



DEPARTMENT OF THE ARMY  
U.S. ARMY CORPS OF ENGINEERS, SOUTH ATLANTIC DIVISION  
60 FORSYTH STREET SW, ROOM 10M15  
ATLANTA, GA 30303-8801

CESAD-PDP

27 August 2020

MEMORANDUM FOR Commander, U.S. Army Corps of Engineers, Wilmington District, 69  
Darlington Avenue, Wilmington, North Carolina 28403-1343

SUBJECT: Review Plan Approval for the Neuse River Basin, NC Feasibility Study

1. References:

a. Memorandum, CESAW-PM-D, 23 July 2020, subject: Neuse River Basin, NC Feasibility Study - Request for Approval of Review Plan.

b. Memorandum, CESPDP-PDP (FRM-PCX), 12 July 2020, subject: Review Plan Endorsement for the Neuse River, North Carolina, Flood Risk Management Feasibility Study.

2. Wilmington District (SAW) prepared the enclosed review plan consistent with EC 1165-2-217. The district coordinated the review plan with the Flood Risk Management Planning Center of Expertise (FRM-PCX), which is the lead office to execute this review plan. For further information, contact Ms. Michelle Kniep, FRM-PCX at 314-331-8404. The Neuse River Basin, NC Feasibility Study is a "Decision Document" under the Review Policy. The District confirmed that a Type I IEPR will not be performed at this time for the study because the project does not meet any of the mandatory triggers for conducting Type I IEPR: the total project cost is not anticipated to exceed \$200 million; there is no request by a Governor to conduct Type I IEPR; and the project is not controversial. Therefore, an exclusion from conducting a Type 1 IEPR for this study is not needed nor requested at this time.

3. I approve this review plan. The approved review plan is subject to change as circumstances require, consistent with study development under the project management business process. Subsequent revisions to this approved review plan due to significant changes in the study, study scope, or level of review will require new written approval from this office.

4. The point of contact for this action is Mr. Wilbert V. Paynes at 404-562-5177.

Encl

LARRY D. MCCALLISTER, PhD, PE, SES  
Director of Programs

# REVIEW PLAN

August 2020

**Project Name:** Neuse Basin Flood Risk Management Study, NC

**P2 Number:** 483258

**Decision Document Type:** Feasibility Report

**Project Type:** Flood Risk Management

**District:** Wilmington District

**District Contact:** Project Manager, 910-251-4489

**Major Subordinate Command (MSC):** South Atlantic Division

**MSC Contact:** Senior Plan Formulator, [REDACTED]

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

**RMO Contact:** Deputy Director, [REDACTED]

## **Key Review Plan Dates**

**Date of RMO Endorsement of Review Plan:** 7/12/20

**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:** None

**Date of Review Plan Web Posting:** Pending

**Date of Congressional Notifications:** Pending

## **Milestone Schedule**

	<b><u>Scheduled</u></b>	<b><u>Actual</u></b>	<b><u>Complete</u></b>
<b><u>FCSA:</u></b>	8-Apr-2020	8-Apr-2020	Yes
<b><u>Alternatives Milestone:</u></b>	13-Jul-2020	13-Jul-2020	Yes
<b><u>Tentatively Selected Plan:</u></b>	15-Jul-2021		No
<b><u>Release Draft Report to Public:</u></b>	16-Sep-2021		No
<b><u>Agency Decision Milestone:</u></b>	10-Jan-2022		No
<b><u>Final Report Transmittal:</u></b>	7-Oct-2022		No
<b><u>Chief's Report:</u></b>	10-Apr-2023		No

## **Project Fact Sheet**

June 2020

**Project Name:** Neuse Basin Flood Risk Management Study

**Location:** North Carolina

**Authority:** House Committee on Transportation and Infrastructure Resolution adopted July 23, 1997.

**Sponsor:** State of North Carolina, Department of Environmental Quality

**Type of Study:** Feasibility

**SMART Planning Status:** This study is 3x3x3 compliant.

**Project Area:** The Neuse River Basin begins in the piedmont of North Carolina above the cities of Raleigh and Durham and extends 248 miles southeast through the Coastal Plain and flows into the Pamlico Sound below New Bern, NC. The basin covers about 6,200 square miles. The basin encompasses all or part of 18 counties, and includes 75 municipalities. Major municipalities in the study area include the cities of Raleigh, Durham, Smithfield, Goldsboro, Kinston, and New Bern, NC.

