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

REPLY TO
ATTENTION OF

CESAD-CG

21 February 2018

MEMORANDUM FOR Commander, Jacksonville District

SUBJECT: Approval of Review Plan for the Project Implementation Report on the Comprehensive Everglades Restoration Plan: Lake Okeechobee Watershed Restoration Project

1. References:

a. Memorandum, CESAJ-PD, 20 Oct 2017, subject: CESAJ-PD Review Plan Approval Request for Lake Okeechobee Watershed Restoration Project (LOWRP).

b. Engineer Circular 1165-2-214, Civil Works Review, 15 December 2012.

c. Planning Bulletin 2016-02, Civil Works Review, 4 March 2016.

2. Jacksonville District prepared the enclosed Review Plan in accordance with Engineer Circular 1165-2-214. The District coordinated preparation of the review plan with the Ecosystem Restoration Planning Center of Expertise (ECO-PCX), which is the lead office to execute this Review Plan. The ECO-PCX recommends approval of the review plan. The Review Plan includes Type I Independent External Peer Review.

3. I hereby approve this Review Plan, which is subject to change as circumstances require, consistent with study development under the Project Management Business Process. Subsequent significant revisions to this Review Plan or its execution will require new written approval from this office. The District shall post the approved Review Plan and a copy of this approval memorandum to the District public internet website and provide a link to the ECO-PCX for their use. Before posting to the website, the names of Corps employees should be removed.

4. The point of contact for this action is [redacted] at (404) 562-[redacted] or [redacted]@usace.army.mil.

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COL, EN
Acting Commander

REVIEW PLAN

CENTRAL AND SOUTHERN FLORIDA PROJECT
COMPREHENSIVE EVERGLADES RESTORATION PLAN
Lake Okeechobee Watershed Restoration Project (114447)
Integrated Project Implementation Report and Environmental Impact Statement

Jacksonville District

MSC Approval Date: 21 February 2018

US Army Corps
of Engineers ®

REVIEW PLAN

CENTRAL AND SOUTHERN FLORIDA PROJECT
COMPREHENSIVE EVERGLADES RESTORATION PLAN

Lake Okeechobee Watershed Restoration Project
Integrated Project Implementation Report and Environmental Impact Statement

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1. PURPOSE AND REQUIREMENTS

a. Purpose. This plan defines the scope and level of peer review for the Integrated Project Implementation Report (PIR) and Environmental Impact Statement (EIS) for the Central and Southern Florida Project (C&SF), Comprehensive Everglades Restoration Plan (CERP), Lake Okeechobee Watershed Restoration Project (LOWRP). The integrated PIR and EIS will describe the reformulation of a previous project known as the Lake Okeechobee Watershed Project (LOWP).

b. References

(1) Section 1044 (a) of the Water Resources Reform and Development Act of 2014
(2) Section 2034(a)(5)(A) of the Water Resources Development Act (WRDA) of 2007
(3) Engineer Circular (EC) 1165-2-214, Civil Works Review, 15 Dec 2012
(4) EC 1105-2-412, Assuring Quality of Planning Models, 31 Mar 2011
(5) Engineer Regulation (ER) 1110-1-12, Quality Management, Change 2, 11 Mar 2011
(6) ER 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 Nov 2007
(7) ER 1110-2-1150, Engineering and Design for Civil Works Projects, 31 August 1999
(8) Lake Okeechobee Watershed Restoration Project, Project Management Plan (PMP), May 2017

c. Requirements. This review plan was developed in accordance with EC 1165-2-214, which establishes an accountable, comprehensive, life-cycle review strategy for Civil Works products. The EC provides a seamless process for review of all Civil Works projects from initial planning through design, construction, and operation, maintenance, repair, replacement and rehabilitation (OMRR&R). Four levels of review are detailed: District Quality Control/Quality Assurance (DQC), Agency Technical Review (ATR), Independent External Peer Review (IEPR), and Policy and Legal Compliance Review. Decision documents are subject to cost engineering review and certification per EC 1165-2-214 and planning models are subject to certification/approval per EC 1105-2-412. Guidance on quality assurance for engineering models is contained in ER 1110-2-1150, Engineering and Design for Civil Works Projects.

2. REVIEW MANAGEMENT ORGANIZATION COORDINATION

A Review Management Organization (RMO) manages the overall peer review effort described in this plan. The RMO for this review effort is the Ecosystem Restoration Planning Center of Expertise (ECO-PCX). The RMO will coordinate with the Cost Engineering Mandatory Center of Expertise/Technical Center of Expertise (MCX/TCX) to conduct ATR of cost estimates, construction schedules and contingencies and with the Risk Management Center (RMC) to conduct a review of project design to ensure dam and levee safety concerns are addressed in accordance with USACE regulations. The LOWRP is a single-purpose ecosystem restoration project and coordination with other centers of expertise is not contemplated at this time.

3. STUDY INFORMATION

a. Decision Document. The PIR /EIS for the C&SF, CERP, LOWRP is intended to evaluate ecosystem problems and restoration opportunities in portions of Glades County, Highlands County, Okeechobee County and Martin County, Florida constituting the northern Lake Okeechobee watershed. Approval for the PIR and integrated EIS will be by the Chief of Engineers.

b. Study/Project Description. The LOWRP, a single-purpose ecosystem restoration project, was approved by Congress as a part of the CERP in the WRDA of 2000. The non-federal sponsor is the South Florida Water Management District (SFWMD).

The northern Lake Okeechobee watershed is located in portions of Martin, Okeechobee, Glades and Highlands Counties. The study area encompasses approximately 950 square miles of the northern watershed adjacent to Lake Okeechobee (see Figure 1). Water flows into the study area from the Kissimmee Chain of Lakes and northern Kissimmee River and from 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.

