



REPLY TO  
ATTENTION OF

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

**DEC 14 2012**

CENAD-RBT

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 2, Ball Mountain Dam, VT  
(NID #VT00001)

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-Ball Mountain Dam, VT – IES Phase II 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 2, Ball Mountain Dam, VT 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.

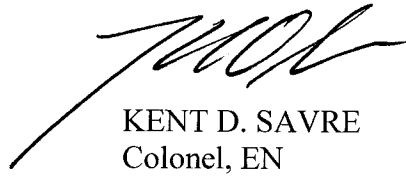
4. The enclosed Review Plan for Issue Evaluation Study Phase 2, Ball Mountain Dam, VT is approved. The Review Plan is subject to change as circumstances require, consistent with study development under the Project Management Business Process. Subsequent revisions to this Review Plan or its execution will require new written approval from this office.

SUBJECT: Review Plan Approval for Issue Evaluation Study Phase 2, Ball Mountain Dam, VT  
(NID #VT00001)

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

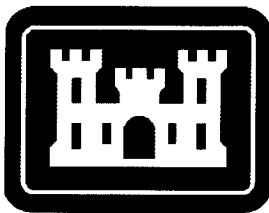


KENT D. SAVRE  
Colonel, EN  
Commanding

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  
North Atlantic Division  
New England District**

**Ball Mountain Dam  
Issue Evaluation Study  
Phase 2**



**US Army Corps  
of Engineers®**

*27 November 2012*

**Contents**

- 1. Introduction ..... 1**
  - a. Purpose ..... 1
  - b. Project Description and Information ..... 1
  - c. Levels of Review ..... 1
  - d. Review Team ..... 7
- 2. Requirements ..... 9**
  - a. Reviews ..... 9
    - i. District Quality Control (DQC) ..... 9
    - ii. Agency Technical Review (ATR) ..... 9
    - iii. Independent External Peer Review (IEPR) ..... 9
    - iv. Policy and Legal Compliance Review ..... 9
    - v. Peer Review of Sponsor In-Kind Contributions ..... 9
  - b. Approvals ..... 10
    - i. Review Plan Approval and Updates ..... 10
    - ii. IES Report ..... 10
- 3. Guidance and Policy References ..... 10**
- 4. Summary of Required Levels of Review ..... 11**
- 5. Models ..... 11**
  - a. General ..... 11
  - b. List ..... 11
- 6. Review Schedule ..... 12**
- 7. Public Participation ..... 12**
- 8. Cost Estimate ..... 12**
- 9. Execution Plan ..... 12**
  - a. District Quality Control ..... 12
    - i. General ..... 12
    - ii. DQC Review and Control ..... 13
  - b. Agency Technical Review ..... 13
    - i. General ..... 13
    - ii. ATR Review and Control ..... 13
- 10. Review Plan Points of Contact ..... 15**

**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 Ball Mountain Dam. This Review Plan was prepared in accordance with EC 1165-2-209, "Civil Works Review Policy", and covers the review process for the Ball Mountain Dam Phase 2 IES Report. A Draft IES Phase 1 has been completed and has recommended additional studies, investigations and modeling to be performed. It is also anticipated that NEPA consultation will be required to implement needed monitoring. Because the Phase 2 IES may potentially justify 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**

Ball Mountain Dam is one of seven flood control dams in the Upper Connecticut River Basin. Authorization for the project construction is contained in the Flood Control Act of 1938 (PL 761-75<sup>th</sup> Congress, 3<sup>rd</sup> session), as modified by the Flood Control Act of the 1941 (PL 228-77<sup>th</sup> Congress, 1<sup>st</sup> session). The primary purpose of the dam is flood control.

Ball Mountain Dam is located on the West River in the town of Jamaica, Vermont. Construction of the dam began in 1957 and was completed in 1961. The dam embankment consists of upstream rockfill and gravel fill zones abutting a large central glacial till impervious core. Inclined gravel and rock filter zones separate the core from the large downstream rockfill shell zone. There is also a cut-off trench under the impervious core and a grout curtain in the abutments to protect against seepage. The downstream rock-fill embankment slope was constructed at a 1.75 horizontal to 1 vertical slope. The physical height of the dam, defined as the difference between the top of the dam and the bottom of the cut-off, is 265 feet. The flood control basin formed by the dam has a capacity of 52,450 acre-feet, and an area of 172 square miles at spillway crest water surface elevation of 1017.0 feet NGVD. A plan view of the dam and typical cross-sections are shown on pages 5 and 6.