**Problem Statement:** The Neuse Basin has a history of flooding during severe storm and hurricane events. The basin was severely impacted by heavy rainfall from Hurricanes Fran (1996), Floyd (1999), Matthew (2016), and Florence (2018) causing widespread flooding and damage to residential and commercial buildings, with both inland and coastal flooding occurring in the study area. Although coastal storm flooding is not a focus of the study, sea level change and coastal storm surge can influence riverine flooding near the coast. Analyses of coastal storm surge elevations as part of the South Atlantic Coastal Study (SACS) will be utilized as the downstream boundary conditions for this study's riverine hydraulic modeling. Incorporation of sea level rise from SACS will be carried forward and regulations related to climate change that affect inland hydrology will be followed. All data and analysis leveraged from the SACS will be reviewed and approved under the SACS study process; any data and analysis that has yet to be reviewed will be included in this feasibility study review process.

**Federal Interest:** The communities of the Neuse Basin have been very active in pursuing flood risk management measures to reduce damages related to future flooding. Due to recurring damages sustained during hurricane events, most recently Hurricane Florence, the State of North Carolina has requested the United States Army Corps of Engineers to pursue a feasibility study to reduce future flood damages in the basin. The project was included in the 2019 Additional Supplemental Appropriations for Disaster Relief. The Feasibility Cost Sharing Agreement was signed 8 April 2020.

**Risk Identification:** Flood risk to human life and structures has been identified in recent flood events associated with Hurricanes Matthew and Florence. Flood risk resulting in economic damage to structures and loss of life is likely to be exacerbated in the future as development within the basin increases, and as climate change increases the intensity and frequency of future storm events.



**Fig. 1.** Location of the Neuse River Basin, NC.

# 1. FACTORS AFFECTING THE LEVELS OF REVIEW

## Scope of Review.

- Will the study likely be challenging?

From a technical standpoint, the Project Delivery Team (PDT) does not anticipate challenges outside the normal activities required for a flood risk management project. However, the study will be challenging as a result of the large area being considered. The PDT will develop a plan formulation strategy to identify focal areas within the basin to target analysis and consider alternatives in a manner consistent with completing the study within three years and under \$3 million. Geographic screening of the basin for areas most at risk of flooding will need to be accomplished prior to application and screening of potential management measures.

- Provide a preliminary assessment of where the project risks are likely to occur and assess the magnitude of those risks.

The study area is approximately 6,200 sq. miles with 8 population centers of greater than 1,000 people at risk from flooding. These communities are spread geographically across the Neuse River sub-watershed. Identification, grouping and selection of alternatives that address both local and regional flooding will require a substantial level of effort. The area under consideration requires a well-developed plan formulation strategy in order to ensure appropriate risk management measures are identified and incorporated into viable alternative plans.

- Is the project likely to be justified by life safety or is the study or project likely to involve significant life safety issues?

The primary flood events within the Neuse Basin have been due to large rainfall events from hurricanes, which are generally forecasted well in advance. Thus, residents generally have ample time to evacuate prior to flood events. Historic floods throughout the basin have generally been characterized by large areas of inundation with relatively low inundation depths that can persist for extended periods of time, particularly in the lower region of the basin. The population in the basin is approximately 1.6 million and concentrated in the communities of Raleigh and Durham with significant lower population concentrations in the communities of Goldsboro, New Bern, Kinston and Clayton. The areas in the basin prone to flood risk have access to the transportation corridors of I-95 and I-40 as evacuation routes via a network of highways (e.g., 70, 258, 421) that traverse throughout the basin prior to storm events. The highway network is well developed serving the basin's metropolitan areas of Raleigh and Durham.

