



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-P

20 Jul 2020

MEMORANDUM FOR Commander, U.S. Army Corps of Engineers, Norfolk District,
 Fort Norfolk 803 Front Street, Norfolk, VA 23510-1011

SUBJECT: Request for Approval of the F.E. Walter Dam & Reservoir Re-
 Evaluation/Feasibility Study, PA Review Plan

1. Reference Memorandum, CENAO-EX, dated 30 June 2020, subject as above.
2. The Flood Risk Management Planning Center of Expertise of the South Pacific Division (SPD) is the lead office to execute the referenced 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 Delivery 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 at 347-370-4571 or Lawrence.J.Cocchieri@usace.army.mil.

Encl

BAKER.KAREN.J. Digitally signed by
 BAKER.KAREN.J.1137993380
 .1137993380 Date: 2020.07.20 15:20:38
 -04'00'

KAREN J. BAKER
 Programs Director
 North Atlantic Division



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, PHILADELPHIA DISTRICT
WANAMAKER BUILDING, 100 PENN SQUARE EAST
PHILADELPHIA, PENNSYLVANIA 19107-3390

CENAP-DE

30 June 2020

MEMORANDUM FOR Commander, U.S. Army Corps of Engineers, North Atlantic Division (CENAD-PD-X), 302 General Lee Avenue, Brooklyn, NY 11252

SUBJECT: F.E. Walter Dam & Reservoir Re-Evaluation/Feasibility Study– Submission of Review Plan

1. The enclosed F.E. Walter Dam & Reservoir Re-Evaluation/Feasibility Study –Submission of Review Plan is for your review and approval.
2. The Point of contact is Dan Hughes, CENAO, Chief Planning Resources Section, Planning Team Lead, at 904-613-8268 or Daniel.B.Hughes@usace.army.mil.

Encl

PARK.DAVID.CH
 ONGWOO.10445
 60808

Digitally signed by
 PARK.DAVID.CHONGWOO.1
 044560808
 Date: 2020.07.07 07:33:21
 +04'00'

DAVID C. PARK
 LTC, EN
 Commanding



DEPARTMENT OF THE ARMY
 SOUTH PACIFIC DIVISION, U.S. ARMY CORPS OF ENGINEERS
 Phillip Burton Federal Building
 450 Golden Gate Avenue
 SAN FRANCISCO, CALIFORNIA 94102

CESPD-PDP (FRM-PCX)

28 May 2020

MEMORANDUM FOR Commander, Philadelphia District, U.S. Army Corps of Engineers
 (CENAP-PL-P / Mr. Peter Blum)

SUBJECT: Review Plan Endorsement for the F.E. Walter Dam Re-Evaluation Study, PA

1. References:

- a. Engineer Circular (EC) 1165-2-217, Review Policy for Civil Works, 20 February 2018.
- b. Memorandum, CECW-CE, 5 April 2019, subject: Interim Guidance on Streamlining Independent External Peer Review (IEPR) for Improved Civil Works Project Delivery.

2. The Flood Risk Management Planning Center of Expertise (FRM-PCX) endorses the subject review plan, dated May 2020, for approval by the North Atlantic Division (NAD).

3. The FRM-PCX, as the assigned Review Management Organization (RMO), coordinated with the Philadelphia District (NAP) in the development of the review plan and reviewed the enclosed plan for compliance with references 1.a and 1.b. The FRM-PCX coordination and review were led by Ms. Karen Miller, FRM-PCX Regional Manager for NAD. All review comments have been satisfactorily resolved.

4. The FRM-PCX concurs with the level and scope of review identified and supported in the initial review plan, including the decision to perform Type I IEPR. The project meets the following mandatory trigger for performing Type I IEPR: the project is considered controversial due to the potential for significant public dispute over the size, nature, effects, or environmental costs or benefits of the project. Additionally, while the estimated cost of a recommended project is unknown at this time, it is possible the total project cost could exceed the \$200M mandatory trigger for Type I IEPR.

5. Please include this memorandum when transmitting the review plan for approval by NAD. Upon approval of the review plan, please provide a copy of the approved plan, a copy of the approval memorandum, and the link to where the plan is posted on the District website to Ms. Miller.

6. Thank you for the opportunity to assist in the preparation of the review plan. Please coordinate the Agency Technical Review (ATR) and IEPR efforts outlined in the review plan, and any future updates to the plan, with Ms. Miller. In particular, the review plan

CESPD-PDP (FRM-PCX)

SUBJECT: Review Plan Endorsement for the F.E. Walter Dam Re-Evaluation Study, PA

should be reviewed and updated as appropriate based on the outcome of the Probable Maximum Flood (PMF) analysis scheduled for completion in August 2020. The outcome of this analysis could significantly impact the scope of the study and subsequently the scope and level of review currently outlined in the review plan.



