



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

18 Sep 2019

MEMORANDUM FOR Commander, U.S. Army Corps of Engineers, New England District, 696 Virginia Road Concord, MA 01742-2751

SUBJECT: Review Plan Approval for the Cape Cod Canal Highway Bridges Major Rehabilitation Evaluation Report, Cape Cod Canal Federal Navigation Project, MA

1. Reference CENAE-PP memorandum dated 26 July 2019, subject as above.
2. I have reviewed the above referenced plan, as well as the endorsement of the Inland Navigation Planning Center of Expertise of the Great Lakes and Ohio River on the 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 NAD.
4. The point of contact is Mr. Larry Cocchieri, NAD Planning Program Manager, 347-370-4571, Lawrence.J.Cocchieri@usace.army.mil.

Encl

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KAREN J. BAKER
Programs Director



DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
696 VIRGINIA ROAD
CONCORD MA 01742-2751

CENAE-PP

26 July 2019

MEMORANDUM FOR Commander, U.S. Army Corps of Engineers, North Atlantic Division, (CENAD-PD-X/Mr. Larry Cocchieri), Fort Hamilton Military Community 302 General Lee Avenue, Brooklyn, NY 11252-6700

SUBJECT: Cape Cod Canal Highway Bridges Major Rehabilitation Evaluation Report, Cape Cod Canal Federal Navigation Project, MA Review Plan Submittal

1. Please find enclosed the Review Plan (RP) and Planning Center of Expertise for Inland Navigation (PCXIN) Endorsement Memorandum for the Cape Cod Canal Highway Bridges Major Rehabilitation Evaluation Report (MRER), Cape Cod Canal Federal Navigation Project (FNP) for your review and approval. The RP has been presented to the Planning Center of Expertise for Inland Navigation and Risk Management Center (PCXIN-RMC) for its review and endorsement in accordance with EC 1165-2-217 "Review Policy for Civil Works" dated 01 May 2018.
2. Request review and approval prior to 16 August 2019 to ensure compliance with guidance for the implementation of Independent External Peer Review (IEPR) according to both Sections 2034 and 2035 of the Water Resources Development Act (WRDA) of 2007 (P.L. 110-114), as amended by Sections 1044 and 3028 of the Water Resources Reform and Development Act (WRRDA) of 2014 (P.L. 113-121).
3. Your approval memorandum, PCXIN Endorsement Memorandum, and the RP will all be posted on the District website in accordance with EC 1165-2-217.
4. If you have any questions or need additional information, please contact Mr. Craig Martin at (978) 318-8638.

A handwritten signature in black ink, appearing to read "Scott E. Acone".

SCOTT E. ACONE
Deputy District Engineer for
Programs & Project Management

Enclosures (as stated)

1. PCXIN Endorsement Memo
2. Cape Cod Canal Highway Bridges MRER Review Plan



DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT, CORPS OF ENGINEERS
502 EIGHT STREET
HUNTINGTON, WEST VIRGINIA 25701-2035

REPLY TO
ATTENTION OF

CELRH-PCXIN-NC

24 July 2019

MEMORANDUM FOR Commander, U.S. Army Corps of Engineers, New England District (CENAE-PPC/Craig Martin) 696 Virginia Road, Concord, Massachusetts.

SUBJECT: Bourne and Sagamore Highway Bridges, Cape Cod Canal Federal Navigation Project, Bourne Massachusetts, Study Review Plan.

1. The National Planning Center of Expertise for Inland Navigation (PCXIN) has reviewed the draft Review Plan (RP) for the subject study and concurs that the RP complies with current peer review policy requirement contained in Engineer Circular 1165-2-217, entitled "Review Policy for Civil Works".
2. This RP was prepared by CENAE-PPC, reviewed by PCXIN, and all review comments have been satisfactorily resolved.
3. PCXIN endorses this RP to be approved by the Major Subordinate Command (MSC) Commander. Upon approval of the RP, please provide a copy of the approved RP, a copy of the MSC Commander's approval memorandum, and a link to where the RP is posted on the District website.
4. Thank you for the opportunity to assist in preparation of this RP. Please coordinate all aspects of the required review efforts as defined in the RP. Please contact Beth Cade at 304.399-5848 should you have any questions or require additional information.

Encl

CADE.BETH.A
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BETH A. CADE
Senior Planner
PCX for Inland Navigation

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DECISION DOCUMENT REVIEW PLAN

1 July 2019

Bourne and Sagamore Highway Bridges Cape Cod Canal Federal Navigation Project Bourne, Massachusetts

P2: 450095

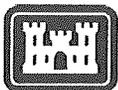
Major Rehabilitation Evaluation Report



District: New England (NAE)
District Contact: Craig Martin

Major Subordinate Command (MSC): North Atlantic Division (NAD)
MSC Contact: Larry Cocchieri

Review Management Organization (RMO): Planning Center of Expertise for
Inland Navigation and Risk Informed Economics Division (PCXIN - RED)
RMO Contact: Beth Cade



**US Army Corps
of Engineers®**

DECISION DOCUMENT REVIEW PLAN

Bourne and Sagamore Highway Bridges Cape Cod Canal Federal Navigation Project Major Rehabilitation Evaluation Report

Key Review Plan Dates

Date of RMO Endorsement of Review Plan: 24 July 2019
Date of MSC Approval of Review Plan: Pending
Date of IEPR Exclusion Approval: N/A
Has the Review Plan changed since PCX Endorsement? N/A
Date of Last Review Plan Revision: 1 July 2019
Date of Review Plan Web Posting: (Once MSC Approval Received)
Date of Congressional Notifications: (enter date the RIT notified Congress of IEPR decisions)

Milestone Schedule

	<i>Scheduled</i>	<i>Actual</i>	<i>Complete</i>
<u>Release Draft Report to Public:</u>	16 Sep 2019		No
<u>Final EA w/FONSI</u>	27 Jan 2020		No
<u>Final Report Transmittal:</u>	15 Feb 2020		No
<u>Senior Leaders Briefing:</u>	6 Mar 2020		No

