US Army Corps of Engineers®

Prepared by:

Jacksonville District

Lake Okeechobee System Operating Manual (LOSOM)

Review Plan

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Section 1
Introduction

1.1 Purpose

This Review Plan (RP) for the Lake Okeechobee System Operating Manual (LOSOM) (P2 474593) will help ensure a quality engineering project is developed by the Corps of Engineers in accordance with EC 1165-2-217, "Review Policy for Civil Works." As part of the Project Management Plan, this RP establishes an accountable, comprehensive, life-cycle review strategy for Civil Works products and lays out a value added process and describes the scope of review for the current phase of work. The EC outlines five general levels of review: District Quality Control/Quality Assurance (DQC), Agency Technical Review (ATR), Biddability, Constructability, Operability, Environmental and Sustainability (BCOES) Review, Independent External Peer Review (IEPR), and Policy and Legal Compliance Review. This effort is an operational study resulting in a new system operating manual and will not include design or development of plans and specifications. Therefore, this RP will not include BCOES review. This RP will be provided to the Project Delivery Team (PDT) and the DQC, ATR, and IEPR Teams. The technical review efforts addressed in this RP, DQC and ATR, are to augment and complement the policy review processes. The District Chief of Engineering has assessed that the life safety risk of this project is significant; however, a Type II IEPR/Safety Assurance Review (SAR) will not be required and instead a Type I IEPR will be performed, see Paragraph 5.1. Any levels of review not performed in accordance with EC 1165-2-217 will require documentation in the RP of the risk-informed decision not to undertake that level of review.

1.2 References

- EC 1165-2-217, Review Policy For Civil Works, 20 February 2018
- ER 1110-1-12, Quality Management, 31 March 2011
- ER 1110-2-1156, Safety of Dams – Policy and Procedure, 31 March 2014
- LOSOM Project Management Plan (PMP) v2, 10 April 2019
- Herbert Hoover Dike Rehabilitation
- Lake Okeechobee Regulation Schedule Study, 2008

1.3 Review Management Organization

The South Atlantic Division (SAD) is the Review Management Organization (RMO) for this project. The RMO contacts for LOSOM are Trent Ferguson, Senior Water Manager for SAD, and Mike Magley, South Florida Ecosystem Restoration (SFER) Program Coordinator.

Section 2
Project Description

2.1 Project Description

The Lake Okeechobee System Operating Manual (LOSOM) effort is reviewing Lake Okeechobee operations in order to establish a new regulation schedule to be implemented when the Herbert Hoover Dike (HHD) rehabilitation is completed at the end of calendar year 2022. The operational study, to be completed by calendar year 2022, will also look at future Comprehensive Everglades Restoration Plan (CERP) infrastructure that will provide additional flexibility in Lake Okeechobee operation. The LOSOM operational study is aimed to address concerns and balance potential competing objectives related to the Congressionally-authorized project purposes of flood risk management, including dam safety requirements for HHD and regulatory releases to the Northern Estuaries; navigation; the well-being of the natural environment for fish and wildlife resources; and water supply, including agricultural, municipal, and industrial water supply, and water supply for the Everglades.

The result of the LOSOM effort will be a new Lake Okeechobee Regulation Schedule that can be implemented following completion of the HHD rehabilitation. Operational protocols for the new regulation schedule will be detailed in a system operating manual (SOM) for Lake Okeechobee and supported by an accompanying National Environmental Policy Act (NEPA) document (specifically, an Environmental Impact Statement (EIS)). The regulation schedule is encompassed within the Water Control Plan (WCP), which is Chapter 7 of the SOM.

2.2 Project Area

Lake Okeechobee (Lake) lies 30 miles west of the Atlantic Ocean and 60 miles east of the Gulf of Mexico in the central part of the Florida peninsula. The northern Lake Okeechobee watershed is located in portions of Martin, Okeechobee, Glades and Highlands Counties. Water originates in the northern part of the watershed, which includes the Kissimmee Chain of Lakes, northern Kissimmee River and Lake Istokpoga. Water flows out of the northern watershed into Lake Okeechobee primarily from the Kissimmee River, Fisheating Creek, and Taylor Creek/Nubbin Slough. The Lake discharges east through the St. Lucie Canal (C-44) into the St. Lucie Estuary, west through the Caloosahatchee River (C-43) into the Caloosahatchee Estuary, and south through four major canals in the Everglades Agricultural Area (EAA) into the Water Conservation Areas (WCA), and ultimately to Everglades National Park, the Southern Estuaries (Florida Bay and Biscayne Bay), and the Lower East Coast.

