



REPLY TO
ATTENTION OF

CENAD-RBT

DEPARTMENT OF THE ARMY
NORTH ATLANTIC DIVISION, US ARMY CORPS OF ENGINEERS
FORT HAMILTON MILITARY COMMUNITY
BROOKLYN, NEW YORK 11252-6700

DEC 14 2012

MEMORANDUM FOR Commander, New England District, ATTN: CENAE-EP (Mr. Mackos),
696 Virginia Road, Concord, MA 01742-2751

SUBJECT: Review Plan Approval for Issue Evaluation Study Phase 1, Hop Brook Dam, CT
(NID #CT00504)

1. References:

- a. E-Mail, CENAE-EP-WG (Ms. Papadopoulos), subject: CENAE District IESs Review Plans
- b. Memorandum, CEIWR-RMC, 30 Nov 12, subject: Risk Management Center Endorsement-Hop Brook Dam, CT – IES Review Plan
- c. EC 1165-2-209, Change 1, Water Resources Policies and Authorities – Civil Works Review Policy, 31 Jan 12
- d. ER 1110-2-1156, Safety of Dams – Policy and Procedures, 28 Oct 11

2. The enclosed Review Plan for the Issue Evaluation Study Phase 1, Hop Brook Dam, CT has been prepared in accordance with Reference 1.c. Issue Evaluation Studies (IES) for dams rated as Dam Safety Action Classification (DSAC) II, III and, IV are required by Reference 1.d, and are studies to determine the nature of a safety issue or concern, and the degree of urgency for action within the context of the entire USACE inventory of dams. The purpose of an IES is to focus on significant potential failure modes when evaluating risk, verify the current DSAC rating, guide the selection and gauge the effectiveness of interim risk reduction measures, and justify the need to pursue or not pursue Dam Safety Modification studies. Issue Evaluation Study results are used to assist dam safety officials with making risk informed decisions, and prioritize dam safety studies and investigations within the context of the entire USACE inventory of dams.

3. The Risk Management Center (RMC) is the Review Management Organization (RMO) for the Agency Technical Review (ATR). The RMC has reviewed the Review Plan and recommends MSC approval. An Independent External Peer Review (IEPR) is not required for IES reports.

4. The enclosed Review Plan for Issue Evaluation Study Phase 1, Hop Brook Dam, CT 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 will require new written approval from this office.

SUBJECT: Review Plan Approval for Issue Evaluation Study Phase 1, Hop Brook Dam, CT
(NID #CT00504)

5. In accordance with Reference 1.b, Appendix B, Paragraph 5, this approved Review Plan shall be posted on your district website for public review and comment. The plan will also be posted on NAD's website for review and comment.

6. The Point of Contact for this action is Mr. Daniel Rodriguez, 347-370-4395 or Daniel.J.Rodriguez@usace.army.mil.

Encl
as

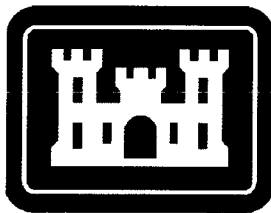


KENT D. SAVRE
Colonel, EN
Commanding

CF (w/ encl):
CEIWR-RMC (T. Bishop)
CENAE-EP-WG (A. Papadopoulos)
CENAE-WP-W (S. Michalak)
CENAD-PD-X (L. Cocchieri)

**Review Plan
U.S. Army Corps of Engineers
New England District
North Atlantic Division**

**Hop Brook Dam
Issue Evaluation Study
Phase 1**



**US Army Corps
of Engineers®**

27 November 2012

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Attachments

Attachment 1 – Completion of Agency Technical Review

Attachment 2 – Team Rosters

1. Introduction

a. Purpose

This Review Plan is intended to ensure a quality-engineering Dam Safety Issue Evaluation Study developed by the Corps of Engineers. ER 1110-2-1156, "Dam Safety Policy and Procedures" dated 28 Oct 2011, Chapter 8 describes the Issue Evaluation Study (IES) Plan development, review, and approval process. This Review Plan has been developed for Hop Brook Dam. This Review Plan was prepared in accordance with EC 1165-2-209, "Civil Works Review Policy", and covers the review process for the Hop Brook Dam Phase 1 IES Report. The IES is a study that may lead to additional studies, modeling, or NEPA consultation. NEPA compliance would occur during the Dam Safety Modification Study Phase. Because the Phase 1 IES is used to justify a Phase 2 Issue Evaluation Studies and potentially Dam Safety Modification (DSM) studies, it is imperative that the vertical teaming efforts are proactive and well coordinated to assure collaboration of the report findings, conclusions, and recommendations, and that there is consensus at all levels of the organization with the recommended path forward.