As late as the 1860s, the Lake Okeechobee watershed and the Lake itself were part of a low gradient natural river and slough system. Water levels would seasonally fluctuate as the water flowed slowly through the creeks, sloughs and rivers of the northern watersheds and into the Lake. The Lake itself was much larger than the current footprint, with an extensive wetland littoral zone along the shoreline. Water levels fluctuated between 17 feet and 23 feet above National Geodetic Vertical Datum (NGVD), and periodically flooded the exposed areas of the low-gradient marsh. Under both high and low conditions, there was abundant submerged and exposed habitat for fish and other wildlife. As the Lake stage fluctuated higher, water would overtop the banks and flow south feeding the Everglades. Four sub-basins make up the northern Lake Okeechobee watershed including the Kissimmee, Istokpoga, Fisheating Creek and Taylor Creek/Nubbin Slough basins. The Kissimmee sub-basin is the headwaters of the Kissimmee-Okeechobee-Everglades ecosystem and encompasses an area of approximately 2,280 square miles contributing approximately 51% of the total surface water inflow to Lake Okeechobee.

Structural works began in the 1800s that modified the Lake and the northern watershed hydrology, and ultimately the hydrology of the entire Everglades system. The original embankments around Lake Okeechobee were completed around 1915 and were rebuilt by the USACE between 1932 and 1938. The construction of the Herbert Hoover Dike and features of the Central and Southern Florida (C&SF) Project in the 1960's have significantly restricted Lake Okeechobee's size and water level fluctuations. Most of the littoral zone is now at an elevation between 12 and 15 feet NGVD. As a result, when water levels are significantly above 15 feet NGVD, the entire littoral zone is flooded causing adverse impacts to the ecology of the littoral zone. When water levels are below 11 feet NGVD, the entire marsh is dry and not available as habitat for fish and other aquatic life. The Kissimmee-Istokpoga Basin portion of the Central and Southern Florida Flood Control Project, completed in 1971, reduced flooding throughout the watershed and, to varying degrees, allowed other operational objectives to be met. Unfortunately there were a number of unintended consequences, which included degradation of lake, lacustrine, littoral, and wetland habitats in both

the Upper and Lower Basins; creation of hypoxic conditions in the C-38 canal and old river oxbows; and displacement of fish and wildlife resources. The overall effect of the C&SF Project flood risk management system to the hydrology of the Kissimmee-Okeechobee-Everglades ecosystem has been a disruption of the natural timing of flows entering and leaving Lake Okeechobee, loss of overall water storage, undesirable discharges to the northern estuaries and a lower quantity of water available for the Everglades.

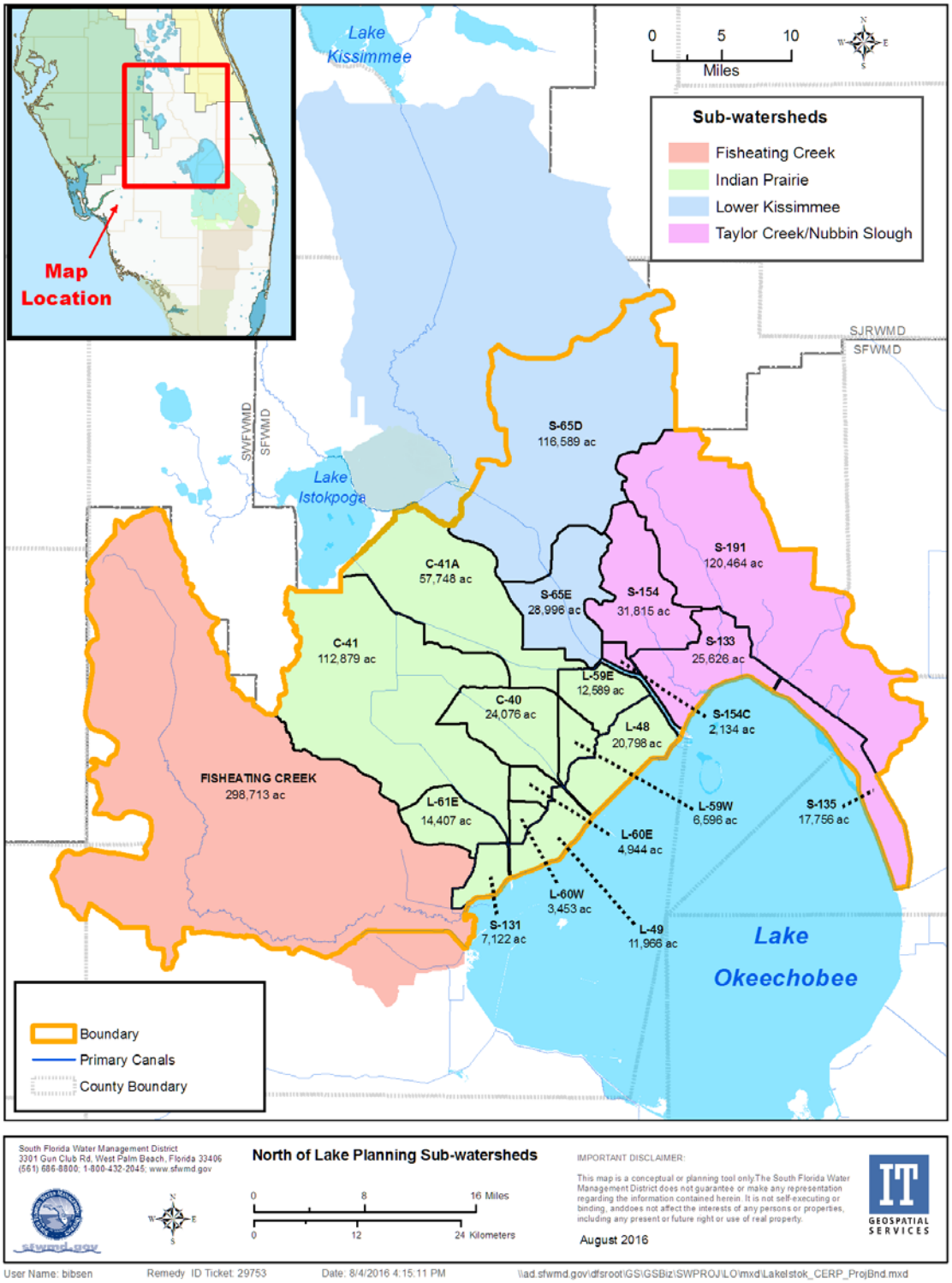

Figure 1. Lake Okeechobee Watershed Project study area boundary.

c. General purposes of the LOWRP. The objectives of the study are to:

- Better manage discharges from Lake Okeechobee to improve the salinity regime and the quality of oyster and submerged aquatic vegetation habitat in the northern estuaries.
- Increase Lake Okeechobee aquatic and wildlife habitat (attenuate extreme high and low water levels).
- Increase the spatial extent and functionality of wetland habitat in the watershed.
- Increase water supply availability to existing legal water users of Lake Okeechobee.