2.2.1 Lake Okeechobee

Lake Okeechobee is a large, broad, shallow lake covering approximately 730 square miles serving as the principal natural reservoir in south Florida. The Lake serves firstly as a flood risk management feature for those within the Lake Okeechobee basin; however, it is also the principal agricultural surface water supply source for southern Florida. It is also used for navigation, recreation, and fish and wildlife enhancement. The Lake is impounded by a system of encircling embankments initially built as levees and now serving as a dam known as Herbert Hoover Dike. The Lake has six major outlets; the two primary ones being the St. Lucie Canal, which discharges eastward to the Atlantic Ocean, and the Caloosahatchee Canal and River, which discharges westward to the Gulf of Mexico. The other four are agricultural canals – the West Palm Beach, Hillsboro, North New River and Miami, all of which discharge to the Atlantic Ocean, southeast of the Lake. Additionally, there are many small culverts and locks that are minor outlets for water supply and navigation.

2.2.2 Northern Estuaries

The Northern Estuaries are composed of two different systems that periodically receive regulatory and water supply releases from the Lake. The eastern portion is composed of the St. Lucie Canal, which feeds into the St. Lucie Estuary, part of a larger system known as the Indian River Lagoon. The St. Lucie Estuary has been designated an Estuary of National Significance and is part of the U.S. Environmental Protection Agency-sponsored National Estuary program. The western portion is composed of the Caloosahatchee Canal and River, and the Caloosahatchee Estuary.

2.2.3 Everglades Agricultural Area

The EAA is approximately 1,100 square miles (700,000 acres) in size and is located immediately south of the Lake. Much of this rich, fertile land is devoted to agriculture, primarily sugarcane production, and is crossed by a network of canals that are maintained to manage water supply and flood protection.

2.2.4 Water Conservation Areas

The Water Conservation Areas (WCAs) are situated south and east of the EAA and comprise an area of approximately 1,350 square miles; they are about 40 miles in width and 100 miles in length from Lake Okeechobee to Everglades National Park (ENP). The WCAs provide floodwater retention, public water supply, preservation of fish and wildlife resources, and also serve as the headwaters of ENP. These areas comprise the largest remnant of the historic Everglades ecosystem outside of ENP. The WCAs are divided into three major sections: WCA 1 (Loxahatchee National Wildlife Refuge), WCA 2, and WCA 3, the largest of the WCAs.

2.2.5 Everglades National Park

ENP is located to the south of the WCAs and is the third largest National Park in the continental U.S. The ENP covers approximately 2,350 square miles and is extremely low and flat, with total elevation changes of only 6-8 feet from Tamiami Trail south to Florida Bay. Established in 1947, ENP possesses a unique landscape comprised of sawgrass sloughs, tropical hardwood hammocks, offshore coral reefs, mangrove forest, and lakes, ponds and bays.

2.2.6 Southern Estuaries

The Southern Estuaries include Biscayne Bay and Florida Bay. Biscayne Bay, a shallow tidal sound, approaches 300 square miles in size. Although the northern and central portions have been greatly affected by development and human encroachment, the southern portion of Biscayne Bay includes Biscayne National Park with Card and Barnes Sounds having been designated part of the Florida Keys National Marine Sanctuary. Florida Bay comprises a large portion of ENP, and is a shallow estuarine system with an average depth of less than three feet. Florida Bay is the main receiving water of the greater Everglades system and is heavily influenced by changes in the timing, distribution and quantity of freshwater flows.

2.2.7 Lower East Coast

The Atlantic Coastal Ridge, generally referred to as the Lower East Coast (LEC) Area, is mostly urbanized and encompasses Palm Beach, Broward and Miami-Dade Counties. The LEC is the most densely populated area in Florida, and includes the population centers of West Palm Beach, Fort Lauderdale and Miami. Water levels in this area are tightly controlled near the shoreline to prevent over-drainage and manage saltwater intrusion, and the entire area is dependent upon operation of the Central and Southern Florida (C&SF) Project for flood control and water supply.

2.3 Project Sponsor

Products and analyses provided by non-Federal sponsors as in-kind services are subject to DQC, ATR, policy and legal compliance, BCOES, and IEPR reviews. Sponsor Peer Review of In-Kind Contributions - There will not be in-kind contributions for this effort. The South Florida Water Management District (SFWMD) is the NFS for most of the Central & Southern Florida Project. For the LOSOM effort, the SFWMD is a non-cost-share partner and Cooperating Agency under the National Environmental Policy Act (NEPA).

2.4 Factors Affecting the Level of Review

Factors affecting the risk-informed decisions on the appropriate levels of review are discussed to provide enough detail to assess the level of review and to support the RMO decision on the reviews and the review team(s) expertise. Each factor is discussed to show how it affects the level of review or if it does not affect the review per EC 1165-2-217.