A previous flood risk management study was conducted by the state of North Carolina. Although this study identified upstream detention basins as potentially viable

measures, other measures (e.g., non-structural measures) were deemed to be more economically justified. Therefore, the study team does not believe it is likely the study will recommend implementation of measures or alternatives that have significant life safety concerns in the event of non-performance or design exceedance. If it becomes likely that a measure with significant life safety concerns will be recommended, the need for additional levels of review will be revisited at that point.

For these reasons, any projects identified through this feasibility study are unlikely to have a significant life safety component either for justification or post-implementation as confirmed by the US Army Corps of Engineers Wilmington District (SAW) Chief of Engineering.

- Has the Governor of an affected state requested a peer review by independent experts?

The Governor of North Carolina has not requested a peer review by independent experts.

- Will it likely involve significant public dispute as to the project's size, nature, or effects?

The PDT does not anticipate significant public dispute regarding the nature and recommendation of this study. Both the USACE Neuse River Basin Environmental Restoration Study in June 2009 and the State of North Carolina Neuse River Basin Flood Analysis and Mitigation Strategies Study in May 2018 demonstrate strong public interest in implementing measures to reduce flood risk in the Neuse River Basin. It is unlikely this study will require an Environmental Impact Statement.

- Is the project/study likely to involve significant public dispute as to the economic or environmental cost or benefit of the project?

There is unlikely to be significant public dispute regarding the economic and/or environmental impacts of the project. The project is expected to have minimal environmental impact and is expected to protect important drivers of the local economy.

- 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?

This study is not likely to utilize novel methods, nor present complex challenges for interpretation. It will not likely contain precedent-setting methods or models, nor present conclusions that alter the originally authorized study.

- Does the project design require redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design/construction schedule?

The study will be considering standard flood risk reduction measures. These are unlikely to require any unique redundancy, resiliency, robustness, or construction actions outside those normally necessary for flood risk management projects.

- Is the estimated total cost of the project greater than \$200 million?

The estimated project cost is anticipated to be less than \$200M based on the planned scope of the study.

- Will an Environmental Impact Statement be prepared as part of the study?

We do not anticipate the need for an Environmental Impact Statement. The PDT expects National Environmental Policy Act (NEPA) compliance to be completed through an Environmental Assessment (EA) and Finding of No Significant Impact (FONSI).

- Is the project expected to have more than negligible adverse impacts on scarce or unique tribal, cultural, or historic resources?

No unique tribal, cultural, or historic resources are expected to be impacted as a result of the recommended Federal action.

- Is the project expected to have substantial adverse impacts on fish and wildlife species and their habitat prior to the implementation of mitigation measures?

No. Shall the recommended plan result in adverse impacts to fish or wildlife species or their habitat, mitigation measures would be implemented to reduce the impacts to a level of significance that would result in a FONSI.

## 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 and 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 shall be conducted during ATR.

**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 team. 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.

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

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



**Table 1: Levels of Review**

<b>Product(s) to undergo Review</b>	<b>Review Level</b>	<b>Start Date</b>	<b>End Date</b>	<b>Cost</b>	<b>Complete</b>
Draft Feasibility Report and EA	District Quality Control	08/16/21	09/03/21	\$25,500	No
Draft Feasibility Report and EA	Agency Technical Review	09/16/21	11/01/21	\$65,000	No
Draft Feasibility Report and EA	Policy and Legal Review	09/16/21	11/01/21	n/a	No
Final Feasibility Report and EA	District Quality Control	06/20/22	07/18/22	\$15,000	No
Final Feasibility Report and EA	Agency Technical Review	07/19/22	09/02/22	\$50,000	No
Final Feasibility Report and EA	Legal Sufficiency Review	09/03/22	10/05/22	n/a	No
Final Feasibility Report and EA	Policy and Legal Review	10/6/22	12/06/22	n/a	No

*Note:* Review timeframes include the time for review and PDT response.