The main portion of the dam and the right abutment are founded on soil, while the left abutment is founded on rock. The soil deposits are of fluvial and/or glacial origin and consist of mixtures of silts, sand, gravel, cobbles, and boulders of varying gradations.

The outlet works, located on the right abutment, consist of an intake channel, an intake tower, a concrete lined tunnel, and an outlet channel. The 13.5-foot circular concrete-lined tunnel is 864 feet long, and has a slope of 0.2 percent. The conservation pool is at elevation 870.5 feet NGVD, and the record pool of 1019.4 feet NGVD occurred in April 1987. The maximum discharge capacity of the gated outflow tunnel when the pool is at 1042 feet NGVD is 14,000 cubic feet per second (cfs). The non-damaging capacity of the downstream channel is approximately 5,000 cfs.

The spillway structure is an uncontrolled, ogee weir and chute spillway located in the south abutment. It is cut from the metamorphic bedrock. The weir elevation is 1017.0 feet NGVD, and the crest is 235 feet in length. The capacity is 150,000 cfs.

Portions of the downstream edge of the crest at Ball Mountain Dam have settled up to 3.2 feet and portions of the upstream edge of the crest have settled up to 1.3 feet since construction was completed in 1961. Overall the crest of the dam is generally sloped in the downstream direction due to the continued downstream rockfill shell settlement. With the current settlement of the dam crest, freeboard and overtopping protection during a PMF event have been reduced.

A "bulge" located on the downstream slope is an original construction feature resulting from construction settlements in the rock fill shell and an as-built slope transition, and does not appear to have changed significantly since construction. While overall slope settlements have continue to increase, the general shape and configurations of the historic bulge has not changed significantly over time.

Inclinometer, crest and slope monuments, and surface survey data indicate that overall settlement of the downstream rock fill shell material is still occurring. However, no horizontal shear zones have been identified in the downslope inclinometers that would indicate a deep seated stability concern within or below the downstream rock fill shell or foundation soils.

Seepage has been observed at the downstream toe of the dam during conservation pool levels or low water elevation (830 feet). A spring has been observed at the old river channel, but flow has generally been clear with small amount of sand occasionally observed.

Ball Mountain Dam was screened by a national risk cadre as part of the FY 2005 Screening for Portfolio Risk Analysis (SPRA). The primary concerns identified by the SPRA were summarized in the SPRA report documentation: 1) embankment stability and/or liquefaction for all of the loading conditions; 2) embankment seepage and piping for all loading conditions; and 3) abutment seepage and piping for all loading conditions. Based on the results of this risk screening, the dam was categorized as Dam Safety Action Classification (DSAC) II (urgent or potentially unsafe).

Although seepage has always been present at Ball Mountain Dam, installation of two temporary monitoring weirs downstream of the embankment toe in June 2009 has made correlation of this seepage with the pool level possible. A seepage analysis conducted in 2008 indicated that seepage is most likely occurring through the pervious foundation soils below the dam, possibly due to an inadequate cutoff or higher permeability soils than originally assumed. The 2009 subsurface investigation program confirmed that the pervious foundation soils were not cutoff during construction. Potential piping of embankment and foundation soils may also be possible into the internal fine rock fill and rock fill shell materials under the downstream embankment, as transition materials between these zones may not be performing as adequate filters.

