APPENDIX H
TECHNICAL REVIEW DOCUMENTATION

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H TECHNICAL REVIEW DOCUMENTATION

This appendix outlines September 2023 and December 2023 IEPR documentation as well as August 2023 and January 2024 ATR documentation.

September 2023 IEPR

BATTELLE

September 13, 2023

Elizabeth Caneja
South Florida Water Management District
3301 Gun Club Road
MS 8410
West Palm Beach, FL 33406

Purchase Order No. 4500142609
SUBMITTAL OF DELIVERABLE: *Independent External Peer Review (IEPR) of the North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study: Final Report*

Dear Ms. Caneja:

This letter accompanies the submission of the Final Report for the Independent External Peer Review (IEPR) of the North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study.

Battelle assures that this report is compliant with the requirements of ER 1165-2-217. Following this submission, Battelle will supply through a separate email a Word file in which the Project Team can develop Draft Evaluator Responses following the normal requirements of USACE DrChecks program along with guidance on the next steps.

Please contact me at 781-681-5510 if you have any technical questions regarding this submittal.

Sincerely,

Lynn A McLeod

Lynn A. McLeod, CEP, PMP
Project Manager

encl.

Final Independent External Peer Review Report North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study

Prepared by
Battelle Memorial Institute

Prepared for
South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33406

Purchase Order No. 4500142609

September 13, 2023

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It can be done

Photo credit: Southwest Florida Water Management District

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Purchase Order No. 4500142609

Final Independent External Peer Review Report North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study

Prepared by

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West Palm Beach, FL 33406

September 13, 2023

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Final Independent External Peer Review Report North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study

Executive Summary

Project Background and Purpose

The south Florida ecosystem includes the Everglades, which encompasses 18,000 square miles from Orlando to the Florida Reef Tract. Everglades National Park (the largest national park east of the Mississippi River, comprising a significant portion of the greater Everglades Ecosystem) is a World Heritage Site, an International Biosphere Preserve and a Wetland of International Importance. The Everglades and the south Florida ecosystem are affected by many factors such as competing demands for recreation, development, and natural and commercial resources and include 68 federally listed threatened and endangered plants and animals.

The Central and Southern Florida (C&SF) project, authorized by Congress in 1948, expanded the existing network of canals, levees, water storage areas and water control structures in south Florida. Project objectives include flood control, regional water supply, prevention of saltwater intrusion, water supply to Everglades National Park, preservation of fish and wildlife, recreation and navigation. While fulfilling these objectives, the project has had unintended adverse effects on the natural environment by disrupting the pre-existing hydrologic regime of the Everglades and south Florida ecosystem. As a result, in 1996, the U.S. Army Corps of Engineers (USACE), in conjunction with the South Florida Water Management District (SFWMD), was directed to develop a comprehensive plan to restore, preserve and protect the south Florida ecosystem while providing for other water-related needs of the region such as water quality and flood protection. The resulting plan was submitted to Congress on July 1, 1999, and consists of proposed structural and operational modifications to the C&SF project.

The recommended plan, identified as the Comprehensive Everglades Restoration Plan (CERP), was approved to provide a framework for the restoration of the natural system under Section 601 of the Water Resources Development Act of 2000. The plan, as documented in the Comprehensive Review Study (Yellow Book), consists of 68 different components that work together, to restore, preserve and protect the south Florida ecosystem while providing for other water-related needs of the region. The CERP components will be implemented over an approximate 40-year period. Together, these components will benefit the ecological function of more than 2.4 million acres of the south Florida ecosystem by improving and/or restoring the proper quantity, quality, timing and distribution of water in the natural system while also addressing other concerns such as urban and agricultural water supply and maintaining existing levels of flood protection. The CERP intends to achieve more natural flows by re-directing current flows that go straight to tide, to a more restored flow of water that is distributed throughout the system similar to the pre-drainage conditions.

Since 2000, much progress has been made. Construction has begun on the first generation of CERP projects authorized by Congress. These include the Picayune Strand Restoration, Indian River Lagoon South, and C-44 Reservoir and Stormwater Treatment Area projects. Congressional authorization has been received for the second generation of CERP projects, including Biscayne Bay Coastal Wetlands-Phase 1, Caloosahatchee River (C-43) West Basin Storage Reservoir, and C-111 Spreader Canal Western Project, which are already under construction or are operational, and the Broward County Water Preserve Areas project, which is currently being designed. The Central Everglades Planning Project (CEPP) was authorized in 2016 and construction of the Everglades Agriculture Area Reservoir began in February 2023. All of these CERP projects contribute significant ecological benefits to the system and specific regional habitats in which they are located. Although substantial progress has been made through the previously authorized projects, additional storage features north of Lake Okeechobee are needed to achieve CERP goals.

CERP Component A. The Lake Okeechobee Component A Reservoir (LOCAR) Feasibility Study (FS), or Component A in the Yellow Book, is included in CERP, which was approved by Congress as a framework for the restoration of the natural system under Section 601 of the Water Resources Development Act (WRDA) of 2000. CERP, as documented in the 1999 Restudy, consists of 68 components. The purpose of Component A is to detain water in a 200,000 acre-foot aboveground storage reservoir during wet periods for later use during dry periods to Lake Okeechobee. Increased storage capacity, north of Lake Okeechobee, would reduce the duration and frequency of both high and low water levels in Lake Okeechobee that are stressful to the lake's littoral ecosystems and cause large discharges from the lake that are damaging to the downstream estuary ecosystems.

The Integrated Delivery Schedule (IDS) provides an overall strategy for project planning, design, and construction of federal projects that are cost-shared with local sponsors as part of the South Florida Ecosystem Restoration Program. The IDS, required as part of the CERP Programmatic Regulations, is based on ecosystem needs, benefits, costs, and available funding. It helps restoration planners, stakeholders, and public focus on priorities, opportunities, and challenges, and provides a path forward to complete construction on previously authorized projects while outlining the next projects to undergo planning and design. The current project planning and anticipated benefits for LOCAR are consistent with the sequencing of projects in the IDS and included in the next generation of CERP project features to provide restoration benefits.

Section 203 Feasibility Study. SFWMD, as local sponsor to CERP, has prepared this LOCAR FS and Environmental Impact Statement (EIS). The SFWMD initiated the LOCAR FS in 2023 as the non-federal interest in response to Florida Governor's Executive Order 23-06. The goal of LOCAR is to construct Component A of CERP. Similar aboveground storage reservoirs are being constructed to the east, south, and west of Lake Okeechobee.

The SFWMD is preparing this FS pursuant to Section 203 of the WRDA of 1986, as amended, for submission to the Assistant Secretary of the Army for Civil Works (ASA[CW]). The Jacksonville District, USACE is the federal agency, acting on the SFWMD's behalf, and intends to prepare a National Environmental Policy Act (NEPA, Title 40 of the Code of Federal Regulations, Chapter V, Parts 1500 through 1508) EIS to support the ASA(CW) review of the FS. Section 203 authorizes non-federal interests to undertake FSs of proposed water resources development projects for submission to the ASA(CW). Upon approval of the SFWMD LOCAR FS by the Governing Board of the SFWMD and the ASA(CW), the recommended plan will be submitted to Congress for authorization.

LOCAR expands upon previously authorized projects and ongoing studies to continue progress towards achievement of the level of restoration envisioned for CERP. LOCAR is focused on aboveground water storage north of Lake Okeechobee. Since the original CERP planning was completed in 1999, new studies, policy guidance, data collection, pilot projects, and improvements in hydrologic systems modeling capabilities allowed for refining the knowledge base and approach in ecosystem restoration. This refined approach is used to maximize project benefits and reduce costs and risks to achieve the CERP goals.

The project area covers a portion of the Lake Okeechobee Watershed in Florida including Glades and Highlands Counties, along with the Seminole Tribe of Florida Brighton Reservation. The study area includes the project area in the Indian Prairie Basin, along with Lake Okeechobee and the Caloosahatchee and St. Lucie estuaries.

Independent External Peer Review Process

Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analysis. SFWMD is conducting an Independent External Peer Review (IEPR) of the North of Lake Okeechobee Storage Reservoir Section 203 Study LOCAR FS (hereinafter: SFWMD LOCAR FS IEPR) which is being prepared for the USACE under the authority granted by Section 203 of the WRDA of 1986 (P.L. 99-662). As a 501(c)(3) non-profit science and technology organization, Battelle is independent, free from conflicts of interest (COIs), and meets the requirements for an Outside Eligible Organization (OEO) described in USACE (2021). Battelle has experience in establishing and administering peer review panels for USACE and was engaged to coordinate this SFWMD LOCAR IEPR. The IEPR was conducted following USACE and Office of Management and Budget (OMB) guidance described in USACE (2021) and OMB (2004). This final report presents the Final Panel Comments of the IEPR Panel (the Panel). Details regarding the IEPR (including the process for selecting panel members, the panel members' biographical information and expertise, and the charge submitted to the Panel to guide its review) are presented in appendices.

Based on the technical content of the decision documents and the overall scope of the project, Battelle identified potential candidates for the Panel in the following key technical areas: Civil Works planning/ economics, environmental/ecological evaluation, hydraulic engineering, and geotechnical engineering. Battelle screened the candidates to identify those most closely meeting the selection criteria and evaluated them for COIs and availability. SFWMD was given the list of final candidates to independently confirm that they had no COIs, and Battelle made the final selection of the four-person Panel.

The Panel received electronic versions of the decision documents (2,244 pages in total), along with a charge that solicited comments on specific sections of the documents to be reviewed. Following guidance provided in USACE (2021) and OMB (2004), SFWMD provided the charge questions, which were included in the draft and final Work Plans.

The SFWMD Project Delivery Team (PDT) briefed the Panel and Battelle during a kick-off meeting held via teleconference at the start of the review to provide the Panel an opportunity to ask questions of SFWMD and clarify uncertainties. Other than Battelle-facilitated teleconferences, there was no direct communication between the Panel and SFWMD during the peer review process. The Panel produced individual comments in response to the charge questions.

IEPR panel members reviewed the decision documents individually and produced individual comments in response to the charge questions. The panel members then met via teleconference with Battelle to review

key technical comments and reach agreement on the Final Panel Comments to be provided to SFWMD. Each Final Panel Comment was documented using a four-part format consisting of (1) a comment statement; (2) the basis for the comment; (3) the significance of the comment (high, medium/high, medium, medium/low, or low); and (4) recommendations on how to resolve the comment.

Overall, 14 Final Panel Comments were identified and documented. Of these, one has been identified as medium/high significance, seven have medium significance, five have medium/low significance, and one has low significance.

Results of the Independent External Peer Review

The panel members agreed on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE, 2021) in the SFWMD LOCAR FS review documents. Table ES-1 lists the Final Panel Comment statements by level of significance. The full text of the Final Panel Comments is presented in Section 4.2 of this report. The following summarizes the Panel's findings.

Based on the Panel's review, the report is well-written, comprehensive, and presents well supported engineering and environmental analysis and plan formulation. The report provided a balanced assessment of the economic, engineering, and environmental issues of the overall project; however, the Panel identified several elements of the project where additional analysis is warranted and places where clarification of project findings, objectives, and assumptions need to be documented or revised.

Plan Formulation/Economics: While the plan formulation process generally followed normal procedures of identifying a variety of alternatives and assessing them against the project objectives, the Panel is concerned whether the Recommended Plan will actually be actionable. Throughout the FS and Appendix E, there are repeated statements that SFWMD sought willing sellers for the purchase of the required acreage to implement the Recommended Plan. However, Appendix D indicates that there is a single corporate landowner who has indicated that they are not willing to sell. Without the property to build the reservoir on, the Recommended Plan will not be actionable as currently proposed. Given the time and cost it takes to go through other actions such as legal condemnation, the Panel is concerned about the ability of this plan to move forward.

Although stated as being a part of Appendix G LOCAR Benefit Model, the cost effectiveness and incremental cost analysis (CE/ICA) was not provided in the document. Therefore, the Panel could not assess the CE/ICA for risk, uncertainty, or accuracy during this review.

Environmental: The positive and negative effects of implementing LOCAR on the natural resources in Lake Okeechobee were thoroughly detailed, well documented, and consistent with the analyses used in other CERP projects. The Panel noted that the conversion of uplands to aquatic environment in each of the Alternatives represents a significant land use change that has not been accounted for during selection of the National Ecosystem Restoration (NER) Plan. The impacts on the habitats at the proposed reservoir sites should be expressed in terms of habitat units (HUs) lost or gained and should be added to the values in the FS to provide a more complete picture of the net HUs created from each alternative.

The Panel is also concerned about how the HUs are currently calculated. Appendix G states the combined performance measure (PM) score is multiplied "by 450,000 acres, as lake state conditions are considered to impact the entire lake" (page G-9). However, when discussing the benefits of LOCAR to

Lake Okeechobee within the FS, the discussion focuses on lake stages and how that impacts the vegetation in the lake's littoral zone and the wildlife that use this area. What is unclear is if changes to lake levels really impact the entire lake, therefore supporting the use of the entire 450,000 acres in the calculation of HUs or whether only the littoral zone should be used in that calculation.

Two additional topics that the Panel believes need further discussion in the EIS are environmental justice (EJ) and planning for identification and cleanup of hazardous, toxic, and radioactive wastes (HTRW). Appendix C states the project does not adversely affect any minority or low-income population. However, the EJ analysis does not appear to be based on currently accepted methodology for determining if an EJ population is present. The Panel also noted that activities conducted over the past 100 years in this area will likely have resulted in HTRWs being present in at least some of this land. Based on regional limitations on fish consumption, if left in the soil there is a likelihood of these chemicals ending up bioaccumulating in species targeted by recreational fishermen as has been experienced in other local areas including Lake Okeechobee.

Engineering: The hydraulic analysis and modeling done for the preliminary conceptual design of the perimeter and interior dams used the latest science, guidance, and state-of-the-art models. The Panel also noted that the seepage and stability analysis modeling is comprehensive. However, there were several instances where the Panel was concerned that assumptions used in the analysis of alternatives could be incorrect and potentially will result in an underestimation of costs or an inability to meet the expected benefits.

The Panel is concerned that some of the construction costs are underestimated. For example, based on real world experiences over the past several years, the fuel costs are underestimated. In another instance, bridge construction costs from 10 to 20 years ago have been presented but it is unclear how they have been used or adjusted to reflect current market costs. If not properly escalated, these costs could be a lot lower than incurred.

When reviewing the Regional Simulation Model BASINS (RSMBN) modeling the Panel identified that approximately 58% of the data used were from dry years while the more recent wet conditions represented only 42% of the data. As the period of record is biased towards drier weather conditions, it is possible that large Lake Okeechobee water conveyances to the LOCAR reservoir and releases to the St. Lucie and Caloosahatchee estuaries may have been underestimated and water shortage cutbacks may have been overestimated in the RSMBN modeling of the alternatives.

The Panel also noted that additional analyses of the constructability of the Recommended Plan should be conducted that are focused on the intermediate stages during construction. These intermediate stages often create greater stress conditions than the final design and generate unsafe situations. Therefore, it is important to analyze and address the constructability of the Recommended Plan as presented in the FS.

Table ES-1. Overview of 14 Final Panel Comments Identified by the SFWMD LOCAR FS IEPR Panel

No.	Final Panel Comment
Significance – Medium/High	
1	The FS is unclear whether the Recommended Plan is actionable given that the acreage needed for this project is owned by a single corporate landowner who has indicated they are not willing to sell.
Significance – Medium	
2	The effects of changes to the habitats at the proposed project and alternative sites were not included in calculating the alternative's contribution to the NER plan.
3	Construction-associated costs related to sheetpile dewatering and bridge construction are underestimated.
4	Evidence that supports multiplying the PM score by the acreage of the entire lake was not provided.
5	The FS, Annexes, and Appendices do not identify if there are any minority or low-income populations present in the study area.
6	The FS, Annexes, and Appendices do not provide a plan for remediating the LOCAR Feature (reservoir) soils to reduce HTRW from entering the water column once the reservoir is constructed.
7	Use of the 1965 to 2016 period of record in the RSMBN modeling potentially biased the results towards drier weather conditions than what is likely to occur in the LOCAR project life.
8	The constructability of the Recommended Plan needs to be analyzed and addressed.
Significance – Medium/Low	
9	The cumulative effects analysis for listed species impacted by the construction of the reservoir, as described in Annex A, is not sufficiently developed.
10	It is unclear whether the Recommended Plan meets the project objective of “increasing the availability of the water supply to existing legal water users of Lake Okeechobee commensurate with improving Lake Okeechobee ecology.”

Table ES-1. Overview of 14 Final Panel Comments Identified by the SFWMD LOCAR FS IEPR Panel (continued)

No.	Final Panel Comment
11	An evaluation of the performance of reservoir geometry, dam geometry, and reservoir water levels against risk and uncertainty from seiche has not been assessed.
12	Documentation that the proposed 12-inch thick soil cement layer on the water side and crest of the dam embankment will withstand 10-foot wave heights was not provided.
13	No explanation of the application of USACE Institute for Water Resources (IWR) Planning Suite CE/ICA is provided in the study documents.
Significance – Low	
14	It is unclear why the sensitivity analysis of a previous version of the Recommended Plan is being used to evaluate the effects of changing pool elevation and the top of embankment elevation rather than the current version.

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LIST OF ACRONYMS

ASA(CW)	Assistant Secretary of the Army for Civil Works
ATR	Agency Technical Review
BDR	Bridge Development Report
C&SF	Central and Southern Florida
CE/ICA	Cost Effectiveness/Incremental Cost Analysis
CEPP	Central Everglades Planning Project
CEQ	Council on Environmental Quality
CERP	Comprehensive Everglades Restoration Plan
CFS	Cubic Feet Per Second
COI	Conflict of Interest
EA	Environmental Assessment
EFH	Essential Fish Habitat
EJ	Environmental Justice
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ER	Engineer Regulation
ERDC	Engineer Research and Development Center
FEMA	Federal Emergency Management Agency
FS	Feasibility Study
H&H	Hydrologic and Hydraulic
HTRW	Hazardous, Toxic, and Radioactive Wastes
HU	Habitat Unit
IDS	Integrated Delivery Schedule
IEPR	Independent External Peer Review
IWR	Institute for Water Resources
LOCAR	Lake Okeechobee Component A Reservoir
MCACES	Micro-Computer Aided Cost Estimating System
NEPA	National Environmental Policy Act
NER	National Ecosystem Restoration
O&M	Operation and Maintenance

OEO	Outside Eligible Organization
OMB	Office of Management and Budget
PED	Pre-Construction Engineering and Design
PDT	Project Delivery Team
PM	Performance Measure
RSMBN	Regional Simulation Model BASINS
SFWMD	South Florida Water Management District
TBD	To Be Determined
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
WRDA	Water Resources Development Act

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1. INTRODUCTION

The south Florida ecosystem includes the Everglades, which encompasses 18,000 square miles from Orlando to the Florida Reef Tract. Everglades National Park (the largest national park east of the Mississippi River, comprising a significant portion of the greater Everglades Ecosystem) is a World Heritage Site, an International Biosphere Preserve and a Wetland of International Importance. The Everglades and the south Florida ecosystem are affected by many factors such as competing demands for recreation, development, and natural and commercial resources and include 68 federally listed threatened and endangered plants and animals.

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CERP Component A. The Lake Okeechobee Component A Reservoir Feasibility Study (LOCAR FS), or Component A in the Yellow Book, is included in CERP, which was approved by Congress as a framework for the restoration of the natural system under Section 601 of Water Resources Development Act (WRDA) of 2000. CERP, as documented in the 1999 Restudy, consists of 68 components. The purpose of Component A is to detain water in a 200,000 acre-foot aboveground storage reservoir during wet periods for later use during dry periods to Lake Okeechobee. Increased storage capacity, north of Lake Okeechobee, would reduce the duration and frequency of both high and low water levels in Lake Okeechobee that are stressful to the lake's littoral ecosystems and cause large discharges from the lake that are damaging to the downstream estuary ecosystems.

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The SFWMD is preparing this FS pursuant to Section 203 of the WRDA of 1986, as amended, for submission to the Assistant Secretary of the Army for Civil Works (ASA[CW]). The Jacksonville District, USACE is the federal agency, acting on the SFWMD's behalf, and intends to prepare a National Environmental Policy Act (NEPA, Title 40 of the Code of Federal Regulations, Chapter V, Parts 1500 through 1508) EIS to support the ASA(CW) review of the FS. Section 203 authorizes non-federal interests to undertake feasibility studies of proposed water resources development projects for submission to the ASA(CW). Upon approval of the SFWMD LOCAR FS by the Governing Board of the SFWMD and the ASA(CW), the recommended plan will be submitted to Congress for authorization.

LOCAR expands upon previously authorized projects and ongoing studies to continue progress towards achievement of the level of restoration envisioned for CERP. LOCAR is focused on aboveground water storage north of Lake Okeechobee. Since the original CERP planning was completed in 1999, new studies, policy guidance, data collection, pilot projects, and improvements in hydrologic systems modeling capabilities allowed for refining the knowledge base and approach in ecosystem restoration. This refined approach is used to maximize project benefits and reduce costs and risks to achieve the CERP goals.

The project area covers a portion of the Lake Okeechobee Watershed in Florida including Glades and Highlands Counties, along with the Seminole Tribe of Florida Brighton Reservation. The study area includes the project area in the Indian Prairie Basin, along with Lake Okeechobee and the Caloosahatchee and St. Lucie estuaries.

Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analysis. The objective of the work described here was to conduct an Independent External Peer Review (IEPR) of the North of Lake Okeechobee Storage Reservoir Section 203 Study LOCAR FS (hereinafter: SFWMD LOCAR FS IEPR) in accordance with procedures described in the Department of the Army, USACE, Engineer Regulation (ER) *Civil Works Review Policy* (ER 1165-2-217) (USACE, 2021) and the Office of Management and Budget (OMB), *Final Information Quality Bulletin for Peer Review* (OMB, 2004). Supplemental guidance on evaluation for conflicts of interest (COIs) was obtained from the *Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports* (The National Academies, 2003).

This final report presents the Final Panel Comments of the IEPR Panel (the Panel) on the existing engineering, economic, environmental, and plan formulation analyses contained in the SFWMD LOCAR FS review documents (Section 4). Appendix A describes in detail how the IEPR was planned and conducted, including the schedule followed in executing the IEPR. Appendix B provides biographical information on the IEPR panel members and describes the method Battelle followed to select them. Appendix C presents the final charge to the IEPR panel members for their use during the review; the final charge was submitted to SFWMD in the final Work Plan according to the schedule listed in Table A-1.

2. PURPOSE OF THE IEPR

To ensure that documents USACE relies upon to make decisions are supported by the best scientific and technical information, USACE has implemented a peer review process that uses IEPR to complement the Agency Technical Review, as described in USACE (2021). This process is also required to be implemented to project documents prepared under authorization of Section 203 of the WRDA.

In general, the purpose of peer review is to strengthen the quality and credibility of the SFWMD-developed decision documents for water resource projects in support of the USACE Civil Works program. IEPR provides an independent assessment of the engineering, economic, environmental, and plan formulation analyses of a project study. In particular, IEPR addresses the technical soundness of the project study's assumptions, methods, analyses, and calculations and identifies the need for additional data or analyses to make a good decision regarding implementation of alternatives and recommendations.

In this case, the IEPR of the SFWMD LOCAR FS was conducted and managed using contract support from Battelle, which is an Outside Eligible Organization (OEO) (as defined by ER 1165-2-217). Battelle, a 501(c)(3) organization under the U.S. Internal Revenue Code, has experience conducting IEPRs for USACE, for state and local agencies, and for industrial clients. Prior to contracting for the SFWMD LOCAR IEPR, Battelle completed an internal organizational COI screening to ensure that Battelle was free from COIs before conducting the IEPR.

3. METHODS FOR CONDUCTING THE IEPR

The methods used to conduct the IEPR are briefly described in this section; a detailed description can be found in Appendix A. The IEPR was completed in accordance with established due dates for milestones and deliverables as part of the final Work Plan; the due dates are based on the award/effective date and the receipt of review documents.

Battelle identified, screened, and selected four panel members to participate in the IEPR based on their expertise in the following disciplines: Civil Works planning/economics, environmental/ecological evaluation, hydraulic engineering, and geotechnical engineering. The Panel reviewed the SFWMD LOCAR FS documents and produced 14 Final Panel Comments in response to 12 charge questions provided by SFWMD for the review. This charge also included two overview questions added by Battelle, for a total of 14 questions. Battelle instructed the Panel to develop the Final Panel Comments using a standardized four-part structure:

1. Comment Statement (succinct summary statement of concern)
2. Basis for Comment (details regarding the concern)
3. Significance (high, medium/high, medium, medium/low, or low; in accordance with specific criteria for determining level of significance)
4. Recommendation(s) for Resolution (at least one implementable action that could be taken to address the Final Panel Comment).

Battelle reviewed all Final Panel Comments for accuracy, adherence to USACE regulations (ER 1165-2-217), and completeness prior to determining that they were final and suitable for inclusion in the Final IEPR Report. There was no direct communication between the Panel and SFWMD during the preparation of the Final Panel Comments. The Panel's findings are summarized in Section 4.1; the Final Panel Comments are presented in full in Section 4.2.

4. RESULTS OF THE IEPR

This section presents the results of the IEPR. A summary of the Panel's findings and the full text of the Final Panel Comments are provided.

4.1 Summary of Final Panel Comments

The panel members agreed on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE, 2021) in the SFWMD LOCAR FS review documents. The following summarizes the Panel's findings.

Based on the Panel's review, the report is well-written, comprehensive, and presents well supported engineering and environmental analysis and plan formulation. The report provided a balanced assessment of the economic, engineering, and environmental issues of the overall project; however, the Panel identified several elements of the project where additional analysis is warranted and places where clarification of project findings, objectives, and assumptions need to be documented or revised.

Plan Formulation/Economics: While the plan formulation process generally followed normal procedures of identifying a variety of alternatives and assessing them against the project objectives, the Panel is concerned whether the Recommended Plan will actually be actionable. Throughout the FS and Appendix E, there are repeated statements that SFWMD sought willing sellers for the purchase of the required acreage to implement the Recommended Plan. However, Appendix D indicates that there is a single corporate landowner who has indicated that they are not willing to sell. Without the property to build the reservoir on, the Recommended Plan will not be actionable as currently proposed. Given the time and cost it takes to go through other actions such as legal condemnation, the Panel is concerned about the ability of this plan to move forward.

Although stated as being a part of Appendix G LOCAR Benefit Model, the cost effectiveness and incremental cost analysis (CE/ICA) was not provided in the document. Therefore the Panel could not assess the CE/ICA for risk, uncertainty, or accuracy during this review.

Environmental: The positive and negative effects of implementing LOCAR on the natural resources in Lake Okeechobee were thoroughly detailed, well documented, and consistent with the analyses used in other CERP projects. The Panel noted that the conversion of uplands to aquatic environment in each of the Alternatives represents a significant land use change that has not been accounted for during selection of the National Ecosystem Restoration (NER) Plan. The impacts on the habitats at the proposed reservoir sites should be expressed in terms of habitat units (HUs) lost or gained and should be added to the values in the FS to provide a more complete picture of the net HUs created from each alternative.

The Panel is also concerned about how the HUs are currently calculated. Appendix G states the combined performance measure (PM) score is multiplied “by 450,000 acres, as lake state conditions are considered to impact the entire lake” (page G-9). However, when discussing the benefits of LOCAR to Lake Okeechobee within the FS, the discussion focuses on lake stages and how that impacts the vegetation in the lake’s littoral zone and the wildlife that use this area. What is unclear is if changes to lake levels really impact the entire lake therefore supporting the use of the entire 450,000 acres in the calculation of HUs or whether only the littoral zone should be used in that calculation.

Two additional topics that the Panel believes need further discussion in the EIS are environmental justice (EJ) and planning for identification and cleanup of hazardous, toxic, and radioactive wastes (HTRW). Appendix C states the project does not adversely affect any minority or low-income population. However, the EJ analysis does not appear to be based on currently accepted methodology for determining if an EJ population is present. The Panel also noted that activities conducted over the past 100 years in this area will likely have resulted in HTRWs being present in at least some of this land. Based on regional limitations on fish consumption, if left in the soil there is a likelihood of these chemicals ending up bioaccumulating in species targeted by recreational fishermen as has been experienced in other local areas including Lake Okeechobee.

Engineering: The hydraulic analysis and modeling done for the preliminary conceptual design of the perimeter and interior dams used the latest science, guidance, and state-of-the-art models. The Panel also noted that the seepage and stability analysis modeling is comprehensive. However, there were several instances where the Panel was concerned that assumptions used in the analysis of alternatives could be incorrect and potentially will result in an underestimation of costs or an inability to meet the expected benefits.

The Panel is concerned that some of the construction costs are underestimated. For example, based on real world experiences over the past several years, the fuel costs are underestimated. In another instance, bridge construction costs from 10 to 20 years ago have been presented but it is unclear how they have been used or adjusted to reflect current market costs. If not properly escalated, these costs could be a lot lower than incurred.

When reviewing the Regional Simulation Model BASINS (RSMBN) modeling the Panel identified that approximately 58% of the data used were from dry years while the more recent wet conditions represented only 42% of the data. As the period of record is biased towards drier weather conditions, it is possible that large Lake Okeechobee water conveyances to the LOCAR reservoir and releases to the St.

Lucie and Caloosahatchee estuaries may have been underestimated and water shortage cutbacks may have been overestimated in the RSMBN modeling of the alternatives.

The Panel also noted that additional analyses of the constructability of the Recommended Plan should be conducted that are focused on the intermediate stages during construction. These intermediate stages often create greater stress conditions than the final design and generate unsafe situations. Therefore, it is important to analyze and address the constructability of the Recommended Plan as presented in the FS.

4.2 Final Panel Comments

This section presents the full text of the Final Panel Comments prepared by the IEPR panel members.

Final Panel Comment 1

The FS is unclear whether the Recommended Plan is actionable given that the acreage needed for this project is owned by a single corporate landowner that has indicated they are not willing to sell.

Basis for Comment

The FS and Appendix E Plan Formulation Screening repeatedly state that SFWMD sought willing sellers for the purchase of the required acreage to implement the Recommended Plan. These statements can be found in FS Sections 4.1.2 Acceptability, 4.3.4 Other Social Effects Table 4-26, and Section 7.4 Compliance with Florida Statutes. In Appendix E Section E.4.2.7 Private Property, it states "The presence of privately owned land was not a reservoir siting constraint. However, public scoping response did highlight concerns about private property ownership. The SFWMD identified willing landowners for potential reservoir locations to minimize concerns" (page E-14).

However, Appendix D Real Estate Section D.22 Attitude of Landowners states

> As the single landowner of the acreage needed for this project, the corporate owner has indicated that they are not willing to sell this portion of their much larger contiguous land holdings at market value. Therefore, condemnation proceedings will likely be required to acquire the lands.

The statements throughout the FS and Appendix E contradict the statement within Appendix D and raise concerns as to whether the Recommended Plan is actionable as currently proposed.

Significance – Medium/High

A single landowner holding all of the acreage required for the project not being willing to sell is a major issue that has a strong probability of influencing the ability to implement the Recommended Plan.

Recommendations for Resolution

1. Please clarify throughout the FS and Appendices whether the Recommended Plan relies solely on property that will not be sold willingly by landowners.
2. Initiate legal condemnation proceedings to determine cost and schedule impacts to the project.

Final Panel Comment 2

The effects of changes to the habitats at the proposed project and alternative sites were not included in calculating the alternative's contribution to the NER plan.

Basis for Comment

As stated in ER 1105-2-100, the USACE uses NER benefits to compare alternatives and select plans for ecosystem restoration projects. Using HUs to demonstrate the benefits of taking no action and the three alternatives, the FS provides a detailed description and justification for selecting the NER Plan. However, the effect of converting uplands to an aquatic environment at the sites of the proposed reservoir described in the alternatives should be a factor in selecting the NER Plan.

The conversion of 13,000 acres (Alternative 1), 20,500 acres of land (Alternative 2), or 14,900 acres (Alternative 3) from uplands to an aquatic environment represents a significant land use change. The importance of this change is due, in part, to the loss of habitat for federal- and state-listed species that will result from implementing any of the LOCAR alternatives. Neither the FS nor Appendix G addressed the effect of converting such a large area of uplands to an aquatic environment when selecting a NER Plan.

The impacts on the habitats at the proposed reservoir sites can be expressed in terms of HUs. The HUs lost or gained can be added to the values in the FS to provide a more complete picture of the net HUs created from each alternative.

Significance – Medium

The results of including the HUs gained/lost from constructing the reservoir could result in a different alternative being selected and/or determining that additional alternatives should be considered.

Recommendations for Resolution

1. Calculate the HUs lost/gained at the proposed project site for each alternative and update the FS, Annexes, and Appendices.

2. Reevaluate the alternatives to determine if Alternative 1 should remain the NER Plan.

Literature Cited

USACE (2000). Planning – Planning Guidance Notebook. Engineer Regulation (ER) 1105-2-100. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. April 22.

Final Panel Comment 3

Construction associated costs related to sheetpile dewatering and bridge construction are underestimated.

Basis for Comment

Appendix B presents the cost estimates for the Recommended Plan. As stated in Section B.1, the primary goal is to present a total project cost (i.e., construction and non-construction cost) for the Recommended Plan, in today's dollars, for project justification/authorization. Additionally, the total project cost summary sheet calculates a fully funded estimate (escalated for inflation through project completion) for budgeting purposes. The intent of these costing efforts is to produce a final product (i.e., cost estimate) that is reliable and accurate and that supports the definition of the government's and the non-federal sponsor's obligations based on the current design plan.

Appendix B.2.4 presents the contracting plan which breaks down the project into 8 separate construction contracts (Contract 1 through 8). Appendix B Attachment 1 – Quantity Take-offs includes quantity calculations currently developed for use in the estimate for all the contracts, sorted by proposed feature. These quantities include assumptions and sources of data used for the cost development (MCACES Summary Printout in Attachment 3 which includes all the unit costs). Under Structure PS-1: 1,500 CFS Diesel Electric Pump Station, the sheetpile dewatering assumes 20 ft deep for dewatering and 40 ft deep for the sheetpile. The number of dewatering pumps for the sheetpile dewatering is stated as TBD (interpreted as "to be determined"). The fuel unit cost used for off-road supply is $3.89/gal. Based on our recent experience with Orlando International Airport and Brightline Highspeed Rail construction projects in 2019-2020 and Patrick Space Force Base in 2023, the above cited fuel unit cost is underestimated. Item 01 09 01 01 01 on Page 3 of Attachment 3 indicates a dewatering duration of 500 days, which translates into using 4-6" pumps for dewatering pumping and a fuel burn rate of approximately 0.5 gal/hr/pump, which is an underestimation of fuel consumption and thus the estimated fuel cost. The pump and hose rental cost of $660/day may be fair but the estimate does not include any installation cost which is likely to be a significant factor. The above dewatering cost estimate is repeated for all other applicable Contracts. Therefore, the dewatering cost for the Recommended Plan is underestimated. This may be compounded with the long duration of the tentative project schedule spanning over 7 years (2024 to 2031).

In Appendix B Attachment 1 – Quantity Take-offs under Feature of Work: Bridges SFWMD has included what appears to be pages from a document titled Structures Design Guidelines Topic No. 625-020-018, Chapter 9 – BDR Cost Estimating from January 2023. This appears to be a Florida Department of Transportation document. Sections 9.3.1 through 9.3.5 within these pages present the unit cost for various types of bridges and slabs based on historical projects in the general geographical area. As listed in the tables in these sections, the letting dates of these projects vary from 1997 to 2012 with at least half of the projects' letting dates being more than 20 years old (1997 to 2002) and the other half having letting dates more than 10 years old (2007 to 2012). Even the cast-in-place flat slab projects in Section 9.3.5 had letting dates more than 10 years old. Currently, there is no explanation as to how this information was used or whether any sort of escalation due to inflation, etc. has been applied. Considering the age of these projects, the prepared estimated cost may be underestimated.

Final Panel Comment 3

Significance – Medium

Some of the assumptions in planning level cost estimates for the construction phase are based on old data and likely underestimate the actual needs of the project during construction.

Recommendation for Resolution

1. Adjust the fuel and operation cost upwards considering the extraneous conditions experienced in the recent past. Revisit the quantity takeoff for dewatering and quantify (to the best possible) more realistic dewatering cost.

2. Consider using unit costs from more recent projects and adjust for the extraneous conditions that were experienced in the recent past.

Final Panel Comment 4

Evidence that supports multiplying the PM score by the acreage of the entire lake was not provided.

Basis for Comment

Appendix G Benefit Model, Section G.3.2 describes the Lake Okeechobee HU calculation stating "3) Calculate HUs—multiply the combined PM score by 450,000 acres, as lake stage conditions are considered to impact the entire lake" (page G-9).

When discussing the benefits of LOCAR to Lake Okeechobee, the discussion focuses on lake stages and how that impacts the vegetation in the lake's littoral zone and the wildlife that use this area. Other CERP projects that impact the lake also focus on changes in vegetation along the shoreline and how this affects wildlife. It is the lake's stage that is the primary factor related to the ecological functioning of the lake.

Calculating the PM score is based on lake stage, and lake stage is of most concern in the littoral zone. This is the habitat that matters when calculating HUs for the lake. To understand if changes to lake level in the open water portion have an impact on the species found in this area, some data and analysis of the data are needed. Appendix G does not provide evidence to support how lake stages are considered to impact the entire lake when calculating HUs.

Significance – Medium

If justification for using the entire lake area when calculating HUs is not provided, the HUs generated for the alternatives will need to be revised and potentially would result in significantly different outcomes.

Recommendations for Resolution

1. Provide evidence that lake stage conditions are considered to impact the entire lake, thus supporting using the lake's entire acreage when calculating HUs.

   OR

2. Recalculate HUs for the lake based on using the acreage in the littoral zone.

Final Panel Comment 5

The FS, Annexes, and Appendices do not identify if there are any minority or low-income populations present in the study area.

Basis for Comment

By not defining if there are recognized minority or low-income populations, the EJ analysis is incomplete. The FS states, “As displayed in Figure 4-3 and listed in Table 4-20 through Table 4-24, communities with people of color and low-income populations are in the Study Area.” These tables provide information on the percentage of minority and low-income populations but never state if any Block Groups or Highlands County have minority or low-income populations based on the accepted definition of a minority or low-income population for an EJ analysis.

Two reports provide the best guidance on defining a minority and low-income population for an EJ analysis and how to determine if a minority or low-income population is present in a designated area. The 1997 Environmental Justice Guidance Under the National Environmental Policy Act (EJ Guidance, CEQ, 1997) report from the CEQ describes procedures for assessing if a minority or low-income population is present.

Guidance in the 1997 EJ report specifies that low-income populations are to be identified using the annual statistical poverty threshold from USCB Current Population Reports Series P-60 on Income and Poverty. Many agencies define a low-income population as twice the poverty rate using the poverty threshold. The FS does not articulate the difference between a low-income population and those living in poverty.

The 2016 report, Promising Practices for EJ Methodologies in NEPA Reviews (Promising Practices), prepared by the Federal Interagency Working Group on Environmental Justice & NEPA Committee (Working Group), recommends using multiple methods to determine if minority or low-income populations are present in the area being studied (Working Group, 2016). The report also provides specific guidance on how to conduct the analyses. Numerous federal agencies support using these reports when determining if minority or low-income populations are present in a project area.

Last, the text in Appendix C suggests that EPA’s tool, EJScreen, was used in the EJ analysis. However, no explanation or details are provided in the text that explains the EJScreen or how it was used to identify minority or low-income populations. The only mention of EJScreen is as a reference in Appendix C.

Significance – Medium

Analysis of EJ issues is a requirement of NEPA that must be met for every project. A lack of an EJ assessment can result in an incomplete report determination.

Recommendations for Resolution

1. Implement the analyses described in the Promising Practices report to identify if there are any minority or low-income populations present that would require an EJ analysis.

Final Panel Comment 5

2. To demonstrate that the proper methods were used to identify minority and low-income populations, include a discussion of EJScreen, how it was used in the EJ analysis, and the results of the EJScreen report.

Literature Cited

Council on Environmental Quality (CEQ). (1997). Environmental Justice. Guidance Under the National Environmental Policy Act. https://www.epa.gov/sites/default/files/2015-02/documents/ej_guidance_nepa_ceq1297.pdf

Federal Interagency Working Group on Environmental Justice & NEPA Committee. (Working Group). (2016). Promising Practices for EJ Methodologies in NEPA reviews. https://www.epa.gov/sites/default/files/2016-08/documents/nepa_promising_practices_document_2016.pdf

Final Panel Comment 6

The FS, Annexes, and Appendices do not provide a plan for remediating the LOCAR Feature (reservoir) soils to reduce HTRW from entering the water column once the reservoir is constructed.

Basis for Comment

Table 2-7 of the FS recognizes that “Lands potentially used for this Project are likely to have a past or present agricultural land use. Activities conducted over the past 100 years will likely have resulted in HTRWs being present on some of this land. State and federal databases include information on known HTRW contamination sites.” The FS project team confirmed that a Phase I Environmental Site Assessment has not been completed on any portion of the project site since 1999. The FS notes, "Phase I and II environmental site assessments will be used to identify unknown HTRW sites and test cultivated areas for the presence of residual agricultural chemicals.” While this is the appropriate step before the LOCAR Feature is constructed, the FS and related documents do not describe how the project site will be remediated or what alternative plans may exist if the preferred site is too contaminated to use.

If the LOCAR feature is constructed and the contaminants in the soil are not removed before construction, these chemicals could become suspended in the water, where they could become available for organisms in the reservoir and possibly accumulate in species occupying higher trophic levels of the food web.

Significance – Medium

High levels of HTRWs could accumulate in species targeted by recreational fishermen and women, resulting in adverse health issues for some people and causing the issuance of “do not consume” warnings. Also, some federally listed species could accumulate elevated levels of HTRWs from feeding on species living in the reservoir.

Recommendations for Resolution

1. Conduct studies to identify the levels of HTRWs in the soil at the proposed project site and their potential to become suspended in the reservoir’s water.
2. Determine the effort needed to remediate the soils to reduce HTRWs to a level that will not create potential health hazards for people or species.
3. Develop an alternative to the project site if it is unusable due to excessively high levels of HTRWs.

Final Panel Comment 7

Use of the 1965 to 2016 period of record in the RSMBN modeling potentially biased the results towards drier weather conditions than what is likely to occur in the LOCAR project life.

Basis for Comment

The SFWMD RSMBN used a 52-year period (1965 to 2016) of climatological inputs (rainfall and evapotranspiration) to simulate in a regional setting the inflows to, outflows from, and operations of the LOCAR reservoir. The FS states “the period of simulation (i.e., 1965 to 2016) used for the LOCAR hydrologic modeling encompasses a wide range of historical climatologic and meteorologic conditions that are representative of central and south Florida hydrology” (FS, Page 5-19). However, the period of record from 1965 to 2016 contains a hydrologically much drier first 30 years from 1965 to 1994, than the next 22 years from 1995 to 2016. This later period had more precipitation, more tropical storms, and many more high-runoff years into Lake Okeechobee. In addition, FS Appendix H Annex H states that Florida experienced generally wetter normal conditions since the early 1990s (page H-26).