**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 shall 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**

<b>DQC Team Disciplines</b>	<b>Expertise Required</b>
DQC Lead	A senior professional with 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.).
Plan Formulation	A senior water resources planner with experience in flood risk management planning. Experience integrating uncertainties in analyses (H&H, geotechnical, cost engineering, and economics) into plan comparison and selection is required.
Economics	A senior economist with thorough knowledge of the various economic analyses utilized in feasibility study (life safety, transportation, flood damage). Has capability and experience to estimate and communicate likely variance in the outcomes of models, analyses, and designs. Is familiar with HEC-FDA and LifeSim modelling which are likely to be used as a part of this study.
Environmental & Cultural Resources	A senior environmental specialist with experience in Cultural Resources compliance, the National Environmental Policy Act and all applicable laws and Executive Orders.
Hydraulic Engineering	A senior engineer with experience in the field of hydraulics and hydrology with experience in climate change impacts to inland flood risk management projects. They shall have a thorough understanding of the application of structural and non-structural flood risk management solutions, and computer modeling techniques. Has capability and experience to estimate and communicate likely variance in the outcomes of models, analyses, and designs. Is familiar with HEC-RAS and HEC-HMS modelling which are likely to be used as a part of this study.
Structural Engineering	A senior engineer with knowledge of stability analyses and design of structural flood risk reduction and protection solutions.
Geotechnical Engineering	A senior geotechnical engineer with a thorough knowledge and experience in geotechnical considerations related to flood risk management projects (e.g., slope stability). Has capability and experience to estimate and communicate

	likely variance in the outcomes of models, analyses, and designs.
Cost Engineering	A senior engineer and expert in the field of cost engineering. They must have a thorough knowledge of and experience in costing structural and non-structural flood risk management solutions. Has capability and experience to estimate and communicate likely variance in the outcomes of models, analyses, and designs.
Civil Design/ Engineering	A senior engineer and expert in the field of civil engineering. They must have a thorough knowledge of and experience with civil design products (e.g., site selection, project development, real estate, and relocations) related to flood risk reduction and protection solutions.
Real Estate	A senior real estate specialist with experience preparing Real Estate Plans and in acquisition of LERRD's. The realty specialist(s) shall have experience in residential and utility/facility relocation (Public Law 91-646).

**Documentation of DQC.** Quality Control shall be performed continuously throughout the study. A specific certification of DQC completion is required. Documentation of DQC shall 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.

Documentation of completed DQC shall 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. The ATR team will be assigned after the review plan has been approved by the MSC.

**Table 3: Required ATR Team Expertise**

<b>ATR Team Disciplines</b>	<b>Expertise Required</b>
ATR Lead	A senior professional with extensive experience preparing Civil Works decision documents and conducting ATR. The lead shall have the skills to manage a virtual team through an ATR. This position may be combined with another discipline.