The LOWRP seeks to address these objectives by developing alternatives that will capture, store, and release water currently flowing directly into Lake Okeechobee; rehydrate areas that have been hydrologically impacted by excessive draining and water diversions; reduce peak discharges to Lake Okeechobee and the estuarine systems; improve timing and distribution of water from the Lake Okeechobee northern watershed to ensure availability of water for downstream ecosystems; and reestablish connections among natural areas that have become spatially and/or hydrologically fragmented. If implemented, these actions will help restore more natural water deliveries, promote improved health and functionality of wetland and upland areas, and increase the quantity and quality of habitat available for native wildlife and vegetation. The CERP authorized plan (the Yellowbook) identified management measures within the footprint of the LOWRP study area. The Yellowbook concept was the starting point for LOWRP planning. Prior planning efforts screened the management measures to identify several alternatives. Final alternatives for LOWRP have not been formulated. Cost for a recommended plan is expected to be on the order of $1.5B to $3.0B.

d. Factors Affecting the Scope and Level of Review. This section discusses factors pertinent to the risk informed decisions on the appropriate scope and level of review. The discussion is intended to be detailed enough to assess the level and focus of review needed to support the PDT, PCX, and vertical team decisions. The discussion will help to determine the types of expertise required on the various review teams to adequately review the document. The following is a discussion of pertinent risk factors:

- <u>Is total project cost estimated to exceed $200M?</u>

  Yes, on the order of $1.5B-$3.0B.

- <u>Does the project pose significant technical, institutional, social, or other challenges?</u>

  Yes. This is a technically complex, multi-component project with significant institutional interest, typical of any geographically large complex ecosystem restoration project.

- <u>Where are significant project risks likely to occur and at what magnitude (e.g., what are the uncertainties and how might they affect the success of the project)?</u>

  As part of the SMART Planning Process, an assessment of Risk and Uncertainty will be developed and will be assembled into a Risk Register. The register will include risk assessments of all pertinent issues regarding Plan Formulation and Policy, Environmental, Socioeconomics, Real Estate and Engineering. The Risk Register will be developed in coordination with the Vertical Team and will be available for use by other reviewers during the study. The Risk Register will be

used to guide the Planning Team through the development of the PIR, and will determine the level of detail for analysis of any policy or technical issues.

Uncertainties have been identified related to geotechnical data and analysis at the proposed reservoir locations. A detailed geotechnical evaluation of each site is necessary to determine the ability of the reservoirs to function as intended and to inform the design requirements to ensure function. Without additional data and analysis there is a high risk of designing a non-functional reservoir, risk of carrying large cost contingency forward in the PIR and a high risk of redesign during PED.

Uncertainties have also been identified in cultural resources information. There is little to no data available in most of the project area. Survey data is required to inform evaluations. Without information there is a high risk of siting features in locations containing significant cultural resources. This may lead to selection of an inappropriate TSP and redesign or reformulation during PED.

- <u>Is the project likely to have significant economic, environmental, and/or social effects to the Nation?</u>

  An economic analysis and analysis of environmental effects will be conducted for the PIR to identify cost effective alternatives. The PIR will describe the alternatives that were analyzed and criteria used to evaluate, compare and select a Recommended Plan. Implementation of the project is expected to result in positive, nationally significant environmental effects via the ecosystem restoration benefits. We have shown in recent Everglades restoration studies that ecosystem restoration in the Everglades brings significant economic and social benefits and we are expecting this project will follow suit. Potential negative environmental and social effects resulting from implementation of the project will be disclosed in the EIS. The Corps will avoid, minimize or mitigate for adverse effects and will develop a robust adaptive management and monitoring plan for the project.

- <u>Does the project likely involve significant threat to human life/safety assurance?</u>

  Due to the nature of the project which includes impoundment of large volumes of water, there is potential for significant threat to human life safety. The project will also look at measures including large above ground storage facilities which may have human life/safety concerns depending on locations determined during alternative development. The proposed project will involve modifications to the C&SF Project for Flood Control and Other Purposes. Flood risk will function as a constraint for the study and will be considered in alternative formulation and evaluation. Additionally, an analysis will be conducted for the project to ensure that flood risk management will not be diminished.

- <u>Is the project/study likely to have significant interagency interest?</u>

  Yes. The LOWP will have an overall positive environmental impact improving the health of not only the northern watershed, but Lake Okeechobee and the northern estuaries. Both state and Federal agencies are part of the Project Delivery Team (PDT) ensuring that needs of multiple stakeholders are addressed. The US Fish and Wildlife Service and the Florida Fish and Wildlife Conservation Commission are expected to have interest in possible impacts to wildlife including

endangered species and species of concern in the study area. The Florida Department of Agriculture and Consumer Services is concerned with the needs of agricultural water users and desires to ensure regional water supply needs are being met. Local governments are concerned with economic impacts to their communities such as loss of tax base and improved recreational opportunities. The US Environmental Protection Agency and Florida Department of Environmental Protection are interested in the use of Aquifer Storage and Recovery (ASR) wells and potential inclusion of Deep Injection Wells as water management features.

- Is the project/study highly controversial (discuss why or why not and, if so, in what ways)?