b. Project Description and Information

Hop Brook Dam is located on Hop Brook in the towns of Middlebury and Naugatuck and the city of Waterbury, Connecticut, 1.4 miles upstream from the confluence of Hop Brook and the Naugatuck River. The Corps of Engineers constructed Hop Brook Dam to provide flood control of the Naugatuck River Watershed in the State of Connecticut. The Naugatuck River Watershed, the largest sub-basin of the Housatonic River Watershed, has a maximum length of approximately 50 miles, a maximum width of about 12 miles, and a total drainage area of 312 square miles. Construction of the rolled-earth fill type dam began in December 1965 and was completed in December 1968. Total construction cost was \$5,500,500. As of December 2011, it has prevented an estimated \$ 108,478,078 in flood damages.

The dam is a rolled earth embankment of random (main body of the dam) and impervious (upstream shoulder) fills, with rock slope protection on the upstream and downstream faces. The top of the dam is at El. 381. The embankment is 520 feet long with a maximum height of 97 feet. A permanent pool is maintained near El. 311 (see Figure on page 7).

Overburden at the dam site consists of variable deposits of silt, sand, and gravel overlying the bedrock in thicknesses up to 25 feet. Boulders are concentrated in the original streambed and in scattered areas on the abutments. Bedrock consists of granitized schist and is exposed on the easterly side (left) of the streambed and at

higher elevations on the left abutment. Construction records describe the bedrock surface exposed for the foundation cutoff and outlet works as being extremely rough with steep rock faces, overhangs, and depressions, which required special compaction efforts. At a minimum, the top five feet of bedrock consisted of either highly fractured or weathered rock. Additional grout holes were added to the cutoff wall during construction for this reason. While drilling PZ-13 in September 1986, cloudy water was observed emerging adjacent to the right side of the outlet structure indicating the presence of a seepage path through the downstream left abutment area (PZ-13 is located on the downstream slope and through the left abutment). Rock cores in this area show heavily stained joint zones further indicating water flow. The rock quality in the upper layers of rock cores sampled in the left abutment during piezometer installation are poorest in the middle of a triangular area defined by the conduit outlet structure, the entrance to the service bridge, and the entrance to the traffic rotary at the left abutment.

Remedial work was performed at Hop Brook following the occurrence of seepage problems through the dam, as explained in the Letter Report, Remedial Measure for Seepage Control and Embankment Stabilization, dated October 1988. Phase I construction consisted of a filter trench at the downstream toe, a sand injection program, and placement of crushed stone over the face of the downstream slope. Phase II construction consisted of stabilization of the existing railroad embankment (located 250 feet downstream of the toe of the dam) and construction of a permanent access road to the downstream toe. All work was completed in 1991. Due to constant seepage problems along the toe of the dam, design of a grout curtain for the full length of the dam was initiated in 2004. Construction of the grout curtain occurred from 2009 to 2010.

A preliminary screening-level risk analysis was performed as part of the FY 2005 Screening Portfolio Risk Assessment (SPRA). The primary concerns identified by the SPRA included: 1) Seepage and Piping at the abutments, 2) Seepage and piping of the embankment along the conduit, and 3) Embankment erosion due to overtopping. The SPRA classified Hop Brook Dam as a DSAC II.

A Potential Failure Modes Analysis (PFMA) was conducted during the week of 15-18 June 2010. It was facilitated by a Cadre with members from many different USACE Districts and was conducted to identify the potential failure modes that were considered to be credible and significant. Of the 33 credible potential failure modes (PFM), seven potential failure modes were identified as significant. Those failure modes include:

- 1. PFM 1 - Groundwater from the left abutment seeps through the rock into the outlet conduit excavation (rock cut) leading to internal erosion of the embankment.** Groundwater from the left abutment seeps through the rock into