Will the study likely be challenging? Yes, the study will be challenging. There are many competing authorized purposes (flood risk management (to include dam safety concerns), water supply, environmental, navigation, recreation, etc.). The periodic occurrence of harmful algal blooms within the Lake O and estuary systems and the public controversy surrounding them will pose a challenge.

The project risks are likely to include study risk and not implementation risk. Since this is an update to the existing water control manual, this project does not include the recommendation of any new infrastructure to be constructed. One major project risk the team can foresee at this time is the controversy in how the authorized purposes will be evaluated for the new regulation schedule and how risk to human health and safety as a result of harmful algal blooms will be considered when evaluating tradeoffs of different operational scenarios (alternatives).

Is the project likely to be justified by life safety or is the study or project likely to involve significant life safety issues? Yes, there is a potential for a threat to human life associated with the failure of Herbert Hoover Dike that surrounds Lake Okeechobee. Currently Herbert Hoover Dike is classified as a DSAC 1 (very high risk) and is undergoing a dam safety modification (rehabilitation). Once the dike is rehabilitated, a Post Implementation Evaluation (PIE) will be completed, which will assess the current dam safety risk with the modifications in place to determine the risk (threat) to human life.

Has the Governor of an affected state requested a peer review by independent experts? Not at this time.

Will it likely involve significant public dispute as to the project's size, nature, or effects? Yes, the impact area for the project includes most of South Florida including St. Lucie Estuary, Caloosahatchee Estuary, Everglades National Park, and Florida Bay. The project has the potential to impact lake levels and releases in Lake Okeechobee, which may have impacts (both positive and negative) to flood risk management, water supply (agriculture and municipal), recreation, navigation, lake ecology, and estuary ecology.

Is the project/study likely to involve significant public dispute as to the economic or environmental cost or benefit of the project? The project will involve significant public dispute related to economic and environmental impacts from implementing the new lake schedule, but not related to the economic cost or benefits of the project. Since the project is not recommending new infrastructure, there will not be an economic benefit-to-cost-ratio calculated for the development of a new operation schedule.

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? There is a potential for the project to use new science data and models.

Does the project design require redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design/construction schedule? Implementing a new design or infrastructure is not part of the scope of this project. This project is to reevaluate the lake regulation schedule.

Is the estimated total cost of the project greater than $200 million? No, there is no construction associated with this project.

Will an Environmental Impact Statement be prepared as part of the study? Yes, an EIS will be prepared as part of the study.

Is the project expected to have more than negligible adverse impacts on scarce or unique tribal, cultural, or historic resources? Yes, it has a potential and will be evaluated as part of the study.

Is the project expected to have substantial adverse impacts on fish and wildlife species and their habitat prior to the implementation of mitigation measures? Yes, and it will be evaluated and documented in the EIS.

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? It is likely and will be evaluated and documented in the EIS.

2.5 Review Execution Plan

This section describes each level of review to be conducted. Based upon the factors discussed in Section 2.4, this study will undergo the following types of reviews:

District Quality Control. All documents (including data, analyses, environmental compliance documents, etc.) undergo DQC. This internal review process covers basic science and engineering work products. It fulfils the project quality requirements of the Project Management Plan.

Agency Technical Review. 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.

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 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.

Section 3
District Quality Control

3.1 Requirements

All implementation documents (including supporting data, analyses, reports, environmental compliance documents, water control manuals, etc.) shall undergo DQC in accordance EC 1165-2-217. DQC is an internal review process of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Management Plan (PMP). The Jacksonville District shall manage DQC. Documentation of DQC activities is required and will be in accordance with the Jacksonville District Quality Management Information System (QMIS)

Quality Control will be performed continuously throughout the study. A specific certification of DQC completion is required at the draft and final report stages. Documentation of DQC will 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).

DQC Lead - A senior professional with extensive experience preparing water control manuals or other Civil Works documents and conducting DQC. The lead may also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc.).

Planning - A senior water resources planner with experience in large scale, component-based multipurpose projects.

Economics - The economics reviewer should be a senior economist with experience evaluating multipurpose project benefits and costs and identifying incidental benefits.

Environmental Resources - The Environmental reviewer should be a senior biologist/ecologist/environmental engineer with experience in ecosystem restoration and familiarity with freshwater, coastal and estuarine systems.

Cultural Resources - The reviewer should be a senior archeologist with demonstrated experience related to Tribal consultation and cultural resource investigations in central and southern Florida.

Hydrology, Hydraulic Engineering and Modeling - This reviewer should be a senior hydraulic engineer with a minimum of 10 years demonstrated experience in the field of hydrology, hydraulics and H&H modeling, including a general knowledge of south Florida hydrology and water management. The reviewer(s) should have a thorough understanding of water storage and conveyance and sediment control and be knowledgeable of associated hydrologic and hydraulic model applications, with the ability to understand the application of RESOPS, RSMBN, RSMGL, WAM, DMSTA, HEC-RAS and other relevant models to south Florida conditions.