As the period of record is biased towards drier weather conditions, it is possible that large Lake Okeechobee water conveyances to the LOCAR reservoir and releases to the St. Lucie and Caloosahatchee estuaries may have been underestimated and water shortage cutbacks may have been overestimated in the RSMBN modeling of the alternatives. The FS does not provide how the 58% dry and 42% wet characteristics of the period of record affected benefits and cost estimates for the Recommended Plan. Also, the FS does not provide how a more evenly distributed period of record between dry and wet years would have affected flood control and water supply benefits for the alternatives. It might be possible that a RSMBN modeling using a period of record that evenly has dry and wet years will provide larger flood control and water supply benefits than the period 1965 to 2016.

The modeled period of record likely does not represent the future and long-term dry and wet year conditions during the life of the LOCAR reservoir project.

Significance – Medium

Using a model biased towards drier years than have been experienced in the last 25 years or more is a potential risk of the Recommended Plan not meeting the stated benefits.

Recommendations for Resolution

1. Document in the FS the potential effects of wetter years than modeled using the period of record (1965 to 2016) on:
    a) Lake Okeechobee water conveyances to the LOCAR reservoir
    b) releases to the St. Lucie and Caloosahatchee estuaries
    c) water shortage cutbacks
    d) flood control.

Final Panel Comment 7

2. State in the FS how benefits for the Recommended Plan would change if a more evenly distributed period of record between dry and wet years was used instead of the period 1965 to 2016.

Final Panel Comment 8

The constructability of the Recommended Plan needs to be analyzed and addressed.

Basis for Comment

Appendices A.7 through A.9 present the geotechnical considerations for construction including preliminary design parameters for LOCAR construction and seepage and stability analyses of the Recommended Plan. Sections A.8.3.2, A.8.4.2, A.8.4.3, and A.9 appropriately use the final design conditions which are essential to the analysis. However, an analysis of the intermediate conditions reaching the construction of the final design is missing.

In other words, constructability or practicality of constructing the design structures for the project is not presented. The constructability of the Recommended Plan needs to be analyzed and addressed for each of the eight contracts documented in the LOCAR FS. It needs a detailed discussion on the safety factors during the intermediate stages of the construction phase for each contract. This will provide not only credibility of the project design but also critical information to the potential contractors to better control the construction cost and implementation strategy.

It is important to note that intermediate stages during construction often create greater stress conditions and generate unsafe situations than the final design. It is therefore important to analyze and address the constructability of the Recommended Plan as presented in the FS.

Significance – Medium

Understanding the stress conditions and unsafe situations that may occur during the intermediate stages of construction will determine if there are any unexpected risks to final project completion.

Recommendation for Resolution

1. List the critical stages of the construction phase for each contract (sub-project) and perform engineering analyses of each stage of each contract.
2. Document the analyses and associated results demonstrating the constructability of the project.
3. Provide the constructability analyses results to each potential contractor during the construction bid process.

Final Panel Comment 9

The cumulative effects analysis for listed species impacted by the construction of the reservoir, as described in Annex A, is not sufficiently developed.

Basis for Comment

Annex A describes the "Harm Resulting from Habitat Loss" for each listed species that is or may be found within the area for the proposed reservoir. This section of the Annex lists large tracts of habitat loss for several species (e.g., 7,567 acres for the caracara, 7,534 acres for the Florida grasshopper sparrow, and 9,502 acres for the Eastern indigo snake).

The cumulative effects analysis concludes that the cumulative effects will result in populations of listed species being maintained in the future and, for some species, increasing their habitat. While this may be correct, the cumulative effects analysis does not provide sufficient quantitative details to support the conclusions. Details of the acres of habitat lost/gained for listed species from past and present projects and predictions of habitat gained/lost for future projects listed in Annex A should be available.

Summarizing these acreages in a table would provide a realistic estimate of the cumulative habitat changes for listed species that the proposed action and past, present, and future projects will impact. This additional analysis could reveal currently unknown impacts (positive and negative) on the acres of habitat for the listed species.

Significance – Medium/Low

Additional details are needed to increase confidence about the conclusion of the cumulative effects analysis.

Recommendations for Resolution

1. Collect, analyze, and summarize quantitative data about the habitat lost/gained from the past, present, and known future projects.
2. Add additional discussion describing the net result of the past, present, and known future projects on the long-term impact on the listed species and, if necessary, revise the conclusions.

Final Panel Comment 10

It is unclear whether the Recommended Plan meets the project objective of "increasing the availability of the water supply to existing legal water users of Lake Okeechobee commensurate with improving Lake Okeechobee ecology."

Basis for Comment

The FS states one of the objectives of the LOCAR is to "increase the availability of the water supply to existing legal water users of Lake Okeechobee commensurate with improving Lake Okeechobee ecology" (FS, page 1-9). The FS Abstract states "The Recommended Plan creates additional water storage north of Lake Okeechobee to facilitate improved flexibility in the timing and distribution of water. Water can be drawn from Lake Okeechobee and stored during wet times to reduce damaging high lake stages and later be released back to the lake to reduce the impacts of low stages during dry times."

The water supply benefits come from LOCAR's contribution in keeping the Lake Okeechobee water levels within the ecologically preferred band. Thus, LOCAR provides the extra volume to store water when lake levels rise above water levels desirable for lake ecology. This stored water can be used for water supply, if needed.

However, throughout the FS, there are statements of Alternative 1 having negligible effects on water supply indicating that it only "maintains pre-Project levels of service" (FS Section 5.13.1, 5-19 and 5-20). This FS section also states "the effects from both increased volumes of water available and water shortages are influenced by the timing and routing of other projects. Therefore, the effects to water supply from Alternative 1 would be negligible."

The Recommended Plan is basically Alternative 1 with refinements for a reduced footprint to avoid environmentally sensitive uplands. However, based on the statement in Section 5.13.1, it appears that the Recommended Plan does not meet the objective of increasing the availability of the water supply to existing legal water users. The FS should be clarified as to whether the Recommended Plan meets the objective noted above or not.

Significance – Medium/Low

Whether the Recommended Plan meets all of the project objectives needs to be clear throughout the FS.

Recommendation for Resolution

1. Clarify in the FS if the Recommended Plan meets or does not meet the objective of increasing the availability of the water supply to existing legal water users.

2. If the Recommended Plan does not meet the objective of increasing the availability of the water supply to existing legal water users, please explain how the application of the period of record that is biased towards drier weather conditions contributed to the Recommended Plan not meeting its objective related to water supply.

Final Panel Comment 11

An evaluation of the performance of reservoir geometry, dam geometry, and reservoir water levels against risk and uncertainty from seiche has not been assessed.

Basis for Comment

Seiche—a standing wave or oscillating water level in an enclosed or partially enclosed water body—can occur at the LOCAR during changes in atmospheric pressures, wind setup, or earthquakes. The Panel notes that seiche from changes in atmospheric pressure is unlikely to occur because the LOCAR is not large enough to experience substantial changes in atmospheric pressure. Appendix H Annex A-1 presents extensive evaluation of wind setup and the dam design already accounts for wind-induced water overtopping. Seiche from wind setup will likely not oscillate higher than the highwater elevation estimated for wind setup. Thus, wind-induced seiche will likely not cause overtopping of the dam. However, a seiche can occur in the reservoir compartments during earthquakes if the earthquake frequency is near the natural frequency of the reservoir compartment.

The FS Appendix A (Engineering Appendix) Section A.7.5 (Seismicity) states that although southern Florida is a low seismicity region, the possibility exists for earthquake imposed seismic loads on Project structures. Section A.8.4.4 states that pseudo-static analyses that simulate earthquake activity will be performed in the future pre-construction engineering and design (PED) phase of the Project. Thus, although very rare, earthquakes can occur in the LOCAR project area and the PED acknowledges the possibility of earthquake occurrence. An earthquake with a frequency near the natural frequency of any of the two LOCAR compartments when LOCAR is at its Normal Full Storage Level (i.e., at a time when the freeboard before dam overtopping occurs is smallest) can cause seiche-induced oscillations of the LOCAR water surface.

Significance – Medium/Low

If seiche occurs when the LOCAR is at its Normal Full Storage Level, the water oscillations from a seiche can increase such that it can overtop the perimeter and/or internal dams. The dam overtopping can cause erosion and damage to the dam structure.

Recommendations for Resolution

1. Estimate the highwater in each LOCAR compartment due to seiche-induced water surface oscillations during an earthquake.

2. Evaluate if dam overtopping can occur from water surface oscillations from seiche. If so, evaluate if there is a need to design the perimeter and internal dams to protect these from possible erosion/damage from seiche-induced water overtopping.

Final Panel Comment 12

Documentation that the proposed 12-inch thick soil cement layer on the water side and crest of the dam embankment will withstand 10-foot wave heights was not provided.

Basis for Comment

In Appendix A of the FS, Section A.8.10.2 describes a 12-inch thick soil cement layer as an appropriate erosion protection for the embankments. The proposed option includes shrinkage and crack control mechanisms along with a drainage layer beneath the soil cement to remove water from behind the system.

The 12-inch thick soil cement may provide adequate protection against wave erosion on the water side and crest of the dam embankment. However, the Panel did not see an investigation of the wave erosion and erosion protection design in the FS or the associated appendices. The proposed design may be conceptually sound but needs supporting analyses for design verification and acceptability.

Significance – Medium/Low

Providing the details of the soil cement design allows understanding and confirmation of the adequacy of the design of the 12-inch thick soil cement against wave-induced erosion.

Recommendations for Resolution

1. Include the details of the soil cement design analyses to improve confidence in the conceptual design of the dam erosion protection.

2. Describe in the FS the maintenance of the soil cement to minimize cracking over time.

Final Panel Comment 13

No explanation of the application of IWR Planning Suite CE/ICA is provided in the study documents.

Basis for Comment

The Panel is not able to assess the adequacy and acceptability of the study analyses used to identify Best Buy alternatives or select the Recommended Plan. Appendix G LOCAR Benefit Model, Section G.3.3 Lake Okeechobee Alternative Performance, page G-16 states: “The AAHUs for Lake Okeechobee will be combined with the Northern Estuaries HUs for the storage cost effectiveness and incremental cost analysis (CE/ICA). The CE/ICA is evaluated in Section G.5.4.” There is no Section G.5.4.

Section G.5 Summary of Alternative Performance, page G-28 presents Table G-13. Total Storage HUs for Each Storage Alternative and Table G-14. Cost-effectiveness and Incremental Cost Analysis Inputs along with Figure G-17. Annual average habitat units and Figure G-18. Annual average habitat units but no explanation of what they mean or how they are used to select the Recommended Plan is provided.

Significance – Medium/Low

This missing or incomplete technical information affects the understanding and completeness of the study documents, and there is uncertainty whether the missing information will affect the Recommended Plan.

Recommendation for Resolution

1. Include a narrative description of the CE/ICA analysis in Appendix G with references to support interpretation of the model output and selection of the Recommended Plan.

Final Panel Comment 14

It is unclear why the sensitivity analysis of a previous version of the Recommended Plan is being used to evaluate the effects of changing pool elevation and the top of embankment elevation rather than the current version.

Basis for Comment

Appendix A Section A.8.9 presents a sensitivity analysis for various scenarios of the design alternative but does not present a sensitivity analysis of the proposed Recommended Plan. The section states “A sensitivity analysis was performed on a previous version of the analyses to evaluate the effects of changing pool elevation and the top of embankment elevation” (Appendix A, page A.8-12).

Without information on how the previous version differs from the proposed version, it is not possible to determine if the sensitivity analysis that was conducted accurately represents the effects of changing pool elevations and top of embankment elevations for the proposed Recommended Plan. Information on how the previous version differs from the current version should be included along with an explanation of why the PDT believes the sensitivity analysis accurately represents the proposed version of the Recommended Plan.

Significance – Low

Clarifying the differences between the previous version and the proposed version of the Recommended Plan and documenting why the reported version accurately represents the current version allows for a complete understanding of why the previous version analysis was used.

Recommendation for Resolution

1. Provide a detailed discussion clarifying the difference between the two versions of the Recommended Plan (previous and current) and any explanations as to why the previous version accurately represents the current version.

5. REFERENCES

Council on Environmental Quality (CEQ). (1997). Environmental Justice. Guidance Under the National Environmental Policy Act. https://www.epa.gov/sites/default/files/2015-02/documents/ej_guidance_nepa_ceq1297.pdf

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APPENDIX A

IEPR Process for the SFWMD LOCAR FS Project

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A.1 Planning and Conduct of the Independent External Peer Review (IEPR)

Table A-1 presents the major milestones and deliverables of the Independent External Peer Review (IEPR) of the North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study (hereinafter: SFWMD LOCAR FS IEPR). Due dates for milestones and deliverables are based on the award/effective date listed in Table A-1. The review documents were provided by South Florida Water Management District (SFWMD) on August 18 and 21, 2023. Note that the actions listed under Task 6 occur after the submission of this report. Battelle anticipates submitting the final deliverable) on October 9, 2023. The actual date for contract end will depend on the date that all activities for this IEPR are conducted and subsequently completed.

Table A-1. Major Milestones and Deliverables of the SFWMD LOCAR FS IEPR

Task	Milestones and Deliverables	Completion Date
1	Award/Effective Date	6/14/2023
	Review documents available	8/21/2023
	Battelle submits draft Work Plan[a]	6/22/2023
	SFWMD provides comments on draft Work Plan	6/23/2023
	Battelle submits final Work Plan[a]	7/6/2023
2	Battelle requests input from SFWMD on the conflict of interest (COI) questionnaire	6/19/2023
	SFWMD provides comments on COI questionnaire	6/19/2023
	Battelle submits list of selected panel members[a]	6/28/2023
	SFWMD confirms the panel members have no COI	6/29/2023
	Battelle completes subcontracts for panel members	7/17/2023
3	Battelle convenes kick-off meeting with SFWMD	6/20/2023
	Battelle sends review documents to panel members	8/21/2023
	Battelle convenes kick-off meeting with panel members	8/17/2023
	Battelle convenes kick-off meeting with SFWMD and panel members	8/18/2023
	Battelle convenes mid-review teleconference for panel members to ask clarifying questions of SFWMD	8/28/2023
4	Panel members complete their review of the documents	8/30/2023
	Battelle provides talking points to panel members for Panel Review Teleconference	8/31/2023
	Battelle convenes Panel Review Teleconference	8/31/2023
	Battelle provides Final Panel Comment templates and instructions to panel members	8/31/2023
	Panel members provide draft Final Panel Comments to Battelle	9/5/2023
	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	9/06/2023 - 9/07/2023
	Panel finalizes Final Panel Comments	9/8/2023

Table A-1. Major Milestones and Deliverables of the SFWMD LOCAR FS IEPR (continued)

Task	Milestones and Deliverables	Completion Date
5	Battelle provides Final IEPR Report to panel members for review	9/8/2023
	Panel members provide comments on Final IEPR Report	9/12/2023
	Battelle submits Final IEPR Report to SFWMD[a]	9/13/2023
6[b]	Battelle provides Final Panel Comment response template to SFWMD	9/13/2023
	Battelle convenes teleconference with SFWMD to review Comment Response process	9/14/2023
	Battelle convenes teleconference with Panel to review Comment Response process	9/14/2023
	SFWMD provides draft PDT Evaluator Responses to Battelle	9/20/2023
	Battelle provides draft Evaluator Responses to panel members	9/20/2023
	Panel members provide draft BackCheck Responses to Battelle	9/21/2023
	Battelle convenes teleconference with panel members to discuss draft BackCheck Responses	9/22/2023
	Battelle convenes Comment Response Teleconference with panel members and SFWMD	9/25/2023
	SFWMD provides final Evaluator Responses	9/26/2023
	Battelle provides final Evaluator Responses to panel members	9/27/2023
	Panel members provide final BackCheck Responses to Battelle	9/29/2023
	Battelle compiles the panel members' final BackCheck Responses	10/6/2023
	Battelle submits final PDF project file to SFWMD[a]	10/9/2023
	Contract End/Delivery Date	12/29/2023

[a] *Deliverable.*

[b] *Task 6 occurs after the submission of this report.*

At the beginning of the Period of Performance for the SFWMD LOCAR FS IEPR, Battelle held a kick-off meeting with SFWMD to review the preliminary/suggested schedule, discuss the IEPR process, and address any questions regarding the scope (e.g., terminology to use etc.). Any revisions to the schedule were submitted as part of the final Work Plan. The final charge consisted of 12 charge questions provided by SFWMD, and two overview questions added by Battelle (all questions were included in the draft and final Work Plans), and general guidance for the Panel on the conduct of the peer review (provided in Appendix C of this final report).

Prior to beginning their review and after their subcontracts were finalized, all the members of the Panel attended a kick-off meeting via teleconference planned and facilitated by Battelle in order to review the IEPR process, the schedule, communication procedures, and other pertinent information for the Panel. Battelle planned and facilitated a second kick-off meeting via teleconference during which SFWMD presented project details to the Panel. Before the meetings, the IEPR Panel received an electronic version of the final charge, as well as the review documents and reference/supplemental materials listed in Table A-2.

Table A-2. Documents to Be Reviewed and Provided as Reference/Supplemental Information

Review Documents	No. of Review Pages
Preliminary Draft EIS Lake Okeechobee Storage Reservoir Section 203 Study	210
Draft Lake Okeechobee Storage Reservoir Section 203 Feasibility Study and Report	212
Appendix A: Engineering Appendix	202
Appendix A Annex A-1 Hydraulic Design	291
Appendix B: Cost Engineering and Risk Analysis	320
Appendix C: Environmental & Cultural Resources	251
Appendix C Annex A: FWCA & ESA Compliance	123
Appendix C Annex B – Part 1: Analyses Required by WRDA	28
Appendix C Annex B – Part 2: State Compliance Report	74
Appendix C Annex C: Draft Project Operations Manual	28
Appendix C Annex D: Adaptive Management and Monitoring Plans	65
Appendix C Annex E: RECOVER Review	3
Appendix C Annex F: Invasive and Nuisance Species Management Plan	36
Appendix C Annex G: Hazardous, Toxic, and Radioactive Waste	169
Appendix C Annex H: Climate Change Assessment	64
Appendix C Annex I: PLSM Alternatives	9
Appendix D: Real Estate	14
Appendix E: Plan Formulation	52
Appendix F: Recreation	17
Appendix G: Benefit Model	70
2023_SFWMD Section 203 Study Prime Farmland Form AD-1006	6
Total # of pages to be reviewed	**2244**

In addition to the materials provided in Table A-2, the panel members were provided the following USACE guidance documents.

- Civil Works Review Policy (ER 1165-2-217, May 1, 2021)
- Office of Management and Budget's Final Information Quality Bulletin for Peer Review (December 16, 2004)
- Foundations of SMART Planning
- Feasibility Study Milestones (PB 2018-01, September 30, 2018 and PB 2018-01(S), June 20, 2019)

- SMART – Planning Overview
- Planning Modernization Fact Sheet
- USACE Climate Change Adaptation Plan (2015)
- Procedures to Evaluate SLR Change Impacts Responses Adaptation (ETL 1100-2-1 – June 30, 2014)
- Incorporating SLR Change in CW Programs (ER 1100-2-8162 – December 31, 2013).

Throughout the review, the Panel developed 11 questions for SFWMD. These were provided to SFWMD by Battelle through email. SFWMD was able to provide responses to all of the questions prior to the end of the review.

In addition, throughout the review period, SFWMD provided documents at the request of panel members. These documents were provided to Battelle and then sent to the Panel as additional information only and were not part of the official review. A list of these additional documents requested by the Panel is provided below.

- 00_Appendix A Annex LOCAR_MDR_20230725.pdf
- 20230811_LOCAR_Alt1_PMF_HECRASmodelfiles.zip
- 20230811_LOCAR_PMP_HECMetVue_modelfiles.zip
- LOCAR-Typical_Cross_Sections_Alt-1_Aug_updt_modtoe.gsz
- 20230814_LOCAR_3D_Seepage_Model_Files.zip.

A.2 Review of Individual Comments

The Panel was instructed to address the charge questions/discussion points within a charge question response form provided by Battelle. At the end of the review period, the Panel produced individual comments in response to the charge questions/discussion points. Battelle reviewed the comments to identify overall recurring themes, areas of potential conflict, and other overall impressions. At the end of the review, Battelle summarized the individual comments into a preliminary list of overall comments and discussion points. Each panel member's individual comments were shared with the full Panel.

A.3 IEPR Panel Teleconference

Battelle facilitated a teleconference with the Panel so that the panel members could exchange technical information. The main goal of the teleconference was to identify which issues should be carried forward as Final Panel Comments in the Final IEPR Report and decide which panel member should serve as the lead author for the development of each Final Panel Comment. This information exchange ensured that the Final IEPR Report would accurately represent the Panel's assessment of the project, including any conflicting opinions. The Panel engaged in a thorough discussion of the overall positive and negative comments, added any missing issues of significant importance to the findings, and merged any related individual comments. At the conclusion of the teleconference, Battelle reviewed each Final Panel Comment with the Panel, including the associated level of significance, and confirmed the lead author for each comment.

A.4 Preparation of Final Panel Comments

Following the teleconference, Battelle distributed a summary memorandum for the Panel documenting each Final Panel Comment (organized by level of significance). The memorandum provided the following detailed guidance on the approach and format to be used to develop the Final Panel Comments for the SFWMD LOCAR FS IEPR:

- Lead Responsibility: For each Final Panel Comment, one panel member was identified as the lead author responsible for coordinating the development of the Final Panel Comment and submitting it to Battelle. Battelle modified lead assignments at the direction of the Panel. To assist each lead in the development of the Final Panel Comments, Battelle distributed a summary email detailing each draft final comment statement, an example Final Panel Comment following the four-part structure described below, and templates for the preparation of each Final Panel Comment.