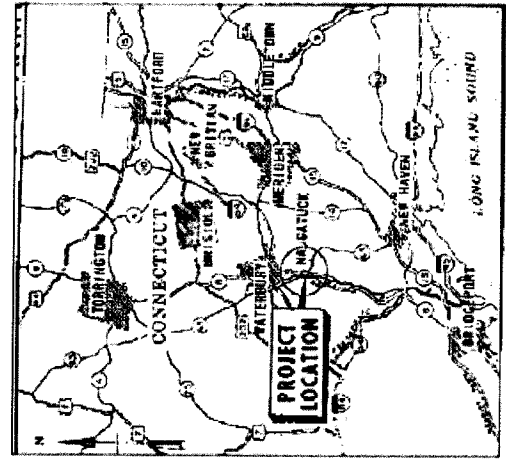
the outlet conduit excavation (rock cut). Fractures in the rock may also be charged from pool as indicated in interconnectivity encountered among drill holes in current rock grouting contract. Seepage leads to internal erosion of the embankment. (Starts in Rock, moves into the conduit backfill).

2. **PFM 2 - Seepage from pool along the conduit interface leads to internal erosion. (Starts in embankment)** Pool allows water to enter a high permeability zone in the impervious fill. Sufficient gradient exists to move the impervious fill into the gravel backfill adjacent to the conduit and forces the gravel backfill to enter the downstream rockfill. Improper gradation of rockfill (despite 1988 remedial repairs) allows internal erosion to continue and voids are created. The embankment holds a roof to allow voids to progress upstream. No upstream material is available to limit flows which allow progression. Breach occurs through sloughing or gross enlargement, resulting in uncontrolled release and loss of the pool resulting in downstream consequences.
3. **PFM 3 - Overtopping Main Embankment.** Rainfall event causes a pool rise to levels that overtop the dam with either static pool or waves. Downstream face erodes and progresses through the crest causing uncontrolled release. Downcutting and widening of the breach down to the foundation leads to complete loss of pool.
4. **PFM 4 - Overtopping Spillway Dike structure.** Rainfall event causes a pool rise to levels that overtop the spillway dike with either static pool or waves. Downstream face erodes and progresses through the crest causing uncontrolled release. Downcutting and widening of the breach down to the foundation leads to complete loss of pool.
5. **PFM 5 - Internal Erosion resulting from seepage through embankment and the presence of an unfiltered exit.** Pool rises causing water to enter the embankment. Gradients are sufficient initiate internal erosion. Inadequate filters allow internal erosion to continue. Progression occurs through the embankment via backwards erosion/piping until the pipe reaches the pool. The breach of the embankment occurs through gross enlargement or sloughing, leading to uncontrolled release of pool and downstream consequences.
6. **PFM 6 & 8- Seepage through the foundation soils or the right or left abutment contact leads to internal erosion.** Pool rises and causes water to seep into the upstream toe and through the foundation soil to the downstream toe. Gradients are sufficient to move materials through the foundation glacial

till/outwash. Downstream filters are not effective and allow internal erosion to continue. Backward erosion and piping progresses due to the ability of the overlying embankment material to form and hold a roof which permits progression. No crack filling or flow limiting occurs. The “pipe” reaches the pool dramatically increasing flows and erodes the embankment and foundation until breach occurs causing uncontrolled release of pool and downstream consequences.

7. **PFM 7A & 7B - Seepage through the right or left abutment leads to scour of the embankment and foundation by seepage through rock defects.** PFM 7A Pool and rainfall cause groundwater flow through rock joints which are in contact with the foundation and the embankment. The rock joint systems is continuous and daylight to an open or unfiltered exit. Velocity causes soil to move into these joints. The lack of filtering allows scour to continue and voids are created at the base of the embankment or soil foundation. Voids collapse and enlarges as scour continues. Stopping reaches the upstream pool, increased flows from pool cause scour into those joints until embankment crest collapse through sinkhole development or slope failure. PFM 7B Pool causes sufficient gradient through the embankment/foundation to initiate erosion into rock joints that are continuous to an open or unfiltered exit. Gradation or embankment/foundation is small enough to allow continuation of scour. Internal erosion progresses to the upstream face, and then flows increase. Scour progresses and a pipe enlarges until a breach occurs through slope failure or sloughing, resulting in loss of crest and uncontrolled release.

An Expert Opinion Elicitation (EOE) was scheduled for October 2012, but was cancelled due to Hurricane Sandy. It has been rescheduled for 17 Dec 2012. Following the EOE completion, an Issue Evaluation Study (IES) report will be completed. The IES is not a decision document. It is a document that is used to present information that confirms the dam safety issues and supports the need for a dam safety modification study (DSMS), or states the case to revise the current Dam Safety Action Classification (DSAC) rating.