DECISION DOCUMENT REVIEW PLAN

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DECISION DOCUMENT REVIEW PLAN

Bourne and Sagamore Highway Bridges Cape Cod Canal Federal Navigation Project Major Rehabilitation Evaluation Report

1. PURPOSE AND REQUIREMENTS

a. Purpose

This Review Plan defines the scope and level of peer review for the Bourne and Sagamore Highway Bridges Major Rehabilitation Report (MRER) of the Cape Cod Canal Federal Navigation Project, Bourne, Barnstable County, Massachusetts. This Review Plan applies to the MRER effort that will document the evaluation results of the present condition, present and future reliability, and consequences of unreliability of various key components of the Bourne and Sagamore highway bridges. The MRER seeks to address the maintenance issues faced in the Bourne and Sagamore bridge complex that affect vehicular access to Cape Cod and the navigational uses of the canal.

b. References

- 1) EC 1165-2-217, Civil Works Review, 1 May 2018
- 2) EC 1105-2-412, Assuring Quality of Planning Models, 31 Mar 2011
- 3) ER 1105-2-100, "Planning Guidance Notebook," April 2000
- 4) ER 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 Nov 2007
- 5) ER 200-2-2, "Procedures for Implementing NEPA", 4 Mar 88
- 6) ER 1165-2-119, "Water Resources Policies and Authorities - Modifications to Completed Projects," 20 September 1982
- 7) ER 1130-2-500, "Project Operations - Partners and Support (Work Management Guidance and Procedures)," 27 December 1996
- 7) EP 1130-2-500, "Project Operations - Partners and Support (Work Management Guidance and Procedures)," 27 December 1996
- 8) ER 1110-1-12, Quality Management, 30 Sep 2006

c. Requirements

This review plan was developed in accordance with EC 1165-2-217 (1 May 2018), 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 (OMRER&R).

The EC outlines four general levels of review: District Quality Control/Quality Assurance (DQC), Agency Technical Review (ATR), Independent External Peer Review (IEPR), and Policy and Legal Compliance Review. In addition to these levels of review, decision documents are subject to cost engineering review and certification (per EC 1165-2-217) and planning model certification/approval (per EC 1105-2-412). This document outlines the peer review plan for the Cape Cod Canal Bridges

Major Rehabilitation Evaluation Report (MRER), Bourne, Massachusetts.

2. REVIEW MANAGEMENT ORGANIZATION (RMO) COORDINATION

The RMO is responsible for managing the overall peer review effort described in this Review Plan. The RMO for decision documents is typically either a Planning Center of Expertise (PCX) or the Risk Management Center (RMC), depending on the primary purpose of the decision document. The RMO for the peer review effort described in this Review Plan is the National Planning Center of Expertise for Inland Navigation and Risk Informed Economics Division (PCXIN-RED).

The RMO will coordinate with the Cost 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. The RMO will also coordinate with the Corps of Engineers Institute for Water Research – Risk Management Center (CEIWR-RMC) to ensure that review teams with appropriate expertise are assembled.

3. STUDY INFORMATION

a. Major Rehabilitation Study Approach

The New England District is undertaking a Major Rehabilitation Evaluation Study to evaluate the existing condition and reliability of both the Bourne and Sagamore highway bridges of the Cape Cod Canal, MA Federal Navigation Project (FNP). The study will lead to a Major Rehabilitation Evaluation Report (MRER) which develops the engineering requirements, budgets, timelines and associated consequences for rehabilitation of the Bourne and Sagamore bridges to determine if major restoration of the bridges can significantly improve their reliability and extend their physical life, or if replacement of one or both bridges is the most fiscally responsible and practicable long-term solution for the project and the region.

The analysis will follow the Major Rehabilitation Evaluation Report guidance outlined in ER/EP 1130-2-500. The MRER compares the base condition, against various major rehabilitation events and replacement scenarios. The base condition assumes that the existing O&M practices continue with emergency repairs of failed components as they occur, or a “Fix-as-Fails” baseline. The rehabilitation alternative includes scheduled replacement of major bridge components over the 50-year maintenance horizon to avoid emergency repair on both structures, while replacement alternatives include construction of a new bridge within the current authorization against a number of transportation solutions.

“Procedures for Implementing NEPA” (ER 200-2-2) will guide efforts in regards to National Environmental Policy Act (NEPA) compliance. It is anticipated that environmental compliance will be met through an Environmental Assessment. However, final actions will be assessed by the New England District’s Evaluation Branch to ensure proper NEPA procedures are followed. The Bourne and Sagamore Highway Bridges, Major Rehabilitation Evaluation Report will be subject to approval through Headquarters, United States Army Corps of Engineers (HQUSACE).

b. Project Background & Authorization

In 1899 the Commonwealth of Massachusetts (the State) issued a charter to the Boston, Cape Cod, and New York Canal Company (Canal Company) for construction of the Cape Cod Canal. The

Charter was established in the Massachusetts Acts and Resolves of 1899 (Ch. 448) as amended by the Massachusetts Acts and Resolves of 1900 (Ch. 476). The Canal Company substantially completed construction of the canal in 1914, and opened the canal to navigation on July 30th of that year. Construction of the canal severed overland transportation between Cape Cod and the rest of the region. As a condition of granting the canal charter to the Canal Company, the Commonwealth required the construction of two highway bridges, one in each of the towns severed by the canal, to maintain vehicular and pedestrian access.

Federal purchase of the Cape Cod Canal (including all property, franchises, and appurtenances) from the Canal Company was authorized by Section 4 of the Rivers and Harbors Act of 8 August 1917. The Cape Cod Canal purchase contract was executed on 29 July 1921 (contained in House Document 139, 12 December 1921, see also Senate Report #924, 68th Congress, 2d Session, 22 Jan 1925), and was later ratified by the Rivers and Harbors Act of 21 January 1927, Chapter 47, Section 2 (44 Stat. 1010, P.L. 69-560, H.R. 11616), thus establishing the Cape Cod Canal Federal Navigation Project (FNP). Title to the Canal passed to the Federal Government on 31 March 1928.