Digitally signed by
THAUT.ERIC.WILLIAM.12316318
24
Date: 2020.05.28 22:13:35 -07'00'

Encl

ERIC THAUT
Deputy Director, Flood Risk Management
Planning Center of Expertise

CF:

CELRH-PM-PD (Miller)
CELRH-PM-PD-F (McKinley)
CENAB-ENE-C (Kaiser)
CENAP-PL-PC (Bogle)
CENAD-PD-C (Allmon)
CENAD-PD-PP (Jadrosich)
CENAD-PD-P (Gruber)
CESWD-PDP (Plaxco)
CELRH-DSMMCX (Sawyers)
CEWR-RMC-W (Clarkson)

REVIEW PLAN

May 2020

Project Name: F.E. Walter Dam & Reservoir Re-Evaluation Study, PA

P2 Number: 402965

Decision Document Type: Section 216 Feasibility Report and Environmental Assessment (EA), Review of Completed Projects

Project Type: Multi-purpose to include Flood Risk Management and Recreation

District: Philadelphia, NAP

District Contact: Project Manager, 757-201-7539; Chief Project Development, 215-656-6585

Major Subordinate Command (MSC): North Atlantic Division, NAD

MSC Contact: Program Manager, Planning & Policy Division; 347-370-4557

Review Management Organization (RMO): Planning Center of Expertise for Flood Risk Management (FRM-PCX)

RMO Contact: Deputy Director, (415)-503-6852

Key Review Plan Dates

Date of RMO Endorsement of Review Plan: 28 May 20

Date of MSC Approval of Review Plan: Pending

Date of IEPR Exclusion Approval: N/A

Has the Review Plan changed since PCX Endorsement? No

Date of Last Review Plan Revision: 28 MAY 20

Date of Review Plan Web Posting: TBD

Date of Congressional Notifications: N/A

| | <u>Milestone Schedule</u> | |
|---|----------------------------------|------------------------------|
| | <u>Scheduled</u> | <u>Actual</u> |
| <u>Alternatives Milestone:</u> | 28 MAY 2020 | <u>Complete</u> No |
| <u>Tentatively Selected Plan:</u> | 24 MAY 2021 | No |
| <u>Release Draft Report to Public:</u> | 02 JUL 2021 | No |
| <u>Agency Decision Milestone:</u> | 16 NOV 2021 | No |
| <u>Final Report Transmittal:</u> | 04 APR 2022 | No |
| <u>Senior Leaders Briefing:</u> | APR 2022 | No |
| <u>Director's Report:</u> | 21 SEP 2022 | No |

Project Fact Sheet

May 2020

Project Name: F.E. Walter Dam & Reservoir Feasibility Study

Location: Pennsylvania, Carbon, Luzerne, Wayne, and Monroe Counties, White Haven

Authority: Section 216 of the Flood Control Act of 1970

Sponsors: The City of New York, Department of Environmental Protection (NYCDEP) and Delaware River Basin Commission (DRBC), both of which have flow objectives to maintain in the Delaware River, are the study sponsors. The sponsors' objectives for the study are to determine if the F.E. Walter Dam & Reservoir can provide water storage and low flow augmentation to help meet their flow objectives under drought conditions and combat the salt front on the Delaware River, which is moving farther upstream due to sea level rise.

Type of Study: Feasibility Report and Environmental Assessment

SMART Planning Status: The F.E. Walter Re-Evaluation Study is following current SMART Planning milestones and is currently scoped to the 3x3x3 rule.

Project Area: The project area includes the F.E. Walter Dam, located at latitude 41.1116° N, and latitude 75.7200° W, approximately 5 miles upstream of White Haven, PA and 77 miles above the Lehigh River's confluence with the Delaware River. The dam is at the confluence of Bear Creek and the Lehigh River. The project area also includes the F.E. Walter reservoir, which has a capacity of 107,975 acre-feet. Above the dam is approximately 288 square miles (21%) of the total 1,368 square mile Lehigh River basin. The project area covers the dam, the reservoir, and the Lehigh River downstream to the town of Easton, Pennsylvania, where the Lehigh empties into the Delaware River.

Problem Statement: The problems at F.E. Walter Dam & Reservoir are: (1) Increased potential for life loss and economic damages during flood events along the Lehigh River due to increased population and development in the study area, as well as the possible increased intensity and frequency of storms in the Northeast U.S.; (2) Degraded aquatic habitat and recreational fishing opportunities in the Lehigh River from mid-July through September due to elevated temperatures in the water released from the F.E. Walter Reservoir; and (3) Increased demand on water stored in the F.E. Walter Reservoir for low flow augmentation to help meet mandated flow objectives in the Delaware River at Trenton, New Jersey, as a result of increasing frequency of drought conditions and salt water intrusion driven by sea level rise

Federal Interest: The Federal interest in the study is stated in Section 216 of the Flood Control Act of 1970: "*The Secretary of the Army, acting through the Chief of Engineers, is authorized to review the operation of projects the construction of which has been completed and which were constructed by the Corps of Engineers in the interest of navigation, flood control, water supply, and related purposes, when found advisable due to significantly changed physical or economic conditions, and to report thereon to Congress with recommendations on the advisability of modifying the structures or their operation, and for improving the quality of the environment in the overall public interest.*" As documented in the 2015 Initial Appraisal Report, significant physical and

economic changes have occurred and warrant a feasibility study to determine if modifications are needed to satisfy the authorized uses of the dam & reservoir (flood risk management and recreation).