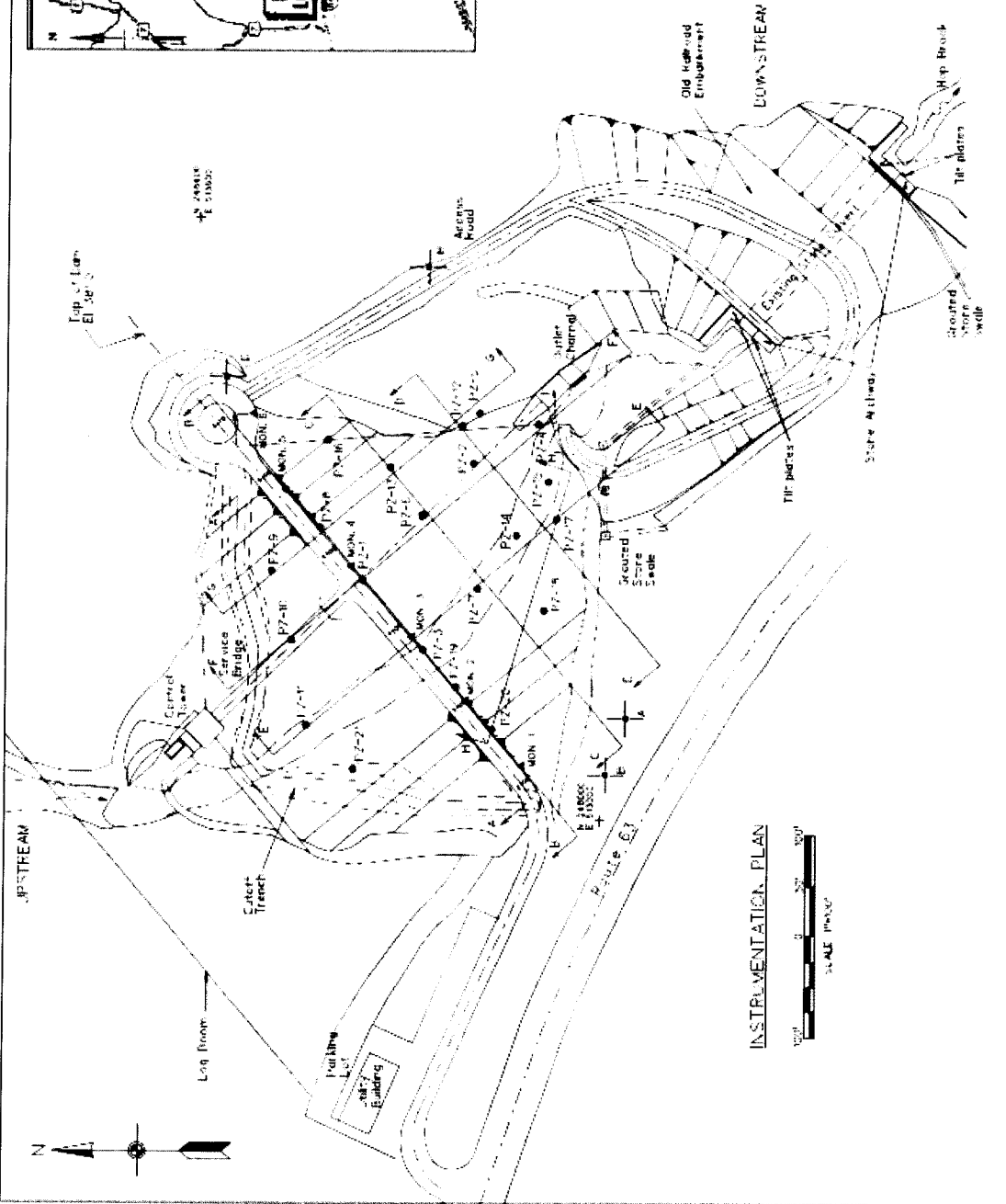
PROJECT LOCATION
M.T.S.

LEGEND	
SYMBOL	DESCRIPTION
MON 1	PIPET MONUMENT
MON 2	MEASUREMENT POINT
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DEPARTMENT OF THE ARMY
 HEADQUARTERS DISTRICT ENGINEERING CENTER
 WASHINGTON, D.C.