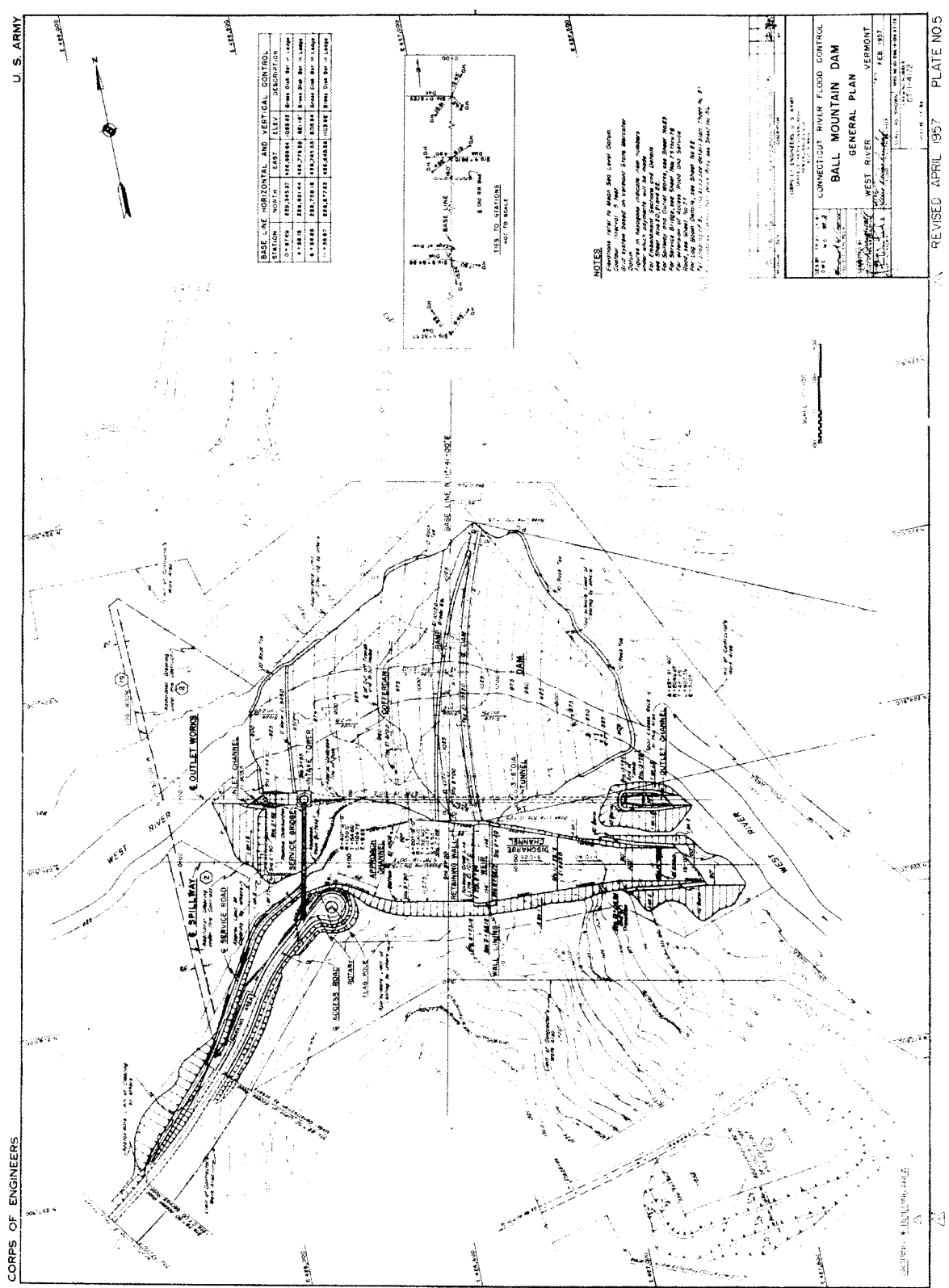
A Potential Failure Mode Analysis (PFMA) was originally conducted the week of May 4, 2009. The project advanced to QCC in October 2011. Although slope instability associated with the historic bulge was not deemed a dam safety issue, failure modes associated with embankment and foundation internal erosion indicate unacceptable levels of societal risk at relatively frequent pools. Several of these failure modes have sufficient uncertainty in the predicted embankment and foundation responses to justify additional investigations.

These conditions lead to the recommendation of a Phase II IES that includes investigations and studies for a designed system to collect and monitor seepage rates at the downstream toe. As part of the Phase II IES, the team recommended seepage, stability, and cost analyses be completed to properly evaluate the alternatives and assist with the design of the most cost effective alternative. An access road must also be constructed as part of these investigations, to provide access to the toe for the construction of either the seepage/monitoring weir and also allow inspection of the downstream dam toe during high pool events and facilitate intervention. The Phase II IES recommendation was initially discussed at the SOG meeting in February 2012 and supported by the Senior Oversight Group and Risk Management Center.

