113-2), the Section 902 cap does not apply to authorized but unconstructed projects that were affected by Hurricane Sandy.

Figure 1 provides a map of the project area location. The authorized plan provides for reduction of storm damages from coastal erosion and flooding and inland flooding along Pews and Compton Creeks caused by high surge events in Raritan Bay through storm protective dune, berm, beach fill, tide gate, levees, floodwalls, road closure gates, pump stations, interior drainage facilities, road raising and wetland mitigation. The State of New Jersey, acting through the Department of Environmental Protection, is the non-Federal sponsor for the project. The Project Partnership Agreement was executed in January 2014. The project will be constructed under multiple construction contracts at an estimated initial project first cost of $104,692,000 (Oct 2012 price level).

The Phase I shore protection components comprised the first construction contract to be designed and awarded. This work consists of a sand dune and berm system, with one rubblemound terminal groin. Appurtenance structures include an extension of an existing fishing pier, pedestrian and vehicular dune crossovers. The construction contract was awarded in May 2014 at a cost of $17.7 million and is scheduled for completion in July 2015.

The Phase II flood risk management components will be constructed under five construction contracts:
Contract 1- Wetland Mitigation; estimated construction cost $6.4 million

Contract 2- Pews Creek Tide Gate; Levee, Pump Station (120 cfs); estimated construction cost $20 million.
Contract 3- Pews Creek Port Monmouth Road Closure Gate and Floodwall; estimated construction cost $8 million.
Contract 4 - Compton Creek Floodwall, Levees, and two Road Closure Gates; estimated construction cost $18 million.
Contract 5- Compton Creek Floodwall, Levees, Pump Station (60 cfs) and Road Raising; estimated construction cost $14 million.

The Phase II contracts are scheduled to be awarded in FY 16 and overall construction is scheduled to be completed by Dec 2017.

The structural measures in Contracts 2, 3, 4, and 5 pose a significant threat to human life (public safety). There are 969 residential structures and 45 nonresidential structures within the project area. Risk concerns and possible failure scenarios for the major structural features are as follows:

Pews Creek Tide Gate- A tide gate structure in Pews Creek is to be constructed as part of Contract 2. The structure will consist of two 24-foot wide by 21.5-foot high vertical lift gates. There is a risk that the gates will not operate during a flood event resulting in flooding of protected areas. Potential failure modes include failure of backup generator (during loss of primary power source) due to lack of fuel or contaminated fuel; obstruction by sediment, trash, timber or other debris; inadequate maintenance resulting in failure to close due to corroded or warped gates, etc.; mechanical failure; control malfunctions; failure of the electric motor actuators required for gate lifting operations, and jamming of the tide gates.

Levee and Floodwalls- Two miles of levees and floodwalls, with a height of 5 to 10 feet, are to be constructed as part of Contracts 2, 3, 4, and 5. There is a risk that the levees and floodwalls could be overtopped resulting in flooding of protected areas, possible full or partial collapse. Potential failure modes include loss of material due to overtopping from storm events exceeding the design level, levee settlement due to poor subsurface conditions exceeding the design amount; seepage through the levee or its foundation material; slope stability failure (levees); toe erosion leading to slope stability failure on levees or undermining of floodwalls; and inadequate foundation support for floodwalls.

Pump Stations- Two pump stations are to be constructed, a 120 cfs pump station as part of Contract 2 and a 60 cfs pump station as part of Contract 5. There is a risk that the pump stations will not operate as designed during flood events resulting in interior flooding of protected areas. Potential failure modes include one or two pumps out of operation thereby reducing the capacity of the pump station; pump intake restricted by large debris or debris build-up if trash rakes fail to operate; or failure of backup generator (during loss of primary power source) due to lack of fuel or contaminated fuel.

Road Closure Gates- Three road closure gates are to be constructed; one in Contract 3 and two in Contract 4. Each gate is about 30 to 50 feet wide and 8 to 9 feet high. There is a risk that a gate will not be closed during a flood event resulting in flooding of protected areas. Potential failure modes include damage to gate by vehicles; inadequate foundation support leading to full or partial collapse for the gate structure; or inadequate equipment on site to close the gate in the event of loss of power to the electric winch.