  There is potential for controversy or strongly differing positions regarding the size, nature, or effects of the project. The proposed project includes the major central measures to implement ecosystem restoration in the vital northern part of the Everglades system. There will be concerns with impacts to water supply and cultural resources as well as economic impacts to study area communities. Significant opposition from local stakeholders including Tribes may arise is large storage facilities are sited in areas adjacent to populated areas.

- Is the project/study likely to contain influential scientific information or be a highly influential scientific assessment (with some discussion as to why or why not and, if so, in what ways)?

  No. The project is not proposing nor developing any new science. Any monitoring likely to provide new scientific information will take place after construction. The PIR contains an adaptive management and monitoring plan.

- Is there information in the decision document or proposed project design that will likely be based on novel methods, involve the use of 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 (with some discussion as to why or why not and, if so, in what ways)?

  Planning models employed to predict ecosystem benefits may be considered novel, or at least unique in application to CERP components. Alternative designs are expected to be neither novel nor precedent setting. The report addresses alternatives that will likely include above-ground storage areas, seepage management barriers, canal improvements, etc. - measures that are commonplace for the USACE and do not change the scope or function of the authorized project.

- Will the proposed project design require redundancy, resiliency, and/or robustness (with some discussion as to why or why not and, if so, in what ways – see EC 1165-2-214)?

  Project features will include measures to achieve the project objectives of ecosystem restoration. Pump stations, ASR wells and most other mechanical equipment may contain secondary or backup systems. These systems would ensure that maintenance could be performed on the equipment without temporarily reducing ecosystem restoration benefits. Unique construction sequencing is not expected; however, implementation of seepage management components may be necessary before operation of any project features that increase water flows or above ground storage in certain areas. Above ground impoundment designs will also comply with the USACE/SFWMD Design Criteria Memorandum 2, Wind and Precipitation Design Criteria for Freeboard.

- Is there a request by the Governor of an affected state for peer review by independent experts?

  No. The Governor of Florida has not requested a review by independent experts.

e. In-Kind Contributions. Products and analyses provided by non-Federal sponsor as in-kind services are subject to DQC, ATR, and IEPR. The non-Federal sponsor will perform the majority of the hydrologic modeling and the ecological modeling. All products produced by the non-Federal sponsor for inclusion in project documents including the PIR and EIS will be subjected to the full range of appropriate quality control both prior to release for agency and public reviews and as part of the ATR and IEPR process.

4. DISTRICT QUALITY CONTROL

All decision documents (including supporting data, analyses, environmental compliance documents, etc.) shall undergo DQC. DQC is an internal review of basic science and engineering work products focused on fulfilling the project quality requirements of the PMP. The District shall manage and document DQC in accordance with the Quality Manual of the District and Major Subordinate Command (MSC).

a. Documentation of DQC. The District will certify DQC for completeness. The certification will contain documentation of the comments, the changes made and signatures of those participating. DQC documentation will be provided to the ATR and IEPR teams at each review.

b. Products to Undergo DQC. All products prepared for milestones and submitted outside the District will undergo DQC. These include read ahead materials for the Alternatives, TSP and Agency Decision milestones. The Draft and Final PIR and EIS, with technical appendices, will undergo DQC prior to ATR. DQC of interim products, in a "continuous" process, will be documented. Continuous DQC will generally be of limited scope and managed by the office generating the product.

c. Required DQC Expertise. Experienced District staff, representing all pertinent disciplines, will perform DQC, including: plan formulation, economics, environmental compliance, cultural resources, engineering design, hydraulics and hydrology, geotechnical engineering, cost engineering and real estate.

5. AGENCY TECHNICAL REVIEW

ATR is mandatory for all decision documents (including supporting data, analyses, environmental compliance documents, etc.). The objective of ATR is to ensure consistency with established criteria, guidance, procedures, and policy. The ATR will assess whether the analyses presented are technically correct and comply with USACE guidance, and that the document explains the analyses and results in a reasonably clear manner for the public and decision makers. ATR is managed within USACE by a designated RMO and is conducted by a qualified team from outside the district that is not involved in the day-to-day production of the project/product. ATR teams will be comprised of senior USACE personnel and may be supplemented by outside experts. To assure independence, the ATR team leader shall be from outside the home MSC.

a. **Products to Undergo ATR.** ATR will be performed on all products subjected to formal review outside of the Jacksonville District, in this case, the Draft PIR/EIS and Final PIR/EIS including the Engineering Appendix. The cost estimate associated with the PIR/EIS will undergo ATR through the Cost DX.

b. **Required ATR Team Expertise.** The ATR team will be finalized by the ECO-PCX and is comprised of individuals from all the technical disciplines that were significant in the preparation of the report. Technical disciplines determined to be appropriate for this review include: Plan Formulation, Economics, Environmental Resources, NEPA Compliance (e.g., NEPA documentation preparation), Hydrology and Hydraulics (H&H), H&H Modeling, Civil Engineering Design, Cost Estimating, Geotechnical, Dam Safety/Risk Management, Water Control, and Real Estate. ATR team members may be from USACE, other Federal agencies, state or local government agencies, universities, private contractors or other institutions. The key factor is extensive, expert knowledge in their field of expertise. This table describes suggested expertise.

ATR Team Members/Disciplines	Expertise Required
ATR Lead	A senior professional with extensive experience in preparing Civil Works decision documents and conducting ATR. The lead will have the necessary skills and experience to lead a virtual team through the ATR process. The ATR lead may also serve as a reviewer for a specific discipline (see below).
Plan Formulation	A senior water resources planner certified to conduct ATR with a minimum of 5 years of experience in large scale component based ecosystem restoration and benefit development.
Economics	A senior economist certified to conduct ATR with a minimum of 10 years of experience evaluating ecosystem restoration project benefits and costs. Experience evaluating the appropriateness of cost effectiveness and incremental cost analysis (CE/ICA), as applied to dollar costs & ecosystem restoration benefits; familiarity with the USACE tool IWR-PLAN is required. Experience in identifying incidental benefits (preferably flood risk management and water supply) is required.
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. They must be able to review for NEPA compliance (including cultural resources coordination) and quality and applicability of ecosystem benefits evaluations. Expertise should include ecological modeling and to be able to review models used to determination of habitat benefits.