The district team is working towards completing a cost estimate and preliminary design for the Phase II investigations and monitoring. The risk cadre will review preliminary

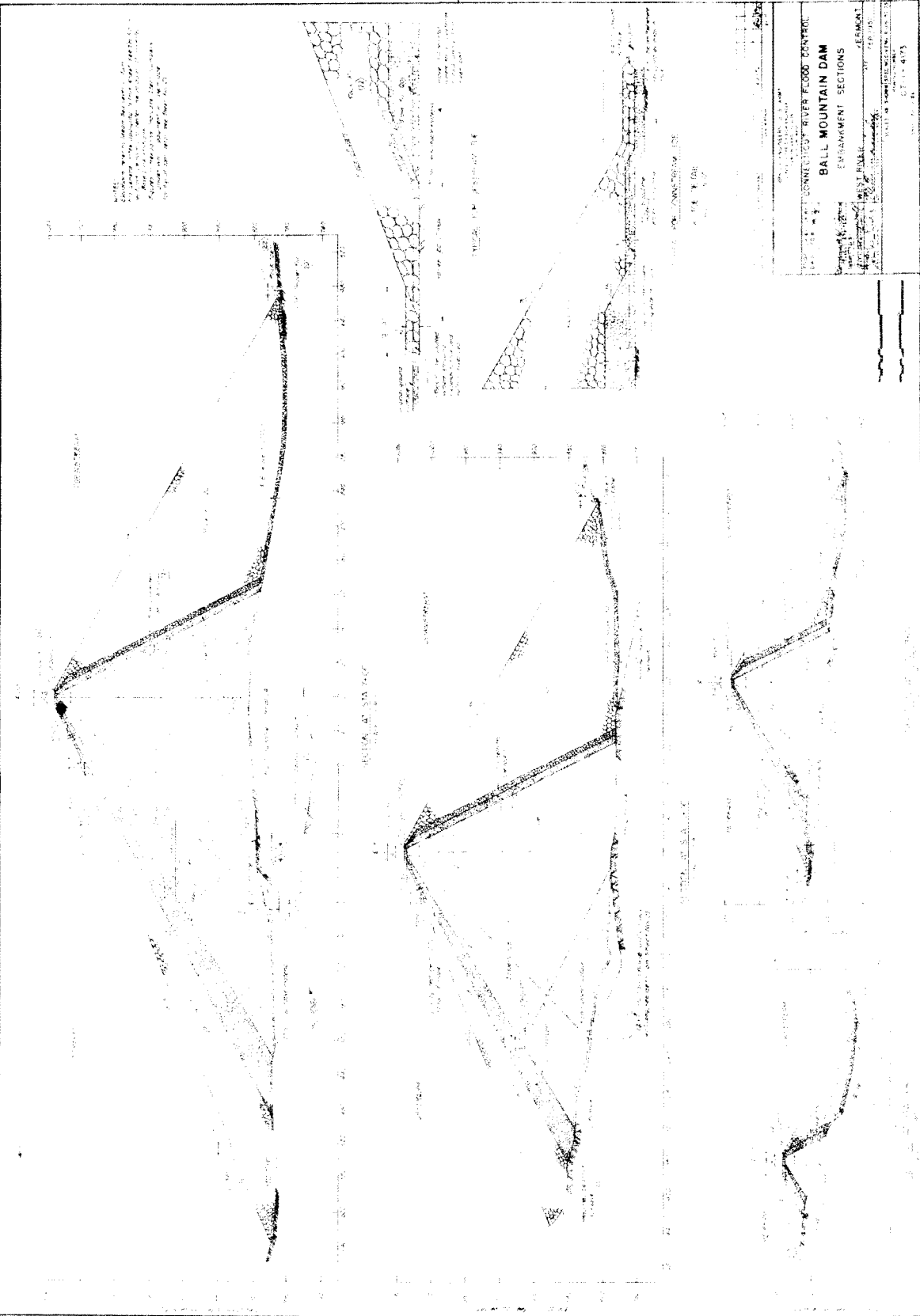
and final designs and update the risk assessment following construction in FY14. The Phase 2 IES will then be prepared and reviewed as described herein. Reviews of the Phase 2 IES report are not anticipated before FY15.