Plan Formulation	The plan formulation lead will have experience preparing and reviewing Civil Works decision documents, developing plan formulation strategies and integrating technical analyses into the SMART planning framework.
Economics	The economist will be a senior economist and have a thorough knowledge of the various economic analyses utilized in a flood risk management feasibility study (life safety, transportation, flood damage). Has capability and experience to estimate and communicate likely variance in the outcomes of models, analyses, and designs. Is familiar with HEC-FDA and LifeSim modelling which are likely to be used as a part of this study.
Environmental & Cultural Resources	A senior environmental specialist with experience in Cultural Resources compliance, the National Environmental Policy Act and all applicable laws and Executive Orders.
Hydraulic Engineering	A senior engineer with expertise in the field of hydraulics and hydrology. They shall have a thorough understanding of the application of structural and non-structural flood risk management solutions, and computer modeling techniques. Has capability and experience to estimate and communicate likely variance in the outcomes of models, analyses, and designs. Is familiar with HEC-RAS and HEC-HMS modelling which are likely to be used as a part of this study.
Structural Engineering	A senior engineer and expert in the field of structural engineering. They must have a thorough knowledge of stability analyses and design of structural flood risk reduction and protection solutions.
Civil Design/Engineering	A senior engineer and expert in the field of civil engineering. They must have a thorough knowledge of and experience with civil design products (e.g., site selection, project development, real estate, and relocations) related to flood risk reduction and protection solutions.
Geotechnical Engineering	A senior geotechnical engineer with a thorough knowledge and experience in geotechnical considerations related to flood risk management projects (e.g., slope stability). Has capability and experience to estimate and communicate likely variance in the outcomes of models, analyses, and designs.
Cost Engineering	Cost MCX staff or Cost MCX Pre-Certified Professional as assigned by the Walla Walla Cost Engineering Mandatory Center of Expertise with experience in preparing cost estimates. Has capability and experience to estimate and communicate likely variance in the outcomes of models, analyses, and designs.

Real Estate	A senior real estate specialist with preparation of Real Estate Plans and experience in acquisition of LERRD's. The realty specialist(s) shall have experience in residential and utility/facility relocation (Public Law 91-646).
Climate Preparedness and Resilience CoP Reviewer	A member of the Climate Preparedness and Resiliency Community of Practice (CoP) with experience in climate change impacts to inland flood risk management projects and sea level rise impacts to tidal influenced communities.
Flood Risk Analysis Reviewer	Subject matter expert in multi-discipline flood risk analysis to ensure consistent and appropriate identification, analysis, and written communication of risk and uncertainty.

**Documentation of ATR.** DrChecks/PROJNET will be used to document all ATR comments, responses and resolutions. Comments shall 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) 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 (see EC 1165-2-217, pages 31-32, for example ATR Completion/Certification Sheet).

### 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.** A Type I IEPR will not be performed for the Neuse River Basin Flood Risk Management Study for the following reasons (see Section 1 "FACTORS AFFECTING THE LEVELS OF REVIEW" for additional detailed discussion):

- The project does to meet any of the mandatory triggers for conducting Type I IEPR:
  - The total project cost is not anticipated to exceed \$200 million,
  - There has been no request by a Governor to conduct Type I IEPR, and
  - The project is not controversial.
- Beyond the mandatory triggers, a risk-informed decision was also made that the study would not significantly benefit from an independent external peer review for the following reasons:

- It is not expected to have adverse impacts on any fish or wildlife species or their habitat listed as endangered or threatened under the Endangered Species Act of 1973.
- This study is not based on novel methods and is not expected to present complex challenges for interpretation, does not contain precedent-setting methods or models, and does not present conclusions that alter the originally authorized study.
- The PDT does not believe the level of life safety risk warrants independent external peer review at this time. All communities within the study area are part of the Neuse River Basin Flood Analysis and Mitigation Strategies Study dated 1 May 2018 conducted by the State of North Carolina's Emergency Management Office, as well as in the on-going South Atlantic Coastal Comprehensive Study being conducted by USACE. These initial studies attempted to identify and mitigate potential life safety concerns

The portion of the basin prone to flooding is serviced by the transportation corridors of I-95 and I-40 as evacuation routes. Since, the primary flood events under consideration are caused by rainfall from hurricanes there is generally adequate warning time to evacuate high risk communities. The study will focus primarily on riverine flooding caused by storm events. The state had a robust emergency warning and response and recovery operation that further limits potential impacts to life safety.

The management measures under consideration prior the Alternatives Milestone are relatively routine and within the core competencies of the agency. The risk of loss of life related to initially identified management measures is low, as such the outcomes of this study would not significantly benefit from an independent external peer review.