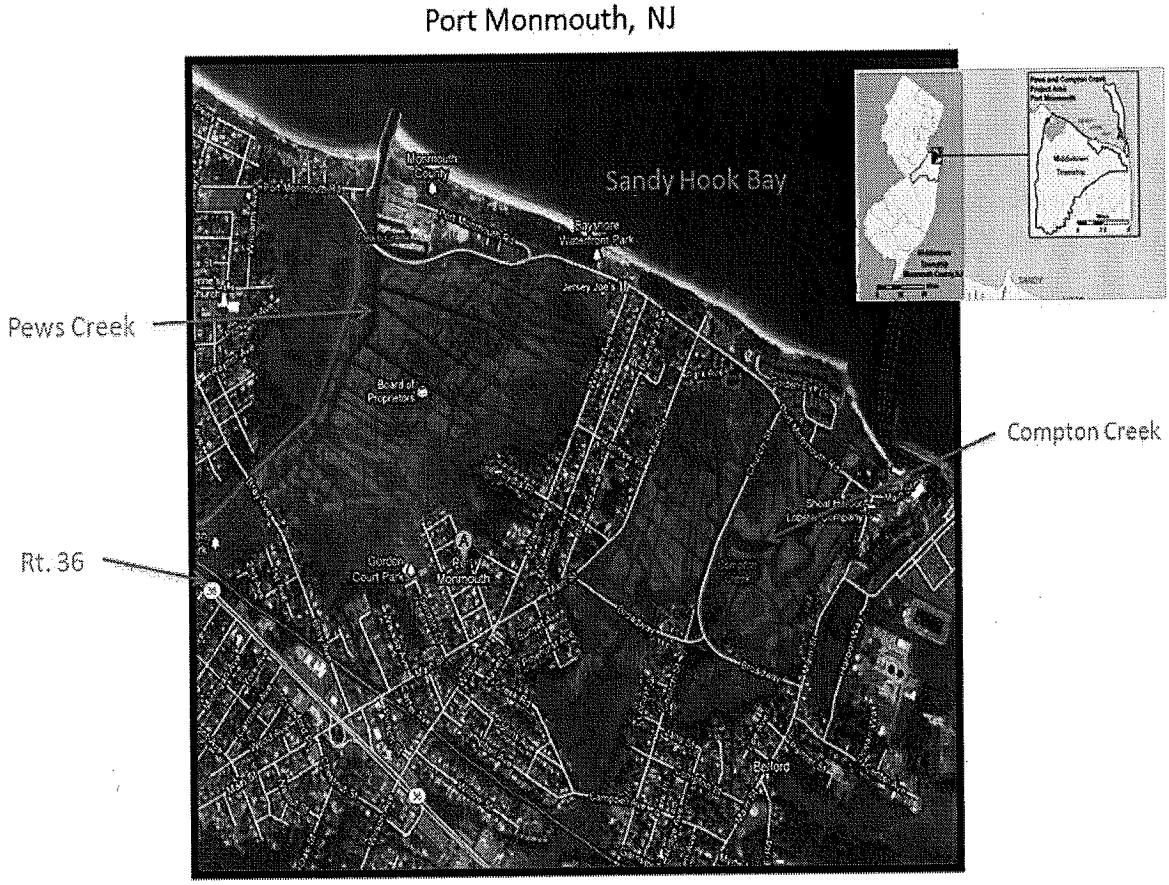

Figure 1. Project Area Location

c. Project Sponsor. The non-Federal sponsor is the New Jersey Department of Environmental Protection. Although no in-kind services from the non-Federal sponsor are anticipated to be provided for the design and construction effort, if this changes and any such services are provided, they will be subject to DQC, ATR, and IEPR.

d. Factors Affecting the Scope and Level of Review. The focus of this Review Plan is on the implementation documents and construction for the Phase II flood risk management components of the overall Raritan Bay and Sandy Hook, Hurricane and Storm Damage Reduction, Port Monmouth, NJ 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 New York District Chief of Engineering Division considered life safety and other factors including whether the project involves the use of innovative materials or techniques; whether project design includes redundancy, resiliency, and robustness; and whether the project has unique construction sequencing.