U. S. ARMY

CORPS OF ENGINEERS



REF: 957 PLATE 006

**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 Phase 2 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.

**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 North Atlantic Division (NAD), the Major Subordinate Command (MSC). Informal coordination with NAD will occur throughout the IES Phase II 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.

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

**ATR Lead:** The RMC will assign the 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 may also serve as a reviewer for a specific discipline. The ATR lead for the Ball Mountain Dam, Phase 2 IES should be a geotechnical engineer.

**Geotechnical Engineer** - shall have experience in the field of geotechnical engineering, analysis, design, and construction of earth embankment 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 earth embankment dams constructed on bedrock and overburden formations. 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. The need for a mechanical engineer is not anticipated at this time.

**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 Phase 2 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, Phase 2 Report*

The IES Phase 2 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
Use of Planning models not anticipated	

## 6. Review Schedule

Project Phase / Submittal	Review Start*	Review Complete
DQC Review	Jun 2015	Aug 2015
ATR Review	Aug 2015	Sep 2015
Report Revisions and Backcheck	Sep 2015	Oct 2015
Submit Report to QCC	Oct 2015	
QCC Review	Oct 2015	Nov 2015
Report Revisions	Nov 2015	Dec 2015
Submit Report to SOG	Dec 2015	
SOG Review	Dec 2015	Jan 2016
Report Revisions	Jan 2016	Feb 2016

\*Note schedule is dependent upon the actual EOE and completion of the report by all parties

## 7. Public Participation

Public participation will take place during planning and implementation of proposed investigations and monitoring. 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	Jun 2015	\$50,000
ATR Review	Aug 2015	\$70,000
QCC Review	Oct 2015	\$80,000
SOG Review	Dec 2015	\$60,000

## 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, Dam Safety, 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. It is anticipated that the ATR team for the Phase 1 IES will perform the ATR for the Phase 2 IES.

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**

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

ATTACHMENT 1

COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the Phase 2 Issue Evaluation Study for Ball Mt. Dam, Jamaica, Vermont. The ATR was conducted as defined in the project’s Review Plan to comply with the requirements of EC 1165-2-209. During the ATR, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions, methods, procedures, and material used in analyses, alternatives evaluated, the appropriateness of data used and level obtained, and reasonableness of the results, including whether the product meets the customer’s needs consistent with law and existing US Army Corps of Engineers policy. The ATR also assessed the District Quality Control (DQC) documentation and made the determination that the DQC activities employed appear to be appropriate and effective. All comments resulting from the ATR have been resolved and the comments have been closed in DrChecks<sup>sm</sup>.

<u>TBD</u> ATR Team Leader <u>Office Symbol/Company</u>	Date
<u>TBD</u> Project Manager <u>CENAE</u>	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 Officer <sup>1</sup> CENAE-EP-W	Date

<sup>1</sup> Only needed if different from the Chief, Engineering Division.