Risk Identification: The below risks have been identified and have been incorporated into a Risk Register in preparation for the Alternatives Milestone Meeting scheduled for 28 May 2020.

| Activity/Action/Issue/Risk | Consequences/Impacts | Proposed Mitigation |
|--|--|---|
| <p>Multiple Uses/Competing Interests: Flood risk mgmt., recreation, and emergency drought storage are authorized uses; low flow augmentation is the sponsor's interest. Intense public and local political pressure to maintain or improve whitewater rafting and recreational fishing. Dam safety and flood risk management are recognized, however, as primary considerations.</p> | <p>Opposing problems, opportunities and objectives may pose a challenge for identifying the TSP. Alternatives may conflict - e.g., water storage for low flow augmentation may reduce the amount available for whitewater releases during summer months.</p> | <p>In the ongoing development of alternatives, the team will continuously evaluate and discuss benefits vs. losses and work towards modifying alternatives to reduce conflicts, where they occur.</p> |
| <p>Dam Safety Considerations: It is unknown if the dam can safely pass the Probable Maximum Flood (PMF) under current guidance/assessment methodologies. The revised PMF analysis takes 3 months, as there are limited resources in this specialized area of expertise. The analysis is being conducted by the Risk Management Center (RMC) and is scheduled for completion on 14 AUG 20.</p> | <p>PMF analysis creates 3-month project delay. A higher PMF could result in the dam being insufficient, in which case a new risk assessment would have to be performed by the RMC, potentially leading to a Dam Safety Modification Study (also led by the RMC). This would result in further delays and exceedance of the 3x3 budget and schedule. Further, it would likely mean the dam would have unacceptable incremental risk, which would prohibit further examination of additional water storage alternatives.</p> | <p>PDT will develop existing conditions including structural inventory updates and future forecasting for projected development and increased runoff that could impact FRM. PDT will simultaneously begin evaluation of other alternatives and coordinate closely with the RMC to revise the PMF as soon as practicable. Meanwhile, the team will focus on non-structural alternatives that meet the plan objectives.</p> |

| | | |
|--|--|---|
| <p>Cultural Resources: Reservoir and surrounding area has not had a recent or complete cultural survey, but rock shelters and Native American dwelling sites are known to be present.</p> | <p>If the pool in the reservoir is raised, significant cultural resources could be inundated upstream as well as downstream of the dam (in the event of a dam failure). This could result in project delays to identify all sites, develop mitigation plans, and respond to comments from Tribes and State Historic Preservation Offices that may weigh in with significant comments/concerns.</p> | <p>The cultural resources lead will issue a task order for a Phase IA resources investigation to obtain a thorough inventory, and impacts to known resources will be thoroughly described in the Environmental Assessment (EA) initially, and the Environmental Impact Statement (EIS), if one is needed.</p> |
| <p>Natural Resources: Several special status species, including Federally endangered Northern long-eared and Indiana bat; bald eagle, osprey, timber rattlesnake, and others are present in the project area. Modeling and historic water quality sampling has shown severe negative water quality impacts in lake and downstream when the reservoir is operated at high pool levels. Potential secondary impacts to the Federally endangered dwarf wedge mussel (located in the Delaware River) if flow changes are recommended (on the Lehigh River) that would decrease required base flows from NYC reservoirs.</p> | <p>If dam raising/permanent pool elevation increase is proposed, significant ecological impacts are anticipated, triggering an EIS and creating significant public and resource agency comments. An EIS would drive the study beyond the 3-year and \$3M limits. (current estimate assumes only an EA required). Comments and response time could result in project delays.</p> | <p>The environmental resources lead will gather all necessary natural resources data early in the study and work closely with the PM and PDT to communicate the need for an EIS. Environmental resources lead with work closely with resource agencies to get advance notice of NEPA-related concerns.</p> |