Water Management/ Operations - The Operations reviewers should be familiar with the operations of the C&SF system.

Dam Safety/Risk Assessment - The reviewer will be experienced with performing and presenting risk analyses in accordance with ER 1105-2-101 and other guidance. The reviewer should be knowledgeable in application of risk analysis specific to design of high hazard impoundments and dam safety design criteria for high hazard impoundments.

Water Quality - The reviewer should be familiar with large, complex civil works projects, with high visibility to the public with competing interests amongst various stakeholders and regulatory agencies. Experience with Tribal Nation, Florida State, and Federal laws and regulations related to air, water quality, nutrient loading, and TMDLs. Additionally, the member should have technical experience with the subject matter, water quality modeling/analysis, and downstream effects due to water quality.

3.2 Documentation

Documentation of completed DQC will 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).

3.3 DQC Schedule and Estimated Cost

Although DQC is always seamless, the milestone reviews and schedules are in Table 1. The cost for the DQC is approximately $50,000.

Project Phase/Submittal	Review Start Date	Review End Date
Draft Water Control Manual and Draft EIS	11/21/21	01/22/22
Final Water Control Manual and Final EIS	04/28/22	06/05/22
ROD Package	09/26/22	10/5/22

Table 1 DQC Scheduled Reviews and Durations

Section 4
Agency Technical Review

4.1 Requirements

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)).

4.2 Documentation of ATR

Documentation of ATR will occur using the requirements of EC 1165-2-217. DrChecks^{SM} will be used to document all ATR comments, responses and resolutions. Comments should be limited to those needed to ensure product adequacy and will follow the four part comment structure. 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.

4.3 Products to Undergo ATR

The NEPA documentation and supporting appendices and annexes along with the water control operating criteria will be reviewed by the ATR team.

4.4 Required Team Expertise and Requirements

ATR teams will be established in accordance with EC 1165-2-217. The following disciplines will be required for ATR of this project:

ATR Lead - A senior professional with extensive experience preparing water control plans or 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).

Planning - A senior water resources planner with a minimum of 10 years of experience in large scale, component-based ecosystem restoration and/or development of large scale operations plans. The reviewer should have experience developing alternative evaluation techniques for complex systems.

Economics - A senior economist with a minimum of 10 years of experience evaluating large ecosystem restoration project benefits and/or regional impacts of large operational plans. The reviewer should have experience identifying incidental benefits and development of performance criteria based on local and regional economic impacts both qualitatively and quantitatively.

Environmental Resources/NEPA Compliance- A senior biologist/ecologist/environmental engineer certified to conduct ATR, preferably with a minimum of 10 years of experience in ecosystem restoration and familiarity with freshwater, coastal and estuarine systems. The reviewer must be able to review for NEPA

compliance (including cultural resources coordination) and quality and applicability of ecosystem effects evaluations.

Hydrology, Hydraulic Engineering and Modeling - A senior hydraulic engineer certified to conduct ATR with a minimum of 10 years of experience in the field of hydrology, hydraulics, and H&H modeling related to water management operations. The reviewer(s) will have a thorough understanding of water storage and conveyance and be knowledgeable of associated H&H model applications.

Water Management/Operations - A senior water manager with a minimum 10 years of experience making operational decisions for regional water management systems. The reviewer should be familiar with the operations of the multipurpose water resource systems.

Climate Preparedness and Resilience - A member of the Climate Preparedness and Resiliency Community of Practice (CoP) will participate in the ATR review.

Dam Safety/Risk Analysis - A senior engineer from the Risk Management Center (RMC) with experience performing and presenting risk analyses in accordance with ER 1105-2-101 and other guidance. The reviewer should be knowledgeable in application of risk analysis specific to water management operational planning within high hazard impoundments and dam safety design criteria for high hazard impoundments, preferably related to the Herbert Hoover Dike (HHD).

4.5 Statement of Technical Review Report

At the conclusion of each ATR effort, the ATR team will prepare a review report with a completion and certification memo. The report will be prepared in accordance with EC 1165-2-217.

4.6 ATR Schedule and Estimated Cost

Although ATR is always seamless, the preliminary ATR milestone schedule is listed in Table 2. The cost for the ATR is approximately $100,000.