ATTACHMENT 2: TEAM ROSTERS

**NAE PROJECT DELIVERY TEAM (PDT)**

<b>Name/Title</b>	<b>Section</b>	<b>Email/Phone</b>
Bill Lawrence / Geotechnical Engineer	Project Manager/Geotechnical Engineering	<a href="mailto:William.T.Lawrence@usace.army.mil">William. T. Lawrence@usace.army.mil</a> 978-318-8786
Mark Vance/ Sr Geotechnical Engineer	Geotechnical Engineering	<a href="mailto:Mark.A.Vance@usace.army.mil">Mark.A. Vance@usace.army.mil</a> 978-318-8179
Thomas Davidson /Geologist	Geology and Chemistry	<a href="mailto:Thomas.A.Davidson@usace.army.mil">Thomas.A. Davidson@usace.army.mil</a> 978-318-8572
Patrick Blumeris /Hydrologic Engineer	Water Management	<a href="mailto:Patrick.M.Blumeris@usace.army.mil">Patrick.M.Blumeris@usace.army.mil</a> 978-318-8737
Mark DeSouza/Civil Engineer	Design Branch	<a href="mailto:Mark.P.DeSouza@usace.army.mil">Mark.P.DeSouza@usace.army.mil</a> 978-318-8784
Michael Penko/Ecologist	Evaluation Branch	<a href="mailto:Michael.Penko@usace.army.mil">Michael.Penko@usace.army.mil</a> 978-318-8139
Maruti Wagle /Structural Engineer	Design Branch	<a href="mailto:Maruti.V.Wagle@usace.army.mil">Maruti.V. Wagle@usace.army.mil</a> 978-318-8044
Denise Kammerer-Cody /Economist	Economic and Cultural Resources	<a href="mailto:Denise.E.Kammerer-Cody@usace.army.mil">Denise.E.Kammerer-Cody@usace.army.mil</a> 978-318-8105
Dale Berkness /Park Manager	Operations Division	<a href="mailto:Dale.H.Berkness@usace.army.mil">Dale.H. Berkness@usace.army.mil</a> 978-318-8459

**SWD RISK CADRE**

<b>Name/Title</b>	<b>Role</b>	<b>Email/Phone</b>
Mark Harris /Geologist	Cadre Lead	<a href="mailto:Mark.C.Harris@usace.army.mil">Mark.C.Harris@usace.army.mil</a> 501-324-5604
Brett Cowan /Geotechnical Engineer	Geotechnical	<a href="mailto:Brett.A.Cowan@usace.army.mil">Brett.A.Cowan@usace.army.mil</a> 918-699-4320
George Hall /Geotechnical Engineer	Geotechnical	<a href="mailto:George.J.Hall@usace.army.mil">George.J.Hall@usace.army.mil</a> 918-699-7520
Mark Harris /Geologist	Geologist	<a href="mailto:Mark.C.Harris@usace.army.mil">Mark.C.Harris@usace.army.mil</a> 501-324-5604
Kevin Sharp /Structural Engineer	Structural	<a href="mailto:Kevin.J.Sharp@usace.army.mil">Kevin.J.Sharp@usace.army.mil</a> 501-324-5660
Mark Piazza/H&H Engineer	H&H	<a href="mailto:Matthew.J.Piazza@usace.army.mil">Matthew.J.Piazza@usace.army.mil</a> 918-699-7510
Glenn Fulton / Economist	Economics	<a href="mailto:Glenn.W.Fulton@usace.army.mil">Glenn.W.Fulton@usace.army.mil</a> 918-699-7453

Tyler Herriman /Economist	Economics	<a href="mailto:Tyler.J.Herriman@usace.army.mil">Tyler.J.Herriman@usace.army.mil</a> 501-324-5612
John Burant	MMC	<a href="mailto:John.T.Burant@usace.army.mil">John.T.Burant@usace.army.mil</a> 309-794-5803
Charles Redlinger /Senior Advisor	RMC	<a href="mailto:Charles.G.Redlinger@usace.army.mil">Charles.G.Redlinger@usace.army.mil</a> 720-292-0967
Brian Farmer /Technical Advisor	RMC	<a href="mailto:Brian.M.Farmer@usace.army.mil">Brian.M.Farmer@usace.army.mil</a> 412-667-6676

**District Quality Control Team**

Discipline	Phone	Years of Experience	Credentials
Anastasia Papadopoulos /Lead DQC	978-318-8107	30+	P.E.
Erik Matthews /Geotechnical Engineer	978-318-8365	20+	P.E.
Rosemary Schmidt /Geologist	978-318-8345	20+	P.G.
Townsend Barker /Hydrology/Hydraulics	978-318-8621	30+	P.E.
Benjamin Piteo/Civil Engineer	978-318-8424	30+	
Karen Umbrell /Economics	978-318-8140	20+	

**Agency Technical Review Team**

Discipline	Phone	Years of Experience	Credentials
Michael Robinette/ATR Lead/Geotechnical Engineer	304-399-5232	20+	
Glendon Stevens /Hydrology/Hydraulics Engineer	215-656-6680	20+	
TBD/Engineering Geologist			
Johnny Chan / Economist/Consequences	917-790-8706	20+	

**QCC Review Team to Be Determined at a later date**