- Directive to the Lead: Each lead was encouraged to communicate directly with the other panel members as needed and to contribute to a particular Final Panel Comment. If a significant comment was identified that was not covered by one of the original Final Panel Comments, the appropriate lead was instructed to draft a new Final Panel Comment.

- Format for Final Panel Comments: Each Final Panel Comment was presented as part of a four-part structure:

  1. Comment Statement (succinct summary statement of concern)
  2. Basis for Comment (details regarding the concern)
  3. Significance (high, medium/high, medium, medium/low, and low; see description below)
  4. Recommendation(s) for Resolution (see description below).

- Criteria for Significance: The following were used as criteria for assigning a significance level to each Final Panel Comment:

  1. **High:** There is a fundamental issue within study documents or data that will influence the technical or scientific basis for selection of, justification of, or ability to implement the recommended plan.

  2. **Medium/High:** There is a fundamental issue within study documents or data that has a strong probability of influencing the technical or scientific basis for selection of, justification of, or ability to implement the recommended plan.

  3. **Medium:** There is a fundamental issue within study documents or data that has a low probability of influencing the technical or scientific basis for selection of, justification of, or ability to implement the recommended plan.

  4. **Medium/Low:** There is missing, incomplete, or inconsistent technical or scientific information that affects the clarity, understanding, or completeness of the study documents, and there is uncertainty whether the missing information will affect the selection of, justification of, or ability to implement the recommended plan.

5. **Low:** There is a minor technical or scientific discrepancy or inconsistency that affects the clarity, understanding, or completeness of the study documents but does not influence the selection of, justification of, or ability to implement the recommended plan.

- Guidelines for Developing Recommendations: The recommendation section was to include specific actions that USACE should consider to resolve the Final Panel Comment (e.g., suggestions on how and where to incorporate data into the analysis, how and where to address insufficiencies, areas where additional documentation is needed).

Battelle reviewed and edited the Final Panel Comments for clarity, consistency with the comment statement, and adherence to guidance on the Panel's overall charge, which included ensuring that there were no comments regarding either the appropriateness of the selected alternative or USACE policy. At the end of this process, 14 Final Panel Comments were prepared and assembled. There was no direct communication between the Panel and USACE during the preparation of the Final Panel Comments. The full text of the Final Panel Comments is presented in Section 4.2 of the main report.

A.5 Final IEPR Report

After concluding the review and preparation of the Final Panel Comments, Battelle prepared a final IEPR report (this document) on the overall IEPR process and the IEPR panel members' findings. Each panel member and Battelle technical and editorial reviewers reviewed the IEPR report prior to submission to USACE for acceptance.

A.6 Comment Response Process

SFWMD will provide responses (Evaluator Responses) to the Final Panel Comments, and the Panel will respond (BackCheck Responses) to the Evaluator Responses. All SFWMD and Panel responses will be documented by Battelle. Battelle will provide SFWMD and the Panel with a pdf printout of all responses, as a final deliverable and record of the IEPR results.

APPENDIX B

Identification and Selection of IEPR Panel Members for the SFWMD LOCAR FS Project

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B.1 Panel Identification

The candidates for the Independent External Peer Review (IEPR) of the North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study (hereinafter: SFWMD LOCAR FS IEPR) Panel were evaluated based on their technical expertise in the following key areas: Civil Works planning/ economics, environmental/ecological evaluation, hydraulic engineering, and geotechnical engineering. These areas correspond to the technical content of the review documents and overall scope of the SFWMD LOCAR FS project.

To identify candidate panel members, Battelle reviewed the credentials of the experts in Battelle's Peer Reviewer Database, sought recommendations from colleagues, contacted former panel members, and conducted targeted Internet searches. Battelle evaluated these candidate panel members in terms of their technical expertise and potential conflicts of interest (COIs). Of these candidates, Battelle chose the most qualified individuals, confirmed their interest and availability, and ultimately selected four experts for the final Panel. The remaining candidates were not proposed for a variety of reasons, including lack of availability, disclosed COIs, or lack of the precise technical expertise required.

Candidates were screened for the following potential exclusion criteria or COIs. These COI questions were intended to serve as a means of disclosure in order to better characterize a candidate's employment history and background. Battelle evaluated whether scientists in universities and consulting firms that are receiving USACE-funding have sufficient independence from USACE to be appropriate peer reviewers. Guidance in OMB (2004, p. 18) states,

> "…when a scientist is awarded a government research grant through an investigator-initiated, peer-reviewed competition, there generally should be no question as to that scientist's ability to offer independent scientific advice to the agency on other projects. This contrasts, for example, to a situation in which a scientist has a consulting or contractual arrangement with the agency or office sponsoring a peer review. Likewise, when the agency and a researcher work together (e.g., through a cooperative agreement) to design or implement a study, there is less independence from the agency. Furthermore, if a scientist has repeatedly served as a reviewer for the same agency, some may question whether that scientist is sufficiently independent from the agency to be employed as a peer reviewer on agency-sponsored projects."

The term "firm" in a screening question referred to any joint venture in which a firm was involved. It applied to any firm that serves in a joint venture, either as a prime or as a subcontractor to a prime. Candidates were asked to clarify the relationship in the screening questions.

Panel COI Screening Questionnaire for the IEPR of the North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study
1. Previous and/or current involvement by you or your firm in the North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study (hereinafter: LOCAR FS) and related projects.
2. Previous and/or current involvement by you or your firm in water storage projects in the central Everglades region.

Panel COI Screening Questionnaire for the IEPR of the North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study

3. Previous and/or current involvement by you or your firm in the conceptual or actual design, construction, or operation and maintenance (O&M) of any projects related to the LOCAR FS.
4. Current employment by the SFWMD.
5. Previous and/or current involvement with paid or unpaid expert testimony related to the LOCAR FS or central Everglades region.
6. Previous and/or current employment or affiliation with the non-Federal sponsors or any of the following cooperating Federal, State, County, local and regional agencies, environmental organizations, and interested groups *(for pay or pro bono):*
    - South Florida Water Management District
    - Everglades National Park
    - Florida Department of Environmental Protection
    - U.S. Fish and Wildlife Service (USFWS)
    - U.S. Geological Survey
    - Florida Department of Agricultural and Consumer Services
    - Florida Wildlife Conservation Commission
    - Any Florida Counties or Municipalities around Lake Okeechobee
    - USACE
    - members of RECOVER.
7. Past, current, or future interests or involvements (financial or otherwise) by you, your spouse, or your children related to Lake Okeechobee or the central Everglades.
8. Current personal involvement with other USACE projects, including whether involvement was to author any manuals or guidance documents for USACE. If yes, provide titles of documents or description of project, dates, and location (USACE district, division, Headquarters, Engineer Research and Development Center [ERDC], etc.), and position/role. Please highlight and discuss in greater detail any projects that are specifically with the Jacksonville District.
9. Previous or current involvement with the development or testing of models that were used for, or in support of, the LOCAR FS project.
    a. RSMBN (Regional Simulation Model BASINS)
10. Current firm involvement with other USACE projects, specifically those projects/contracts that are with the Jacksonville District. If yes, provide title/description, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role. Please also clearly delineate the percentage of work you personally are currently conducting for the Jacksonville District. Please explain.
11. Any previous employment by SFWMD or USACE Jacksonville District. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.

Panel COI Screening Questionnaire for the IEPR of the North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study
12. Any previous employment by SFWMD as a contractor (either as an individual or through your firm) within the last 10 years. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.
13. Previous experience conducting technical peer reviews. If yes, please highlight and discuss any technical reviews concerning the central Everglades region, and include the client/agency and duration of review (approximate dates).
14. Pending, current, or future financial interests in contracts/awards from SFWMD related to the LOCAR FS project.
15. Significant portion of your personal or office's revenues within the last three years came from SFWMD contracts.
16. Significant portion of your personal or office's revenues within the last three years came from USACE Jacksonville contracts.
17. Any publicly documented statement (including, for example, advocating for or discouraging against) related to the LOCAR FS project.
18. Participation in relevant prior and/or current Federal studies related to the LOCAR FS project.
19. Previous and/or current participation in prior non-Federal studies related to the LOCAR FS project.
20. Has your research or analysis been evaluated as part of the LOCAR FS project?
21. Is there any past, present, or future activity, relationship, or interest (financial or otherwise) that could make it appear that you would be unable to provide unbiased services on this project? If so, please describe.

Providing a positive response to a COI screening question did not automatically preclude a candidate from serving on the Panel. For example, participation in previous USACE technical peer review committees and other technical review panel experience was included as a COI screening question. A positive response to this question could be considered a benefit.

B.2 Panel Selection

In selecting the final members of the Panel, Battelle chose experts who best fit the expertise areas and had no COIs. Table B-1 provides information on each panel member's affiliation, location, education, and overall years of experience. Battelle established subcontracts with the panel members when they indicated their willingness to participate and confirmed the absence of COIs through a signed COI form. USACE was given the list of candidate panel members, but Battelle selected the final Panel.

Table B-1. SFWMD LOCAR FS IEPR Panel: Summary of Panel Members

Name	Affiliation	Location	Education	P.E.	Exp. (yrs)
Civil Works Planning / Economics (Dual Role)					
Don Ator	Independent Consultant	Baton Rouge, LA	M.S., Economics and Agriculture Economics; M.B.A., Concentration in Finance and Accounting	N/A	40+
Environmental/Ecological Evaluation					
Kris Thoemke	Eolas Consultants, LLC	Daytona Beach, FL	Ph.D., Biology	No	44
Hydraulic Engineering					
Michael Kabiling	Taylor Engineering, Inc.	Jacksonville, FL	Ph.D., Hydraulics and Coastal Engineering	Yes	30
Geotechnical Engineering					
Bijay K. Panigrahi	AMCON, Inc.	Orlando, FL	Ph.D., Civil Engineering	Yes	40

Table B-2 presents an overview of the credentials of the final four members of the Panel and their qualifications in relation to the technical evaluation criteria. More detailed biographical information on the panel members and their areas of technical expertise is given in Section B.3.

Table B-2. SFWMD LOCAR FS IEPR Panel: Technical Criteria and Areas of Expertise

Technical Criterion	Ator	Thoemke	Kabiling	Panigrahi
Civil Works Planning / Economist (Dual Role)				
Minimum 10 years of demonstrated experience in public works planning	X			
Very familiar with USACE plan formulation process, procedures, and standards	X			
Familiar with evaluation of alternative plans for ecosystem restoration projects	X			
Experience with high public and interagency interests and may have nearby project impacted sensitive habitats	X			
Familiarity with USACE standards and procedures is required	X			
At least ten years of experience directly related to water resource economic evaluation or review	X			
Minimum M.S. degree or higher in economics	X			
Familiar with the USACE planning process, guidance, and economic evaluation techniques including cost-effectiveness-incremental cost analyses and procedures associated with identifying the National Ecosystem Restoration plan	X			
Environmental/ Ecological Evaluation				
At least 10 years of experience directly related to water resource environmental evaluation or review and National Environmental Policy Act (NEPA) compliance		X		
Minimum M.S. degree or higher in a related field		X		
Extensive experience working with wetlands and estuarine ecosystems		X		
Familiar with USACE calculation and application of environmental impacts and benefits		X		
Experience in the South Florida region is preferred but not required		X		
Hydraulic Engineer				
Registered professional engineer			X	
Minimum of 10 years of experience in hydrologic and hydraulic engineering or as professors from academia with extensive background in hydrologic and hydraulic theory and practice			X	
Knowledge of south Florida hydrology and water management			X	
Minimum M.S. degree in engineering			X	
Familiar with the application of integrated surface water and groundwater models, including the capability to review typical data output from hydrologic models			X	

Table B-2. SFWMD LOCAR FS IEPR Panel: Technical Criteria and Areas of Expertise (continued)

Technical Criterion	Ator	Thoemke	Kabiling	Panigrahi
Prior experience with some of the hydrologic modeling tools selected for project application, including the RESOPS, LOOPS, RSMBN, SFWMM, RSMGL, DMSTA and HEC-RAS, is preferred but not required			X	
Active participation in related professional societies is encouraged			X	
Geotechnical Engineer				
At least 10 years of experience directly related to geologic processes in coastal environments				X
Minimum M.S. degree in a related field				X
Extensive experience working with geomorphic processes in wetlands and coastal ecosystems				X
Experience in the South Florida region is preferred but not required				X

B.3 Panel Member Qualifications

Detailed biographical information on each panel members' credentials, qualifications and areas of technical expertise is provided in the following paragraphs.

Name	Don Ator
Role	Civil Works Planning/Economist (Dual Role)
Affiliation	Independent Consultant

Mr. Ator is an independent consultant and serves as Research Associate, Professor, and Undergraduate Advisor in the Department of Agriculture Economics and Agribusiness at Louisiana State University. He earned his M.S. in economics and agriculture economics and his M.B.A. with a concentration in finance and accounting from Louisiana State University. His current research is in financial resiliency analysis and planning for local governments in Louisiana, Texas, Alabama, Mississippi, Florida, Georgia, Kentucky, and Nebraska.

Mr. Ator has 44 years of specialized experience conducting public works planning and water resource economic evaluations and technical reviews of USACE Civil Works Projects throughout the nation. His expertise includes planning, data assembly, analysis, and formulating and evaluating the economic feasibility of alternatives to identify a tentatively selected plan. Mr. Ator has performed technical analysis and reviews of project cost analyses, financial documentation for cost-sharing agreements, and risk and uncertainty analyses on hundreds of Civil Works projects. He has developed economic net benefits and benefit-cost ratios of alternatives for decision documents that authorize Congressional funding for civil works projects.

Mr. Ator's familiarity with the USACE plan formulation process is evidenced by his service as a team leader for the USACE New Orleans District while embedded in the Plan Formulation Branch. His responsibilities included directing the plan formulation activities of three plan formulators by providing project oversight and review to ensure compliance with USACE procedures and guidelines as set forth in ER 1105-2-100. Mr. Ator has experience directly dealing with the USACE SMART planning process as outlined in the Planning Manual Part II: Risk-Informed Planning and has worked closely with USACE since its implementation in 2015. Selected USACE project summaries are provided below.

- Caño Martín Peña (CMP) Ecosystem Restoration Feasibility Study and Integrated Environmental Impact Statement (EIS) in San Juan, Puerto Rico, USACE, Jacksonville District. Mr. Ator prepared the following sections of this report: recreation plan; the plan formulation; real estate plan; and economic analysis. He used the USACE IWR Planning Suite investment decision support tool to formulate and evaluate the monetary and non-monetary cost and benefits of the alternative plans to identify the Tentatively Selected Plan using Cost-Effectiveness and Incremental Cost Analysis (CE/ICA). In addition, he prepared the responses to comments from the District Quality Control, Agency Technical Review (ATR) and Independent External Peer Review (IEPR) comments for the report documents.
- Licking River Watershed and Dillon Lake Ecosystem Restoration Project, OH (Huntington District, USACE). For this project Mr. Ator was responsible for developing, evaluating, and recommending alternatives to restore the aquatic ecosystem of the Licking River Watershed and Dillon Lake. Trends in economic growth in the watershed had critically impaired the aquatic and riparian ecosystem and resulted in excessive sediment deposition in the reservoir. The IWR Planning Suite investment decision support tool was employed to formulate and evaluate the ecosystem restoration alternative plans involving monetary and non-monetary cost and benefits using CE/ICA.
- Grand and White Lakes Water Management Study, Southwest LA (New Orleans District, USACE). This project was conducted to assess the economic impacts of the quantity and quality of water under different management plans in the Grand and White Lakes system in the southwestern coastal area of Louisiana. The different management plans under consideration would affect water levels in the lakes and have economic impacts on coastal and shoreline erosion, commercial fisheries, wildlife (trapping industry), the quality of irrigation water (rice industry), and water levels in the Gulf Intracoastal Waterway (shipping industry). Over 160 surveys of farmers, navigation interests, irrigation companies, commercial fishers, hunters, trappers, and federal, state, and local government officials were conducted to collect information to assess the economic impacts of land loss due to erosion, factors causing erosion and water quality impacts (primarily salinity levels). Results of the project informed decision makers of the economic impacts of the alternative management plans under consideration for the lake system in identifying the Tentatively Selected Plan.

Mr. Ator has participated in the review of over two dozen water resource decision documents justifying construction efforts including Internal Technical Reviews, ATRs and IEPRs. Mr. Ator is actively involved in professional engineering and scientific societies, including the Society of American Military Engineers (SAME) and the American Society of Civil Engineers (ASCE).

Name	Kris Thoemke, Ph.D.
Role	Environmental/ Ecological Evaluation
Affiliation	Eolas Consultants, LLC

Dr. Thoemke is an independent consultant and part-time American Public University System faculty member. He received his Ph.D. in biology from the University of South Florida in 1979 and is a Certified

Environmental Professional. He has 44 years of experience as a professional ecologist in South Florida and has been a researcher and land manager for the State of Florida, a private ecological consultant, an environmental and outdoor communicator, and an Everglades project manager for a non-profit organization. He also teaches undergraduate- and graduate-level courses for the American Public University System.

His familiarity with water resource environmental evaluation is evident in his work with wetlands and estuarine ecosystems in South Florida and coastal Louisiana. Since 2005, Dr. Thoemke has been an environmental consultant working on freshwater, estuarine, and nearshore marine resources in Southwest Florida, emphasizing Lee, Collier, Charlotte, and Manatee Counties. His research focuses on evaluating the ecological performance of seagrasses and oyster communities from disturbances such as sedimentation, physical changes, and the impacts of excessive freshwater input.

Dr. Thoemke has assessed construction impacts on the marine and terrestrial ecology of coastal regions with emphasis on benthic invertebrates, seagrasses, shorebirds, and dune plant communities at Stump Pass, Big Carlos Pass, and Blind Pass, Florida. Dr. Thoemke has experience permitting and mitigating construction impacts resulting from coastal and upland development on seagrasses, beach and dune systems, nesting sea turtles, shorebirds, and upland species found in the coastal and beach/dune habitats. In addition, he has conducted post-storm analyses of beach and dune systems, completed Section 7 assessments for listed species under National Marine Fisheries Service jurisdiction, coordinated with the U.S. Fish and Wildlife Service (USFWS) on Biological Opinions, and conducted essential fish habitat (EFH) consultation for projects along the Gulf Coast in southwest and south central Florida.

He has experience with wetlands and estuarine ecosystems which are hydrologically connected to the Everglades. He was a member of the IEPR teams that reviewed the Lake Okeechobee System Operating Manual IEPR and Loxahatchee River Watershed Restoration Project, Draft Integrated Project Implementation Report and EIS. Dr. Thoemke also has 40 years of experience as an active recreational user of Lake Okeechobee, the Everglades and Big Cypress Swamp, and the coastal zone of Southwest Florida.

Dr. Thoemke is familiar with large, complex Civil Works projects with high public and interagency interests. His direct experience includes his work as a wetland scientist on the Florida Everglades restoration program, ongoing involvement as the environmental scientist for the Charlotte County Florida Erosion Control Project for Stump Pass, and participation on a team working on large Civil Works coastal restoration projects for the State of Louisiana in the Mississippi Delta region.

Before entering the consulting field, he was a professor and Program Chair of the Environmental Management MS program at Hodges University. For the past 11 years, he has taught undergraduate- and graduate-level courses in Environmental Policy, Regulation and Law, Conservation Biology, and Restoration Ecology. He instructs students on methods for evaluating ecological performance in various environments in these classes. The course material discusses temporal, spatial, and spatial–dynamic ecological models. Through teaching these classes, he has become conversant with the methods for evaluating ecological performance in upland, riverine, wetland, and estuarine ecosystems.

Dr. Thoemke is an active NEPA practitioner. He began preparing Environmental Assessments (EA) and EISs and assessing large, complex projects in 2012. Dr. Thoemke was the project manager on the Port Everglades Ocean Dredged Material Disposal Site EA, which included addressing Marine Mammals Protection Act listed species, preparing sections of the EIS for the Terrebonne Basin Barrier Island Shoreline Restoration Project, Louisiana, including the Endangered Species Act and EFH sections, and was the primary author of the West Grande Terre Beach Nourishment and Stabilization Project EA. He has also reviewed EISs and EAs for other coastal storm risk management projects in the Mississippi Delta and along the Gulf and Atlantic coasts.

He is familiar with all NEPA EA and EIS requirements. For the past 11 years, he has taught graduate-level classes in Environmental Impact Assessment, Environmental Policy, Regulation and Law, and NEPA. Through teaching these classes, he has read hundreds of EAs and EISs while working with students and reads extensively about NEPA in professional journals.

Specific to the LOCAR project, he is familiar with the Regional Simulation Model Basins (RSMBN) used on this project to calculate Habitat Units (HUs) based on performance measures for Lake Okeechobee and the Northern Estuaries. This model was used in the Lake Okeechobee System Operating Manual EIS that he reviewed as an IEPR member in 2022. He also has experience reviewing how HUs were developed and applied in the Loxahatchee River Watershed Restoration Project, Draft Integrated Project Implementation Report and Environmental Impact Statement; Central and Southern Florida Project, Comprehensive Everglades Restoration Plan, Lake Okeechobee Watershed Restoration Project; and Central Everglades Planning Project (CEPP) Draft Project Implementation Report and Environmental Impact Statement.