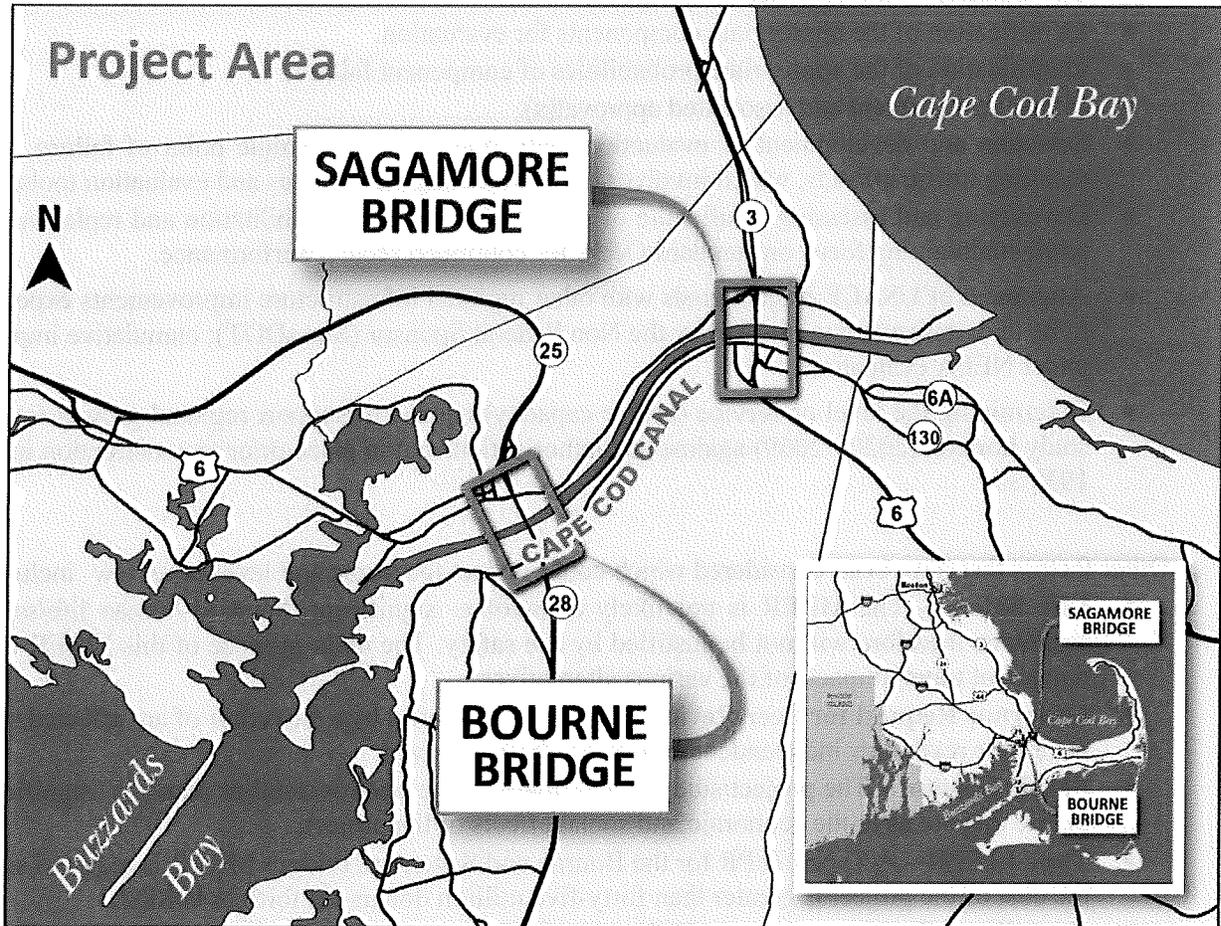
When USACE (the Corps) took ownership of the Canal, it assumed the obligations of the former owner, including ownership and responsibility for the vehicle and rail crossings. Widening and deepening of the canal in the 1930s required the replacement of the two original draw bridges with the existing railroad lift bridge and two fixed high-level highway bridges (Bourne & Sagamore). The bridge replacement, completed in 1935, was accomplished as part of the public works program under the National Recovery Act of 1933, though the Corps performed final design and construction management. Modifications to the Cape Cod Canal FNP, as recommended in House Document #15 (26 December 1934), were authorized by the River and Harbor Act of 30 August 1935, 74th Congress, 1st Session (P.L. 74-409). The modifications authorized by RHA 1935 included the responsibility for the USACE to maintain the three newly completed bridges as part of the Canal project.

The two highway bridges last underwent major rehabilitation in 1979-1983. The two highway bridges are now over 84+ years old and, despite diligent maintenance and increasing frequent repair efforts, continue to deteriorate. Posting of the highway bridges to limit heavy loads is likely in the near future and will have a significant impact on regional transportation and the local and regional economy. Extensive rehabilitation or replacement is likely required in the 2025-2030 timeframe.

c. Project Area

The Bourne and Sagamore bridges, located in southeast Massachusetts, provide the only vehicular access to the 15 towns of Cape Cod with nearly 215,000 year-round residents and a population increase of up to 300% during the height of the summer tourist season between Memorial Day and Labor Day. The bridges also provide access to the 8 offshore island municipalities on Nantucket and Dukes Counties (including Martha's Vineyard) through the ferry terminals located on Cape Cod. Traffic volumes have increased exponentially since the 1930's leading to significantly increased loading on the bridges with the result of increasingly frequent maintenance and repair events. Because the bridges do not comply with current highway standards, each maintenance/repair event requires lane closures causing significant restrictions of each bridge's carrying capacity during each maintenance/repair event.

d. Project Map



4. FACTORS AFFECTING THE LEVELS OF REVIEW

Major rehabilitation of the Bourne and Sagamore bridges require an assessment of the reliability of specific components of the structures and the associated costs of repairs. In addition to the reliability effort, the economic impact of lane and full bridge closure, from planned repair closures through catastrophic failure, will be evaluated to determine the consequences of various repair schedules and aid in the determination of the most efficient plan.