ATR Team Members/Disciplines	Expertise Required
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, including a general knowledge of south Florida hydrology and water management. The reviewer(s) will have a thorough understanding of water storage and conveyance and sediment control and be knowledgeable of associated H&H model applications, with the ability to understand the application of RESOPS, RSMBN, SFWMM, WAM, DMSTA and HEC-RAS to south Florida conditions.
Civil Engineering	A senior civil engineering certified to conduct ATR with experience in engineering/construction management for water storage and conveyance in structural and non-structural systems, wetland restoration, and sediment control. A minimum of 10 years of experience is preferred.
Cost Engineering	A senior cost engineer with 5+ years of experience in Ecosystem Restoration projects. The Cost MCX/TCX will approve and designate this team member.
Geotechnical Engineering	A senior geotechnical engineer certified to conduct ATR with a minimum of 10 years of experience with design and evaluation of earthern dams and levees. The reviewer will have a thorough understanding of current design regulations for above ground impoundments and be knowledgeable of associated geotechnical model applications including seepage and foundation design tools with the ability to understand the application to south Florida conditions.
Real Estate	The reviewer must have a minimum 5 years of expertise in the real estate planning process for cost shared and full federal civil works projects, relocations, report preparation and acquisition of real estate interests under SMART Planning. Possess a full working knowledge of EC 405-2-12, the portions of EC 405-2-12 that are currently applicable, and Public Law 91-646. Ability to identify areas of the REP that are not compliant with EC 405-2-12 and recommend actions to bring the report into compliance. All estates suggested for use should be termed sufficient to allow project construction. The cost estimate should be validated as adequate for real estate acquisition.
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, including familiarity with how information from the various disciplines involved in the analysis interact and affect the results. 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.

c. **Documentation of ATR.** DrChecks review software will be used to document all comments, responses and associated resolutions accomplished in the review process. Comments should be limited to those that are required to ensure adequacy of the product. The four key parts of a quality review comment include:

(1) The review concern – identify the product's information deficiency or incorrect application of policy, guidance, or procedures;
(2) The basis for the concern – cite the appropriate law, policy, guidance, or procedure that has not be properly followed;
(3) The significance of the concern – indicate the importance of the concern with regard to its potential impact on the plan selection, recommended plan components, efficiency (cost), effectiveness (function/outputs), implementation responsibilities, safety, Federal interest, or public acceptability; and
(4) The probable specific action needed to resolve the concern – identify the action(s) that the reporting officers must take to resolve the concern.

In some situations, especially addressing incomplete or unclear information, ATR team members may seek clarification to then assess whether further specific concerns may exist. The ATR documentation in DrChecks will include the text of each ATR concern, the PDT response, a brief summary of the pertinent points in any discussion, including any vertical team coordination, and the agreed upon resolution. If an ATR concern cannot be satisfactorily resolved between the ATR team and the PDT, it will be elevated to the vertical team for further resolution following the policy issue resolution process in either ER 1110-1-12 or ER 1105-2-100, Appendix H, as appropriate. Unresolved concerns can be closed in DrChecks with a notation that the concern has been elevated to the vertical team for resolution.

At the conclusion of each ATR effort, the ATR team will prepare a Review Report summarizing the review. Review Reports will be considered an integral part of the ATR documentation and shall:

- Identify the document(s) reviewed and the purpose of the review;
- Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
- Include the charge to the reviewers;
- Describe the nature of their review and their findings and conclusions;
- Identify and summarize each unresolved issue (if any); and
- Include a copy of each reviewer's comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

ATR may be certified when all ATR concerns are either resolved or referred to the vertical team for resolution and the ATR documentation is complete. The ATR Lead will prepare a Statement of Technical Review certifying that the issues raised by the ATR team have been resolved (or elevated to the vertical team). A Statement of Technical Review should be completed, based on work reviewed to date, for draft report and final report. A sample Statement of Technical Review is included in Attachment 2.

6. INDEPENDENT EXTERNAL PEER REVIEW

IEPR may be required for decision documents under certain circumstances. 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 1165-2-214, 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.

- Type I IEPR. These reviews are managed outside the USACE and are conducted on project 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 any biological opinions of the project study. Type I IEPR will cover the entire decision document or action and will address all of the underlying engineering, economics, and environmental work, not just one aspect of the study. For decision documents where a Type II IEPR (Safety Assurance Review) is anticipated during project implementation, safety assurance shall also be addressed during the Type I IEPR per EC 1165-2-214.

- Type II IEPR. Safety Assurance Reviews, are managed outside the USACE and are conducted on design and construction activities for hurricane, storm, and flood risk management projects or other projects where existing and potential hazards pose a significant threat to human life. Type II IEPR panels will conduct reviews of the design and construction activities prior to initiation of physical construction and, until construction activities are completed, periodically thereafter on a regular schedule. The reviews shall consider the adequacy, appropriateness, and acceptability of the design and construction activities in assuring public health safety and welfare.

a. Decision on IEPR. Types I and II IEPR will be conducted for this project/study. This is a large, technically complex, multi-component ecosystem restoration project with significant institutional interest. The project cost is on the order of $1.5B-$3.0B. Since life safety issues exist, a Safety Assurance Review is required and will be addressed during the Type I IEPR per Paragraph 2.c.(3) of Appendix D of EC 1165-2-214. During the implementation/design and construction phase the decision concerning Type II IEPR will be reaffirmed at the beginning of the design phase and addressed in a separate Review Plan.

b. Products to Undergo Type I IEPR. The Draft PIR and technical appendices will be reviewed.

c. Required Type I IEPR Panel Expertise. Each panel member should be a professional from academia, a public agency, or consulting firm with a minimum of 10 years of experience in their area of expertise. They should be familiar with large, complex civil works projects of high public and interagency interests.