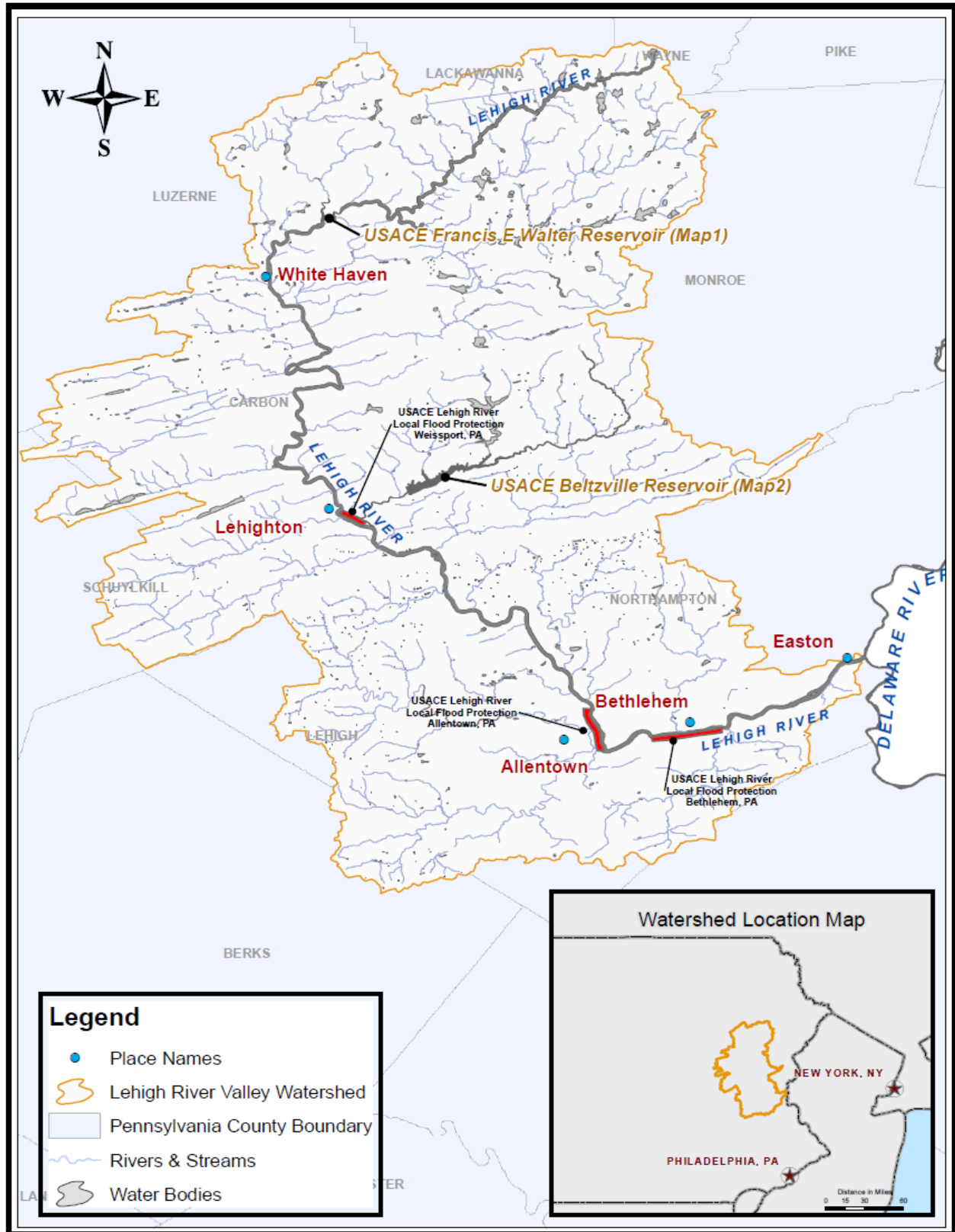


Figure 1 F.E. Walter Watershed

1. FACTORS AFFECTING THE LEVELS OF REVIEW

Scope of Review. Engineer Circular (EC) 1165-2-217 stipulates that the appropriate scope and level of review be made as a risk-informed decision and provides criteria for doing so. This review plan for the F.E. Walter Dam & Reservoir Feasibility Study and Environmental Assessment includes District Quality Control (DQC), Agency Technical Review (ATR), as well as Policy and Legal Compliance Reviews. The PDT has determined that an Independent External Peer Review (IEPR) will be necessary. Because the study is reexamining the project to see if it meets current needs and modification of the project that may require new authorizations will be considered, multiple centers of expertise may need to be engaged in reviews. If after analysis of the probable maximum flood and other alternatives, it becomes apparent that there is a dam safety issue, then an analysis of the effect of a higher pool on the probability of failure and consequences as required by ER 1110-2-1156 Safety of Dams – Policy and Procedures, Section 24.3.2 and 24.4.2 will be conducted, followed by appropriate reviews by the Risk Management Center (RMC).

- Will the study likely be challenging? The study will not be technically challenging, as it will follow guidelines and procedures per guidance, such as ER 1105-2-100 Planning Guidance Notebook, which provide direction regarding analysis and alternative formulation. In order to mitigate the above identified risks, some new information and new analysis will need to be completed, but it isn't expected to be challenging. There are three areas beyond technical study challenges that will require close coordination and vertical team alignment to include balancing multiple needs in the basin, public involvement concerns, and low flow requirements noted by the sponsors.

Public involvement may be challenging, as there is significant pressure from local stakeholders to continue or improve the current recreational uses. If changes to operations or water storage negatively affect whitewater recreation, there is the potential for significant challenges by the public, elected officials, and commercial interests.

- Provide a preliminary assessment of where the project risks are likely to occur and assess the magnitude of those risks. Risk identification was provided on page 2.
- Is the project likely to be justified by life safety or is the study or project likely to involve significant life safety issues? The dam currently holds a DSAC rating of 4, Low Urgency, and is not anticipated to pose a significant risk to life safety. However, the ability of the dam to pass the probable maximum flood (PMF) needs to be evaluated using current standards. If life safety issues are identified after the evaluation and a pool elevation raise is recommended in the planning study, a Safety Assurance Review will be conducted during implementation per EC 1165-2-217.
- Has the Governor of an affected state requested a peer review by independent experts? No, the governor of Pennsylvania has not requested a peer review by independent experts.
- Will the project/study likely involve significant public dispute as to the project's size, nature, or effects? Coordination with key agencies and stakeholders will be necessary, as there is

significant public concern about the potential effects of the study recommendations on recreational use of the Leghigh River and the upstream/in-lake fishery.