Project Phase/Submittal	Review Start Date	Review End Date
Draft Water Control Manual and Draft EIS	01/13/22	03/03/22
Final Water Control Manual and Final EIS	06/06/22	06/27/22

Table 2 ATR Scheduled Reviews and Durations

Section 5
Independent External Peer Review

5.1 Decision on IEPR

IEPR is the most independent level of review, and is applied in cases that meet certain criteria where the risk and magnitude of the proposed project are such that a critical examination by a qualified team outside of USACE is warranted. A risk-informed decision, as described in EC 1165-2-217, is made as to whether IEPR is appropriate. IEPR panels will consist of independent, recognized experts from outside of the USACE in the disciplines representing a balance of areas of expertise suitable for the review being conducted. There are two types of IEPR: Type I is generally for decision documents and Type II is generally for implementation products.

5.1.1 Type I

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.

The District has made a risk-informed-decision that this project has significant inherent public controversy and poses significant human life safety issues (public safety); therefore, a Type I IEPR will be performed.

5.1.2 Type II

The second kind of IEPR is Type II IEPR. These Safety Assurance Reviews (SAR) 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 would 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.

Since this operational study does not include any design or construction activities, a Type II IEPR is not warranted.

5.2 Products to Undergo IEPR

The Draft NEPA document and associated appendices and annexes along with the water control criteria will undergo IEPR.

5.3 Required IEPR Panel Expertise

The IEPR panel will be established in accordance with EC 1165-2-217 and 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. The following disciplines will be required for IEPR of this project:

Economics (an economist is required; the PDT may specify one or more specific disciplines for the panel – e.g., Navigation Economist and Agricultural Economist) - The Panel Member must be experienced with evaluating the appropriateness of cost effectiveness and incremental cost analysis (CE/ICA), as applied to dollar

costs and ecosystem restoration benefits; familiar with the USACE tool IWR-PLAN; able to ascertain computational accuracy of spreadsheets; and able to identify incidental non-ecosystem restoration benefits or be familiar with separable cost/separable benefits analyses.

Environmental (an environmental member is required; the PDT may specify one or more specific disciplines for the panel–e.g. NEPA Compliance and Fisheries Biologist) - The Panel Member must be familiar with large, complex civil works projects with high public and interagency interests; familiar with the ecology of shallow freshwater systems, coastal wetlands and estuarine environments in South Florida; and familiar with methods for evaluating ecological performance in those environments.

Engineering (an engineer is required; the PDT may specify one or more disciplines for the panel) - This Panel Member must have experience in the field of hydrology, hydraulics, water management operations and H&H modeling. Expertise in all of these areas may require more than one expert to obtain the appropriate mix of skills. The Panel Member(s) should have a thorough understanding of water storage and conveyance and be knowledgeable of associated regional H&H model applications in south Florida.

Water Quality – The Panel Member should be familiar with large, complex civil works projects, with high visibility to the public with competing interests amongst various stakeholders and regulatory agencies. Experience with Tribal Nation, Florida State, and Federal laws and regulations related to air, water quality, nutrient loading, and TMDLs. The member should have technical experience with the subject matter, water quality modeling/analysis, and downstream effects due to water quality.

Dam Safety/Risk Analysis – The reviewer will be experienced with performing and presenting risk analyses in accordance with ER 1105-2-101 and other guidance. The reviewer should be knowledgeable in application of risk analysis specific to design of high hazard impoundments and dam safety design criteria for high hazard impoundments.

5.4 Documentation of IEPR

Documentation of IEPR will be prepared in accordance with EC 1165-2-217. The Outside Eligible Organization (OEO) will submit a final Review Report no later than 60 days after the end of the draft NEPA document (EIS) public comment period. USACE shall consider all recommendations in the Review Report and prepare a written response for all recommendations. The final NEPA document will summarize the Review Report and USACE response and will be posted on the internet.

5.5 Scope, Schedule, and Estimated Cost of IEPR

The IEPR will be performed in accordance with EC 1165-2-217. IEPR review will occur at the milestone shown in Table 3. The estimated cost for the IEPR of this project is in the range of $125,000 to $150,000. This estimate will be refined when the Scope of Work for the IEPR task order is completed.

Project Phase/Submittal	Review Start Date	Review End Date
Draft Water Control Manual and Draft EIS	02/18/22	04/24/22

Table 3 IEPR Scheduled Review and Duration

Section 6
Model Certification and Approval

6.1 Planning Models

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. Coordination through the ECO-PCX may be required for performance measures and evaluation criteria developed for LOSOM. The following planning models, software, and tools are anticipated to be used:

Model Name and Version	Brief Model Description and How It Will Be Used in the Study	Approval Status
IWR Planning Suite II - Multi-Criteria Decision Analysis (MCDA) functionality	The MCDA is the Corps certified tool for multi-criteria analysis and evaluation. It can be used to measure qualitative units such as socioeconomic factors or cultural resources, it allows the decision maker to weight criteria and choose the appropriate ranking and normalization methods, and it provides a context for stakeholders to voice their opinions and potentially come to a consensus around decisions.	Approved for use
Lake Okeechobee System Operating Manual Effects Model	A model may be developed to evaluate alternatives within the LOSOM project area and area of effects domain (ecoregion and/or watershed in south Florida). The primary areas to be evaluated include the basins north of Lake Okeechobee (including the Kissimmee River), Lake Okeechobee, the Northern Estuaries (St. Lucie River and the Caloosahatchee River and Estuary), the Everglades Agricultural Area (EAA), the Water Conservation Ares (WCAs), the Lower East Coast, the southern estuaries (Lake Worth Lagoon, Biscayne Bay, and Florida Bay), and the greater Everglades. Performance measures will be used to document the linkage between hydrologic output from models and ecosystem/economic functions to evaluate the degree to which alternative plans meet objectives and the overall effects on region. Performance measures and criteria may be utilized from the prior south Florida based projects, may be updated based on the availability of new tools, changes to the landscape, updated knowledge on the system from peer reviewed literature and technical reports, and CERP RECOVER comments, or may be developed specifically for LOSOM based on PDT and stakeholder feedback. Each performance measure will have a predictive target or	TBD

Model Name and Version	Brief Model Description and How It Will Be Used in the Study	Approval Status
	comparable performance scores and process for how to measure predicted performance of alternatives. Quantitative targets or performance criteria will be based on technical synthesis reports of multiple data sources and peer-reviewed relationships between hydrology and ecological, economic, or water quality. Other evaluation criteria may be qualitative based on available data.	

Table 4 Planning Models and Status

6.2 Engineering Models

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.

Model Name and Version	Brief Model Description and How It Will Be Used in the Study	Approval Status
Hydrologic Engineering Center-River Analysis System Ver. 5.0.7 (HEC-RAS)	Used to perform one-dimensional steady, one and two-dimensional unsteady flow river hydraulics calculations, sediment transport, and water temperature/water quality modeling. HEC-RAS version 5.0.7 has capabilities that allow changes to culvert inlet/outlet controls, lateral structures connected to 2-dimensional flow areas, and a suite of RAS Mapper output options. The program allows the model to apply complex operation of gated structures and pump stations, which can change in time or water level conditions anywhere in the system. HEC-RAS will allow the 1-dimensional channel flow to interact with 2-dimensional floodplain flow allowing for more accurate floodplain mapping. In areas where the interaction of open channel flow and aquifer groundwater needs to be explicitly modeled, a new integrated tool based on the original HEC-RAS and MODFLOW models can be used to accurately simulate the aquifer/canal flow exchange.	HH&C CoP Approved: Preferred Model
Regional Simulation Model – Basins Ver. 3.1 (RSMBN)	A link-node based model used to simulate the transfer of water from a pre-defined set of watersheds, lakes, reservoirs or any “'waterbody” that receives or transmits water to another adjacent waterbody. The RSMBN uses the same source code as the mesh-based RSM, which includes the RSMGL regional model. The model assumes that water in each waterbody is held in level pools. The model domain covers Lake Okeechobee and four major watersheds: Kissimmee, Lake Okeechobee, St. Lucie River, Caloosahatchee River and the Everglades Agricultural Area.	HH&C CoP Approved: Allowed for use only by Jacksonville District
Regional Simulation Model – Glades-LECSA	A tool to simulate the natural hydrology and the water management operations of several important basins in South Florida. The Glades-LECSA (Lower East Coast Service Area) implementation	HH&C CoP Approved: Allowed for

Model Name and Version	Brief Model Description and How It Will Be Used in the Study	Approval Status
Ver. 3.1 (RSMGL)	uses the RSM developed by the Hydrologic and Environmental Systems Modeling Section of the SFWMD. The RSM is an implicit, finite-volume, continuous, distributed, and integrated surface-water and ground-water model. It can simulate one-dimensional canal/stream flow and two-dimensional overland and groundwater flow in arbitrarily shaped areas using a variable triangular mesh. The overland and groundwater flow components are fully coupled in the RSM for a more realistic representation of runoff generation. It has physically based formulations for the simulation of overland and groundwater flow, evapotranspiration, infiltration, levee seepage, and canal and structure flows.	use only by Jacksonville District
SFWMM	The South Florida Water Management Model (SFWMM) will be used as a source of boundary conditions to the other planning or detailed models and also as the representation of the full CERP condition in the "updating conceptual framework" portion of the project. The SFWMM is a physically-based simulation model that combines the hydrology and management aspects of a greater portion of the South Florida Water Management District (SFWMD). The SFWMM includes a spatial extent covering most of south Florida, and it encompasses an area of substantial heterogeneity in both natural and managed hydrology. It covers an area of 7600 square miles using a mesh of 2 mile x 2 mile cells.	HH&C CoP Validated: Allowed for Use
DMSTA	The Dynamic Model for Stormwater Treatment Areas (DMSTA) was developed for the U.S. Department of the Interior and the U.S. Army Corps of Engineers (Walker and Kadlec 2005, http://www.wwwalker.net/DMSTA/index.htm). DMSTA was developed and calibrated to information specific to south Florida, and to predict phosphorus removal performance of Stormwater Treatment Areas (STAs) and storage reservoirs. DMSTA parameters were calibrated based on data from fully functional treatment cells with viable vegetation communities. The model generates error/warning notices if simulated conditions exceeded the range of the calibration characteristics. DMSTA does not allow dry outs, and does not reproduce the vegetative responses and phosphorus dynamics (e.g., post-dry-out spikes) observed in treatment cells that periodically go dry. Phosphorus removal performance simulated for large wetland systems with limited water availability may be overly optimistic.	Approved for Use for South Florida applications