IEPR Panel Members/Disciplines	Expertise Required
Economics	The panel member must be experienced with evaluating the appropriateness of cost effectiveness and incremental cost analysis (CE/ICA), as applied to dollar costs & 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.
Aquatic Ecology	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 benefits in those environments including the ecological modeling tools utilized for benefit calculation.
Design and Construction Cost Engineering	The Panel Member must have experience in performing cost engineering/construction management for water storage and conveyance and sediment control. Be familiar with similar projects across US and related Cost Engineering. Experience in associated contracting procedures, total cost growth analysis and related cost risk analysis is desired. Also be familiar with construction industry and practices in Florida and/or the Southeastern US.
Hydrology, Hydraulic Engineering and Modeling	This Panel Member must have experience in the field of hydrology, hydraulics 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 sediment control and be knowledgeable of associated H&H model applications, with the ability to understand the application of RESOPS, RSMBN, SFWMM, WAM, DMSTA and HEC-RAS in south Florida.
Civil Engineering Design and Risk Analysis	This Panel Member must have experience in the field of civil engineering specifically design and evaluation of large water storage impoundments. The Panel member should have experience in risk analysis in water resource projects and application of current dam safety design standards for high hazard impoundments.

d. Documentation of Type I IEPR. The IEPR panel will be selected and managed by an Outside Eligible Organization (OEO) per EC 1165-2-214. Panel comments will be compiled by the OEO and should address the adequacy and acceptability of the economic, engineering and environmental methods, models, and analyses used. IEPR comments should generally include the same four key parts described in Section 5.c. The OEO will prepare a final Review Report that will accompany the publication of the final decision document and shall:

- Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
- Include the charge to the reviewers;
- Describe the nature of their review and their findings and conclusions; and
- Include a copy of each reviewer's comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

The final Review Report will be submitted by the OEO no later than 60 days following the close of the public comment period for the draft PIR and EIS. USACE shall consider all recommendations in the Review Report and prepare a written response for all recommendations adopted or not adopted. The final decision document will summarize the Review Report and USACE response. The Review Report and USACE response will be made available to the public on the internet.

7. POLICY AND LEGAL COMPLIANCE REVIEW

All decision documents will be reviewed throughout the study process for compliance with law and policy. Guidance for these reviews is addressed in Appendix H, ER 1105-2-100. These reviews determine whether the recommendations in the reports, supporting analyses, and coordination comply with law and policy, and warrant approval or further recommendation to higher authority by the MSC Commander. DQC and ATR augment and complement the policy review processes by addressing compliance with pertinent Army policies, particularly policies on analytical methods and the presentation of findings in decision documents.

8. COST ENGINEERING REVIEW AND CERTIFICATION

All decision documents shall be coordinated with the Cost Engineering Mandatory Center of Expertise/Technical Center of Expertise (MCX/TCX) at the Walla Walla District. The MCX/TCX will assist in determining the expertise of the ATR team and in developing the review charge(s). The MCX/TCX will provide the Cost Engineering MCX/TCX certification. The RMO will coordinate with the Cost Engineering MCX/TCX.

9. MODEL CERTIFICATION AND 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 defined as any models and analytical tools that planners use to define water resources management problems and opportunities, to formulate potential alternatives to address the problems and take advantage of the opportunities, to evaluate potential effects of alternatives and to support decision making. The use of a certified/approved planning model does not constitute technical review of the planning product. 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.

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 and the professional practice of documenting the application of the software and modeling results will be followed. As part of the USACE Scientific and Engineering Technology (SET) Initiative, many engineering models have been identified as preferred or acceptable for use on Corps studies. These models should be used when

appropriate. 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. Additional guidance pertaining to the process applied by the Hydrology, Hydraulics, and Coastal Community of Practice (HH&C CoP) to use and validate engineering software for use in planning studies and to satisfy the requirements of the SET initiative are documented in ES-0801.

a. **Planning Models.** The following table contains a list of planning models and performance measures that may be used to evaluate, compare and select a plan. For the final subset, full details of the methodology will be included in a model approval plan provided to the ECO-PCX for review and approval for individual use. ECO-PCX model review is estimated to take 6 months. Planning Model review is expected to be complete by September 2017. Schedule and cost is provided in Section 10, below.

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Certification / Approval Status
Lake Okeechobee Watershed Project Benefit Model	The model was developed to evaluate alternatives within the LOWP project domain (ecoregion and/or watershed in south Florida). The primary areas to be evaluated include the Sub Basins north of Lake Okeechobee (Fisheating Creek, Indian Prairie, Kissimmee River, and Taylor Creek and Nubbin Slough), Lake Okeechobee, and the Northern Estuaries (St. Lucie River and the Caloosahatchee River and Estuary). Performance measures were used to document the linkage between hydrologic output from models and ecosystem functions to evaluate the degree to which alternative plans met restoration objectives. Each performance measure was updated from the prior Lake Okeechobee Watershed project based on the availability of new tools, changes to the landscape, updated knowledge on the system from peer reviewed literature and technical reports, and RECOVER review comments. Each performance measure has a predictive target or comparable performance scores and process for how to measure predicted performance of alternatives. Targets were based on peer-reviewed relationships between hydrology and ecological species or communities, and technical synthesis reports of multiple data sources identifying restored conditions in Lake Okeechobee, the sub basins and in the St. Lucie and Caloosahatchee estuaries. Performance measure scores were displayed as a function of restoration potential or achievement of the target. Habitat unit (HU) scores were produced by indexing the scores 0-1. The indexed scores were then multiplied by their proportion of the total index score for a given ecological zone and then multiplied by the area to get the HUs. HUs are then evaluated for the Existing Condition Baseline, future without project condition, and project alternatives, to identify the best performer for each zone and the whole Lake Okeechobee Watershed Project area.	Not certified. USACE ECO-PCX approved for use.