PROJECT TITLE: REGULATORY RIVER FLOOD CONTROL
 PROJECT NUMBER: HRF BRICK LAKE
 INSTRUMENTATION PLAN

DATE: JAN 2010
 DRAWN BY: [Name]
 CHECKED BY: [Name]
 SCALE: AS SHOWN
 DATE: APRIL 2011



c. Levels of Review

IES Reviews shall include:

- District Quality Control (DQC)
- Agency Technical Review (ATR)

RMC Reviews shall include:

- Quality Control and Consistency Review (RMC staff and/or external experts)

Independent External Peer Review (IEPR) is applied in cases that meet certain criteria. This IES is not a decision document and does not cover work requiring a Type I or Type II IEPR. Issue Evaluation Studies are used to justify Dam Safety Modification Studies. If this project requires a Dam Safety Modification Study, both Type I and Type II IEPR will be conducted, as appropriate.

d. Review Team

Review Management Office: The USACE Risk Management Center (RMC) is the Review Management Organization (RMO) for dam safety related work, including this IES. Contents of this review plan have been coordinated with the RMC and the Major Subordinate Command (MSC). Informal coordination with NAD will occur throughout the IES development, including briefings to the NAD Dam Safety Committee and Program Review Board updates. 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. The NAD Dam Safety Program Manager will be the POC for vertical team coordination. This review plan will be updated for each new project phase.

Agency Technical Review Team: No additional project specific technical specialties are required.

Required ATR Team Expertise: The ATR team will be chosen based on each individual’s qualifications and experience with similar projects.

ATR Lead: The ATR team is a senior professional with extensive experience in preparing Civil Works documents and conducting ATRs (or ITRs). The lead has the necessary skills and experience to lead a virtual team through the ATR process. The ATR lead for Hop Brook Lake Dam should be a geotechnical engineer and may also serve as a reviewer for his or her specific discipline.

Geotechnical Engineer - shall have experience in the field of geotechnical engineering, analysis, design, and construction of earthen dams. The geotechnical engineer shall have experience in subsurface investigations, rock and soil mechanics, internal erosion (seepage and piping), slope stability evaluations, erosion protection

design, and earthwork construction. The geotechnical engineer shall have knowledge and experience in the forensic investigation of seepage, settlement, stability, and deformation problems associated with high head dams and appurtenances constructed on rock and soil foundations.

Engineering Geologist - shall have experience in assessing internal erosion (seepage and piping) beneath earthen dams constructed on glacial formations and bedrock. The engineering geologist shall be familiar with identification of geological hazards, exploration techniques, field and laboratory testing, and instrumentation. The engineering geologist shall be experienced in the design of grout curtains and must be knowledgeable in grout theology, concrete mix designs, and other materials used in foundation seepage barriers.

Hydraulic Engineer – shall have experience in the analysis and design of hydraulic structures related to dams including the design of hydraulic structures (e.g., spillways, outlet works, and stilling basins). The hydraulic engineer shall be knowledgeable and experienced with the routing of inflow hydrographs through multipurpose flood control reservoirs utilizing multiple discharge devices, Corps application of risk and uncertainty analyses in flood damage reduction studies, and standard Corps hydrologic and hydraulic computer models used in drawdown studies, dam break inundation studies, hydrologic modeling and analysis for dam safety investigations.

Mechanical Engineer –shall have experience in machine design, machine rehabilitation and familiarity with design of mechanical gates and controls for flood control structures.

Structural Engineer – shall have experience and be proficient in performing stability analysis, finite element analysis, seismic time history studies, external stability analysis including foundations on high head mass concrete dams. The structural engineer shall have specialized experience in the design, construction and analysis of concrete dams.

Economist (or Consequence Specialist) – shall be knowledgeable of policies and guidelines of ER 1110-2-1156 as well as experienced in analyzing flood risk management projects in accordance with ER 1105-2-100, the Planning Guidance Notebook. The economist shall be knowledgeable and experienced with standard Corps computer models and techniques used to estimate population at risk, life loss, and economic damages.