Table 5 Engineering Models and Status

Section 7
Policy and Legal Review

Policy and legal compliance reviews for draft and final water control plans and supporting NEPA documentation are delegated to the MSC (see Director's Policy Memorandum 2018-05, paragraph 9).

7.1 Policy Review

The policy review team is identified through the collaboration of the MSC Chief of Planning and Policy. The team is identified in Attachment 1 of this Review Plan. The makeup of the Policy Review team will be drawn from 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 NEPA documents. These engagements may include In-Progress Reviews, Issue Resolution Conferences or other vertical team meetings. The input from the Policy Review team should be documented in a Memorandum for the Record (MFR) produced for each engagement with the team. The MFR should be distributed to all meeting participants.

In addition, teams may choose to capture some of the policy review input in a risk register if appropriate. These items should be highlighted at future meetings until the issues are resolved. Any key decisions on how to address risk or other considerations should be documented in an MFR.

7.2 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.

7.3 Scope and Schedule of Policy and Legal Review

The policy and legal review will be performed in accordance with EC 1165-2-217. IEPR review will occur at the milestones shown in Table 6.

Project Phase/Submittal	Review Start Date	Review End Date
Draft Water Control Manual and Draft EIS	01/12/22	02/12/22
Final Water Control Manual and EIS	06/06/22	06/27/22
ROD Package	10/6/22	10/20/22

Table 6 Policy & Legal Review Scheduled Reviews and Durations

Section 8

Public Posting of Review Plan

As required by EC 1165-2-217, the approved RP will be posted on the District public website https://www.saj.usace.army.mil/Missions/Civil-Works/Review-Plans/. This is not a formal comment period and there is no set timeframe for the opportunity for public comment. If and when comments are received, the PDT will consider them and decide if revisions to the RP are necessary.

Section 9

Review Plan Approval and Updates

The South Atlantic Division Commander is responsible for approving this RP. The Commander's approval reflects vertical team input (involving the District and MSC) as to the appropriate scope and level of review. The RP is a living document and should be updated in accordance with 1165-2-217. All changes made to the approved RP will be documented in Attachment 2, Table 11 RP Revisions. The latest version of the RP, along with the Commander's approval memorandum, will be posted on the District's webpage and linked to the MSC webpage. The approved RP should be provided to the RMO.

Section 10

Review Plan Points of Contact

Title	Organization	Phone

Table 7 Review Plan POC's

ATTACHMENT 1

Team Rosters (FOUO)

Discipline/Role	Name	Description of Credentials
DQC Lead		A senior professional with extensive experience preparing water control manuals or other Civil Works documents and conducting DQC
Planning		A senior water resources planner with experience in large scale, component-based multipurpose projects.
Economics		The economics reviewer should be a senior economist with experience evaluating multipurpose project benefits and costs and identifying incidental benefits.
Environmental Resources		The Environmental reviewer should be a senior biologist/ecologist/environmental engineer with experience in ecosystem restoration and familiarity with freshwater, coastal and estuarine systems.
Cultural Resources		The reviewer should be a senior archeologist with demonstrated experience related to Tribal consultation and cultural resource investigations in central and southern Florida.
Hydrology, Hydraulic Engineering and Modeling		This reviewer should be a senior hydraulic engineer with a minimum of 10 years demonstrated experience in the field of hydrology, hydraulics and H&H modeling, including a general knowledge of south Florida hydrology and water management. The reviewer(s) should have a thorough understanding of water storage and conveyance and sediment control and be knowledgeable of associated hydrologic and hydraulic model applications, with the ability to understand the application of RESOPS, RSMBN, RSMGL, WAM, DMSTA, HEC-RAS and other relevant models to south Florida conditions.
Water Management/ Operations		The Operations reviewers should be familiar with the operations of the C&SF system.
Dam Safety/Risk Assessment		The reviewer will be experienced with performing and presenting risk analyses in accordance with ER 1105-2-101 and other guidance. The reviewer should be knowledgeable in application of risk analysis specific to design of high hazard impoundments and dam safety design criteria for high hazard impoundments.
Water Quality		The reviewer should be familiar with large, complex civil works projects, with high visibility to the public with competing interests amongst various stakeholders and regulatory agencies. Experience with Tribal Nation, Florida State, and Federal laws and regulations related to air, water quality, nutrient loading, and TMDLs. Additionally, the member should have technical experience with the subject matter, water quality modeling/analysis, and downstream effects due to water quality.