4. DISTRICT QUALITY CONTROL (DQC) AND BIDDABILITY, CONSTRUCTABILITY, OPERABILITY, ENVIRONMENTAL AND SUSTAINABILITY (BCOES) REVIEWS

All implementation documents will 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 will manage the DQC. The DQC process will be performed in two phases. The initial phase will be the day-to-day production reviews performed by the designers' Supervisor, Team Leader, or senior engineer as the product is being developed. The second phase in the process will be an independent district review. Qualified Engineers/Scientists not affiliated with the development of the product will be selected commensurate with the complexity of the product to be reviewed.

a. Documentation of DQC and BCOES. DQC (independent) and BCOES comments will be documented through the use of DrChecks[sm] and DQC/BCOES certificates. A sample Statement of District Quality Control Review is included in Attachment 2.

b. Products to Undergo DQC and BCOES. Products that will undergo DQC include DDR, EDR (as needed), Plans and Specifications and Cost Estimate. The BCOES review will focus on the Plans and Specifications.

c. Required DQC and BCOES Expertise. DQC and BCOES will be performed by staff in the home district that is not involved in preparing the implementation documents. The required disciplines for review are similar to the PDT disciplines listed in Attachment 1. The DQC supplements the reviews provided by the Project Delivery Team during the course of completing the design.

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 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. The ATR team lead will be from outside the home MSC.

a. Products to Undergo ATR. The products that will undergo ATR include the DDR, EDR (as needed), and Plans and Specifications. No site visits by the ATR team and no ATR effort during construction are anticipated to be needed.

b. Required ATR Team Expertise.

ATR Team Members/Disciplines	Expertise Required
ATR Lead	The ATR lead shall 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 shall have independently completed EA/EIS's and be well versed in the NEPA process. Expertise in tidal wetland resources is required, as well as participation in partnerships with other environmental resource agencies. The team member shall have experience with identifying and resolving environmental issues in a coastal ecosystem, and shall have experience with Section 106 actions and documentation.
Civil Engineering	Team member shall have expertise in civil engineering design and review of site/civil layout, grading, drainage and utilities for projects involving levees, floodwalls, pump stations, and gated structures within a coastal environment, and shall be a registered professional engineer.
Coastal/Hydraulics & Hydrologic Engineering	Team member shall have expertise in coastal, hydraulics and hydrologic engineering and shall have a thorough understanding of application of wave forces, water levels, and implications of sea level change over the likely range of storm return periods, and HEC computer modeling programs, and have experience sizing pump stations and other interior drainage features, and shall be a registered professional engineer.

Construction Management	Team member shall be a construction manager with 10 years experience in the management of coastal construction projects. Team member shall have experience as an Administrative Contracting Officer of projects involving levees, floodwalls, tide gates, road closure gates, pump stations, and construction of coastal structures. Team member shall be a registered professional engineer.
Electrical Engineering	Team member shall have expertise in electrical engineering design and review of electrical components, instrumentation and SCADA (Supervisory Control and Data Acquisition) for pump stations, closure gates, tide gates, and sluice gates, and shall be a registered professional engineer.
Geotechnical Engineering	Team member shall have expertise in geotechnical engineering design and review of levees and foundations for pump stations, floodwalls, gates within a coastal environment, and shall be a registered professional engineer. A minimum of a Masters degree in geotechnical engineering is also required.
Mechanical Engineering	Team member shall have expertise in mechanical engineering design and review of mechanical components of pump stations, generators, closure gates, tide gates, and sluice gates within a coastal environment, and shall be a registered professional engineer.
Structural Engineering	Team member shall have expertise in structural engineering design and review of floodwalls, tide gates, road closure gates, and pump stations within a coastal environment shall be a registered professional engineer.

c. Documentation of ATR. DrChecks[sm] ,Design Review and Checking System, 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 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[sm] 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 ER 1110-1-12. Unresolved concerns can be closed in DrChecks[sm] 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 document(s) 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) Include a copy of 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 all 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.

a. Types of IEPR. There are two types of IEPR:

1. 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.

2. 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.

b. Decision on IEPR.

(1) Type I IEPR is not applicable as per EC 1165-2-214, Civil Works Review Policy, since the Port Monmouth project is in the implementation phase.