Dr. Thoemke is a member of the National Association of Environmental Professionals (NAEP) and the Academy of Board Certified Environmental Professionals. He presented papers on NEPA topics with his master's degree students at past annual NAEP conferences and, in 2019, was co-author of the paper, Implementing EO 13807 – Coordinating NEPA and Compliance with Other Federal Laws (Environmental Practice, 21:4, 159-170).

Name	Michael Kabiling, Ph.D., P.E., CFM
Role	Hydraulic Engineer
Affiliation	Taylor Engineering, Inc.

Dr. Kabiling is a senior engineer with Taylor Engineering, Inc. in Jacksonville, Florida, an engineering consulting firm that specializes in hydrology, hydraulic, and coastal engineering. Dr. Kabiling has more than 30 years of experience with advanced expertise in water resources engineering, coastal engineering, numerical modeling, and climate change resiliency. He earned his Ph.D. in hydraulic and coastal engineering from the Yokohama National University, Japan, in 1994; is a professional engineer (PE) licensed in Florida, Georgia, South Carolina, and Washington; and is a Certified Floodplain Manager. Specifically, he has over 15 years of experience in hydrologic and hydraulic (H&H) engineering, flood risk management, and H&H modeling. Dr. Kabiling has a good knowledge of south Florida hydrology and water management; understands the water storage and conveyance in south Florida; is knowledgeable of associated H&H model applications related to wetland restoration; and is familiar with the application of integrated surface water and groundwater models, including the capability to review typical data output from hydrologic models through his (a) IEPR work on USACE's Modified Water Deliveries to Everglades National Park and Canal 111 South Dade Projects Combined Operational Plan in Palm Beach and Miami-Dade Counties, (b) IEPR work on USACE's Lake Okeechobee System Operating Manual (LOSOM), and (c) flood risk engineering work in USACE's Lake Okeechobee/Herbert Hoover Dam Breach/Dam-Break Analysis project. As a steering committee member in the Federal Emergency Management Agency's (FEMA) coastal surge flood studies along coastal Georgia and northeast Florida, east central Florida, and south Florida; and as IEPR hydraulic engineer reviewer in various central and south Florida studies, Dr. Kabiling is experienced in evaluating project effects in accordance with various assessments and guidance from FEMA, USACE, SFWMD, and other agencies. As the consulting flood engineer and IEPR reviewer in the three projects mentioned above, he has prior experience/knowledge in the application of hydrologic modeling tools including the LOOPS, RSMBN, RSMGL, DMSTA, and HEC-RAS.

As the consulting flood engineer in the Herbert Hoover Dam Breach Dam-Break Analysis project, he has knowledge in the application of risk analysis specific to design of high hazard impoundments and dam safety design criteria for high hazard impoundments. As part of the Jordan Creek Feasibility Study Report and Environmental Assessment, Springfield Greene County, MO peer review panel, Dr. Kabiling applied the USACE's evaluation of H&H modeling completed under SMART planning and principles in the review process.

In 2011, Dr. Kabiling was a water resources engineer, reviewed previous water supply studies and data, conducted field reconnaissance to inspect existing reservoir levees and dam structures, and evaluated different reservoir development schemes for the Wolf-Pennywash Creek Reservoir Water Supply Permitting Project, Osceola County, Florida. Dr. Kabiling is a member of the ASCE, Association of State Floodplain Managers, Association of State Dam Safety Officials, and International Association for Hydro-Environmental Engineering and Research.

Name	Bijay K. Panigrahi, Ph.D., P.E., P.G., D.WRE, BCEE, CUC
Role	Geotechnical Engineer
Affiliation	AMCON, Inc.

Dr. Bijay K. Panigrahi is a Principal Engineer and President of AMCON, Inc. (formerly BPC Group). Dr Panigrahi is a licensed Professional Geologist (P.G.) in Florida and North Carolina, Certified Underground Utility and Excavation Contractor (CUC) in Florida, Board Certified Environmental Engineer (BCEE), Diplomate, Water Resources Engineering (D.WRE), and a registered Professional Engineer (P.E.) in Florida, Virginia, and Michigan. He received his Ph.D. in Civil Engineering from Drexel University in 1985 and an M.S. in Civil Engineering and Geology from Oklahoma State University in 1981.

He has more than 35 years of experience in projects involving civil infrastructures including design, evaluation and management of diversified geotechnical and geohydrological projects involving site investigations, feasibility studies, seepage evaluations, foundation analyses, slope stability analyses, soil stabilization, and construction specifications. His geotechnical experience includes soil suitability studies, slope stability analyses, foundation and settlement analyses including bridge foundations, sinkhole evaluation and mitigation, construction dewatering, sheet pile design, slurry wall design, and pavement and drainage system design. He has designed a number of roadways and flow control structures that include bridges, culverts, weirs, pump stations, stormwater retention ponds, infiltration basin, gypsum stacks, seepage control measures, canals, and levees/dikes. He has used statistical and geostatistical analyses in numerous modeling projects as a tool for accuracy assessments and data verification and validation.

Dr. Panigrahi has assessed and designed several canal conveyance systems and water resources control structures such as levees/dikes, culverts, reservoirs, and treatment systems. He has completed civil engineering infrastructure projects (Comprehensive Everglades Restoration Plan (CERP) and non-CERP) in Florida involving modeling and design of hydraulic structures (reservoirs/impoundments, canals, culverts, and pump stations) and hydraulic measurements and rating analyses.

He has also completed wave run analyses and scour evaluation for extreme hurricane conditions on Big Sand Lake to assist in the design of the Westgate Lakes resort in Orlando, Florida, developed high-level hydrologic restoration plan for a 92 sq-mi Yuca Pens watershed for SFWMD, and completed simulation of natural systems (pre-1950 conditions) and future conditions (2050 land use) for the Southwest Florida Feasibility Study area (> 5000 sq mi) for the SFWMD/USACE.

Dr. Panigrahi has worked on numerous planning, design, permitting, and construction projects. Most notably, they include gravity bypass, earthen cofferdam, dewatering and shoring, traffic control, erosion

control, environmental protection for C-44 Reservoir/STA System Discharge Project, SFWMD; feasibility study (hydrologic and hydraulic modeling, environmental and permitting issues, seepage and stability analyses, and retrofit alternatives) for replacement and/or retrofit of the coastal gated spillway structure S-46, SFWMD; and engineering services for design and construction of an 840 ft long temporary outer wall system in the ocean with more than 25 ft tidal head differential consisting of steel sheet pile cofferdam, shoring, and dewatering/rewatering system for WRA Land/Water Interface, Kings Bay Navy Submarine Base, US Navy.

His projects also include designs, plans, and permits for earthen cofferdams, sheet pile and shoring systems, dewatering, traffic control, erosion control, environmental protection for STA1W Expansion #2 project, SFWMD; design of seepage canal and reservoir impact evaluation on the surrounding community for the Site 1 Impoundment (Frein Reich Preserve) BODR project, SFWMD; civil and geotechnical engineering services (scour analysis, bank stabilization, erosion control, sheet piling and bridge foundations) for the Riverside Acres S/D Arch Pipe Replacement project for Orange County; and design of an optimal ground water recovery system and impact evaluation of the recovery system on Cone Ranch wellfield and the surrounding wetlands for the Plant City Phosphate Complex, CFI Industries (1200 ft deep, 282 sq mi).

Dr. Panigrahi has served on the Florida Board of Professional Engineers (Gubernatorial Appointment) from 2008 to 2012, and has authored more than 50 technical manuals, monographs, and peer-reviewed papers.

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APPENDIX C

Final Charge for the SFWMD LOCAR FS IEPR

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Charge Questions and Guidance to the Panel Members for the Independent External Peer Review (IEPR) of the North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study

This is the final Charge to the Panel for the SFWMD LOCAR FS IEPR. This final Charge was submitted to USACE as part of the final Work Plan, originally submitted on July 6, 2023. The dates and page counts in this document have not been updated to match actual changes made throughout the project.

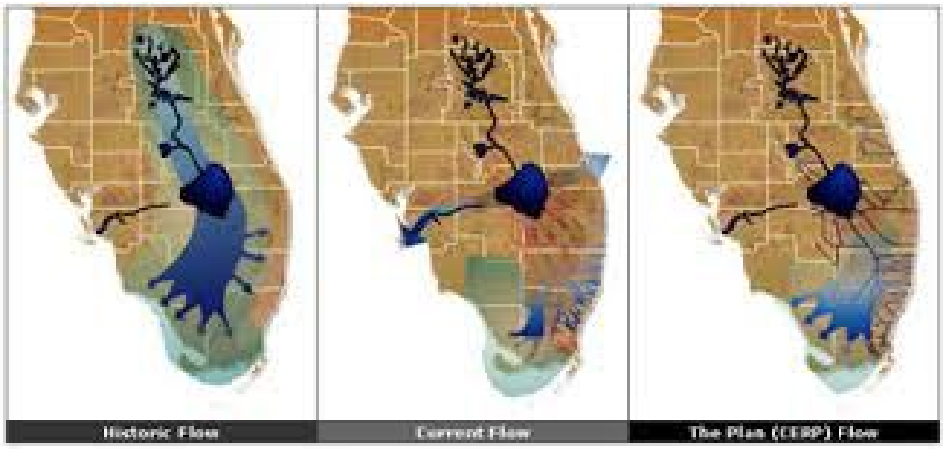
BACKGROUND

Overview of the Comprehensive Everglades Restoration Plan. The south Florida ecosystem includes the Everglades, which encompasses 18,000 square miles from Orlando to the Florida Reef Tract. Everglades National Park (the largest national park east of the Mississippi River, comprising a significant portion of the greater Everglades Ecosystem) is a World Heritage Site, an International Biosphere Preserve and a Wetland of International Importance. The Everglades and the south Florida ecosystem are affected by many factors such as competing demands for recreation, development, and natural and commercial resources and include 68 federally listed threatened and endangered plants and animals.

The Central and Southern Florida (C&SF) project, authorized by Congress in 1948 expanded the existing network of canals, levees, water storage areas and water control structures in south Florida. Project objectives include flood control, regional water supply, prevention of saltwater intrusion, water supply to Everglades National Park, preservation of fish and wildlife, recreation and navigation. While fulfilling these objectives, the project has had unintended adverse effects on the natural environment by disrupting the pre-existing hydrologic regime of the Everglades and south Florida ecosystem. As a result, in 1996, the U.S. Army Corps of Engineers (USACE) in conjunction with the South Florida Water Management District (SFWMD) was directed to develop a comprehensive plan to restore, preserve and protect the south Florida ecosystem while providing for other water-related needs of the region such as water quality and flood protection. The resulting plan was submitted to Congress on July 1, 1999 and consists of proposed structural and operational modifications to the C&SF project.

The recommended plan, identified as the Comprehensive Everglades Restoration Plan (CERP), was approved to provide a framework for the restoration of the natural system under Section 601 of the Water Resources Development Act of 2000. The plan, as documented in the Comprehensive Review Study (Yellow Book), consists of 68 different components that work together, to restore, preserve and protect the south Florida ecosystem while providing for other water related needs of the region. The CERP components will be implemented over an approximate 40-year period. Together, these components will benefit the ecological function of more than 2.4 million acres of the south Florida ecosystem by improving and/or restoring the proper quantity, quality, timing and distribution of water in the natural system while also addressing other concerns such as urban and agricultural water supply and maintaining existing levels of flood protection. The CERP intends to achieve more natural flows by re-directing current flows that go straight to tide, to a more restored flow of water that is distributed throughout the system similar to the pre-drainage conditions (Figure 1).

Figure 1. Pre-drainage, current and restored flows to illustrate CERP restoration



Since 2000, much progress has been made. Construction has begun on the first generation of CERP projects authorized by Congress. These include the Picayune Strand Restoration, Indian River Lagoon South, and C-44 Reservoir and Stormwater Treatment projects. Congressional authorization has been received for the second generation of CERP projects, including Biscayne Bay Coastal Wetlands-Phase 1, Caloosahatchee River (C-43) West Basin Storage Reservoir, and C-111 Spreader Canal Western Project, which are already under construction or are operational, and the Broward County Water Preserve Areas project, which is currently being designed. The Central Everglades Planning Project (CEPP) was authorized in 2016 and construction of the Everglades Agriculture Area Reservoir began in February 2023. All these CERP projects contribute significant ecological benefits to the system and specific regional habitats in which they are located. Although substantial progress has been made through the previously authorized projects, additional storage features north of Lake Okeechobee are needed to achieve CERP goals.

CERP Component A. The LOCAR, or Component A in the Yellow Book, is included in CERP, which was approved by Congress as a framework for the restoration of the natural system under Section 601 of WRDA 2000. CERP, as documented in the 1999 Restudy, consists of 68 components. The purpose of Component A is to detain water in a 200,000 acre-foot aboveground storage reservoir during wet periods for later use during dry periods to Lake Okeechobee. Increased storage capacity, north of Lake Okeechobee, would reduce the duration and frequency of both high and low water levels in Lake Okeechobee that are stressful to the lake's littoral ecosystems and cause large discharges from the lake that are damaging to the downstream estuary ecosystems.

The Integrated Delivery Schedule (IDS) provides an overall strategy for project planning, design, and construction of federal projects that are cost-shared with local sponsors as part of the South Florida Ecosystem Restoration Program. The IDS, required as part of the CERP Programmatic Regulations, is based on ecosystem needs, benefits, costs, and available funding. It helps restoration planners, stakeholders, and public focus on priorities, opportunities, and challenges, and provides a path forward to complete construction on previously authorized projects while outlining the next projects to undergo planning and design. The current project planning and anticipated benefits for LOCAR are consistent with the sequencing of projects in the IDS and included in the next generation of CERP project features to provide restoration benefits.

Section 203 Feasibility Study. South Florida Water Management District (SFWMD), as local sponsor to CERP, has prepared this LOCAR Feasibility Study and Environmental Impact Statement. The SFWMD initiated the LOCAR Feasibility Study in 2023 as the non-federal interest in response to Florida Governor's Executive Order 23-06. The goal of LOCAR is to construct Component A of CERP. Similar aboveground storage reservoirs are being constructed to the east, south, and west of Lake Okeechobee.

The SFWMD is preparing this Feasibility Study pursuant to Section 203 of the Water Resources Development Act (WRDA) of 1986, as amended, for submission to the Assistant Secretary of the Army for Civil Works (ASA[CW]). The Jacksonville District, U.S. Army Corps of Engineers (Corps) is the federal agency, acting on the District's behalf, and intends to prepare a National Environmental Policy Act (NEPA, Title 40 of the Code of Federal Regulations, Chapter V, Parts 1500 through 1508) Environmental Impact Statement to support the ASA(CW) review of the Feasibility Study. Section 203 authorizes non-federal interests to undertake feasibility studies of proposed water resources development projects for submission to the ASA(CW). Upon approval of the LOCAR Feasibility Study by the Governing Board of the SFWMD and the ASA(CW), the recommended plan will be submitted to Congress for authorization.

LOCAR expands upon previously authorized projects and ongoing studies to continue progress towards achievement of the level of restoration envisioned for CERP. LOCAR is focused on aboveground water storage north of Lake Okeechobee. Since the original CERP planning was completed in 1999, new studies, policy guidance, data collection, pilot projects, and improvements in hydrologic systems modeling capabilities allowed for refining the knowledge base and approach in ecosystem restoration. This refined approach is used to maximize project benefits and reduce costs and risks to achieve the CERP goals.

The project area covers a portion of the Lake Okeechobee Watershed in Florida including Glades and Highlands counties, along with the Seminole Tribe of Florida Brighton Reservation (Figure 2). The study area includes the project area in the Indian Prairie Basin, along with Lake Okeechobee and the Caloosahatchee and St. Lucie estuaries.

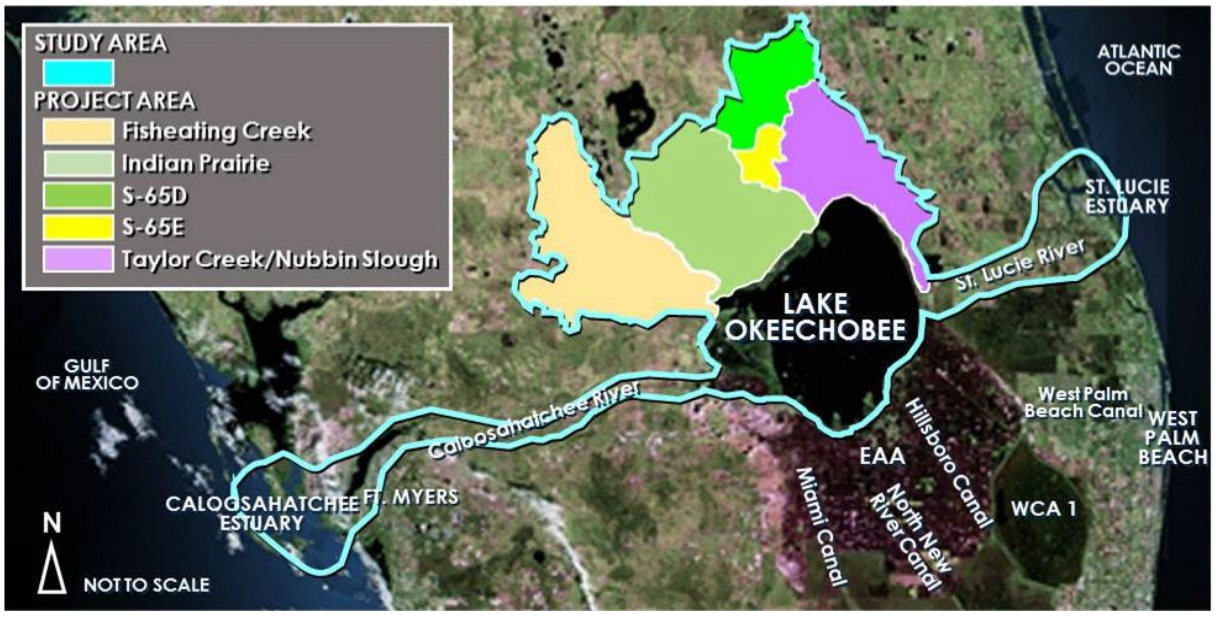


Figure 2. Project and study areas.

OBJECTIVES

The objective of this work is to conduct an independent external peer review (IEPR) of the North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study (hereinafter: LOCAR FS IEPR) in accordance with the Department of the Army, U.S. Army Corps of Engineers (USACE), Water Resources Policies and Authorities' *Review Policy for Civil Works* (Engineer Circular [EC] 1165-2-217, May 1, 2021), and the Office of Management and Budget's (OMB's) *Final Information Quality Bulletin for Peer Review* (December 16, 2004). Peer review is one of the important procedures used to ensure that the quality of published information meets the standards of the scientific and technical community. Peer review typically evaluates the clarity of hypotheses, validity of the research design, quality of data collection procedures, robustness of the methods employed, appropriateness of the methods for the hypotheses being tested, extent to which the conclusions follow from the analysis, and strengths and limitations of the overall product.

The purpose of the IEPR is to "assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, economic analyses, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, models used in evaluation of economic or environmental impacts, and any biological opinions" (EC 1165-2-217; p. 39) for the decision documents. The IEPR will be limited to technical review and will not involve policy review. The IEPR will be conducted by subject matter experts (i.e., IEPR panel members) who meet the technical criteria and areas of expertise required for and relevant to the project.

The Panel will be "charged" with responding to specific technical questions as well as providing a broad technical evaluation of the overall project. Per EC 1165-2-217 (p.41), review panels should identify, explain, and comment upon assumptions that underlie all the analyses, as well as evaluate the soundness of models, surveys, investigations, and methods. Review panels should be able to evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable. Reviews should focus on assumptions, data, methods, and models. The panel members may offer their opinions as to whether there are sufficient analyses upon which to base a recommendation.

DOCUMENTS PROVIDED

The following is a list of documents, supporting information, and reference materials that will be provided for the review. The review assignments for the panel members may vary slightly according to discipline.

Review Documents	No. of Review Pages	Subject Matter Experts			
		Civil Works Planner/ Economics	Environmental /Ecological Evaluation	Hydraulic Engineer	Geotechnical Engineering
Feasibility Study	300	300	300	300	300
Hydrology and Hydraulics Appendix	100			100	
Engineering Appendix	200			200	
Geotechnical Appendix	200				200
Cost Engineering Appendix	50				50
Real Estate Appendix	30	30			
Recreation Appendix	30	30	30		
Environmental, Cultural, and NEPA Appendix	300		300		
Plan Formulation Appendix	90	90	90	90	90
HTRW and Agricultural Chemicals Appendix	170		170		
Adaptive Management and Monitoring Appendix	190		190		
Environmental Benefits Model Appendix	140		140		
Invasive Species Management Plan Appendix	40		40		
Total Number of Review Pages	**1,840**	**450**	**1260**	**690**	**640**

Documents for Reference

- USACE, Water Resources Policies and Authorities' *Review Policy for Civil Works* (Engineer Circular [EC] 1165-2-217, May 1, 2021)
- Office of Management and Budget's Final Information Quality Bulletin for Peer Review (December 16, 2004)

SCHEDULE & DELIVERABLES

This schedule is based on the receipt date of the final review documents and may be revised if review document availability changes. This schedule may also change due to circumstances out of Battelle's control such as changes to SFWMD's project schedule and unforeseen changes to panel member and SFWMD availability. As part of each task, the panel member will prepare deliverables by the dates indicated in the table (or as directed by Battelle). All deliverables will be submitted in an electronic format compatible with Microsoft® Word (Office 2003).