- Is the project/study likely to involve significant public dispute as to the economic or environmental cost or benefit of the project? Significant public dispute regarding costs or benefits are possible, given the significance economic benefits of whitewater and fishery recreation downstream and upstream of the dam.
- Is the information in the decision document or anticipated project design likely to be based on novel methods, involve innovative materials or techniques, present complex challenges for interpretation, contain precedent-setting methods or models, or present conclusions that are likely to change prevailing practices? No, the study is using USACE approved or preferred modeling for all the different disciplines.
- Does the project design require redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design/construction schedule? No
- Is the estimated total cost of the project greater than \$200 million? Not at this time.
- Will an Environmental Impact Statement be prepared as part of the study? An EIS is not anticipated at this time. However, if the TSP involves a permanent pool raise, an EIS may be necessary, as significant natural and cultural resources may be inundated upstream of the dam.
- Is the project expected to have more than negligible adverse impacts on scarce or unique tribal, cultural, or historic resources? Not at this time.
- Is the project expected to have substantial adverse impacts on fish and wildlife species and their habitat prior to the implementation of mitigation measures? Not at this time.
- Is the project expected to have, before mitigation measures, more than a negligible adverse impact on an endangered or threatened species or their designated critical habitat? Not at this time.

2. 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 fulfills the project quality requirements of the Project Management Plan.

Agency Technical 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.

Independent External Peer Review. Type I IEPR 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.

Cost Engineering Review. 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. These reviews typically occur as part of ATR.

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 below 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 |
|-------------------------------------|-------------------------|-------------------|-----------------|-------------|-----------------|
| **Probable Maximum Flood Analysis | DQC | 3 AUG 20 | 7 AUG 20 | \$6K | No |
| Probable Maximum Flood Analysis | ATR (by RMC) | 10 AUG 20 | 14 AUG 20 | \$4K | No |
| **Stream Gage Analysis | DQC | 1 FEB 21 | 8 FEB 21 | \$5K | No |
| Stream Gage Analysis | ATR | 10 FEB 21 | 21 FEB 21 | \$5K | No |
| Draft Feasibility Report and EA/EIS | DQC | 30 MAR 21 | 12 APR 21 | \$30K | No |
| Draft Feasibility Report and EA/EIS | ATR | 2 JUL 21 | 17 AUG 21 | \$50K | No |
| Draft Feasibility Report and EA/EIS | Type I IEPR | 2 JUL 21 | 17 SEP 21 | \$200K | No |
| Draft Feasibility Report and EA/EIS | Policy and Legal Review | 2 JUL 21 | 19 AUG 21 | n/a | No |
| Final Feasibility Report and EA/EIS | DQC | 7 FEB 22 | 6 MAR 22 | TBD | No |
| Final Feasibility Report and EA/EIS | ATR | 7 MAR 22 | 4 APR 22 | \$20K | No |
| Final Feasibility Report and EA/EIS | Policy and Legal Review | 5 APR 22 | 20 APR 22 | n/a | No |

***Being conducted in parallel and will inform the feasibility study*

a. DISTRICT QUALITY CONTROL

The home district shall manage DQC and will appoint a DQC Lead to manage the local review (see EC 1165-2-217, section 8.a.1). The DQC Lead should prepare a DQC Plan and provide it to the RMO and MSC prior to starting DQC reviews. Table 2 identifies the required expertise for the DQC team.

Table 2: Required DQC Expertise

| DQC Team Disciplines | Expertise Required |
|-----------------------------------|---|
| DQC Lead | A senior professional with extensive experience preparing Civil Works decision documents and conducting DQC. The lead may also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc). |
| Planning | The Planning reviewer should be a senior water resources planner with experience in formulation and evaluation of alternatives for water supply and assessment of significance of impacts on other project purposes (e.g. flood risk mitigation, recreation, water quality, fish and wildlife, and hydropower) at multi-purpose projects. |
| Economics | The economics reviewer should be a senior economist with experience in FRM consequences modeling (HEC-FDA), development of population and water use forecasts, cost allocation at multi-purpose projects, calculation of storage pricing based on updated cost of storage and benefits foregone methods, including reviewing a recreation analysis. The reviewer should also be able to evaluate inputs into a spreadsheet model for water demand and supply. Lastly, the reviewer should also be able to provide expertise for water storage agreements. |
| Environmental Resources | The environmental resources reviewer should be a senior NEPA practitioner who is able to review the combined report to confirm that all environmental and cultural resource statutes are in compliance and that impact evaluation is adequate. |
| Cultural Resources | The cultural resources reviewer should be a senior archaeologist. Reviewer should also have expertise in both Pre-Contact/Post-Contact Archaeology, and geographic expertise in the Northeast United States geographical area. |
| Hydrology & Hydraulic Engineering | Thorough knowledge of hydrology and hydraulics as it pertains to the hydrologic (HEC-HMS) model for normal and high flows through the dam and reservoir models (HEC-RAS, HEC-ResSim) for high flow elevations and velocities. Knowledge of climate change analysis as it pertains to regional changes in storm frequency and intensity is also needed. |
| Geotechnical Engineering | The geotechnical engineer will have experience in the design, construction, and evaluation of embankments, potential failure mode analysis, and dam safety risk analysis. The geotechnical engineer will have experience in subsurface investigations, rock and |