(2) Type II Independent External Peer Review, Safety Assurance Review, is required by EC 1165-2-214 for any hurricane and storm 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 which considered life safety factors (Attachment 4- memorandum dated 22 September 2014), New York District Chief, Engineering determined that the Raritan Bay and Sandy Hook Bay, Hurricane and Storm Damage Reduction, Port Monmouth, NJ project poses a significant threat to human life (public safety) for four of the five Phase II construction contracts which involve structural measures. These measures include a tide gate, levees, floodwalls, road closure gates, and pump stations. Only Contract 1-Wetland Mitigation does not pose a threat to human life and

safety. Accordingly, a Type II IEPR, Safety Assurance Review, will be performed for Phase II Contracts 2, 3, 4, and 5.

c. **Products to Undergo IEPR.** The products that will undergo IEPR include the implementation documents, construction work (site visits near mid-point and end of construction of each contract are anticipated), and OMRR&R Manuals for the following Phase II contracts:
Contract 2: Pews Creek Tide Gate; Levee, Pump Station;
Contract 3: Pews Creek Port Monmouth Road Closure Gate and Floodwall;
Contract 4: Compton Creek Floodwall, Levees, and two Road Closure Gates;
Contract 5: Compton Creek Floodwall, Levees, Pump Station and Road Raising.

d. **Required IEPR Panel Expertise.**

IEPR Team Members/Disciplines	Expertise Required
Project Manager	The Project Manager shall be a registered professional engineer with a minimum of 15 years project management experience. The Project Manager shall have extensive knowledge of Civil Works projects including levees, floodwalls, pump stations, road closure gates, tide gates. The Project Manager should also have the necessary skills and experience to lead a virtual team through the IEPR process.
Civil Engineering	Panel member shall be a registered professional engineer from an Architect-Engineer or consulting firm, a public agency, or academia with a minimum of 20 years of civil engineering experience, including extensive experience in the design, layout, and construction of flood risk management structures including levees, floodwalls, tide gates, road closure gates, and pump stations within a coastal environment. The panel member should have demonstrated experience in performing construction management for flood risk management related projects. The Panel member shall have demonstrated knowledge in a variety of construction-related activities involving site/civil layout, surveying, 3-dimensional modeling, construction techniques, grading, hydraulic structures, interior drainage, earthwork, concrete placement, design of access roads, retaining walls design, and relocation of underground utilities.
Coastal/Hydraulics & Hydrologic Engineering	Panel member shall be a registered professional engineer from an Architect-Engineer or consulting firm, a public agency, or academia with a minimum of 20 years of experience in coastal, hydraulics and hydrologic engineering, including extensive experience in the application of wave forces, water levels and implications of sea level change over the likely range of storm return periods, and with coastal and HEC computer modeling programs, and have experience sizing pump stations and

	other interior drainage features; be familiar with USACE application of risk and uncertainty analyses. A minimum of a Masters degree in engineering is also required.
Electrical Engineering	Panel member shall be a registered professional engineer from an Architect-Engineer or consulting firm, a public agency, or academia with a minimum of 20 years of electrical engineering experience, including extensive experience with design of electrical controls, instrumentation and SCADA (Supervisory Control and Data Acquisition) for pump stations, closure gates, tide gates, and sluice gates.
Geotechnical Engineering	Panel member shall be a registered professional engineer from an Architect-Engineer or consulting firm, a public agency, or academia with a minimum of 20 years of experience in the geotechnical design of levees, and foundations for floodwalls, pump stations, and gated structures within a coastal environment, experience in subsurface investigations; field & laboratory testing and the determination of in-situ material properties; soil compaction and earthwork construction; soil mechanics; seepage and piping; slope stability evaluations; bearing capacity and settlement; dewatering and excavation in an active stream channels, and scour protection design. A minimum of a Masters degree in geotechnical engineering is also required.
Mechanical Engineer	Panel member shall be a registered professional engineer from an Architect-Engineer or consulting firm, a public agency, or academia firm with a minimum of 20 years of mechanical engineering experience, including extensive experience in the mechanical design and construction of structures such as pump stations, generators, closure gates, tide gates, and sluice gates within a coastal environment.
Structural Engineering	Panel member shall be a registered professional engineer from an Architect-Engineer or consulting firm, a public agency, or academia with a minimum of 20 years of experience in the structural engineering design and construction of hydraulic structures for civil works projects including T-wall and I-wall floodwalls, tide gates, road closure gates, and pump stations within a coastal environment.

e. **Documentation of IEPR.** DrChecks[sm] review software will be used to document all IEPR comments, responses and associated resolutions accomplished throughout the review process. Interim Project Review Reports will be prepared for each review conducted by the IEPR panel. In addition, a Final Report will be prepared to provide final documentation of the IEPR process.