Task	Action	Due Date
Meetings	Battelle sends review documents to panel members	7/21/2023
	Battelle convenes kick-off meeting with panel members	7/18/2023
	Battelle convenes kick-off meeting with SFWMD and panel members	7/21/2023
	Battelle convenes mid-review teleconference for panel members to ask clarifying questions of SFWMD	7/28/2023
Review	Panel members complete their individual reviews	8/1/2023
	Battelle provides talking points for Panel Review Teleconference to panel members	8/2/2023
	Battelle convenes Panel Review Teleconference	8/2/2023
	Battelle provides Final Panel Comment templates and instructions to panel members	8/2/2023
	Panel members provide draft Final Panel Comments to Battelle	8/4/2023
	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	8/05/2023 - 8/08/2023
	Panel finalizes Final Panel Comments	8/9/2023
Final Report	Battelle provides Final IEPR Report to panel members for review	8/11/2023
	Panel members provide comments on Final IEPR Report	8/14/2023
	*Battelle submits Final IEPR Report to SFWMD	8/15/2023
Comment Response Process	Battelle provides Final Panel Comment response template to SFWMD	8/17/2023
	Battelle convenes teleconference with Panel to review the Comment Response process	8/18/2023
	SFWMD provides draft PDT Evaluator Responses to Battelle	8/21/2023
	Battelle provides draft PDT Evaluator Responses to panel members	8/21/2023
	Panel members provide draft BackCheck Responses to Battelle	8/22/2023
	Battelle convenes teleconference with panel members to discuss draft BackCheck Responses	8/23/2023
	Battelle convenes Comment Response Teleconference with panel members and SFWMD	8/24/2023
	SFWMD provides final Evaluator Responses	8/25/2023
	Battelle provides final Evaluator Responses to panel members	8/28/2023
	Panel members provide final BackCheck Responses to Battelle	8/30/2023
	Battelle compiles the panel members' final BackCheck Responses	9/7/2023
	Battelle submits final PDF project file to SFWMD*	9/8/2023

Task	Action	Due Date
	Contract End/Delivery Date	12/29/2023

* Deliverables

CHARGE FOR PEER REVIEW

Members of this IEPR Panel are asked to determine whether the technical approach and scientific rationale presented in the decision documents are credible and whether the conclusions are valid. The Panel is asked to determine whether the technical work is adequate, competently performed, and properly documented; satisfies established quality requirements; and yields scientifically credible conclusions. The Panel is being asked to provide feedback on the economic, engineering, environmental resources, and plan formulation. The panel members are not being asked whether they would have conducted the work in a similar manner.

Specific questions for the Panel (by report section or appendix) are included in the general charge guidance, which is provided below.

General Charge Guidance

Please answer the scientific and technical questions listed below and conduct a broad overview of the decision documents. Please focus your review on the review materials assigned to your discipline/area of expertise and technical knowledge. Some sections have no questions associated with them; however, you may still comment on them. Please feel free to make any relevant and appropriate comment on any of the sections and appendices you were asked to review. In addition, please note that the Panel will be asked to provide an overall statement related to 2 and 3 below per USACE guidance (EC 1165-2-217).

1. Your response to the charge questions should not be limited to a “yes” or “no.” Please provide complete answers to fully explain your response.
2. Assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, and any biological opinions of the project study.
3. Assess the adequacy and acceptability of the economic analyses, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, and models used in evaluating economic or environmental impacts of the proposed project.
4. If appropriate, offer opinions as to whether there are sufficient analyses upon which to base a recommendation.
5. Identify, explain, and comment upon assumptions that underlie all the analyses, as well as evaluate the soundness of models, surveys, investigations, and methods.
6. Evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable.
7. Please focus the review on assumptions, data, methods, and models.

Please **do not** make recommendations on whether a particular alternative should be implemented, or whether you would have conducted the work in a similar manner. Also, please **do not** comment on or make recommendations on policy issues and decision making. Comments should be provided based on your professional judgment, **not** the legality of the document.

1. If desired, panel members can contact one another. However, panel members **should not** contact anyone who is or was involved in the project, or prepared the subject documents.
2. Please contact the Battelle Project Manager Lynn McLeod (mcleod@battelle.org) for requests or additional information.
3. In case of media contact, notify the Battelle Project Manager, Lynn McLeod (mcleod@battelle.org) immediately.
4. Your name will appear as one of the panel members in the peer review. Your comments will be included in the Final IEPR Report but will remain anonymous.

Please submit your comments in electronic form to the Project Manager, no later than 10 pm ET by the date listed in the schedule above.

Independent External Peer Review of the North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study

Charge Questions and Relevant Sections as Supplied by SFWMD

The following Review Charge to Reviewers outlines the objectives of the Independent External Peer Review (IEPR) for the subject study and identifies specific items for consideration for the IEPR Panel.

The objective of the IEPR is to obtain an independent evaluation of whether the interpretations of analysis and conclusions based on analysis are reasonable for the subject study. The IEPR Panel is requested to offer a broad evaluation of the overall study decision document in addition to addressing the specific technical and scientific questions included in the Review Charge. The Panel has the flexibility to bring important issues to the attention of decision makers, including positive feedback or issues outside those specific areas outlined in the Review Charge. The Panel can use all available information to determine what scientific and technical issues related to the decision document may be important to raise to decision makers.

The Panel review is to focus on scientific and technical matters, leaving policy determinations for the SFWMD, and subsequently to USACE and the Army, following submittal of the report to the Assistant Secretary of the Army (Civil Works) in accordance with section 203 of the Water Resources Development Act of 1986, as amended. The Panel should not make recommendations on whether a particular alternative should be implemented or present findings that become “directives” in that they call for modifications or additional studies or suggest new conclusions and recommendations. In such circumstances, the Panel would have assumed the role of advisors as well as reviewers, thus introducing bias and potential conflict in their ability to provide objective review.

Panel review comments are to be structured to fully communicate the Panel’s intent by including the comment, why it is important, any potential consequences of failure to address, and suggestions on how to address the comment.

The Panel is asked to consider the following items as part of its review of the decision document and supporting materials.

Broad Evaluation Review Charge Questions

1. Is the need for, and intent of, the decision document clear?
2. Does the decision document adequately address the stated need and intent relative to scientific and technical issues?
3. Assess the adequacy and acceptability of the project evaluation data used in the study analyses.
4. Assess the adequacy and acceptability of the economic, environmental, and engineering assumptions that underlie the study analyses.
5. Assess the adequacy and acceptability of the economic, environmental, and engineering methodologies, analyses, and projections.

6. Assess the adequacy and acceptability of the models used in the evaluation of existing and future without-project conditions and of economic or environmental impacts of alternatives.
7. Assess the adequacy and acceptability of the methods for integrating risk and uncertainty.
8. Assess the adequacy and acceptability of the formulation of alternative plans and the range of alternative plans considered.
9. Assess the adequacy and acceptability of the quality and quantity of the surveys, investigations, and engineering sufficient for conceptual design of alternative plans.
10. Assess the adequacy and acceptability of the overall assessment of significant environmental impacts and any biological analyses.
11. Evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable.
12. Assess the considered and tentatively selected alternatives from the perspective of systems, including systemic aspects being considered from a temporal perspective, including the potential effects of climate change.

Battelle Summary Charge Questions to the Panel Members[1]

Summary Questions

13. Please identify the most critical concerns (up to five) you have with the project and/or review documents. These concerns can be (but do not need to be) new ideas or issues that have not been raised previously.
14. Please provide positive feedback on the project and/or review documents.

[1] Questions 13 and 14 are Battelle-supplied questions and should not be construed or considered part of the list of USACE-supplied questions. These questions were delineated in a separate appendix in the final Work Plan submitted to USACE.

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BATTELLE

It can be done

Comment Response Record for the Independent External Peer Review (IEPR) of the North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study

Final Evaluator Responses and Final Panel BackCheck Responses

Prepared by
Battelle Memorial Institute
505 King Avenue
Columbus, Ohio 43201

Prepared for
South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33406

Purchase Order No. 4500142609

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Final Panel Comment 1

The FS is unclear whether the Recommended Plan is actionable given that the acreage needed for this project is owned by a single corporate landowner that has indicated they are not willing to sell.

Basis for Comment

The FS and Appendix E Plan Formulation Screening repeatedly state that SFWMD sought willing sellers for the purchase of the required acreage to implement the Recommended Plan. These statements can be found in FS Sections 4.1.2 Acceptability, 4.3.4 Other Social Effects Table 4-26, and Section 7.4 Compliance with Florida Statutes. In Appendix E Section E.4.2.7 Private Property, it states "The presence of privately owned land was not a reservoir siting constraint. However, public scoping response did highlight concerns about private property ownership. The SFWMD identified willing landowners for potential reservoir locations to minimize concerns" (page E-14).

However, Appendix D Real Estate Section D.22 Attitude of Landowners states

> As the single landowner of the acreage needed for this project, the corporate owner has indicated that they are not willing to sell this portion of their much larger contiguous land holdings at market value. Therefore, condemnation proceedings will likely be required to acquire the lands.

The statements throughout the FS and Appendix E contradict the statement within Appendix D and raise concerns as to whether the Recommended Plan is actionable as currently proposed.

Significance – Medium/High

A single landowner holding all of the acreage required for the project not being willing to sell is a major issue that has a strong probability of influencing the ability to implement the Recommended Plan.

Recommendations for Resolution

1. Please clarify throughout the FS and Appendices whether the Recommended Plan relies solely on property that will not be sold willingly by landowners.
2. Initiate legal condemnation proceedings to determine cost and schedule impacts to the project.

SFWMD Final Evaluator Response (FPC #1)

	Concur	**X**	**Non-Concur**

Explanation: The District considers this comment non-concur because the single owner has indicated they are willing to see the planning process through and is interested in exploring options that may result in the land acquisition being higher than market value. It is not that they are not a willing seller, we are in negotiations with them. It is possible that the landowner may be willing to sell at a significant premium over market value to avoid a lengthy legal process of condemnation by the non-federal sponsor. South Florida Water Management District policy as the non-federal sponsor is to wait until the project receives congressional authorization. Once the project has been authorized, we begin land

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acquisition proceedings. This policy is to reduce the risk the District would acquire land for a project that may not be realized if for some reason it is not congressionally authorized.				
Recommendation 1:	**X**	**Adopt**		**Not Adopt**
Explanation: Additional language has been added to Appendix D Real Estate Section D.22 Attitude of Landowners to clarify the position of the landowner and to more clearly articulate the SFWMD policy position of waiting for a project to be congressionally authorized prior to proceeding with land acquisition. Given the land ownership and location of the project, it is expected that the existing landowner would not be a willing seller at the appraised value because the project would bifurcate their property with a large reservoir. Therefore, an additional 30 percent incremental cost factor to resolve a condemnation proceeding for the acquisition cost of the real estate interest is added to the estimate of value for the Project lands.				
Recommendation 2:		**Adopt**	**X**	**Not Adopt**
Explanation: Upon receiving congressional authorization, we would begin with land acquisition. In the event the landowner remains an unwilling seller, SFWMD has condemnation authority that is outlined in Florida Statute that we would invoke and go down the condemnation route. As a SFWMD policy for CERP projects we typically wait until the project receives congressional authorization before proceeding with land acquisition to reduce the risk on expending funds on lands for a project that has not been federally authorized.				

Panel Final BackCheck Response (FPC #1)			
X	**Concur**		**Non-Concur**
Explanation: While the scenario where a single landowner owning the required acreage for the project might be open to selling at a substantial premium above market value, to circumvent the protracted legal process of condemnation by the non-federal sponsor, is a significant obstacle to implementing for the Recommended Plan, the Panel's charge does not include making recommendations on policy issues and decision making.			

Final Panel Comment 2

The effects of changes to the habitats at the proposed project and alternative sites were not included in calculating the alternative's contribution to the NER plan.

Basis for Comment

As stated in ER 1105-2-100, the USACE uses NER benefits to compare alternatives and select plans for ecosystem restoration projects. Using HUs to demonstrate the benefits of taking no action and the three alternatives, the FS provides a detailed description and justification for selecting the NER Plan. However, the effect of converting uplands to an aquatic environment at the sites of the proposed reservoir described in the alternatives should be a factor in selecting the NER Plan.

The conversion of 13,000 acres (Alternative 1), 20,500 acres of land (Alternative 2), or 14,900 acres (Alternative 3) from uplands to an aquatic environment represents a significant land use change. The importance of this change is due, in part, to the loss of habitat for federal- and state-listed species that will result from implementing any of the LOCAR alternatives. Neither the FS nor Appendix G addressed the effect of converting such a large area of uplands to an aquatic environment when selecting a NER Plan.

The impacts on the habitats at the proposed reservoir sites can be expressed in terms of HUs. The HUs lost or gained can be added to the values in the FS to provide a more complete picture of the net HUs created from each alternative.

Significance – Medium

The results of including the HUs gained/lost from constructing the reservoir could result in a different alternative being selected and/or determining that additional alternatives should be considered.

Recommendations for Resolution

1. Calculate the HUs lost/gained at the proposed project site for each alternative and update the FS, Annexes, and Appendices.

2. Reevaluate the alternatives to determine if Alternative 1 should remain the NER Plan.

Literature Cited

USACE (2000). Planning – Planning Guidance Notebook. Engineer Regulation (ER) 1105-2-100. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. April 22.

SFWMD Final Evaluator Response (FPC #2)

	Concur	**X**	**Non-Concur**

Explanation: The NER Plan requires consideration of the plan that meets planning objectives and constraints and maximizes environmental benefits while also being cost effective, and meeting the criteria for acceptability, completeness, efficiency, and effectiveness. The HUs are a metric to predict environmental benefits that are calculated based on the project performance measures and are used to compare alternatives, not determine the NER Plan. Overall, the alternatives performed similarly with

SFWMD Final Evaluator Response (FPC #2)				
comparable benefits and Habitat Units (See Table 4.7). However, Alternative 1 was the most cost effective due to a smaller footprint requiring less land acquisition and infrastructure. The selected alternative impacts the lowest number of acres in a mosaic of habitats in the region, therefore the lowest conversion of acres to aquatic habitat. Typically, when a wetland feature is under consideration, the upland conversation to an aquatic habitat is accounted for, but this is not the case for a reservoir or impoundment. For example, with UMAM you would include a risk factor and greater time lag. It is unlikely the HUs would change for the alternatives since they are based on performance measures and not acreages lost/gained.				
Recommendation 1:		**Adopt**	**X**	**Not Adopt**
Explanation: Habitat units are calculated based on the project performance measures and are not shown as a loss or anything less than zero. Zero represents a fully degraded ecosystem.				
Recommendation 2:		**Adopt**	**X**	**Not Adopt**
Explanation: The NER Plan is based on a selection criterion outlined in Table 4-26. All of the alternatives were compared, and no further analysis is recommended.				

Panel Final BackCheck Response (FPC #2)			
X	**Concur**		**Non-Concur**
Explanation: Additional information provided by the SFWMD resolves the panel's concerns.			

Final Panel Comment 3

Construction associated costs related to sheetpile dewatering and bridge construction are underestimated.

Basis for Comment

Appendix B presents the cost estimates for the Recommended Plan. As stated in Section B.1, the primary goal is to present a total project cost (i.e., construction and non-construction cost) for the Recommended Plan, in today's dollars, for project justification/authorization. Additionally, the total project cost summary sheet calculates a fully funded estimate (escalated for inflation through project completion) for budgeting purposes. The intent of these costing efforts is to produce a final product (i.e., cost estimate) that is reliable and accurate and that supports the definition of the government's and the non-federal sponsor's obligations based on the current design plan.

Appendix B.2.4 presents the contracting plan which breaks down the project into 8 separate construction contracts (Contract 1 through 8). Appendix B Attachment 1 – Quantity Take-offs includes quantity calculations currently developed for use in the estimate for all the contracts, sorted by proposed feature. These quantities include assumptions and sources of data used for the cost development (MCACES Summary Printout in Attachment 3 which includes all the unit costs). Under Structure PS-1: 1,500 CFS Diesel Electric Pump Station, the sheetpile dewatering assumes 20 ft deep for dewatering and 40 ft deep for the sheetpile. The number of dewatering pumps for the sheetpile dewatering is stated as TBD (interpreted as "to be determined"). The fuel unit cost used for off-road supply is $3.89/gal. Based on our recent experience with Orlando International Airport and Brightline Highspeed Rail construction projects in 2019-2020 and Patrick Space Force Base in 2023, the above cited fuel unit cost is underestimated. Item 01 09 01 01 01 on Page 3 of Attachment 3 indicates a dewatering duration of 500 days, which translates into using 4-6" pumps for dewatering pumping and a fuel burn rate of approximately 0.5 gal/hr/pump, which is an underestimation of fuel consumption and thus the estimated fuel cost. The pump and hose rental cost of $660/day may be fair but the estimate does not include any installation cost which is likely to be a significant factor. The above dewatering cost estimate is repeated for all other applicable Contracts. Therefore, the dewatering cost for the Recommended Plan is underestimated. This may be compounded with the long duration of the tentative project schedule spanning over 7 years (2024 to 2031).

In Appendix B Attachment 1 – Quantity Take-offs under Feature of Work: Bridges SFWMD has included what appears to be pages from a document titled Structures Design Guidelines Topic No. 625-020-018, Chapter 9 – BDR Cost Estimating from January 2023. This appears to be a Florida Department of Transportation document. Sections 9.3.1 through 9.3.5 within these pages present the unit cost for various types of bridges and slabs based on historical projects in the general geographical area. As listed in the tables in these sections, the letting dates of these projects vary from 1997 to 2012 with at least half of the projects' letting dates being more than 20 years old (1997 to 2002) and the other half having letting dates more than 10 years old (2007 to 2012). Even the cast-in-place flat slab projects in Section 9.3.5 had letting dates more than 10 years old. Currently, there is no explanation as to how this information was used or whether any sort of escalation due to inflation, etc. has been applied. Considering the age of these projects, the prepared estimated cost may be underestimated.

Significance – Medium

Final Panel Comment 3

Some of the assumptions in planning level cost estimates for the construction phase are based on old data and likely underestimate the actual needs of the project during construction.

Recommendation for Resolution

1. Adjust the fuel and operation cost upwards considering the extraneous conditions experienced in the recent past. Revisit the quantity takeoff for dewatering and quantify (to the best possible) more realistic dewatering cost.

2. Consider using unit costs from more recent projects and adjust for the extraneous conditions that were experienced in the recent past.

SFWMD Final Evaluator Response (FPC #3)

X	**Concur**		**Non-Concur**

Explanation: Appendix B will be updated between the Draft and Final FS Report to address cost of sheet pile wall, dewatering, and quantity take offs are being checked. Cost estimates were prepared using the most recent project information from ongoing large scale water resource and CERP projects in Florida.

Recommendation 1:	**X**	**Adopt**		**Not Adopt**

Explanation: The fuel and operations costs, sheet pile wall, dewatering, and quantity take offs will be re-checked. Annex B will be updated between draft and final FS report based on this check.

Recommendation 2:		**Adopt**	**X**	**Not Adopt**

Explanation: Re-affirming cost estimates were prepared using the most recent project information for CERP projects and other larger regional water resource projects in Florida.

Panel Final BackCheck Response (FPC #3)

X	**Concur**		**Non-Concur**

Final Panel Comment 4

Evidence that supports multiplying the PM score by the acreage of the entire lake was not provided.

Basis for Comment

Appendix G Benefit Model, Section G.3.2 describes the Lake Okeechobee HU calculation stating "3) Calculate HUs—multiply the combined PM score by 450,000 acres, as lake stage conditions are considered to impact the entire lake" (page G-9).

When discussing the benefits of LOCAR to Lake Okeechobee, the discussion focuses on lake stages and how that impacts the vegetation in the lake's littoral zone and the wildlife that use this area. Other CERP projects that impact the lake also focus on changes in vegetation along the shoreline and how this affects wildlife. It is the lake's stage that is the primary factor related to the ecological functioning of the lake.

Calculating the PM score is based on lake stage, and lake stage is of most concern in the littoral zone. This is the habitat that matters when calculating HUs for the lake. To understand if changes to lake level in the open water portion have an impact on the species found in this area, some data and analysis of the data are needed. Appendix G does not provide evidence to support how lake stages are considered to impact the entire lake when calculating HUs.

Significance – Medium

If justification for using the entire lake area when calculating HUs is not provided, the HUs generated for the alternatives will need to be revised and potentially would result in significantly different outcomes.

Recommendations for Resolution

1. Provide evidence that lake stage conditions are considered to impact the entire lake, thus supporting using the lake's entire acreage when calculating HUs.

   OR

2. Recalculate HUs for the lake based on using the acreage in the littoral zone.

SFWMD Final Evaluator Response (FPC #4)

Concur	**X**	**Non-Concur**

Explanation: Appendix G has been revised with additional citations and a paragraph clarifying how lake stages impact the entirety of the lake and not just the littoral zone. The most recent version of the performance metric graphics for Lake Okeechobee were used in the FS study for the benefits analysis which includes how lake stage conditions affect the entire lake. Pasted here is the new text:

While the littoral shelf occupies roughly only 100,000 acres, there is a transitional area between the center limnetic portion of the lake and the littoral shelf, which is often referred to as the "nearshore zone" (also approximately 100,000 acres). Water quality in either offshore region (nearshore or

SFWMD Final Evaluator Response (FPC #4)				
limnetic) can be affected by lake stage, either through changes in things like horizontal transport of nutrients and suspended material (Maceina 1993; Havens and Gawlik 2005) or through wind-induced resuspension or thermal stratification effects on sediment (Havens 1997, James and Havens 2005). In addition, fish distribution offshore can be profoundly affected by lake stage, as the 2006 FFWCC report showed a nearly 200 percent increase in biomass when lake stages dropped (FFWCC 2007), and important limnetic species of game fish like black crappie depend on littoral areas for reproduction. Because lake stage affects all portions of the lake, from the deepwater mud sediments to the highest elevation communities near the levee, SFWMD used the entire 450,000-acre footprint of the lake to calculate HUs.				
Recommendation 1:		**Adopt**	**X**	**Not Adopt**
Explanation: The revised performance metric was done in collaboration with the science group of CERP called RECOVER. The new revised PM considers various lake stage conditions and how this affects the entire lake ecology.				
Recommendation 2:		**Adopt**	**X**	**Not Adopt**
Explanation: The HU calculation was done correctly and is the same performance metric that will be and is used in other CERP projects.				