2. Requirements

a. Reviews

The review of all work products will be in accordance with the requirements of EC 1165-2-209 by following the guidelines established within this review plan. All engineering and design products will undergo District Quality Control Reviews.

i. *District Quality Control (DQC)*

DQC is the review of basic science and engineering work products focused on fulfilling the project quality requirements. DQC will be performed for all district engineering products by staff not involved in the work and/or study. Basic quality control tools include a plan providing for seamless review, quality checks and reviews, supervisory reviews, Project Delivery Team (PDT) reviews, etc.

ii. *Agency Technical Review (ATR)*

ATR is an in-depth review, managed within USACE, and conducted by a qualified team outside of the home district that is not involved in the day-to-day production of the project/product. The purpose of this review is to ensure the proper application of clearly established criteria, regulations, laws, codes, principles and professional practices. The ATR team reviews the various work products and assure that all the parts fit together as a coherent whole. ATR teams will be comprised of senior USACE personnel (Regional Technical Specialists, etc.), and may be supplemented by outside experts as appropriate. To assure independence, the leader of the ATR team shall be from outside the home Major Subordinate Command (MSC).

iii. *Independent External Peer Review (IEPR)*

IEPR is the most independent level of review, and is applied in cases that meet certain criteria. This IES is not a decision document and does not cover work requiring a Type I or Type II IEPR. Issue Evaluation Studies are used to justify Dam Safety Modification Studies. If this project requires a Dam Safety Modification Study, both Type I and Type II IEPR will be conducted.

iv. *Policy and Legal Compliance Review*

Policy and Legal Compliance Review is required for decision documents. Since this IES is not a decision document it does not require a Policy and Legal Compliance Review. If this project requires a Dam Safety Modification Study, a Policy and Legal Compliance Review will be conducted.

v. *Peer Review of Sponsor In-Kind Contributions*

There will be no in-kind contributions for this IES.

b. Approvals

i. Review Plan Approval and Updates

The MSC for this IES is the North Atlantic Division. The MSC Commander is responsible for approving this Review Plan. The Commander's approval reflects vertical team input (involving the New England District, MSC, RMC and HQUSACE members) as to the appropriate scope and level of review for the study and endorsement by the RMC. Like the PMP, the Review Plan is a living document and may change as the study progresses. The 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 an Attachment to this plan. Significant changes to the Review Plan (such as changes to the scope and/or level of review) should be re-endorsed by the RMC and 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 District's webpage and linked to the HQUSACE webpage.

ii. IES Report

The IES Report shall undergo a DQC and formal ATR. After the ATR, the PDT will present the IES to the Quality Control and Consistency (QCC) Panel for review. The district and the risk assessment cadre present the IES risk assessment, IES findings, conclusions, and recommendations for review. After the QCC meeting, the Risk Cadre and RMC will certify that the risk estimate was completed in accordance with the Corps' current guidelines and risk management best practices. The IES will then be presented to the Senior Oversight Group (SOG). The SOG generally consists of the following members: Special Assistant for Dam Safety (Chair); CoP & Regional Representatives to include Geotechnical and Materials CoP Leader, Structural CoP Leader, and Hydraulics and Hydrologic CoP Leader; Regional representatives determined by Special Assistant for Dam Safety; Corps Business Line & Program Representatives to include DSPM, Flood Damage Reduction, Navigation, Programs, and Director, Risk Management Center; and any other Representatives determined by the Special Assistant for Dam Safety. The District Dam Safety Officer (DSO), the MSC DSO, and the SOG Chairman will jointly approve the final IES after all comments are resolved.

3. Guidance and Policy References

- ER 5-1-11, USACE Business Process
- EC 1165-2-209, Civil Works Review Policy, 31 Jan 2010
- ER 1110-2-1156, Safety of Dams – Policy and Procedure, 28 Oct 2011
- ER 1110-1-12, Quality Management, 31 Mar 2011

4. Summary of Required Levels of Review

The dam safety program follows the policy review process described in EC1165-2-209, Civil Works Review Policy. The RMC will be the review management office for the ATR, and the RMC must certify that the risk assessment was completed in accordance with the USACE current guidelines and best risk management practices. A Quality Control and Consistency (QCC) review will be conducted including the district, MSC, and RMC. The district and the risk assessment cadre will present the IES risk assessment, IES findings, conclusions, and recommendations for review. After resolution of QCC review comments, the MSC and HQUSACE will complete quality assurance and policy compliance review.