Prepare Final Report: The Final Review Report will be submitted by the Type II IEPR panel no later than 60 days following submittal of the last interim deliverable. The SAR contractor shall prepare a Final Review Report to include the panel review of

the implementation documents, construction work and OMRR&R Manual. The SAR report and USACE responses shall be made available to the public on the District's website.

7. POLICY AND LEGAL COMPLIANCE REVIEW

All implementation documents will be reviewed for their compliance with law and policy. These reviews culminate in determinations that the designs and the supporting analyses and coordination comply with law and policy. DQC and ATR facilitate 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. The project has already been authorized for construction. Therefore, cost certification is not required per ER 1110-2-1302.

9. MODEL CERTIFICATION AND APPROVAL

Not applicable since the Port Monmouth project is in the Construction 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 of the Phase II DDR, EDR (as needed), Plans & Specifications are as follows:

- Contract 1 Wetland Mitigation: Oct-Nov 2015 ($30,000)
- Contract 2 Pews Creek Tide Gate; Levee, Pump Station: Jan-Feb 2016 ($40,000)
- Contract 3 Pews Creek Port Monmouth Road Closure Gate and Floodwall: Aug- Sep 2015 ($40,000)
- Contract 4 Compton Creek Floodwall, Levees, and two Road Closure Gates: Jan-Feb 2016 ($40,000)
- Contract 5 Compton Creek Floodwall, Levees, Pump Station and Road Raising: Jan-Feb 2016 ($40,000)

b. IEPR Schedule and Cost. The schedules for Phase II IEPR reviews are as follows:

Contract 2 Pews Creek Tide Gate; Levee, Pump Station:

- Design Review: Jan-Mar 2016
- Construction Review: Jan and Jul 2017
- OMRR&R Review: Jul 2017

Contract 3 Pews Creek Port Monmouth Road Closure Gate and Floodwall:

- Design Review: Aug-Oct 2015
- Construction: Jan and Jul 2017
- OMRR&R Review: Jul 2017

Contract 4 Compton Creek Floodwall, Levees, and two Road Closure Gates:

- Design Review: Jan-Mar 2016
- Construction Review: Jan and Jul 2017
- OMRR&R Review: Jul 2017

Contract 5 Compton Creek Floodwall, Levees, Pump Station and Road Raising:

- Design Review: Jan-Mar 2016
- Construction Review: Jan and Jul 2017
- OMRR&R Review: Jul 2017

The budgeted costs for these IEPR reviews, including an additional construction review if needed, is $750,000.

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 NJDEP, the county and local municipality. 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.

As required by EC 1165-2-214, the approved Review Plan will be posted on the District's public website (http://www.nan.usace.army.mil/Missions/CivilWorks/ReviewPlansandDocuments.aspx) Information will be conveyed to the public through the use of press releases and media interviews, as necessary, and through the use of posting information to the New York District's website. The public will have 30 days to provide comments on the documents; after all comments have been submitted, the comments will be provided to the technical reviewers.

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 (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. The

latest version of the Review Plan, along with the Commanders' approval memorandum, shall be posted on the Home District's webpage (http://www.nan.usace.army.mil/Missions/CivilWorks/ReviewPlansandDocuments.aspx).

13. REVIEW PLAN POINT OF CONTACT

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

David Gentile, Project Manager, New York District, 917-790-8484, David.T.Gentile@usace.army.mil

ATTACHMENT 2: SAMPLE STATEMENT OF TECHNICAL REVIEW

Raritan Bay and Sandy Hook Bay, New Jersey
Hurricane and Storm Damage Reduction
Flood Risk Management Components
Port Monmouth Phase II, Contract #___

STATEMENT OF DISTRICT QUALITY CONTROL REVIEW

The New York District has completed a District Quality Control (DQC) review of the Design Documentation Report and Plans and Specifications for the Port Monmouth, NJ Phase II Contract #_ Flood Risk Management Components. This included review of assumptions; methods, and procedures used in analyses; the appropriateness of data used and level of data obtained; and reasonableness of the results. The DQC reviewers below worked in collaboration with the Project Development Team to discuss and to resolve technical comments and issues.