The project risks primarily involve the reliability of the structure components and the modeling of potential economic consequences. A single point of failure leading to extended lane or full bridge closure would result in significant traffic impacts for residents, workers and travelers to and from Cape Cod. The resulting constriction of goods, services, and transportation of people could severely impact the economy of the region due to the nature of Cape Cod as a tourism destination. The economic evaluation seeks to quantify the time costs of such vehicular access restrictions. This type of evaluation involves the use of innovative modeling techniques and presents unique challenges and risks.

In summary, the primary challenges of the MRER are:

- Coordination of a diverse team of experts.
- Identification of the appropriate components for evaluation.
- Identification of the appropriate probabilities of component failure.
- Model development and associated approval(s).
- Selection and development of evaluation methodology for the single point of failure and resulting traffic impacts, which involves novel modeling techniques and evaluation tools.
- Developing and assessing a full suite of project alternatives (rehabilitation and replacement) while maintaining focus on standard O&M for continued project performance.
- Alignment of USACE project goals with other regional infrastructure improvements expected to be undertaken in conjunction by the Non Federal Sponsor (MassDOT); cumulative impacts under NEPA evaluation.
- Determining the level of service (bridge capacity) needed to support regional growth for the study horizon (2020 - 2069) against the authorizations put in place prior to construction in the 1930's.

Other factors that have been considered which could impact the scope and level of review include:

- **Life Safety** – The MRER is not likely to involve significant threat to human life/safety assurance therefore will not be justified by life safety. The main purpose of this MRER is to document travel impacts of the various alternatives.
- **Governor Request for Peer Review** – To date, no request by a Governor of an affected state for a peer review by independent experts has been received.
- **Public Dispute** – The project/study is anticipated to be controversial or result in significant public dispute as to the economic and social effects of the project.
- **Type I IEPR** – A Type I IEPR for the Bourne and Sagamore bridges MRER is required since the cost of the project is greater than forty-five million dollars set forth in WRDA.
- **Cost-Share Partner** – A cost sharing partner is not required for the study portion of the MRER as all rehabilitation being considered is directed towards restoring the reliability of the original project features. Potential cost sharing of design, build, finance, maintain and operate activities of replacement bridges are expected to be addressed as a part of a “Value of Money” analysis and contained within the final MRER.
- **In-Kind Contributions**. The bridges are federally owned, operated and maintained, thus, there will be no in-kind contribution during the decision document. Should replacement be selected and a non-Federal sponsor wish to augment the design of the structures the Federal Government will consider betterments

5. REVIEW EXECUTION PLAN

This section describes each level of review to be conducted. Based upon the factors discussed in Section 1, this study will undergo the following types of reviews:

District Quality Control: All decision documents (including data, analyses, environmental compliance documents, etc.) undergo DQC. This internal review process covers basic science and

engineering work products. It fulfils the project quality requirements of the Project Management Plan.

Agency Technical Review (including Cost Engineering Review): ATR is performed by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. These teams will be comprised of certified USACE personnel. The ATR team lead will be from outside the home MSC. If significant life safety issues are involved in a study or project a safety assurance review should be conducted during ATR.

All decision documents shall be coordinated with the Cost Engineering Mandatory of Expertise (MCX). The MCX will assist in determining the expertise needed on the ATR and IEPR teams. The MCX will provide the Cost Engineering certification. The RMO is responsible for coordinating with the MCX for the reviews.

Independent External Peer Review: Type I IEPR will be required for decision documents under certain circumstances. This is the most independent level of review, and is applied in cases that meet criteria where the risk and magnitude of the project are such that a critical examination by a qualified team outside of USACE is warranted. A risk-informed decision is made as to whether Type I IEPR is appropriate.

Model Review and Approval/Certification: EC 1105-2-412 mandates the use of certified or approved models for all planning work to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions.

Policy and Legal Review. All decision documents will be reviewed for compliance with law and policy. ER 1105-2-100, Appendix H provides guidance on policy and legal compliance reviews. These reviews culminate in determinations that report recommendations and the supporting analyses and coordination comply with law and policy, and warrant approval or further recommendation to higher authority by the home MSC Commander. These reviews are not further detailed in this section of the Review Plan.

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

Table 1: Levels of Review

Product(s) to undergo Review	Review Level	Start Date	End Date	Cost	Complete (Y/N)
Bourne and Sagamore Bridges Structural Reliability Model	Model Review	01Sep2017	01Dec2017	\$2,500	Y
Bourne and Sagamore Bridges Reliability Economic Model	Model Review	15Mar2018	30May2018	\$4,500	Y
Draft Major Rehabilitation Evaluation Report and EA	District Quality Control	08Aug2019	04Sep2019	\$15,000	N
Draft Major Rehabilitation Evaluation Report and EA	Agency Technical Review	15Sep2019	01Nov2019	\$25,000	N
Draft Major Rehabilitation Evaluation Report and EA	Type I IEPR	07Oct2019	15Dec2019	\$125,000	N
Draft Major Rehabilitation Evaluation Report and EA	Policy and Legal Review	15Sep2019	01Nov2019	\$7,500	N
Final Major Rehabilitation Evaluation Report and EA	District Quality Control	01Jan2020	20Jan2020	\$10,000	N
Final Major Rehabilitation Evaluation Report and EA	Agency Technical Review	21Jan2020	12Feb2020	\$25,000	N
Final Major Rehabilitation Evaluation Report and EA	Policy and Legal Review	21Jan2020	12Feb2020	\$7,500	N

a. DISTRICT QUALITY CONTROL

All decision documents (including supporting data, analyses, environmental compliance documents, etc.) shall undergo District Quality Control (DQC). DQC is an internal review process of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Management Plan (PMP). The home district shall manage DQC. Documentation of DQC activities is required and should be in accordance with the Quality Manual of the District and the home Major Subordinate Command MSC. The U.S. Army Corps of Engineers, New England District has adopted the North Atlantic Division (NAD) quality control process.