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Certification / Approval Status
IWR-PLAN Decision Support Software	Assists plan formulation by combining user-defined solutions to problems and calculating the effects of each combination, or "plan." The program can assist with plan comparison by conducting CE/ICA, identifying the plans which are best financial investments and displaying the effects of each on a range of decision variables.	USACE Certified

b. Engineering Models. This table lists engineering models that may be used to evaluate and compare plans. For the final subset, full details of the methodology will be provided to the USACE SET team for review and approval for individual use if not already approved for use. The following engineering models are anticipated to be used in the development of the decision document.

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Approval Status
Hydrologic Engineering Center's River Analysis System (HEC-RAS)	The program provides the capability to perform one-dimensional steady and unsteady flow river hydraulics calculations. The most recent release of HEC-RAS (version 4.2) includes capabilities that allow the model to apply complex operation of gated structures and pump stations. Such operations can change in time or water level conditions anywhere in the system. A new feature 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 now be used to accurately simulate the aquifer/canal flow exchange.	HH&C CoP Approved: Preferred Model
REservoir Sizing and Operations Screening (RESOPS)	RESOPS is a coarse-scale water management simulation spreadsheet model that was developed to quickly test alternative reservoir sizes and system operating rules for the region surrounding and including Lake Okeechobee. RESOPS performs monthly time-step, 41-year (1965-2005) continuous simulations of the hydrology and operations of south Florida's regional water management system and the interaction with proposed reservoir and wetland treatment area features and generates a wide variety of graphical and statistical summary measures of performance that can be used to compare up to four test scenarios.	Approved Model: The application of the model will be reviewed during LOWP ATR.

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Approval Status
Regional Simulation Model - Basins (RSMBN)	RSMBN is a link-node based model designed 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. It 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 Validated: Allowed for Use
South Florida Water Management Model (SFWMM)	This 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. It is a physically-based simulation model that combines the hydrology and management aspects of a greater portion of the SFWMD. The model includes a spatial extent covering most of south Florida, and it encompasses an area of substantial heterogeneity in natural and managed hydrology. It covers 7,600 square miles using a mesh of 2 mile x 2 mile cells.	HH&C CoP Validated: Allowed for Use
Dynamic Model for Stormwater Treatment Areas (DMSTA)	The DMSTA (Walker and Kadlec 2005), (http://www.wwwalker.net/dmsta/) was developed and calibrated to information specific to south Florida, and to predict phosphorus removal performance of Stormwater Treatment Areas 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. It 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
Watershed Assessment Model (WAM)	WAM was developed by Soil and Water Engineering Technology, Inc. It is a GIS based model that simulates hydrology and water quality responses within a watershed. WAM can be used to perform hydrological and water quality analysis that simulate flows and nutrients loads for existing landuses, soils, and land management practices; analyze hydrological and water quality impacts on streams and lakes, and view and analyze the simulated flow and concentrations for source cells and stream reaches.	Not approved: Use request will be submitted to HH&C CoP. Model application will be reviewed during ATR.

10. CONSOLIDATED REVIEW SCHEDULES AND COSTS

The ATRs are estimated to cost $221K and the IEPR is estimated to cost $280K. The schedule is outlined below.

- DQC of formulation of alternatives, Oct 2016 (Est. Cost $19K)
- Planning Model Certification/Approval for Use, Nov 2017 (Est. Cost $16K)
- Engineering Model Certification/Approval, Aug 2017 (Est Cost $17K)
- ATR-1: models and Plan formulation process, Sep 2017 (Est. Cost $63K)
- DQC of the Draft Report, Feb 2018 (Est. Cost $43K)
- District Legal Review of the Draft Report, Feb 2018 (Est. Cost $5K)
- ATR-2: Draft Report, Apr-May 2018 (Est. Cost $120K)
- Public and Agency review of Integrated Draft Report and EIS, Apr-May 2018
- Policy and Legal Review by USACE Headquarters and South Atlantic Division, Mar-Apr 2018
- Independent External Peer Review (IEPR), Apr-Jun 2018 (Est. Cost $280K)
- DQC of the Final Report, Nov 2018 (Est. Cost $24K)
- District Legal Review of the Final Report, Nov 2018 (Est. Cost $5K)
- ATR-3: Final Report, Dec 2018 (Est. Cost $38K)
- Policy and Legal Review by USACE Headquarters and South Atlantic Division, Dec 2018-Jan 2019

11. PUBLIC PARTICIPATION

As required by EC 1165-2-214, the approved Review Plan will be posted on the District public website (http://www.saj.usace.army.mil/Missions/CivilWorks/ReviewPlans.aspx). Public reviews of the Draft PIR and Final PIR will be noticed using the Federal Register, press releases, email notifications, and posting to the Jacksonville District's website and the Everglades Restoration website. The public will have 45 days to provide comments on the Draft report. Comments and PDT responses will be provided to the technical reviewers. The review period for the Final report will be 30 days. The IEPR final report will be posted to the Jacksonville District website. After responses to IEPR comments have been approved by USACE HQ, the approved responses will be posted to the Jacksonville District website.

12. REVIEW PLAN APPROVAL AND UPDATES

The South Atlantic Division Commander is responsible for approving this Review Plan, including by delegation within the MSC. The MSC Commander's approval reflects vertical team input (district, MSC, RMO, and HQUSACE) as to the appropriate scope and level of review for the decision document. The Review Plan may change as the study progresses. The district is responsible for keeping the Review Plan up to date. Minor changes since the last MSC Commander approval will be documented in Attachment 3. Significant changes to the plan (such as changes to the scope and/or level of review) must be approved by the MSC Commander following the process used for the initial approval. The latest version of the Review Plan, along with the Commander's approval memorandum, will be posted on the District's webpage, and be provided to the RMO and MSC.