5. Models

a. General

The use of certified or approved models for all planning activities is required by EC 1105-2-407. The EC defines planning models 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 EC does not cover engineering models. Engineering software is being addressed under the Engineering and Construction (E&C) Science and Engineering Technology (SET) initiative. Until an appropriate process that documents the quality of commonly used engineering software is developed through the SET initiative, engineering type models will not be reviewed for certification and approval. 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.

b. List

Model	Status
N/A	Planning Models Not Used

6. Review Schedule

Project Phase / Submittal	Review Start*	Review Complete
DQC Review	25-Mar-2013	3-May-2013
ATR Review	6-May-2013	31-May-2013
Report Revisions and Back check	3-Jun-2013	21-Jun-2013
Submit Report to QCC	24-Jun-2013	
QCC Review	24-Jun-2013	19-Jul-2013

Report Revisions	22-Jul-2013	16-Aug-2013
Submit Report to SOG	19-Aug-2013	
SOG Review	19-Aug-2013	20-Sep-2013
Report Revisions	23-Sep-2013	25-Oct-2013
*Note schedule is dependent upon the actual EOE and completion of the report by all parties		

7. Public Participation

Public participation will not take place until the IES phase is completed. Public and stakeholder coordination has been performed to inform interested parties about the DSAC II rating and ongoing IES. Findings of the Final IES will also be shared with appropriate stakeholders. If this project results in a Dam Safety Modification Study (DSMS), future public coordination will occur for NEPA compliance.

8. Cost Estimate

Task Description	Review Start	Review Cost
DQC Review	25-Mar-13	\$45,500.00
ATR Review	6-May-13	\$50,500.00
QCC Review	24-Jun-13	\$50,000.00
SOG Review	19-Aug-13	\$60,000.00

9. Execution Plan

a. District Quality Control

i. General

DQC will be conducted after completion of the final draft IES. DQC requires both supervisory oversight and District technical experts. The district will conduct a robust DQC in accordance with EC 1165-2-209, Civil Works Review Policy, the District's Quality Management Plan, and ER 1110-2-12, Quality Management. Documentation of DQC activities is required and will be in accordance with the District and MSC Quality manuals. Comments and responses from DQC will be available for the ATR team to review through ProjNet DrChecks.

ii. DQC Review and Control

The District DSAC Project Manager will schedule DQC review meetings. The in progress review meetings should include PDT members from Geotechnical, Hydrology & Hydraulics, Structures, Mechanical, General Engineering, Cost Engineering, Project Management, Planning, and Operations as applicable. DQC Review will be conducted on the completed final draft IES including all Sections and Appendixes and will include comments, backcheck and IES revisions. ProjNet DrChecks review software will be used to document reviewer comments, responses and associated resolutions.

Comments should be limited to those that are required to ensure the adequacy of the product.

b. Agency Technical Review

i. General

Draft ER 1110-2-1156, Chapter 8 describes the purpose, process, roles and responsibilities for an IES in addition to the submittal, review, and approval process. The Risk Management Center (RMC) is responsible for coordinating and managing agency technical review of the IES Report in accordance with EC 1165-2-209. The ATR Lead will be an RMC team member unless otherwise approved by the RMC Director. The ATR Lead in cooperation with the PDT, MSC, and vertical team will determine the final make-up of the ATR team.

ii. ATR Review and Control

Reviews will be conducted in a fashion which promotes dialogue regarding the quality and adequacy of the IES and baseline risk assessment necessary to achieve the purposes of the IES. The ATR team will review the IES report which includes supporting risk and stability analysis documentation. A QCC of the baseline risk estimate and supporting documentation will be performed under the leadership of the RMC. Therefore, the level of effort for each ATR reviewer is expected to be between 16 and 32 hours. DrChecks review software will be used to document reviewer comments, responses and associated resolutions. Comments should be limited to those that are required to ensure the adequacy of the product. The RMC in conjunction with the MSC, will prepare the charge to the reviewers, containing instructions regarding the objective of the review and the specific advice sought. A kick off meeting will be held with the ATR team to familiarize reviewers with the details of the project.

The four key parts of a review comment will normally include:

- (1) The review concern – identify the product’s information deficiency or incorrect application of policy, guidance, or procedures.
- (2) The basis for the concern – cite the appropriate law, policy, guidance, or procedure that has not been properly followed.
- (3) The significance of the concern – indicate the importance of the concern with regard to its potential impact on the plan selection, recommended plan components, efficiency (cost), effectiveness (function/outputs), implementation responsibilities, safety, Federal interest, or public acceptability.
- (4) The probable specific action needed to resolve the concern – identify the action(s) that the PDT 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 coordination, and lastly the agreed upon resolution. The ATR team will prepare a Review Report which includes a summary of each unresolved issue; each unresolved issue will be raised to the vertical team for resolution. Review Reports will be considered an integral part of the ATR documentation and shall also:

- (1) Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer.
- (2) Include the charge to the reviewers prepared by the RMC in accordance with EC 1165-2-209, 7c.
- (3) Describe the nature of their review and their findings and conclusions.
- (4) Include a verbatim copy of each reviewer's comments and the PDT's responses.