1. Products to undergo DQC will include:

a. Engineering.

- (1) *Structural Engineering*: surveys; model input and output for base conditions, future without conditions and alternative plans; alternative rehabilitation plans; structures design of alternative plans; structures design of tentatively selected plan; risk analysis of the tentatively selected plan and the recommended plan; draft structural appendix, and final structural appendix, draft and final MRER.
- (2) *Civil Engineering*: surveys; model input and output for base conditions, future without and alternative plans; alternative plans; general operational and maintenance designs of alternative plans; general operational and maintenance designs of the tentatively selected plan; inter-relationship of adjacent infrastructure (Non-Federal) with bridge design; put to the draft and final MRER; structures design of alternative plans; structures design of tentatively selected plan; risk analysis of the tentatively selected plan and the recommended plan, draft and final MRER.
- (3) *Cost Engineering*: construction cost estimates of the alternative plans, Cost and Schedule Risk Analysis (CSRA), cost of tentatively selected plan, and recommended plan, draft and final MRER.

b. Economics. documentation identifying a baseline condition; regional impact assessment (RIA), a RIA model, event tree analysis, alternative analysis, simulation modeling, project benefits determination and evaluation, NED determination, transportation rate savings study, traffic forecasts, elasticity of demand calculations and related modeling, analysis of response to closures, draft economic appendix, and final economic appendix.

c. Environmental. preliminary draft National Environmental Policy Act documentation and associated technical analyses and reports; preliminary draft MRER; public review comments and responses; initial cultural resources evaluations; cultural resources scope of work; cultural resources input to the MRER; final NEPA documentation; and final MRER document.

Where practicable, the technical products that support subsequent analyses should be reviewed prior to being used in the study. Additionally, the PDT will be responsible for a complete reading of the report to assure the overall integrity of the report, technical appendices and the

recommendations before the approval by the District Commander. Each draft report submittal for NAD/MSC review will be subjected to the DQC process and will include a DQC certification.

2. Required DQC Expertise

DQC checks will be performed by qualified staff within each discipline to include engineering, construction, operations, risk and reliability, environmental, economics, cost engineering, real estate and legal. Supervisors within each area of responsibility will assign appropriate qualified staff to perform QC on their respective products. Personnel performing QC shall have the necessary expertise to address compliance with published Corps policy.

Due to the size and complexity of the project and availability of discipline staff at the District the DQC may require additional review at the Division/MSC level to meet integrity requirements. Those requested to review as a part of the DQC will be excluded from the ATR.

Table 2: Required DQC Team Expertise

DQC Team Disciplines	Expertise Required
DQC Lead and Plan Formulation	<p>The DQC Lead/Planning reviewer should have at least 10 years' experience as a plan formulator who has worked with project teams to identify and evaluate major rehabilitation activities and alternatives using appropriate planning methodologies to address navigation studies in accordance with ER 1105-2-100, the Planning Guidance Notebook.</p> <p>Must have extensive plan formulation experience reviewing the analysis with which the measures and alternatives were evaluated and determining that they are sufficiently comprehensive and complete to result in approval of a recommended alternative. Review the documentation of the selection of a recommended plan and ensure the team used an approved plan selection methodology.</p>
Economics	<p>The Economics reviewer should have at least 10 years USACE economics experience or equivalent education. The Economics reviewer should have a background in developing economic simulation models and analysis for large, complex regional investigations, involving non-traditional project benefit determination. Should have extensive experience in analyzing navigation projects in accordance with ER 1105-2-100, the Planning Guidance Notebook. Experience certifying economic models preferred.</p>
Civil Engineering	<p>The Civil Engineering reviewer should have a PE and at least 10 years civil engineering experience or equivalent education. Should have extensive civil engineering experience on design or construction teams related to navigation projects, bridge rehabilitation and/or replacement experience preferred.</p>

Structural Engineering	The Structural Engineering reviewer should have a PE and at least 10 years structural engineering experience or equivalent education. Should have extensive structural engineering experience on design or construction teams that worked on navigation (bridge rehab / replacement) projects elements such as lock gates and gate bays, lock chambers, lock guide walls, and levees. Should have design experience evaluating reinforced concrete structures and steel gates.
Cost Engineering	The Cost Engineering reviewer should have at least 10 years' experience working with estimating complex and phased costing of multi-year civil construction projects. Should have direct cost engineering experience working with navigation projects in a design phase or construction management capacity, bridge rehabilitation or replacement preferred.
Environmental / Cultural Resources & NHP	The Environmental / Cultural Resources reviewer should have at least 10 years' experience in reviewing environmental compliance documents for large, complex regional investigations, involving traditional project impacts. The reviewer should be thoroughly versed in national environmental statutes and guidelines, especially in regard to the National Environmental Policy Act, and the National Historic Preservation Act experience

3. Documentation of DQC.

Documentation of DQC will follow the procedures as outlined in DrChecks for QC/QA Procedures for Civil Works. It is the responsibility of each product development team member, their supervisors, and the project manager to ensure that every product receives an internal quality control review. It is the responsibility of the supervisor or section chief for each team member to ensure that a qualified DQC reviewer that has not been involved with the preparation of the technical product under review is selected and conducts a review of their product prior to delivery to the project manager, or prior to completion. In accordance with District QMP procedures, the management of the review process will be coordinated by a designated Quality Control Review Leader (QCRL). The QCRL will compile all technical, grammatical, and editorial comments and will ensure DQC standards are met prior to submission of the MRER and associated appendices to the Vertical Team. Dr. Checks will be used to document all DQC comments, responses, and associated resolution accomplished throughout the review process. Once the DQC process is complete a Certificate of Quality Control Review and the DrChecks comments will be provided to the ATR team lead.

b. AGENCY TECHNICAL REVIEW

Agency Technical Review (ATR) is mandatory for all decision documents (including supporting data, analyses, environmental compliance documents, etc.). The objective of ATR is to ensure consistency with established criteria, guidance, procedures, and policy. The ATR will assess whether the analyses presented are technically correct and comply with published USACE guidance, and that the document explains the analyses and results in a reasonably clear manner for the public and decision makers.