Table 8 DQC Reviewers

Discipline	Name	Description of Credentials
ATR Lead		A senior professional with extensive experience preparing water control plans or Civil Works decision documents and conducting ATR. The lead should have the skills to manage a virtual team through an ATR.
Planning		A senior water resources planner with a minimum of 10 years of experience in large scale, component-based ecosystem restoration and/or development of large scale operations plans. The reviewer should have experience developing alternative evaluation techniques for complex systems.
Economics		A senior economist with a minimum of 10 years of experience evaluating large ecosystem restoration project benefits and/or regional impacts of large operational plans. The reviewer should have experience identifying incidental benefits and development of performance criteria based on local and regional economic impacts both qualitatively and quantitatively.
Environmental Resources/NEPA Compliance		A senior biologist/ecologist/environmental engineer certified to conduct ATR, preferably with a minimum of 10 years of experience in ecosystem restoration and familiarity with freshwater, coastal and estuarine systems. The reviewer must be able to review for NEPA compliance (including cultural resources coordination) and quality and applicability of ecosystem effects evaluations.
Hydrology, Hydraulic Engineering and Modeling		A senior hydraulic engineer certified to conduct ATR with a minimum of 10 years of experience in the field of hydrology, hydraulics, and H&H modeling for water management. The reviewer(s) will have a thorough understanding of water storage and conveyance and be knowledgeable of associated H&H model applications.
Water Management/ Operations		A senior water manager with a minimum 10 years of experience making operational decisions for regional water management systems. The reviewer should be familiar with the operations of the multipurpose water resource systems
Climate Preparedness and Resilience CoP Reviewer		A member of the Climate Preparedness and Resiliency Community of Practice (CoP) will participate in the ATR review
Dam Safety/Risk Analysis		A senior engineer from the Risk Management Center (RMC) with experience performing and presenting risk analyses in accordance with ER 1105-2-101 and other guidance. The reviewer should be knowledgeable in application of risk analysis specific to water management operational planning within high hazard impoundments and dam safety design criteria for high hazard impoundments, preferably related to the Herbert Hoover Dike (HHD).

Table 9 ATR Team

Discipline	Name	Description of Credentials
IEPR Lead	TBD	A senior professional with extensive experience conducting IEPR type reviews. The lead should have the skills to manage a virtual team through an IEPR
Economics	TBD	The Panel Member must be experienced with evaluating the appropriateness of cost effectiveness and incremental cost analysis (CE/ICA), as applied to dollar costs and ecosystem restoration benefits; familiar with the USACE tool IWR-PLAN; able to ascertain computational accuracy of spreadsheets; and able to identify incidental non-ecosystem restoration benefits or be familiar with separable cost/separable benefits analyses.
Environmental	TBD	The Panel Member must be familiar with large, complex civil works projects with high public and interagency interests; familiar with the ecology of shallow freshwater systems, coastal wetlands and estuarine environments in South Florida; and familiar with methods for evaluating ecological performance in those environments.
Engineering	TBD	This Panel Member must have experience in the field of hydrology, hydraulics, water management operations and H&H modeling. Expertise in all of these areas may require more than one expert to obtain the appropriate mix of skills. The Panel Member(s) should have a thorough understanding of water storage and conveyance and be knowledgeable of associated regional H&H model applications in south Florida.
Water Quality	TBD	The Panel Member should be familiar with large, complex civil works projects, with high visibility to the public with competing interests amongst various stakeholders and regulatory agencies. Experience with Tribal Nation, Florida State, and Federal laws and regulations related to air, water quality, nutrient loading, and TMDLs. The member should have technical experience with the subject matter, water quality modeling/analysis, and downstream effects due to water quality.
Dam Safety/ Risk Analysis	TBD	The reviewer will be experienced with performing and presenting risk analyses in accordance with ER 1105-2-101 and other guidance. The reviewer should be knowledgeable in application of risk analysis specific to design of high hazard impoundments and dam safety design criteria for high hazard impoundments.

Table 10 IEPR Panel

ATTACHMENT 2

Review Plan Revisions

Revision Date	Description of Change	Page/Paragraph Number

Table 11 Review Plan Revisions