13. REVIEW PLAN POINTS OF CONTACT

Public questions and/or comments on this Review Plan can be directed to the following points of contact:

- Project Manager, Jacksonville District, 904-232-XXXX
- Everglades Program Manager, South Atlantic Division, 404-562-XXXX
- Review Management Organization POC, ECO-PCX, 651-290-XXXX

ATTACHMENT 1: SAMPLE STATEMENT OF DISTRICT QUALITY CONTROL REVIEW FOR DECISION DOCUMENTS

STATEMENT OF COMPLETION OF THE DISTRICT QUALITY CONTROL (DQC) REVIEW FOR THE *[PROJECT NAME]*

District Quality Control: The Jacksonville District has completed a District Quality Control review of the ***[Project Name]***. EC 1165-2-214 states that all work products and reports, evaluations, and assessments shall undergo necessary and appropriate District Quality Control/Quality Assurance (DQC). The home district shall manage DQC. Documentation of DQC activities is required and should be in accordance with the Quality Manual of the District and the responsible MSC; product issues identified via DQC should be resolved prior to ATR and IEPR. The DQC of products and reports shall also cover any necessary National Environmental Policy Act (NEPA) documents, other environmental compliance products, and any in-kind services provided by local sponsors.

The DQC process reviews the basic science, economics, and engineering focused on fulfilling the project quality requirements and assures compliance with established policy principles and procedures. This included review of assumptions; methods, procedures, and material used in analysis; alternatives evaluated; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing Corps policy.

Project Description:

[include brief description of the project, reason for the DQC, and phase of the project.]

The following Jacksonville District team members conducted the District Quality Control review between DD-MMM-YYY and DD-MMM-YYY:

Project Delivery Team Review

Reviewer Name	Focus of Review	Office	Phone

Supervisory Review

Reviewer Name	Focus of Review	Office	Phone

Summary:

[Include review comments from DrChecks (if used), tabulated comments, or redlined comments from the review. Discuss any critical or significant comments from the review. Explain/discuss any unresolved comments.]

CERTIFICATION OF DISTRICT QUALITY CONTROL REVIEW

All concerns resulting from the District Quality Control review of the project have been mutually resolved and comments incorporated. The ***Project Name***, and all associated documents required by the National Environmental Policy Act have been fully reviewed.

_____ _____

[NAME] Date
Chief, Planning and Policy Division

_____ _____

[NAME] Date
Chief, Engineering Division

_____ _____

[NAME] Date
Chief, Real Estate Division

_____ _____

[NAME] Date
Chief, Water Resources Branch
Programs and Project Management Division

ATTACHMENT 2: SAMPLE STATEMENT OF TECHNICAL REVIEW FOR DECSION DOCUMENTS
COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the *<type of product>* for *<project name and location>*. The ATR was conducted as defined in the project's Review Plan to comply with the requirements of EC 1165-2-214. During the ATR, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions, methods, procedures, and material used in analyses, alternatives evaluated, the appropriateness of data used and level obtained, and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing US Army Corps of Engineers policy. The ATR also assessed the District Quality Control (DQC) documentation and made the determination that the DQC activities employed appear to be appropriate and effective. All comments resulting from the ATR have been resolved and the comments have been closed in DrChecks[sm].

SIGNATURE _____ _____
Name Date
ATR Team Leader
Office Symbol/Company

SIGNATURE _____ _____
Name Date
Project Manager
Office Symbol

SIGNATURE _____ _____
Name Date
Architect Engineer Project Manager[1]
Company, location

SIGNATURE _____ _____
Name Date
Review Management Office Representative
Office Symbol

CERTIFICATION OF AGENCY TECHNICAL REVIEW

Significant concerns and the explanation of the resolution are as follows: *Describe the major technical concerns and their resolution.*

As noted above, all concerns resulting from the ATR of the project have been fully resolved.

SIGNATURE _____ _____
Name Date
Chief, Engineering Division
Office Symbol

SIGNATURE _____ _____

Name	Date
Chief, Planning Division	
Office Symbol	

[1] Only needed if some portion of the ATR was contracted

ATTACHMENT 3: REVIEW PLAN REVISIONS

Revision Date	Description of Change	Page / Paragraph Number

ATTACHMENT 4: TEAM ROSTERS

NAME	AGENCY	EMAIL
	USACE	
	USACE	
	USACE	
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	Seminole Tribe	
	USDOI BIA	
	Miccosukee Tribe	
	Miccosukee Tribe	
	USDOI	
	USDOI	
	USDOI IOS	

NAME	AGENCY	EMAIL
	USDOI	
	USDOI IOS	
	USEPA	
	USEPA	
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	USFWS	
	USFWS	
	USFWS	
	USFWS	
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	USGS	
	USGS	
	USDA NRCS	
	FDACS	
	FDACS	
	FDACS	
	FDACS	
	FDACS	
	FDACS	
	FDEP Kissimmee Prairie Reserve	
	FDEP	
	FDEP	
	FDEP	
	FDEP	
	FDEP	
	FDEP	
	FDEP Kissimmee Prairie Reserve State Park	
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	FFWCC	

NAME	AGENCY	EMAIL
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	Glades County	
	Highlands County	
	Highlands County	
	Highlands County	
	Lee county	
	Lee county	
	Lee county	
	Lee County	
	Lee county	
	Martin County	
	Martin County	
	Martin County	
	Martin County	
	Okeechobee County	
	Okeechobee County	
	St. Lucie County	
	Coquina Water Control District	
	Town of Fort Myers Beach	
	Okeechobee, City of	
	Okeechobee Utility Authority	
	Okeechobee City Council	

AGENCY TECHNICAL REVIEW TEAM

Discipline/Expertise	Name	District/Division
Eco-PCX Operational Director		MVD
District ATR Coordinator		Jacksonville/SAD
Eco-PCX Account Manager		MVP/MVD
Agency Technical Review Team		
ATR Lead/Eco Rest Plan Formulation		MVP
Environmental Resources/ NEPA Compliance		MVN
Plan Formulation		SPK
Real Estate		TBA
Economics		TBA
Civil Design		TBA
Geotechnical		TBA
Risk Analysis/Dam Safety (RMC)		TBA
Hydrology and Hydraulics		SAS
Cost Engineering		TBA