ATR is managed within USACE by the designated RMO and is conducted by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. ATR teams will be comprised of senior USACE personnel and may be supplemented by outside experts as appropriate. The ATR team lead will be from outside the home MSC. The PCXIN will coordinate the ATR with the INDC-MCX as necessary for technical advice and oversight. The ATR Team Leader will be selected from outside the North Atlantic Division. All ATR reviewers for an engineering discipline will be CERCAP certified. If the INDC representative has an engineering background, this team member will also be CERCAP certified.

1. Products to Undergo ATR.

ATR will be performed for the following standard products:

- Draft MRER and EA
- Final MRER Report and EA

In addition to the above, early ATR will be required for the economic modeling and cost engineering efforts. This ATR will be part of the model review and approval process. Further, in progress documentation will be prepared as practicable and necessary for review of process and outcomes as determined by the PCXIN.

2. Required ATR Team Expertise.

The names, organizations, and contact information of ATR team members are included in Attachment 1.

Table 3: Required ATR Team Expertise

ATR Team Disciplines	Expertise Required
ATR Lead and Plan Formulation	<p>The ATR Lead/Planning reviewer should have at least 15 years' experience as a plan formulator who has worked with project teams to identify and evaluate major rehabilitation activities and alternatives using appropriate planning methodologies to address navigation studies in accordance with ER 1105-2-100, the Planning Guidance Notebook.</p> <p>Must have extensive plan formulation experience reviewing the analysis with which the measures and alternatives were evaluated and determining that they are sufficiently comprehensive and complete to result in approval of a recommended alternative. Review the documentation of the selection of a recommended plan and ensure the team used an approved plan selection methodology.</p>

Economics	The Economics reviewer should have at least 10 years USACE economics experience or equivalent education. The Economics reviewer should have a background in developing economic simulation models and analysis for large, complex regional investigations, involving non- traditional project benefit determination. Should have extensive experience in analyzing navigation projects in accordance with ER 1105-2-100, the Planning Guidance Notebook. Experience certifying economic models preferred.
Civil Engineering	The Civil Engineering reviewer should have a PE and at least 10 years civil engineering experience or equivalent education. Should have extensive civil engineering experience on design or construction teams related to navigation projects, bridge rehabilitation and/or replacement experience preferred.
Structural Engineering	The Structural Engineering reviewer should have a PE and at least 10 years structural engineering experience or equivalent education. Should have extensive structural engineering experience on design or construction teams that worked on navigation (bridge rehab / replacement) projects elements such as lock gates and gate bays, lock chambers, lock guide walls, and levees. Should have design experience evaluating reinforced concrete structures and steel gates.
Cost Engineering	The Cost Engineering reviewer should have at least 10 years' experience working with estimating complex and phased costing of multi-year civil construction projects. Should have direct cost engineering experience working with navigation projects in a design phase or construction management capacity, bridge rehabilitation or replacement preferred.
Environmental / Cultural Resources & NHP	The Environmental / Cultural Resources reviewer should have at least 10 years' experience in reviewing environmental compliance documents for large, complex regional investigations, involving traditional project impacts. The reviewer should be thoroughly versed in national environmental statutes and guidelines, especially in regard to the National Environmental Policy Act, and the National Historic Preservation Act experience

3. 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:

- a. The review concern – identify the product's information deficiency or incorrect application of policy, guidance, or procedures;
- b. The basis for the concern – cite the appropriate law, policy, guidance, or procedure that has not been properly followed;

- c. 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
- d. The probable specific action needed to resolve the concern – identify the action(s) that the reporting officers must take to resolve the concern.

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

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

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

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

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

c. 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 1165-2-217, 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.

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.

Decision on IEPR. In accordance with EC 1165-2-217, Paragraph 11, and Section 20134(a)(5)(A) of WRDA 2007, a Type I IEPR will be mandatory for the Bourne and Sagamore bridges MRER as the cost of the project is expected to exceed the \$200 million, have significant interagency interest, and will likely have significant public controversy. Additionally, the project involves the use of innovative modeling techniques in the economic evaluation and involves the development and approval of a onetime use economic model.

1. Products to Undergo Type I IEPR include:

- Draft Major Rehabilitation Evaluation Report and EA

2. Required Type I IEPR Panel Expertise. Anticipated panel review disciplines are listed below.

Table 4: Required IEPR Panel Expertise

IEPR Panel Members/Disciplines	Expertise Required
Planning & Economics	<p>The Planning & Economics panel member should be from academia, a public agency, a non-governmental entity, or an Architect-Engineer or Consulting Firm with at least a Master's degree and have 15 years demonstrated experience as a senior water resources planner or economist who has worked with project teams to identify and evaluate measures and alternatives using appropriate planning and economic methodologies to address navigation (bridge replacement) projects in a coastal waterway system. Must have extensive experience reviewing economics related to transportation including experience with financing transportation infrastructure and national and international logistics and transportation requirements. Must have extensive experience reviewing the analysis with which the measures and alternatives were evaluated and determine that they are sufficiently comprehensive and complete to result in approval of a recommended alternative. Should have experience working with risk informed approaches to decision making, risk models and disaster scenarios with regard to economic impact. Review the documentation of the selection of a recommended plan and ensure the team used an approved plan selection methodology. Five years of experience directly dealing with USACE planning process as outlined in ER 1105-2-100, Planning Guidance Notebook, is highly recommended.</p>
Civil/Structural Engineering	<p>The Civil/Structural Engineering panel members should have a PE with a minimum 15 years demonstrated civil/structural engineering experience or combined equivalent of education and experience assessing navigation (bridge replacement) projects. Member should be a Registered Professional Engineer from academia, a public agency, or an Architect-Engineer or Consulting Firm with at least a Master's degree. Should have direct civil engineering design or construction management experience with regard to bridge repair and construction, waterway engineering/hydraulics, traffic management plans, reinforced concrete structures, and transportation infrastructure.</p> <p>Active participation in related professional societies is encouraged.</p>