_____ Date_____
Name
Civil Engineer, CENAN-EN

_____ Date_____
Name
Coastal Engineer, CENAN-EN-S

_____ Date_____
Name
Hydraulic Engineer, CENAN-EN-H

_____ Date_____
Name
Hydrologist, CENAN-EN-H

_____ Date_____
Name
Electrical Engineer, CENAN-EN-DB

_____ Date_____
Name
Geotechnical Engineer, CENAN-EN-DC

_____ Date_____
Name
Mechanical Engineer, CENAN-EN-DB

_____ Date_____
Name
Structural Engineer, CENAN-EN-DC

_____ Date_____
Name
Environmentalist, CENAN-PL-E

_____ Date_____
Name
Chief, Design Branch, CENAN-EN-D

_____Date_____
Name
Chief, Hurricane Sandy Relief Branch, CENAN-EN-S

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[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 _____ _____

Nathan Snorteland Date
Review Management Office Representative
RMC

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

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

ATTACHMENT 3: 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
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/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

Attachment 4
CENAN-EN-S 22 September 2014

MEMORANDUM For Record

SUBJECT: Raritan Bay and Sandy Hook Bay, Hurricane and Storm Damage Reduction, Port Monmouth, NJ, Phase II Flood Risk Management Components- Risk Informed Assessment of Significant Threat to Human Life

1. Project Information. The recommended plan resulting from the Feasibility Report for Raritan Bay and Sandy Hook Bay, Hurricane and Storm Damage Reduction, Port Monmouth, NJ provides for reduction of storm damages from coastal erosion and flooding and inland flooding along Pews and Compton Creeks caused by high surge events in Raritan Bay through storm protective dune, berm, beach fill, levees, floodwalls, closure gates, pump stations, interior drainage facilities, road raising and wetland mitigation. The State of New Jersey, acting through the Department of Environmental Protection, is the non-Federal sponsor for the project. A Review Plan was previously approved for the shore protection component and construction of that component is underway. A Review Plan is now being prepared for the implementation documents for the flood risk management components of project.

2. Project Description. The flood risk management components of the Port Monmouth project consist of levees, floodwalls, one tide gate, three road closure structures, road raising and two pump stations. In addition, wetland mitigation is included.

3. Risk Informed Assessment. In accordance with EC 1165-2-214 (15 Dec 2012), Civil Works Review, a risk informed assessment was made as to whether there is a significant threat to human life from the flood risk management components (Table 1).

4. Determination. Based on a risk informed assessment which considered life safety factors, I have determined that there is a significant threat to human life associated with the structural measures of the Raritan Bay and Sandy Hook Bay, Hurricane and Storm Damage Reduction, Port Monmouth, NJ, Phase II Flood Risk Management components. There is no threat to human life and safety due to the wetland mitigation

work. Accordingly, it is recommended that a Type II IEPR, Safety Assurance Review, is warranted for the Phase II Contracts 2, 3, 4, and 5 of the of the flood risk management components.

Encl

for ARTHUR J.CONNOLLY, P.E.
C, Engineering Division

Risk Informed Assessment. In accordance with EC 1165-2-214 (15 Dec 2012), Civil Works Review, Appendix E, Paragraph 2, a risk informed assessment was made as to whether there is a significant threat to human life from the Port Monmouth, NJ Hurricane and Storm Damage Reduction Project Phase II flood risk management components which would thereby require a Safety Assurance Review (SAR). The Phase II flood risk management structural components which may require a SAR include: levees, floodwalls, one tide gate, three road closure structures, road raising, and two pump stations. There is no risk to life safety from the wetland mitigation elements of the project.

Table 1: Risk Assessment for Significant Threat to Life Safety, Port Monmouth 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	Medium	Port Monmouth is a suburban community located in northern Middletown Township, Monmouth County, New Jersey. The northern border is defined by Raritan Bay. West of the project area are the communities of Keansburg and East Keansburg. East of the project area is the community of Belford. The southern boundary of the project area is formed by NJ Route 36.	Land use is primarily residential, single family homes. Significant acreage of tidal wetlands are within the protected area, bordering Pews and Comptons Creeks. Risk Assessment details are provided in 1a-c below.
1a	Population Density	Medium	Port Monmouth is approximately 1.3 square miles with an estimated population of 4,204 (US Census survey 2005-2009), or 3,234 persons/sq. mi.	Port Monmouth has a suburban population density consistent with smaller homes and yards. Due to population density, many people could be affected by flooding and/or project failure. There is a risk of inundation due to a sudden catastrophic failure along the line of protection.
1b	Critical Facilities Affected (e.g., schools, hospitals, assisted living/nursing homes, evacuation routes)	Low	Port Monmouth Road on the northern border of the project area and State Route 36 on the southern border of the project area provide east/west evacuation routes. Wilson Avenue, Main Street, and Church Street provide evacuation routes south of the project area away from Raritan Bay. Emergency services located in the project area are a Fire House on Main Street and a First Aid station on Wilson Avenue. A Daycare facility is also located within the project area on Main Street.	Critical facilities in the project area consist primarily of evacuation routes for the resident population plus other local services. Multiple alternative evacuation routes are available.
1c	Number or types of structures in	Low	There are 969 residential structures and 45 nonresidential structures within the project area.	Many residential structures may be affected by flooding or project failure, however sufficient