| | |
|-------------------|---|
| | soil mechanics, internal erosion evaluation, slope stability evaluation, and earthwork construction. |
| Water Management | The water management reviewer will be a senior engineer with expertise in water control manuals and operations of multipurpose projects and river basin systems, including an understanding of storage accounting. They should also have expertise in developing and running rules based reservoir and river system simulation models including HEC-ResSim. |
| Cost Engineering | The cost engineering reviewer will be a senior cost engineer with expertise in preparing life cycle cost estimates and baseline project cost estimates, in accordance with ERs 1110-2-1300 and -1302, using the Micro-Computer Aided Cost Engineering System (MCACES). |
| Civil Engineering | The civil engineering reviewer will be a senior civil engineer with expertise in dam modifications, infrastructure, access roads, and utilities. The reviewer will be prepared to review mapping, alternative layout plans, and general details for conceptual level designs. |
| Dam Safety | The dam safety reviewer will be a senior professional who is a subject matter expert in the area of dam safety evaluations. DSO will be engaged in the DQC. |
| Operations | A senior professional from dam operations who is a subject matter expert of the day to day operations of the dam and reservoir will review the report of accuracy. |
| Real Estate | The real estate reviewer should be an experienced and certified real estate reviewer. |

Documentation of DQC. Quality Control should be performed continuously throughout the study. A specific certification of DQC completion is required at the draft and final report stages. Documentation of DQC should follow the District Quality Manual and the MSC Quality Management Plan. An example DQC Certification statement is provided in EC 1165-2-217, on page 19 (see Figure F).

Documentation of completed DQC should be provided to the MSC, RMO and ATR Team leader prior to initiating an ATR. The ATR team will examine DQC records and comment in the ATR report on the adequacy of the DQC effort. Missing or inadequate DQC documentation can result in delays to the start of other reviews (see EC 1165-2-217, section 9).

b. AGENCY TECHNICAL REVIEW

The ATR will assess whether the analyses are technically correct and comply with guidance, and that documents explain the analyses and results in a clear manner. An RMO manages ATR. The review is conducted by an ATR Team whose members are certified to perform reviews. Lists of certified reviewers are maintained by the various technical Communities of Practice (see EC 1165-2-217, section 9(h)(1)). Table 3 identifies the disciplines and required expertise for this ATR Team.

Table 3: Required ATR Team Expertise

| ATR Team Disciplines | Expertise Required |
|-----------------------------------|---|
| ATR Lead | A senior professional with extensive experience preparing Civil Works decision documents and conducting ATR. The lead should have the skills to manage a virtual team through an ATR. The lead may serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc.). |
| Planning | The Planning reviewer should be a senior water resources planner with experience in formulation and evaluation of alternatives for water supply and assessment of significance of impacts on other project purposes (e.g. flood risk mitigation, recreation, water quality, fish and wildlife, and hydropower) at multi-purpose projects. |
| Economics | The economics reviewer should be a senior economist with experience in FRM consequences modeling (HEC-FDA), development of population and water use forecasts, cost allocation at multi-purpose projects, calculation of storage pricing based on updated cost of storage and benefits foregone methods, including reviewing a recreation analysis. The reviewer should also be able to evaluate inputs into a spreadsheet model for water demand and supply. Lastly, the reviewer should also be able to provide expertise for water storage agreements. |
| Environmental Resources | The environmental resources reviewer should be a senior NEPA practitioner who is able to review the combined report to confirm that all environmental and cultural resource statutes are in compliance and that impact evaluation is adequate. |
| Cultural Resources | The cultural resources reviewer should be a senior archaeologist. Reviewer should also have expertise in both Pre-Contact/Post-Contact Archaeology, and geographic expertise in the Northeast United States geographical area. |
| Hydrology & Hydraulic Engineering | Thorough knowledge of hydrology and hydraulics as it pertains to downstream consequences for a project. Thorough knowledge of hydrology and hydraulics as it pertains to the hydrologic (HEC-HMS) model for normal and high flows through the dam. |
| Geotechnical Engineering | The geotechnical engineer will have experience in the design, construction, and evaluation of embankments, potential failure mode analysis, and dam safety risk analysis. The geotechnical engineer will have experience in subsurface investigations, rock and soil mechanics, internal erosion evaluation, slope stability evaluation, and earthwork construction. |
| Water Management | The water management reviewer will be a senior engineer with expertise in water control manuals and operations of multipurpose projects and river basin systems, including an understanding of storage accounting. They should also have expertise in developing and running rules based reservoir and river system simulation models including HEC-ResSim. |
| Cost Engineering | The cost engineering reviewer will be a senior cost engineer with expertise in preparing life cycle cost estimates and baseline project |

| | |
|--|---|
| | cost estimates, in accordance with ERs 1110-2-1300 and -1302, using the Micro-Computer Aided Cost Engineering System (MCACES). |
| Civil Engineering | The civil engineering reviewer will be a senior civil engineer with expertise in dam modifications, infrastructure, access roads, and utilities. The reviewer will be prepared to review mapping, alternative layout plans, and general details for conceptual level designs. |
| Real Estate | The real estate reviewer should be an experienced and certified real estate reviewer. |
| Climate Preparedness and Resilience CoP Reviewer | A member of the Climate Preparedness and Resiliency Community of Practice (CoP) will participate in the ATR review. (Inland hydrology) |
| Risk Analysis | A reviewer with experience in performing and presenting risk analyses in accordance with ER 1105-2-101 and other related guidance, including familiarity with how information from the various disciplines involved in the analysis interact and affect the results. |

Documentation of ATR. DrChecks will be used to document all ATR comments, responses and resolutions. Comments should be limited to those needed to ensure product adequacy. If a concern cannot be resolved by the ATR team and PDT, it will be elevated to the vertical team for resolution using the EC 1165-2-217 issue resolution process. Concerns can be closed in DrChecks by noting the concern has been elevated for resolution. The ATR Lead will prepare a Statement of Technical Review (see EC 1165-2-217, Section 9), for the draft and final reports, certifying that review issues have been resolved or elevated. ATR may be certified when all concerns are resolved or referred to the vertical team and the ATR documentation is complete.

c. INDEPENDENT EXTERNAL PEER REVIEW

(i) Type I IEPR.