Cost Engineer	The Cost Engineering panel member should have a PE with 15 years demonstrated experience or combined equivalent of education and experience assessing navigation (bridge replacement) projects in a coastal waterway system. Member should be a Registered Professional Engineer from academia, a public agency, or an Architect-Engineer or Consulting Firm with at least a Master's degree. Should have direct cost engineering design or construction management experience centered around bridge / transportation infrastructure design and construction along the coastal waterway system. Should be familiar with USACE applications of risk and uncertainty analysis in navigation transportation projects. Active participation in related professional societies is encouraged.
Environmental/ Cultural Resources	The Environmental and Cultural Resources panel members should be a scientist from academia, a public agency, a non-government entity, or an Architect-Engineer or Consulting Firm with a minimum 15 demonstrated experience working with the NEPA impact assessment of public works projects. The panel member should have at least a Master's degree in an appropriate field of study. Experience should encompass determining the scope and appropriate methodologies for environmental impact analyses for projects and programs with high public and interagency interests. Should have detailed knowledge of the National Environmental Protection Act and National Historic Preservation Action.

3. Documentation of Type I IEPR.

The IEPR panel will be selected and managed by an Outside Eligible Organization (OEO) per EC 1165-2-217, 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 b.3 above. The OEO will prepare a final Review Report that will accompany the publication of the final decision document and shall:

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

The official USACE response to the IEPR panel recommendations will be provided in the final Review Report only. Initial responses to IEPR panel recommendations will be developed and documented by the PDT and provided to the vertical team for consideration in developing the official USACE response.

The final Review Report will be submitted by the OEO no later than 30 days following the close of the IEPR review period for the draft decision document. USACE shall consider all recommendations contained in the Review Report and prepare a written response for all recommendations adopted or not adopted. The final decision document will summarize the Review Report and USACE response. The Review Report and USACE response will be made available to the public, including through electronic means on the internet.

6. 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 certified/approved planning models does not constitute technical review of the planning product. The selection and application of the model and the input and output data is still the responsibility of the users and is subject to DQC, ATR, and IEPR (if required).

EC 1105-2-412 does not cover engineering models used in planning. The responsible use of well-known and proven USACE developed and commercial engineering software will continue and the professional practice of documenting the application of the software and modeling results will be followed. As part of the USACE Scientific and Engineering Technology (SET) Initiative, many engineering models have been identified as preferred or acceptable for use on Corps studies and these models should be used whenever appropriate. The selection and application of the model and the input and output data is still the responsibility of the users and is subject to DQC, ATR, and IEPR (if required).

a. Planning Models.

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

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Certification and Approval
@RISK Version 7.1.2	@RISK performs risk analysis using Monte Carlo simulation to show you many possible outcomes in a spreadsheet model	Approved

Bourne and Sagamore Bridges Reliability Economic Model	The Bourne and Sagamore Bridges Reliability Economic Model is a spreadsheet model developed utilizing @Risk with inputs from Engineering Reliability modeling. This model will be utilized to combine the probability of failure of Bourne and Sagamore bridges components with the corresponding economic impact of that failure.	Approved for single project use.
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b. Engineering Models.

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

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Approval Status
TRACES MII 4.1 (Tri-Service Automated Cost Engineering Systems)	TRACES is an integrated suite of cost engineering tools designed to support the cost engineers throughout the USACE, Air Force, and Navy. MCACES (Micro-Computer Aided Cost Estimating System) MII is a second generation module of TRACES used by the USACE for the preparation of detailed construction cost estimates.	Approved
STAAD.Pro V8i (SELECTseries 2)	STAAD is a structural engineering software product for model generation, analysis and multi-material design.	Approved
@RISK Version 6.1.2	@RISK performs risk analysis using Monte Carlo simulation to show you many possible outcomes in your spreadsheet model	Approved
Bourne and Sagamore Highway Bridges Reliability Economic Model	Bourne and Sagamore Bridges Reliability Economic Model is a spreadsheet model developed through NAE utilizing @Risk with inputs from Engineering Reliability modeling and those developed through the Rockwell Automation Arena Simulation model. This model will be utilized to combine the probability of failure of the Bourne and Sagamore bridge components with the corresponding economic impact of that failure.	Approved for single project use.

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.

a. Policy Review.

The policy review team is identified through the collaboration of the MSC Chief of Planning and Policy and the HQUSACE Chief of the Office of Water Project Review. The team is identified in Attachment 1 of this Review Plan. The makeup of the Policy Review team will be drawn from Headquarters (HQUSACE), the MSC, the Planning Centers of Expertise, the District, and other review resources as needed.

- The Policy Review Team will be invited to participate in key meetings during the development of decision documents. These engagements may include In-Progress Reviews, Issue Resolution Conferences or other vertical team meetings.
- The input from the Policy Review team should be documented in a Memorandum for the Record (MFR) produced for each engagement with the team. The MFR should be distributed to all meeting participants.
- In addition, teams may choose to capture some of the policy review input in a risk register if appropriate. These items should be highlighted at future meetings until the issues are resolved. Any key decisions on how to address risk or other considerations should be documented in an MFR.

b. Legal Review.