**(i) 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.** For the reasons discussed in Scope of Review and in the Decision on Type I IEPR, this document does not involve significant life safety concerns that warrant a Type II IEPR, as confirmed by the SAW Chief of Engineering. Therefore, a Type II IEPR would not be considered at this time. Dependent on the Tentatively Selected Plan (TSP)

, this decision may be revisited during Preconstruction Engineering and Design and update to the Review Plan moving into the design and implementation phase.

**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:

<b>Model Name and Version</b>	<b>Brief Model Description and How It Will Be Used in the Study</b>	<b>Certification / Approval</b>
HEC-FDA 1.4.2	The program integrates hydrologic engineering and economic analysis to formulate and evaluate plans using risk-based analysis methods. It will be used to evaluate/compare plans to aid in selecting a recommended plan.	Certified
LifeSim or HEC-FIA	Both models simulate life loss using hydrologic and demographic data and risk-based estimation techniques.	Certified
HEP (Habitat Evaluation Procedures)	The Habitat Evaluation Procedures (HEP) is an established approach to assess natural resources. The HEP approach has been well documented and is approved for use in Corps projects as an assessment framework that combines resource quality and quantity over time and is appropriate throughout the United States. The Habitat Suitability Index (HSI) models are the format for quantity determinations that are applied within the HEP framework. While the exact models have yet to be determined, only HEP models which have been certified or approved for use will be utilized for this study. ATR of input data is required in all instances.	Certified or Approved for Use

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 shall 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:

<b>Model Name and Version</b>	<b>Brief Model Description and How It Will Be Used in the Study</b>	<b>Approval Status</b>
HEC-RAS 5.0 (River Analysis System)	The software performs 1-D steady and unsteady flow river hydraulics calculations and has capability for 2-D (and combined 1-D/2-D) unsteady flow calculations. It will be used for steady flow analysis to evaluate the future without-project and future with-project conditions.	HH&C CoP Preferred Model
HEC-HMS	This software is designed to simulate the complete hydrologic processes of a dendritic watershed system. It will be used to develop inflow frequency and inflow hydrographs for HEC-RAS if 2-D and unsteady state calculations are needed. It could also be used to develop better estimates of various storm events (e.g., 50- and 100-year storms).	HH&C CoP Preferred Model

**e. POLICY AND LEGAL REVIEW**

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

**(ii) 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 shall be documented in a Memorandum for the Record (MFR) produced for each engagement with the team. The MFR shall 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 shall be highlighted at future meetings until the issues are resolved. Any key decisions on how to address risk or other considerations shall 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.

**ATTACHMENT 1: TEAM ROSTERS**

PROJECT DELIVERY TEAM			
Name	Office	Position	Phone Number
[REDACTED]	CESAW-PM-D	Project Manager	[REDACTED]
[REDACTED]	CESAW-PM-D	SAW Project Manager Mentor	[REDACTED]
[REDACTED]	CESAW-ECP-P	Plan Formulation	[REDACTED]
[REDACTED]	CESAW-ECP-EC	H&H Engineer (ETL)	[REDACTED]
[REDACTED]	CESAW-ECP-EC	H&H Engineer	[REDACTED]
[REDACTED]	CESAW-ECP-ED	Civil Engineer	[REDACTED]
[REDACTED]	CESAW-ECP-EG	Geotechnical Civil Engineer	[REDACTED]
[REDACTED]	CESAW-ECP-ET	Cost Engineer	[REDACTED]
[REDACTED]	CESAW-ECP-PE	Biologist	[REDACTED]
[REDACTED]	CESAS-RE-HA	Realty Specialist	[REDACTED]
[REDACTED]	CESAJ-PD-D	Economist	[REDACTED]
[REDACTED]	CESAW-ECP-ET	Geospatial Specialist	[REDACTED]
[REDACTED]	CESAW-CT	Contracting Officer	[REDACTED]
[REDACTED]	CESAW-OC	Office of Counsel	[REDACTED]
[REDACTED]	CESAW-PAO	Communications Specialist	[REDACTED]
[REDACTED]	CESAW-PM-D	Project Management Assistant	[REDACTED]