	floodplain			evacuation routes exist to remove population and reduce risk to life and safety.
2	Structural failure of project components	Medium	Weather events that create surge and wave conditions on Raritan Bay that could cause significant damage to the levee/floodwall/dune system thereby leading to loss of functional integrity. Pump stations may fail, leading to interior flooding.	For the completed project, structural failure of a project component up to the design event is unlikely due to the use of proven design and construction techniques. However, larger events which can lead to failure would result in significant flood damages and impact a large number of people. Risk will be inherent with all levee/floodwall projects.
3	Overtopping of Hydraulic Structure	High	Weather events that create surge on Raritan Bay that would exceed the structure design elevation, or waves which would result in wave overtopping of levee/floodwalls/dunes. Increasing likelihood of such events as sea level rises over time.	Still water levels higher than the design crest elevation of +13 ft NAVD (estimated at a 200-yr return period without sea level rise) would cause general catastrophic overtopping of the line of protection. Before the still water level overtops the line of protection, however, wave overtopping will induce significant flooding behind the line of protection between 25- and 50-year return period events, exceeding capacity of the proposed pump stations. Increases to sea level over time will increase likelihood of wave and/or still water overtopping.
4	Shoreline Storm Erosion	Low	Coastal storms often result in significant shore erosion over short time periods which can undermine structures.	Construction of the dune/berm component increased berm width, dune height, and dune volume which will lessen the risk of storm erosion.
5	Wave Attack	Low	Overtopping of the line of protection by waves during high water level events can result in damage to structures from direct wave impact.	Direct wave attack to structures within the line of protection will be largely prevented by the line of protection.
6	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 will employ accepted methods in accordance with COE guidance. No innovative or precedent setting methods or models are anticipated.
7	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 project features will fall within prevailing practice and include only time-tested design.
8	Use of unique or non-traditional construction	Low	Unique or non-traditional construction materials or methods may be poorly understood or executed inadequately resulting in a	All materials and construction techniques used are in common practice.

	materials or methods		project feature that may be more subject to failure than those built with proven materials and methods.	
9	Does the project have unique construction sequencing or a reduced or overlapping design/construct ion schedule?	Medium	The size of the project requires construction to be sequenced in a series of contracts. In the interim prior to completion of all contracts, the partially built project may be subject to risk of failure in terms of inundation in the project area.	Due to the construction sequencing, the authorized line of protection will not be achieved until all portions are constructed.
10	Does the project design require:			
10a	Redundancy	Medium	Failure of one critical project element would result in sudden, catastrophic damage. Duplication of critical components of the protective system are required to increase the reliability of the system.	The levees, floodwalls, tide gate, dune/berm, etc. greatly reduce the risk to human life and property relative to the without project condition. Certain features including sluice gates, flap valves, and pump stations provide some minimal redundancy.
10b	Resiliency	High	Level of protection may be reduced over time. This is of particular concern due to the authorization of the project to a specified elevation of +13 ft. NAVD.	Increase in sea level will reduce the relative crest elevation of the line of protection, and will reduce its effectiveness against surge and wave overtopping over the 50-year project life. To increase the line of protection elevation of the structural measures will require major reconstruction and possibly new authorization. Adherence to OMRR&R requirements will help sustain the operating efficiency of the project.
10c	Robustness	High	Natural events can occur that are greater than the optimized project design, and may lead to project failure.	This project is designed to a +13 ft. NAVD crest elevation. Should storm surge and/or wave overtopping exceed that elevation, damages will occur, as well as possible project failure. Sea level rise will lead to increased risk over the project life.