Representatives from the Office of Counsel will be assigned to participate in reviews. Members may participate from the District, MSC and/or HQUSACE. The MSC Chief of Planning and Policy will coordinate membership and participation with the office chiefs.

- In some cases legal review input may be captured in the MFR for the particular meeting or milestone. In other cases, a separate legal memorandum may be used to document the input from the Office of Counsel.
- Each participating Office of Counsel will determine how to document legal review input.

8. PUBLIC PARTICIPATION

A Public Involvement Plan has been developed to ensure open, collaborative, and meaningful public, agency, and stakeholder participation throughout the environmental review process. All comments received as part of the public review period will be provided to all review panel members at the beginning of respective reviews: District Quality Control/Quality Assurance (DQC), Agency Technical Review (ATR), Independent External Peer Review (IEPR), and Policy and Legal Compliance Review. Additionally, public comments and responses will be included in the final NEPA document. Any agencies with regulatory review responsibilities will be contacted for coordination as required by applicable laws and procedures.

9. 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 decision document. Like the PMP, the Review Plan is a living document and may change as the study progresses. The New England District is responsible for keeping the Review Plan up to date. Minor changes to the review plan since the last MSC Commander approval will be documented in Attachment 3. Significant changes to the Review Plan (such as changes to the scope and/or level of review) will 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, will be posted on the New England District's webpage. The latest Review Plan will also be provided to the RMO and home MSC.

10. REVIEW PLAN POINT OF CONTACT

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

Title	Name	Office Phone Number
Project Manager	Craig Martin	978-318-8638

ATTACHMENT 1: TEAM ROSTERS

PROJECT DELIVERY TEAM (PDT) MEMBERS

Discipline	Office Symbol	Name	Telephone Number
Project Manager	NAE	Craig Martin	978-318-8638
Plan Formulator	NAE	Mark Habel	978-318-8871
Economist	NAE	Danielle Pruell	978-318-8729
Civil Engineer	NAE	Henry Philips	978-318-8503
Structural Engineer	NAE	John Kedzierski	978-318-8521
Real Estate	NAE	Daniel Jalbert	978-318-8322
Cost Engineer	NAE	Jeff Gaeta	978-318-8438
NEPA Coordinator	NAE	Rosemarie Bradley	978-318-8127
Cultural Resources/ NHPA	NAE	Kathleen Atwood	978-318-8537
Cape Cod Canal Operations Manager	NAE	John Macpherson	978-318-8176
Office of Counsel	NAE	Joseph McInerny	978-318-8247
Public Affairs Office	NAE	Tim Dugan	978-318-8264
Risk Assessor	RMC	Bob Patev	978-318-8394
Biologist	NAE	David Oster	978-318-8205

DISTRICT QUALITY CONTROL (DQC) MEMBERS

Discipline	Office Symbol	Name	Telephone Number
Plan Formulation	NAE	Chris Hatfield	978-318-8520
Economics	NAE	Denise Kammerer-Cody	978-318-8105
Civil Engineering	NAE	Matt Tessier	978-318-8248
Structural Engineering	NAE	Jason Paolino	978-318-8664
Cost Engineering	NAE	Andrew Jordan	978-318-8476
Environmental/NHPA	NAE	Larry Oliver	978-318-8347

AGENCY TECHNICAL REVIEW (ATR) MEMBERS

Discipline	Office Symbol	Name	Telephone Number
ATR Lead	LRD-RIT	Karen Miller	304-399-5859
Plan Formulator	TBD		TBD
Economist	LRL	Michael "Alex" Ryan	502-315-6866
Civil Engineer	TBD		TBD
Structural Engineer	TBD		TBD
Cost Engineer	TBD		TBD
Environmental Reviewer / Cultural Resources	TBD		TBD

INDEPENDENT EXTERNAL PEER REVIEW (IEPR) MEMBERS

Discipline	Organization	Name	Telephone Number
Plan Formulator/Economist	TBD		TBD
Civil / Structural Engineer	TBD		TBD
Cost Engineer	TBD		TBD
Environmental / Cultural Resources	TBD		TBD

POLICY AND LEGAL REVIEW (IEPR) MEMBERS

Discipline	Organization	Name	Telephone Number
Office of Water Project Review	HQUSACE	Wes Coleman	TBD
MSC Regional Integration Team Lead	NAD	Christopher Ricciardi	TBD
	TBD		TBD
	TBD		TBD

ATTACHMENT 2: STATEMENT OF TECHNICAL REVIEW FOR DECISION DOCUMENTS

COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the Major Rehabilitation Report for Bourne and Sagamore bridges, Bourne, MA. The ATR was conducted as defined in the project's Review Plan to comply with the requirements of EC 1165-2-217. 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 DrChecksSM.

SIGNATURE

Karen Miller
ATR Team Leader
LRH-PM-PD-F

Date

SIGNATURE

Craig Martin
Project Manager
NAE-PP-C

Date

SIGNATURE

Beth Cade
Review Management Office Representative
LRD-PCXIN

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

David Margolis
Chief, Engineering Division
CENAE-EDT

Date

SIGNATURE

Scott Acone
DDE-PM & Chief, Programs and Project Management Division
CENAE-PP

Date

ATTACHMENT 3: REVIEW PLAN REVISIONS

Revision Date	Description of Change	Page / Paragraph Number

ATTACHMENT 4: 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	OMRER&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
Home District/MS	The District or MSC responsible for the preparation of the decision document	RED	Regional Economic Development
HQUSACE	Headquarters, U.S. Army Corps of Engineers	RMC	Risk Management Center
IEPR	Independent External Peer Review	RMO	Review Management Organization
ITR	Independent Technical Review	RTS	Regional Technical Specialist
LRR	Limited Reevaluation Report	SAR	Safety Assurance Review
MRER	Major Reevaluation Evaluation Report	USACE	U.S. Army Corps of Engineers
MSC	Major Subordinate Command	WRDA	Water Resources Development Act