DISTRICT QUALITY CONTROL TEAM			
Name	Office	Position	Phone Number
[REDACTED]	CESAW-ECP-P	DQC Lead/Chief, Planning & Environmental Branch	[REDACTED]
[REDACTED]	CESAJ-PD-D	Regional Economics Chief	[REDACTED]
[REDACTED]	CESAW-ECP-PE	Chief, Environmental Resources Section	[REDACTED]
[REDACTED]	CESW-ECP-EC	Chief, Water Resources	[REDACTED]
[REDACTED]	CESAS-RE-A	Chief, Acquisition Branch	[REDACTED]
[REDACTED]	CESAW-EDP-EG	Chief, Geotechnical and Dam Safety Section	[REDACTED]
[REDACTED]	CESAW-ECP-ED	Chief, Design Section	[REDACTED]
[REDACTED]	CESAW-ECP-ET	Chief, Technical Support and Cost Engineering	[REDACTED]
[REDACTED]	CESAW-PM-D	Ch, Civil Works PPM	[REDACTED]

AGENCY TECHNICAL REVIEW TEAM			
Name	Office	Position	Phone Number
██████████	CEMVP- RPEDN-PD-F	ATR Lead	██████████
[Name]	[Office]	Plan Formulation	[Phone #]
[Name]	[Office]	Economics	[Phone #]
[Name]	[Office]	Environmental & Cultural Resources	[Phone #]
[Name]	[Office]	Hydraulic Engineering	[Phone #]
[Name]	[Office]	Structural Engineering	[Phone #]
[Name]	[Office]	Geotechnical Engineering	[Phone #]
[Name]	[Office]	Civil Design/Engineering	[Phone #]
[Name]	[Office]	Cost Engineering	[Phone #]
[Name]	[Office]	Real Estate	[Phone #]
[Name]	[Office]	Climate Preparedness and Resilience CoP Reviewer	[Phone #]
[Name]	[Office]	Flood Risk Analysis Reviewer	[Phone #]

*Note:* Multiple areas of expertise will be represented by individual reviewers to the extent possible. Despite the decreased number of reviewers on the ATR team, all 11 areas of expertise will be represented.

VERTICAL TEAM			
Name	Office	Position	Phone Number
[REDACTED]	CESAD-PM	Program Management	[REDACTED]
[REDACTED]	CESAD-PDP	Economics	[REDACTED]
[REDACTED]	CECW-SAD-RIT	Deputy Chief, SAD-RIT	[REDACTED]
[REDACTED]	CECW-SAD	SAD-RIT	[REDACTED]
[REDACTED]	CESAD-PDP	Chief, Planning and Policy Division	[REDACTED]
[REDACTED]	CESAD-PDP	Senior Plan Formulator	[REDACTED]
[REDACTED]	CESAD-RBT	Chief of Engineering	[REDACTED]
[REDACTED]	CESPD-PDP	FRM-PCX	[REDACTED]
[REDACTED]	CESAD-PDC	Investigations Account Manager	[REDACTED]

POLICY REVIEW TEAM			
Name	Office	Position	Phone Number
[REDACTED]	CECC-SAD	Office of Counsel	[REDACTED]
[REDACTED]	CESAD-PDH	Review Manager	[REDACTED]
[REDACTED]	CESAD-RBT	Engineering & Construction	[REDACTED]
[REDACTED]	CESAD-PDP	Economics	[REDACTED]
[REDACTED]	CECW-PC	Environmental	[REDACTED]
[REDACTED]	CECW-PC	Planning	[REDACTED]
[REDACTED]	CESAD-PDR	Real Estate	[REDACTED]
[REDACTED]	CECW-EC	Climate Preparedness and Resiliency	[REDACTED]