Type I IEPR is managed outside of the USACE and conducted on 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.

Decision on Type I IEPR. The PDT made a risk-informed decision to perform a Type I IEPR based on the decision criteria in EC 1165-2-217, Section 11. Specifically, the mandatory triggers described in Section 11(d)(1)(e) and (f) are relevant to the project. These triggers involve significant public dispute as to size, nature, or effects of the project as well as the economic or environmental cost or benefit of the project. This dispute is anticipated based on the level of public, commercial, municipal, county, and state interest in the project.

Products to Undergo Type I IEPR. The full draft feasibility report will undergo IEPR.

Required Type I IEPR Panel Expertise. Panels will consist of independent, recognized experts from outside of the USACE in disciplines representing a balance of areas of expertise suitable for the review being conducted. Table 4 lists the required panel expertise. Anticipating three reviewers.

Table 4: Required Type I IEPR Panel Expertise

| IEPR Panel Member Disciplines | Expertise Required |
|--------------------------------------|---|
| Economics | FRM, recreation, water supply |
| Environmental | NEPA Compliance |
| Engineering | H&H, Geotechnical, and Risk Analysis, with experience in large flood risk management projects, modifications of existing dams, and increased pool levels. |

Documentation of Type I IEPR. The Outside Eligible Organization (OEO) will submit a final Review Report no later than 60 days after the end of the draft report public comment period. USACE shall consider all recommendations in the Review Report and prepare a written response for all recommendations. The final decision document will summarize the Review Report and USACE response and will be posted on the internet.

(ii) Type II IEPR.

The second kind of IEPR is Type II IEPR. These Safety Assurance Reviews are managed outside of the USACE and are conducted on design and construction for hurricane, storm and flood risk management projects or other projects where existing and potential hazards pose a significant threat to human life. A Type II IEPR Panel will be convened to review the design and construction activities before construction begins, and until construction activities are completed, and periodically thereafter on a regular schedule.

Decision on Type II IEPR. It is unclear at this time whether Type II IEPR will be needed during design and construction of a recommended plan. If it is determined that the recommended plan poses a significant threat to human life, a Type II IEPR will be conducted during the Preconstruction Engineering and Design (PED) and Constuction phases of the project.

d. MODEL CERTIFICATION OR 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 are any models and analytical tools used 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 a certified/approved planning model does not constitute technical review of a planning product. The selection and application of the model and the input and output data is the responsibility of the users and is subject to DQC, ATR, and IEPR.

Table 5: Planning Models. The following models may be used to develop the decision document:

| Model Name and Version | Brief Model Description and How It Will Be Used in the Study | Certification / Approval |
|---|---|---------------------------------|
| HEC-FDA ver 1.4.2 | Calculate expected value of flood damages to establish future without-project condition damages and with-project condition damage reduction | Certified |
| HEP (USFWS Species Blue Book HSI Model) | Model species in the Lehigh River watershed | Certified & approved |

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. The professional practice of documenting the application of the software and modeling results will be followed. The USACE Scientific and Engineering Technology Initiative has identified many engineering models as preferred or acceptable for use in studies. These models should be used when 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.

Table 6: Engineering Models. These models may be used to develop the decision document:

| Model Name | Brief Model Description and How It Will Be Used in the Study | Approval Status |
|-------------------------|---|--------------------------|
| HEC-HMS, Version 4.4.1 | Hydrologic model that will be used to determine flood flows to identify flood pool alternatives as well as everyday flows to identify water supply pool alternatives. | HH&C CoP Preferred Model |
| HEC-ResSim, Version 3.1 | Reservoir model that will be used to assess different operational rules at FE Walter Dam and the impact on outflow. | HH&C CoP Preferred Model |
| HEC-RAS, Version 5.0.7 | Hydraulic model that will be used to determine flood elevations upstream and downstream of the dam, to be provided to Economics team member to determine damages. | HH&C CoP Preferred Model |

e. POLICY AND LEGAL REVIEW

Policy and legal compliance reviews for draft and final planning decision documents are delegated to the MSC (see Director's Policy Memorandum 2018-05, paragraph 9).

(i) 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, and other review resources as needed.

- The Policy Review Team will be invited to participate in key meetings during the development of decision documents as well as SMART Planning Milestone meetings. These engagements may include In-Progress Reviews, Issue Resolution Conferences or other vertical team meetings plus the milestone events.
- 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.

(ii) Legal Review.