ATR may be certified when all ATR concerns are either resolved or referred to HQUSACE for resolution and the ATR documentation is complete. Certification of ATR should be completed, based on work reviewed to date, for the final report. A draft certification is included in Attachment 1.

10. Review Plan Points of Contact

Name/Title	Organization	Email/Phone
Tom Bishop / Review Manager	CEIWR-RMC	thomas.w.bishop@usace.army.mil
Daniel Rodriguez/ NAD Dam Safety Program Manager	CENAD-RB-T	daniel.j.rodriquez@usace.army.mil
David Carlson/Program Manager-Eastern Division	CEIWR-RMC	david.e.carlson@ usace.army.mil

ATTACHMENT 1

COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the Issue Evaluation Studies for Hop Brook Dam in Naugatuck, CT. 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 DrCheckssm.

Name - TBD
ATR Team Leader
Office Symbol/Company

Date

Name - TBD
Project Manager (home district)
Office Symbol

Date

NATHAN SNORTELAND, P.E.
Director, Risk Management Center
CEIWR-RMC

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.

ANTHONY T. MACKOS, P.E.
Chief, Engineering/Planning Division
CENAE-EP

Date

SCOTT C. MICHALAK, P.E.
Dam Safety Officer¹
CENAE-EP-W

Date

¹ Only needed if different from the Chief, Engineering Division.

ATTACHMENT 2: TEAM ROSTERS

NAE PROJECT DELIVERY TEAM (PDT)

Name	Discipline	Email/Phone
George Claflin	Project Manager Geotechnical Engineer	<u>George.A.Claflin@usace.army.mil</u> 978-318-8081
Rose Schmidt	Geologist	<u>Rosemary.A.Schmidt@usace.army.mil</u> 978-318-8345
Patrick Blumeris	Hydrologic Engineer	<u>Patrick.M.Blumeris@usace.army.mil</u> 978-318-8737
Denise Kammerer- Cody	Economist	<u>Denise.E.Kammerer-Cody@usace.army.mil</u> 978-318-8105
Keith Beecher	Park Manager	<u>Keith.W.Beecher@usace.army.mil</u> 978-318-8405

SAS RISK CADRE

Name	Discipline	E-mail/Phone
Mark W. Pabst - RMC	Senior Advisor	Mark.w.pabst@ usace.army.mil 303-330-1389
Colin W. Krumdieck - RMC	Technical Advisor	Colin.w.krumdieck@ usace.army.mil 303-963-4541
Cleveland Harding - SAS	Project Manager	Cleveland.i. Harding@ usace.army.mil 912-652-5556
Philip E. Smith - SAS	Geotechnical Engineer	Philip.e.smith@ usace.army.mil 912-652-5678
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Michael C. Bailey - SAS	Geologist	Michael.c.bailey@ usace.army.mil 912-652-5167
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Joseph T. Hoke - SAS	Hydraulics & Hydrology	Joseph.t.hoke@ usace.army.mil 912-652-5516

Vongmony Var - SAS	Economist	Var.vongmony@ usace.army.mil 251-694-3866
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DISTRICT QUALITY CONTROL TEAM

Discipline	Phone	Years of Experience	Credentials
Anastasia Papadopoulos /Lead DQC	978-318-8107	20+	P.E.
TBD /Geotechnical Engineer	978-318-8	20+	P.E.
Rosemary Schmidt /Geologist	978-318-8345	20+	P.G.
Townsend Barker /Hydrology/Hydraulics	978-318-8621	30+	P.E.
Ed O'Leary /Economics	978-318-8235	20+	

AGENCY TECHNICAL REVIEW TEAM*

**To Be Determined*

Discipline	Phone	Years of Experience	Credentials
/ATR Lead/Geotechnical Engineer			
/Hydrology/Hydraulics Engineer			
/Engineering Geologist			
/ Economist/Consequences			

QCC Review Team to Be Determined at a later date