Panel Final BackCheck Response (FPC #4)			
X	**Concur**		**Non-Concur**
Explanation: The revision to Appendix G addresses the panel's concerns.			

Final Panel Comment 5

The FS, Annexes, and Appendices do not identify if there are any minority or low-income populations present in the study area.

Basis for Comment

By not defining if there are recognized minority or low-income populations, the EJ analysis is incomplete. The FS states, “As displayed in Figure 4-3 and listed in Table 4-20 through Table 4-24, communities with people of color and low-income populations are in the Study Area.” These tables provide information on the percentage of minority and low-income populations but never state if any Block Groups or Highlands County have minority or low-income populations based on the accepted definition of a minority or low-income population for an EJ analysis.

Two reports provide the best guidance on defining a minority and low-income population for an EJ analysis and how to determine if a minority or low-income population is present in a designated area. The 1997 Environmental Justice Guidance Under the National Environmental Policy Act (EJ Guidance, CEQ, 1997) report from the CEQ describes procedures for assessing if a minority or low-income population is present.

Guidance in the 1997 EJ report specifies that low-income populations are to be identified using the annual statistical poverty threshold from USCB Current Population Reports Series P-60 on Income and Poverty. Many agencies define a low-income population as twice the poverty rate using the poverty threshold. The FS does not articulate the difference between a low-income population and those living in poverty.

The 2016 report, Promising Practices for EJ Methodologies in NEPA Reviews (Promising Practices), prepared by the Federal Interagency Working Group on Environmental Justice & NEPA Committee (Working Group), recommends using multiple methods to determine if minority or low-income populations are present in the area being studied (Working Group, 2016). The report also provides specific guidance on how to conduct the analyses. Numerous federal agencies support using these reports when determining if minority or low-income populations are present in a project area.

Last, the text in Appendix C suggests that EPA’s tool, EJScreen, was used in the EJ analysis. However, no explanation or details are provided in the text that explains the EJScreen or how it was used to identify minority or low-income populations. The only mention of EJScreen is as a reference in Appendix C.

Significance – Medium

Analysis of EJ issues is a requirement of NEPA that must be met for every project. A lack of an EJ assessment can result in an incomplete report determination.

Recommendations for Resolution

1. Implement the analyses described in the Promising Practices report to identify if there are any minority or low-income populations present that would require an EJ analysis.

Final Panel Comment 5
2. To demonstrate that the proper methods were used to identify minority and low-income populations, include a discussion of EJScreen, how it was used in the EJ analysis, and the results of the EJScreen report.

Literature Cited

Council on Environmental Quality (CEQ). (1997). Environmental Justice. Guidance Under the National Environmental Policy Act. https://www.epa.gov/sites/default/files/2015-02/documents/ej_guidance_nepa_ceq1297.pdf

Federal Interagency Working Group on Environmental Justice & NEPA Committee. (Working Group). (2016). Promising Practices for EJ Methodologies in NEPA reviews. https://www.epa.gov/sites/default/files/2016-08/documents/nepa_promising_practices_document_2016.pdf

SFWMD Final Evaluator Response (FPC #5)				
X	**Concur**		**Non-Concur**	
Explanation: All EJ sections in the FS will be edited to explicitly state if there are recognized minority or low-income populations. The edits will state that we used accepted definitions of minority and low-income populations contained in CEQ's *Environmental Justice Guidance under the National Environmental Policy Act* document. Where appropriate, EJ sections will also be edited to describe EJ Screen, discuss how it was used, and to identify EJ Screen results.				
Recommendation 1:	**X**	**Adopt**		**Not Adopt**
Explanation: All EJ sections in the FS will be revised as described above.				
Recommendation 2:	**X**	**Adopt**		**Not Adopt**
Explanation: All EJ sections in the FS will be revised as described above.				

Panel Final BackCheck Response (FPC #5)			
X	**Concur**		**Non-Concur**
Explanation: Conducting the additional work addresses the panel's concerns.			

Final Panel Comment 6

The FS, Annexes, and Appendices do not provide a plan for remediating the LOCAR Feature (reservoir) soils to reduce HTRW from entering the water column once the reservoir is constructed.

Basis for Comment

Table 2-7 of the FS recognizes that “Lands potentially used for this Project are likely to have a past or present agricultural land use. Activities conducted over the past 100 years will likely have resulted in HTRWs being present on some of this land. State and federal databases include information on known HTRW contamination sites.” The FS project team confirmed that a Phase I Environmental Site Assessment has not been completed on any portion of the project site since 1999. The FS notes, "Phase I and II environmental site assessments will be used to identify unknown HTRW sites and test cultivated areas for the presence of residual agricultural chemicals.” While this is the appropriate step before the LOCAR Feature is constructed, the FS and related documents do not describe how the project site will be remediated or what alternative plans may exist if the preferred site is too contaminated to use.

If the LOCAR feature is constructed and the contaminants in the soil are not removed before construction, these chemicals could become suspended in the water, where they could become available for organisms in the reservoir and possibly accumulate in species occupying higher trophic levels of the food web.

Significance – Medium

High levels of HTRWs could accumulate in species targeted by recreational fishermen and women, resulting in adverse health issues for some people and causing the issuance of “do not consume” warnings. Also, some federally listed species could accumulate elevated levels of HTRWs from feeding on species living in the reservoir.

Recommendations for Resolution

1. Conduct studies to identify the levels of HTRWs in the soil at the proposed project site and their potential to become suspended in the reservoir’s water.
2. Determine the effort needed to remediate the soils to reduce HTRWs to a level that will not create potential health hazards for people or species.
3. Develop an alternative to the project site if it is unusable due to excessively high levels of HTRWs.

SFWMD Final Evaluator Response (FPC #6)			
X	**Concur**		**Non-Concur**
Explanation: The property will be assessed and remediated in accordance with the “Protocol for Assessment, Remediation and Post-Remediation Monitoring for Environmental Contaminants on Everglades Restoration Projects” (Protocol). Based on the historical environmental assessment completed and a desktop survey of the area, there are no reported contaminated sites or Formerly Used Defense Sites within ½ mile of the project. The level of HTRW is expected to be consistent with the historical agricultural use of the property and will be addressed using the Protocol.			
Recommendation 1:		**Adopt**	X **Not Adopt**
Explanation: A phase II assessment would need to be performed prior to the District committing to a sediment study. There may not be any environmental impacts.			
Recommendation 2:		**Adopt**	X **Not Adopt**
Explanation: A phase II assessment would provide baseline data for soils within the project footprint. The District cannot determine the effort to remediate soils since there may not be any environmental impacts. This would be determined at a later stage during the project.			
Recommendation 3:		**Adopt**	X **Not Adopt**
Explanation: On other comparable ecosystem restoration projects, the District mitigates or remediates environmental impacts prior to implementing construction activities.			

Panel Final BackCheck Response (FPC #6)			
X	**Concur**		**Non-Concur**
Explanation: The additional work proposed in the response will address the panel’s concerns.			

Final Panel Comment 7

Use of the 1965 to 2016 period of record in the RSMBN modeling potentially biased the results towards drier weather conditions than what is likely to occur in the LOCAR project life.

Basis for Comment

The SFWMD RSMBN used a 52-year period (1965 to 2016) of climatological inputs (rainfall and evapotranspiration) to simulate in a regional setting the inflows to, outflows from, and operations of the LOCAR reservoir. The FS states “the period of simulation (i.e., 1965 to 2016) used for the LOCAR hydrologic modeling encompasses a wide range of historical climatologic and meteorologic conditions that are representative of central and south Florida hydrology” (FS, Page 5-19). However, the period of record from 1965 to 2016 contains a hydrologically much drier first 30 years from 1965 to 1994, than the next 22 years from 1995 to 2016. This later period had more precipitation, more tropical storms, and many more high-runoff years into Lake Okeechobee. In addition, FS Appendix H Annex H states that Florida experienced generally wetter normal conditions since the early 1990s (page H-26).

As the period of record is biased towards drier weather conditions, it is possible that large Lake Okeechobee water conveyances to the LOCAR reservoir and releases to the St. Lucie and Caloosahatchee estuaries may have been underestimated and water shortage cutbacks may have been overestimated in the RSMBN modeling of the alternatives. The FS does not provide how the 58% dry and 42% wet characteristics of the period of record affected benefits and cost estimates for the Recommended Plan. Also, the FS does not provide how a more evenly distributed period of record between dry and wet years would have affected flood control and water supply benefits for the alternatives. It might be possible that a RSMBN modeling using a period of record that evenly has dry and wet years will provide larger flood control and water supply benefits than the period 1965 to 2016.

The modeled period of record likely does not represent the future and long-term dry and wet year conditions during the life of the LOCAR reservoir project.

Significance – Medium

Using a model biased towards drier years than have been experienced in the last 25 years or more is a potential risk of the Recommended Plan not meeting the stated benefits.

Recommendations for Resolution

1. Document in the FS the potential effects of wetter years than modeled using the period of record (1965 to 2016) on:
    a) Lake Okeechobee water conveyances to the LOCAR reservoir
    b) releases to the St. Lucie and Caloosahatchee estuaries
    c) water shortage cutbacks
    d) flood control.
2. State in the FS how benefits for the Recommended Plan would change if a more evenly distributed period of record between dry and wet years was used instead of the period 1965 to 2016.

SFWMD Final Evaluator Response (FPC #7)			
	Concur	**X**	**Non-Concur**
Explanation: The long-term period of climate data encompasses almost an equal number of “wet regime” years (~1965-1969 & ~1995 to 2016 representing 27 years) to “dry regime” years (~1970-1994 representing 25 years) as categorized by sea surface temperature indicators (e.g. Atlantic Multi-decadal Oscillation). Furthermore, the general regime does not preclude extreme conditions as indicated by the realized drought periods of 2001, 2007 & 2011 occurring within the “wetter regime”. The use of long-term climate scenario modeling in CERP is well-established (every CERP plan to date has used a similar long-term regional simulation approach) and the RSM application for this project is appropriate given that the model has been scientifically peer reviewed (twice) and certified as “approved for use” by the USACE for CERP decision making.			
Recommendation 1:		**Adopt**	**X** **Not Adopt**
Explanation: The report will not be modified based on the explanation provided above.			
Recommendation 2:		**Adopt**	**X** **Not Adopt**
Explanation: The report will not be modified based on the explanation provided above.			

Panel Final BackCheck Response (FPC #7)			
X	**Concur**		**Non-Concur**
Explanation: The SFWMD indicated that the period 1965 to 2016 has 27 wet and 25 dry regime years—an almost equal number of dry and wet years. Considering the drought periods of 2001, 2007, and 2011 in the wet year regime provides a more equal number of dry and wet years in the period 1965 to 2016.			

Final Panel Comment 8

The constructability of the Recommended Plan needs to be analyzed and addressed.

Basis for Comment

Appendices A.7 through A.9 present the geotechnical considerations for construction including preliminary design parameters for LOCAR construction and seepage and stability analyses of the Recommended Plan. Sections A.8.3.2, A.8.4.2, A.8.4.3, and A.9 appropriately use the final design conditions which are essential to the analysis. However, an analysis of the intermediate conditions reaching the construction of the final design is missing.

In other words, constructability or practicality of constructing the design structures for the project is not presented. The constructability of the Recommended Plan needs to be analyzed and addressed for each of the eight contracts documented in the LOCAR FS. It needs a detailed discussion on the safety factors during the intermediate stages of the construction phase for each contract. This will provide not only credibility of the project design but also critical information to the potential contractors to better control the construction cost and implementation strategy.

It is important to note that intermediate stages during construction often create greater stress conditions and generate unsafe situations than the final design. It is therefore important to analyze and address the constructability of the Recommended Plan as presented in the FS.

Significance – Medium

Understanding the stress conditions and unsafe situations that may occur during the intermediate stages of construction will determine if there are any unexpected risks to final project completion.

Recommendation for Resolution

1. List the critical stages of the construction phase for each contract (sub-project) and perform engineering analyses of each stage of each contract.
2. Document the analyses and associated results demonstrating the constructability of the project.
3. Provide the constructability analyses results to each potential contractor during the construction bid process.

SFWMD Final Evaluator Response (FPC #8)

	Concur	**X**	**Non-Concur**

Explanation: Based on experience with the construction of the C-43 Reservoir, the LOCAR Reservoir project has very similar soil materials, weather conditions, agricultural land setting and associated water control structures. Lessons learned from construction related issues from C-43 Reservoir were applied in the development of the LOCAR Recommended Plan and will be carried through the PED phase of the LOCAR project.

Recommendation 1:		**Adopt**	**X**	**Not Adopt**

SFWMD Final Evaluator Response (FPC #8)				
Explanation: Additional constructability analysis and details will be applied in the PED phase of the project.				
Recommendation 2:		**Adopt**	**X**	**Not Adopt**
Explanation: Additional constructability analysis and details will be applied in the PED phase of the project.				
Recommendation 3:		**Adopt**	**X**	**Not Adopt**
Explanation: Additional constructability analysis and details will be applied in the PED phase of the project.				

Panel Final BackCheck Response (FPC #8)			
X	**Concur**		**Non-Concur**
Explanation: The explanation to Non-Concur states that the constructability issues “will be carried through the PED phase of the LOCAR project.” This is an acceptable practice to perform the constructability analyses during engineering design phase (PED phase) prior to preparation of the bid document. Similar responses to all three recommendations.			

Final Panel Comment 9

The cumulative effects analysis for listed species impacted by the construction of the reservoir, as described in Annex A, is not sufficiently developed.

Basis for Comment

Annex A describes the “Harm Resulting from Habitat Loss” for each listed species that is or may be found within the area for the proposed reservoir. This section of the Annex lists large tracts of habitat loss for several species (e.g., 7,567 acres for the caracara, 7,534 acres for the Florida grasshopper sparrow, and 9,502 acres for the Eastern indigo snake).

The cumulative effects analysis concludes that the cumulative effects will result in populations of listed species being maintained in the future and, for some species, increasing their habitat. While this may be correct, the cumulative effects analysis does not provide sufficient quantitative details to support the conclusions. Details of the acres of habitat lost/gained for listed species from past and present projects and predictions of habitat gained/lost for future projects listed in Annex A should be available.

Summarizing these acreages in a table would provide a realistic estimate of the cumulative habitat changes for listed species that the proposed action and past, present, and future projects will impact. This additional analysis could reveal currently unknown impacts (positive and negative) on the acres of habitat for the listed species.

Significance – Medium/Low

Additional details are needed to increase confidence about the conclusion of the cumulative effects analysis.

Recommendations for Resolution

1. Collect, analyze, and summarize quantitative data about the habitat lost/gained from the past, present, and known future projects.

2. Add additional discussion describing the net result of the past, present, and known future projects on the long-term impact on the listed species and, if necessary, revise the conclusions.

SFWMD Final Evaluator Response (FPC #9)

	Concur	**X**	**Non-Concur**

Explanation: The draft BA was submitted to the USACE and USFWS and all comments incorporated. The final BA has been submitted to the USFWS with all their comments addressed which is the basis for the draft Coordination Act Report recently received. Section 8 of the Final BA (page 46) includes a detailed cumulative effects analysis. Any comments to the cumulative effects analysis from USACE or USFWS have been addressed. At the present time no additional language beyond what has already been written or revised is planned to be included. Additionally, Section 6.3.3 of the EIS includes a cumulative effects write-up and a Table summarizing the effects for multiple resources including vegetation, T&E species, and Fish/Wildlife.

SFWMD Final Evaluator Response (FPC #9)				
Recommendation 1:		**Adopt**	**X**	**Not Adopt**
Explanation: From the draft CAR received from the USFWS the cumulative effects analysis seems to be sufficient.				
Recommendation 2:		**Adopt**	**X**	**Not Adopt**
Explanation: From the draft CAR received from the USFWS the cumulative effects analysis seems to be sufficient.				

Panel Final BackCheck Response (FPC #9)			
X	**Concur**		**Non-Concur**
Explanation: The Draft Fish and Wildlife Coordination Act Report, provides information that resolves this concern.			

Final Panel Comment 10

It is unclear whether the Recommended Plan meets the project objective of "increasing the availability of the water supply to existing legal water users of Lake Okeechobee commensurate with improving Lake Okeechobee ecology."

Basis for Comment

The FS states one of the objectives of the LOCAR is to "increase the availability of the water supply to existing legal water users of Lake Okeechobee commensurate with improving Lake Okeechobee ecology" (FS, page 1-9). The FS Abstract states "The Recommended Plan creates additional water storage north of Lake Okeechobee to facilitate improved flexibility in the timing and distribution of water. Water can be drawn from Lake Okeechobee and stored during wet times to reduce damaging high lake stages and later be released back to the lake to reduce the impacts of low stages during dry times."

The water supply benefits come from LOCAR's contribution in keeping the Lake Okeechobee water levels within the ecologically preferred band. Thus, LOCAR provides the extra volume to store water when lake levels rise above water levels desirable for lake ecology. This stored water can be used for water supply, if needed.

However, throughout the FS, there are statements of Alternative 1 having negligible effects on water supply indicating that it only "maintains pre-Project levels of service" (FS Section 5.13.1, 5-19 and 5-20). This FS section also states "the effects from both increased volumes of water available and water shortages are influenced by the timing and routing of other projects. Therefore, the effects to water supply from Alternative 1 would be negligible."

The Recommended Plan is basically Alternative 1 with refinements for a reduced footprint to avoid environmentally sensitive uplands. However, based on the statement in Section 5.13.1, it appears that the Recommended Plan does not meet the objective of increasing the availability of the water supply to existing legal water users. The FS should be clarified as to whether the Recommended Plan meets the objective noted above or not.

Significance – Medium/Low

Whether the Recommended Plan meets all of the project objectives needs to be clear throughout the FS.

Recommendation for Resolution

1. Clarify in the FS if the Recommended Plan meets or does not meet the objective of increasing the availability of the water supply to existing legal water users.

2. If the Recommended Plan does not meet the objective of increasing the availability of the water supply to existing legal water users, please explain how the application of the period of record that is biased towards drier weather conditions contributed to the Recommended Plan not meeting its objective related to water supply.

SFWMD Final Evaluator Response (FPC #10)			
X	Concur		Non-Concur
Explanation: The project does meet the objective of increasing the availability of the water supply to existing legal water users. The FS will be updated to include more details about the modeling results related to water supply and the benefits observed from the project.			
Recommendation 1:	X	**Adopt**	**Not Adopt**
Explanation: The FS will be updated to include more details about the modeling results related to water supply and the benefits observed from the project.			
Recommendation 2:		**Adopt**	X **Not Adopt**
Explanation: The FS will include additional details clarifying the recommend plan meeting the objective of increasing the availability of water supply to existing legal users by being able to return water to the lake when lake levels are low and reducing the frequency the lake enters water supply cutbacks.			

Panel Final BackCheck Response (FPC #10)		
X	Concur	Non-Concur

Final Panel Comment 11

An evaluation of the performance of reservoir geometry, dam geometry, and reservoir water levels against risk and uncertainty from seiche has not been assessed.

Basis for Comment

Seiche—a standing wave or oscillating water level in an enclosed or partially enclosed water body—can occur at the LOCAR during changes in atmospheric pressures, wind setup, or earthquakes. The Panel notes that seiche from changes in atmospheric pressure is unlikely to occur because the LOCAR is not large enough to experience substantial changes in atmospheric pressure. Appendix H Annex A-1 presents extensive evaluation of wind setup and the dam design already accounts for wind-induced water overtopping. Seiche from wind setup will likely not oscillate higher than the highwater elevation estimated for wind setup. Thus, wind-induced seiche will likely not cause overtopping of the dam. However, a seiche can occur in the reservoir compartments during earthquakes if the earthquake frequency is near the natural frequency of the reservoir compartment.

The FS Appendix A (Engineering Appendix) Section A.7.5 (Seismicity) states that although southern Florida is a low seismicity region, the possibility exists for earthquake imposed seismic loads on Project structures. Section A.8.4.4 states that pseudo-static analyses that simulate earthquake activity will be performed in the future pre-construction engineering and design (PED) phase of the Project. Thus, although very rare, earthquakes can occur in the LOCAR project area and the PED acknowledges the possibility of earthquake occurrence. An earthquake with a frequency near the natural frequency of any of the two LOCAR compartments when LOCAR is at its Normal Full Storage Level (i.e., at a time when the freeboard before dam overtopping occurs is smallest) can cause seiche-induced oscillations of the LOCAR water surface.

Significance – Medium/Low

If seiche occurs when the LOCAR is at its Normal Full Storage Level, the water oscillations from a seiche can increase such that it can overtop the perimeter and/or internal dams. The dam overtopping can cause erosion and damage to the dam structure.

Recommendations for Resolution

1. Estimate the highwater in each LOCAR compartment due to seiche-induced water surface oscillations during an earthquake.

2. Evaluate if dam overtopping can occur from water surface oscillations from seiche. If so, evaluate if there is a need to design the perimeter and internal dams to protect these from possible erosion/damage from seiche-induced water overtopping.