Representatives from the Office of Counsel will be assigned to participate in reviews. Members may participate from the District, MSC and 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.

f. PUBLIC PARTICIPATION

This study will include a public involvement program designed to meet NEPA requirements; solicit public and government agency input about the effects of alternatives and the selected plan; ensure that public and agency concerns are addressed; and keep the public and agencies involved in the development of the study and selected plan. Coordinating with US Fish & Wildlife Service will occur to ensure compliance with the Endangered Species Act and the Fish and Wildlife Coordination Act. Coordination will include such State and local agencies and organizations as the Pennsylvania State Historic Preservation Officer, the Pennsylvania Department of Conservation and Natural Resources, and federally recognized affiliated Native American Tribes. Significant and relevant public comments that are received during early coordination will be provided to the reviewers. Comments collected during the scoping meetings will also be provided to the ATR and IEPR reviewers.

The draft feasibility report and environmental assessment will be posted on the Philadelphia District's home page for a 30-day public comment period. Public and interagency review for the Feasibility Report/EA will be conducted in accordance with NEPA, as outlined in ER 1105-2-100.

ATTACHMENT 1: TEAM ROSTERS

| Role | Individual | Contact |
|---------------------------------------|--------------------------------------|------------------------------|
| Project Manager | Julie Kaiser (interim) Dan Hughes | 443-447-4277 215-656-6880 |
| Plan Formulation | Brian Bogle | 215-656-6585 |
| Environmental | Greg Wacik | 215-656-6561 |
| Economics | Andrew Lobo | 215-656-6453 |
| Cultural Resources | Nikki Minnichbach | 215-656-6556 |
| Hydrology & Hydraulic Engineering | Laura Bittner | 215-656-6688 |
| Water Management | Christine Lewis-Coker | 215-656-6679 |
| Geotechnical Engineering & Dam Safety | Christopher Myers | 215-656-5621 |
| Operations | Dave Williams | 610-377-0438 |
| Real Estate | Janay Dixon | 410-962-4919 |
| Climate Preparedness and Resilience | TBD | |
| Construction | TBD | |

| DISTRICT QUALITY CONTROL TEAM | | | |
|-------------------------------|-------------|-----------------------------|--------------|
| Name | Office | Position | Phone Number |
| Scott Sanderson | CENAP-PL-PC | DQC Lead | 215-656-6571 |
| Brian Bogle | CENAP-PL-PC | Planning Reviewer | 215-656-6585 |
| Jake Helminiak | CENAP-EC-EH | H&H Reviewer | 215-656-6466 |
| Bob Moore | CENAP-EC-EH | H&H Reviewer | 215-656-6684 |
| Rob Lowinski | CENAP-EC-EH | Water Management Reviewer | 215-656-6690 |
| Derek Martowska | CENAP-EC-EG | Geotech/Dam Safety Reviewer | 215-656-6667 |
| Preston Oakley | CENAP-PL-P | Economics Reviewer | 215-656-6582 |
| TBD | | Environmental Reviewer | |
| TBD | | Cultural Resources Reviewer | |

| AGENCY TECHNICAL REVIEW TEAM | | | |
|------------------------------|---------------|-------------------------|--------------|
| Name | Office | Position | Phone Number |
| Natalie McKinley | CELRH-PM-PD-F | ATR Lead/Economics | 304-399-5842 |
| | | Plan Formulation | |
| | | Environmental Resources | |
| | | Cultural Resources | |

| | | | |
|--|--|--------------------------|--|
| | | Geotechnical Engineering | |
| | | Civil Engineering | |
| | | Risk Analysis | |
| | | Climate Change | |
| | | Real Estate | |
| | | H&H | |
| | | Water Management | |

| VERTICAL TEAM (includes Policy and Legal Compliance Team) | | | |
|---|---------|-----------------------------------|--------------|
| Name | Office | Position | Phone Number |
| Joseph Vietri | CENAD | Chief, Planning & Policy | 347-370-4570 |
| Hank Gruber | CENAD | Deputy Chief, Planning & Policy | 347-370-4566 |
| Alan Huntly | CENAD | Chief, Engineering & Construction | 347-370-4667 |
| Daniel Rodriguez | CENAD | Dam Safety Program Manager | 347-370-4595 |
| Kim Gavigan | HQ | NAD RIT | 202-761-1371 |
| Daniela Todesco | HQ | NAD RIT | 202-761-8816 |
| Eric Thaut | FRM PCX | Deputy Director | 415-503-6852 |
| Karen Miller | FRM PCX | NAD Regional Director | 304-399-5859 |

| POLICY and LEGAL COMPLIANCE REVIEW TEAM | | | |
|---|--------|-----------------------------------|----------------|
| Name | Office | Position | Phone Number |
| Valerie Cappola | CENAD | Review Manager & Environmental | (347) 370-4557 |
| Megan Jadosich | CENAD | Plan Formulation | (347) 370-4653 |
| Jeff Strahan | OWPR | Economics | (202) 761-8643 |
| Ann Banitt | CEMVP | Climate Preparedness & Resiliency | (651) 290-5541 |
| Carlos Gonzalez | CENAD | Real Estate | (347) 370-4529 |
| Suzanne Kimble | CENAD | Legal Compliance | (347) 370-4527 |
| Bruce Rogers | CENAD | Dam Safety | (347) 370-4655 |
| Patricia Bolton | CENAD | Cost Engineering | (347) 370-4682 |
| George Nieves | CENAD | Operations | (347) 370-4556 |
| Ralph LaMoglia | CENAD | Engineering | (347) 370-4599 |