SFWMD Final Evaluator Response (FPC #11)			
	Concur	**X**	**Non-Concur**
Explanation: Design Criteria Memorandum: DCM-6 Geotechnical Seismic Evaluation of CERP Dam Foundations (DCM-6) governs the seismic evaluation of high hazard CERP Dam foundations. Seiche due to earthquake activity is not likely to occur and was not identified in the U.S. Army Corps. of Engineers' Risk Assessment Probably Failure Mode Analysis for the LOCAR project. However, seiche analysis of the reservoir will be performed. The methodology and results of this analysis will be presented in Section A.5.6 (existing Section A.5.6 References will become A.5.7 References) of Appendix A of the LOCAR Feasibility Study Report to be published in early December 2023. Wind generated waves and oscillation are much more likely to occur in the reservoir; and are covered in detail in the wind/wave modeling sections of the LOCAR feasibility study report (Section A.5 and Annexes A-2.2 and A-2.3 of Appendix A).			
Recommendation 1:	**X**	**Adopt**	**Not Adopt**
Explanation: Seiche analysis will be performed as described above.			
Recommendation 2:	**X**	**Adopt**	**Not Adopt**
Explanation: Seiche analysis will be performed as described above.			

Panel Final BackCheck Response (FPC #11)			
X	**Concur**		**Non-Concur**
Explanation: The Panel concurs because the SFWMD has indicated in its response that it will perform the seiche analysis and will adopt the two recommendations. The Panel thinks these future actions by the SFWMD will evaluate the presently unknown risks due to seiche.			

Final Panel Comment 12

Documentation that the proposed 12-inch thick soil cement layer on the water side and crest of the dam embankment will withstand 10-foot wave heights was not provided.

Basis for Comment

In Appendix A of the FS, Section A.8.10.2 describes a 12-inch thick soil cement layer as an appropriate erosion protection for the embankments. The proposed option includes shrinkage and crack control mechanisms along with a drainage layer beneath the soil cement to remove water from behind the system.

The 12-inch thick soil cement may provide adequate protection against wave erosion on the water side and crest of the dam embankment. However, the Panel did not see an investigation of the wave erosion and erosion protection design in the FS or the associated appendices. The proposed design may be conceptually sound but needs supporting analyses for design verification and acceptability.

Significance – Medium/Low

Providing the details of the soil cement design allows understanding and confirmation of the adequacy of the design of the 12-inch thick soil cement against wave-induced erosion.

Recommendations for Resolution

1. Include the details of the soil cement design analyses to improve confidence in the conceptual design of the dam erosion protection.

2. Describe in the FS the maintenance of the soil cement to minimize cracking over time.

SFWMD Final Evaluator Response (FPC #12)

	Concur	**X**	**Non-Concur**

Explanation: The thickness of the proposed soil-cement revetment for the LOCAR perimeter and divider dams will be further refined in the PED phase of the project. A 12-inch thickness was selected based on previous experience concerning soil-cement revetment for similar reservoirs, using similar soil properties, wave height and storage level drawdown conditions.

Recommendation 1:		**Adopt**	**X**	**Not Adopt**

Explanation: Design of the perimeter and divider dams will be further refined in PED phase of the project.

Recommendation 2:		**Adopt**	**X**	**Not Adopt**

Explanation: The design is too preliminary at this phase and the maintenance will be described during the PED phase.

Panel Final BackCheck Response (FPC #12)			
X	**Concur**		**Non-Concur**
Explanation: The explanation to Non-Concur states that the design is too preliminary at this phase and that “The thickness of the proposed soil-cement revetment for the LOCAR perimeter and divider dams will be further refined in the PED phase of the project.” This is acceptable as long as they are addressed during engineering design phase (PED phase) prior to preparation of the bid document. Similar responses to all two recommendations.			

Final Panel Comment 13

No explanation of the application of IWR Planning Suite CE/ICA is provided in the study documents.

Basis for Comment

The Panel is not able to assess the adequacy and acceptability of the study analyses used to identify Best Buy alternatives or select the Recommended Plan. Appendix G LOCAR Benefit Model, Section G.3.3 Lake Okeechobee Alternative Performance, page G-16 states: "The AAHUs for Lake Okeechobee will be combined with the Northern Estuaries HUs for the storage cost effectiveness and incremental cost analysis (CE/ICA). The CE/ICA is evaluated in Section G.5.4." There is no Section G.5.4.

Section G.5 Summary of Alternative Performance, page G-28 presents Table G-13. Total Storage HUs for Each Storage Alternative and Table G-14. Cost-effectiveness and Incremental Cost Analysis Inputs along with Figure G-17. Annual average habitat units and Figure G-18. Annual average habitat units but no explanation of what they mean or how they are used to select the Recommended Plan is provided.

Significance – Medium/Low

This missing or incomplete technical information affects the understanding and completeness of the study documents, and there is uncertainty whether the missing information will affect the Recommended Plan.

Recommendation for Resolution

1. Include a narrative description of the CE/ICA analysis in Appendix G with references to support interpretation of the model output and selection of the Recommended Plan.

SFWMD Final Evaluator Response (FPC #13)			
X	**Concur**		**Non-Concur**
Explanation: Additional details will be added to the report to include a narrative description of CE/ICA Analysis in Appendix G.			
Recommendation 1:	X	**Adopt**	**Not Adopt**
Explanation: Report revisions will be made as described above.			

Panel Final BackCheck Response (FPC #13)			
X	**Concur**		**Non-Concur**

Final Panel Comment 14

It is unclear why the sensitivity analysis of a previous version of the Recommended Plan is being used to evaluate the effects of changing pool elevation and the top of embankment elevation rather than the current version.

Basis for Comment

Appendix A Section A.8.9 presents a sensitivity analysis for various scenarios of the design alternative but does not present a sensitivity analysis of the proposed Recommended Plan. The section states “A sensitivity analysis was performed on a previous version of the analyses to evaluate the effects of changing pool elevation and the top of embankment elevation” (Appendix A, page A.8-12).

Without information on how the previous version differs from the proposed version, it is not possible to determine if the sensitivity analysis that was conducted accurately represents the effects of changing pool elevations and top of embankment elevations for the proposed Recommended Plan. Information on how the previous version differs from the current version should be included along with an explanation of why the PDT believes the sensitivity analysis accurately represents the proposed version of the Recommended Plan.

Significance – Low

Clarifying the differences between the previous version and the proposed version of the Recommended Plan and documenting why the reported version accurately represents the current version allows for a complete understanding of why the previous version analysis was used.

Recommendation for Resolution

1. Provide a detailed discussion clarifying the difference between the two versions of the Recommended Plan (previous and current) and any explanations as to why the previous version accurately represents the current version.

SFWMD Final Evaluator Response (FPC #14)

X	**Concur**		**Non-Concur**

Explanation: In the upcoming Final LOCAR Feasibility Study Report (scheduled to be completed in early December 2023), the sensitivity analysis presented in Appendix A, Section A.8.9 will be updated to be consistent with the design of the Recommended Plan as presented in the Final LOCAR Feasibility Study report.

Recommendation 1:	**X**	**Adopt**		**Not Adopt**

Explanation: If warranted for clarification purposes, the description between the two analyses will be described in detail for the Final LOCAR FS.

Panel Final BackCheck Response (FPC #14)

X	**Concur**		**Non-Concur**

December 2023 IEPR

BATTELLE

January 10, 2024

Elizabeth Caneja
South Florida Water Management District
3301 Gun Club Road
MS 8410
West Palm Beach, FL 33406

Purchase Order No. 4500142609
SUBMITTAL OF DELIVERABLE: *Independent External Peer Review (IEPR) of the North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study: Revised Final Report*

Dear Ms. Caneja:

This letter accompanies the submission of the Revised Final Report for the Independent External Peer Review (IEPR) of the North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study. The final report has been updated to include information on the Supplemental Review that was conducted in December 2023/January 2024.

Battelle assures that this report is compliant with the requirements of ER 1165-2-217. Following this submission, Battelle will supply through a separate email a Word file in which the Project Team can develop Draft Evaluator Responses following the normal requirements of USACE DrChecks program along with guidance on the next steps.

Please contact me at 781-681-5510 if you have any technical questions regarding this submittal.

Sincerely,

Lynn A McLeod

Lynn A. McLeod, CEP, PMP
Project Manager

encl.

Revised Final Independent External Peer Review Report
North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study

Prepared by
Battelle Memorial Institute

Prepared for
South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33406

Purchase Order Nos. 4500142609/4500145833

January 10, 2024

BATTELLE
It can be done

Photo credit: Southwest Florida Water Management District

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Purchase Order Nos. 4500142609/4500145833

Revised Final Independent External Peer Review Report

North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study

Prepared by

Battelle
505 King Avenue
Columbus, Ohio 43201

for

South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33406

January 10, 2024

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Revised Final Independent External Peer Review Report
North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study

Executive Summary

Project Background and Purpose

The south Florida ecosystem includes the Everglades, which encompasses 18,000 square miles from Orlando to the Florida Reef Tract. Everglades National Park (the largest national park east of the Mississippi River, comprising a significant portion of the greater Everglades Ecosystem) is a World Heritage Site, an International Biosphere Preserve and a Wetland of International Importance. The Everglades and the south Florida ecosystem are affected by many factors such as competing demands for recreation, development, and natural and commercial resources and include 68 federally listed threatened and endangered plants and animals.

The Central and Southern Florida (C&SF) project, authorized by Congress in 1948, expanded the existing network of canals, levees, water storage areas and water control structures in south Florida. Project objectives include flood control, regional water supply, prevention of saltwater intrusion, water supply to Everglades National Park, preservation of fish and wildlife, recreation and navigation. While fulfilling these objectives, the project has had unintended adverse effects on the natural environment by disrupting the pre-existing hydrologic regime of the Everglades and south Florida ecosystem. As a result, in 1996, the U.S. Army Corps of Engineers (USACE), in conjunction with the South Florida Water Management District (SFWMD), was directed to develop a comprehensive plan to restore, preserve and protect the south Florida ecosystem while providing for other water-related needs of the region such as water quality and flood protection. The resulting plan was submitted to Congress on July 1, 1999, and consists of proposed structural and operational modifications to the C&SF project.

The recommended plan, identified as the Comprehensive Everglades Restoration Plan (CERP), was approved to provide a framework for the restoration of the natural system under Section 601 of the Water Resources Development Act of 2000. The plan, as documented in the Comprehensive Review Study (Yellow Book), consists of 68 different components that work together, to restore, preserve and protect the south Florida ecosystem while providing for other water-related needs of the region. The CERP components will be implemented over an approximate 40-year period. Together, these components will benefit the ecological function of more than 2.4 million acres of the south Florida ecosystem by improving and/or restoring the proper quantity, quality, timing and distribution of water in the natural system while also addressing other concerns such as urban and agricultural water supply and maintaining existing levels of flood protection. The CERP intends to achieve more natural flows by re-directing current flows that go straight to tide, to a more restored flow of water that is distributed throughout the system similar to the pre-drainage conditions.

Since 2000, much progress has been made. Construction has begun on the first generation of CERP projects authorized by Congress. These include the Picayune Strand Restoration, Indian River Lagoon South, and C-44 Reservoir and Stormwater Treatment Area projects. Congressional authorization has been received for the second generation of CERP projects, including Biscayne Bay Coastal Wetlands-Phase 1, Caloosahatchee River (C-43) West Basin Storage Reservoir, and C-111 Spreader Canal Western Project, which are already under construction or are operational, and the Broward County Water Preserve Areas project, which is currently being designed. The Central Everglades Planning Project (CEPP) was authorized in 2016 and construction of the Everglades Agriculture Area Reservoir began in February 2023. All of these CERP projects contribute significant ecological benefits to the system and specific regional habitats in which they are located. Although substantial progress has been made through the previously authorized projects, additional storage features north of Lake Okeechobee are needed to achieve CERP goals.

CERP Component A. The Lake Okeechobee Component A Reservoir (LOCAR) Feasibility Study (FS), or Component A in the Yellow Book, is included in CERP, which was approved by Congress as a framework for the restoration of the natural system under Section 601 of the Water Resources Development Act (WRDA) of 2000. CERP, as documented in the 1999 Restudy, consists of 68 components. The purpose of Component A is to detain water in a 200,000 acre-foot aboveground storage reservoir during wet periods for later use during dry periods to Lake Okeechobee. Increased storage capacity, north of Lake Okeechobee, would reduce the duration and frequency of both high and low water levels in Lake Okeechobee that are stressful to the lake's littoral ecosystems and cause large discharges from the lake that are damaging to the downstream estuary ecosystems.

The Integrated Delivery Schedule (IDS) provides an overall strategy for project planning, design, and construction of federal projects that are cost-shared with local sponsors as part of the South Florida Ecosystem Restoration Program. The IDS, required as part of the CERP Programmatic Regulations, is based on ecosystem needs, benefits, costs, and available funding. It helps restoration planners, stakeholders, and public focus on priorities, opportunities, and challenges, and provides a path forward to complete construction on previously authorized projects while outlining the next projects to undergo planning and design. The current project planning and anticipated benefits for LOCAR are consistent with the sequencing of projects in the IDS and included in the next generation of CERP project features to provide restoration benefits.

Section 203 Feasibility Study. SFWMD, as local sponsor to CERP, has prepared this LOCAR FS and Environmental Impact Statement (EIS). The SFWMD initiated the LOCAR FS in 2023 as the non-federal interest in response to Florida Governor's Executive Order 23-06. The goal of LOCAR is to construct Component A of CERP. Similar aboveground storage reservoirs are being constructed to the east, south, and west of Lake Okeechobee.

The SFWMD is preparing this FS pursuant to Section 203 of the WRDA of 1986, as amended, for submission to the Assistant Secretary of the Army for Civil Works (ASA[CW]). The Jacksonville District, USACE is the federal agency, acting on the SFWMD's behalf, and intends to prepare a National Environmental Policy Act (NEPA, Title 40 of the Code of Federal Regulations, Chapter V, Parts 1500 through 1508) EIS to support the ASA(CW) review of the FS. Section 203 authorizes non-federal interests to undertake FSs of proposed water resources development projects for submission to the ASA(CW). Upon approval of the SFWMD LOCAR FS by the Governing Board of the SFWMD and the ASA(CW), the recommended plan will be submitted to Congress for authorization.

LOCAR expands upon previously authorized projects and ongoing studies to continue progress towards achievement of the level of restoration envisioned for CERP. LOCAR is focused on aboveground water storage north of Lake Okeechobee. Since the original CERP planning was completed in 1999, new studies, policy guidance, data collection, pilot projects, and improvements in hydrologic systems modeling capabilities allowed for refining the knowledge base and approach in ecosystem restoration. This refined approach is used to maximize project benefits and reduce costs and risks to achieve the CERP goals.

The project area covers a portion of the Lake Okeechobee Watershed in Florida including Glades and Highlands Counties, along with the Seminole Tribe of Florida Brighton Reservation. The study area includes the project area in the Indian Prairie Basin, along with Lake Okeechobee and the Caloosahatchee and St. Lucie estuaries.

Independent External Peer Review Process

Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analysis. SFWMD is conducting an Independent External Peer Review (IEPR) of the North of Lake Okeechobee Storage Reservoir Section 203 Study LOCAR FS (hereinafter: SFWMD LOCAR FS IEPR) which is being prepared for the USACE under the authority granted by Section 203 of the WRDA of 1986 (P.L. 99-662). As a 501(c)(3) non-profit science and technology organization, Battelle is independent, free from conflicts of interest (COIs), and meets the requirements for an Outside Eligible Organization (OEO) described in USACE (2021). Battelle has experience in establishing and administering peer review panels for USACE and was engaged to coordinate this SFWMD LOCAR IEPR. The IEPR was conducted following USACE and Office of Management and Budget (OMB) guidance described in USACE (2021) and OMB (2004). This final report presents the Final Panel Comments of the IEPR Panel (the Panel). Details regarding the IEPR (including the process for selecting panel members, the panel members' biographical information and expertise, and the charge submitted to the Panel to guide its review) are presented in appendices.

Based on the technical content of the decision documents and the overall scope of the project, Battelle identified potential candidates for the Panel in the following key technical areas: Civil Works planning/ economics, environmental/ecological evaluation, hydraulic engineering, and geotechnical engineering. Battelle screened the candidates to identify those most closely meeting the selection criteria and evaluated them for COIs and availability. SFWMD was given the list of final candidates to independently confirm that they had no COIs, and Battelle made the final selection of the four-person Panel.

The Panel received electronic versions of the decision documents (2,244 pages in total), along with a charge that solicited comments on specific sections of the documents to be reviewed. Following guidance provided in USACE (2021) and OMB (2004), SFWMD provided the charge questions, which were included in the draft and final Work Plans.

The SFWMD Project Delivery Team (PDT) briefed the Panel and Battelle during a kick-off meeting held via teleconference at the start of the review to provide the Panel an opportunity to ask questions of SFWMD and clarify uncertainties. Other than Battelle-facilitated teleconferences, there was no direct communication between the Panel and SFWMD during the peer review process. The Panel produced individual comments in response to the charge questions.

IEPR panel members reviewed the decision documents individually and produced individual comments in response to the charge questions. The panel members then met via teleconference with Battelle to review

key technical comments and reach agreement on the Final Panel Comments to be provided to SFWMD. Each Final Panel Comment was documented using a four-part format consisting of (1) a comment statement; (2) the basis for the comment; (3) the significance of the comment (high, medium/high, medium, medium/low, or low); and (4) recommendations on how to resolve the comment.

During this review, 14 Final Panel Comments were identified and documented. Of these, one has been identified as medium/high significance, seven have medium significance, five have medium/low significance, and one has low significance.

After completion of the original review, design changes were made to the project that impacted portions of the engineering plan and associated cost assessment. At USACE's request, a supplemental review of the changes was conducted. Based on the information that was updated throughout the document, it was determined by Battelle and the panel members that only the hydraulic engineer and geotechnical engineer would need to review the changes. The two engineers reviewed the updated documents and determined that no additional Final Panel Comments were necessary.

Results of the Independent External Peer Review

The panel members agreed on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE, 2021) in the SFWMD LOCAR FS review documents. Table ES-1 lists the Final Panel Comment statements by level of significance. The full text of the Final Panel Comments is presented in Section 4.2 of this report. The following summarizes the Panel's findings.

Based on the Panel's review, the report is well-written, comprehensive, and presents well supported engineering and environmental analysis and plan formulation. The report provided a balanced assessment of the economic, engineering, and environmental issues of the overall project; however, the Panel identified several elements of the project where additional analysis is warranted and places where clarification of project findings, objectives, and assumptions need to be documented or revised.

Plan Formulation/Economics: While the plan formulation process generally followed normal procedures of identifying a variety of alternatives and assessing them against the project objectives, the Panel is concerned whether the Recommended Plan will actually be actionable. Throughout the FS and Appendix E, there are repeated statements that SFWMD sought willing sellers for the purchase of the required acreage to implement the Recommended Plan. However, Appendix D indicates that there is a single corporate landowner who has indicated that they are not willing to sell. Without the property to build the reservoir on, the Recommended Plan will not be actionable as currently proposed. Given the time and cost it takes to go through other actions such as legal condemnation, the Panel is concerned about the ability of this plan to move forward.

Although stated as being a part of Appendix G LOCAR Benefit Model, the cost effectiveness and incremental cost analysis (CE/ICA) was not provided in the document. Therefore, the Panel could not assess the CE/ICA for risk, uncertainty, or accuracy during this review.

Environmental: The positive and negative effects of implementing LOCAR on the natural resources in Lake Okeechobee were thoroughly detailed, well documented, and consistent with the analyses used in other CERP projects. The Panel noted that the conversion of uplands to aquatic environment in each of the Alternatives represents a significant land use change that has not been accounted for during selection

of the National Ecosystem Restoration (NER) Plan. The impacts on the habitats at the proposed reservoir sites should be expressed in terms of habitat units (HUs) lost or gained and should be added to the values in the FS to provide a more complete picture of the net HUs created from each alternative.

The Panel is also concerned about how the HUs are currently calculated. Appendix G states the combined performance measure (PM) score is multiplied "by 450,000 acres, as lake state conditions are considered to impact the entire lake" (page G-9). However, when discussing the benefits of LOCAR to Lake Okeechobee within the FS, the discussion focuses on lake stages and how that impacts the vegetation in the lake's littoral zone and the wildlife that use this area. What is unclear is if changes to lake levels really impact the entire lake, therefore supporting the use of the entire 450,000 acres in the calculation of HUs or whether only the littoral zone should be used in that calculation.

Two additional topics that the Panel believes need further discussion in the EIS are environmental justice (EJ) and planning for identification and cleanup of hazardous, toxic, and radioactive wastes (HTRW). Appendix C states the project does not adversely affect any minority or low-income population. However, the EJ analysis does not appear to be based on currently accepted methodology for determining if an EJ population is present. The Panel also noted that activities conducted over the past 100 years in this area will likely have resulted in HTRWs being present in at least some of this land. Based on regional limitations on fish consumption, if left in the soil there is a likelihood of these chemicals ending up bioaccumulating in species targeted by recreational fishermen as has been experienced in other local areas including Lake Okeechobee.

Engineering: The hydraulic analysis and modeling done for the preliminary conceptual design of the perimeter and interior dams used the latest science, guidance, and state-of-the-art models. The Panel also noted that the seepage and stability analysis modeling is comprehensive. However, there were several instances where the Panel was concerned that assumptions used in the analysis of alternatives could be incorrect and potentially will result in an underestimation of costs or an inability to meet the expected benefits.

The Panel is concerned that some of the construction costs are underestimated. For example, based on real world experiences over the past several years, the fuel costs are underestimated. In another instance, bridge construction costs from 10 to 20 years ago have been presented but it is unclear how they have been used or adjusted to reflect current market costs. If not properly escalated, these costs could be a lot lower than incurred.

When reviewing the Regional Simulation Model BASINS (RSMBN) modeling the Panel identified that approximately 58% of the data used were from dry years while the more recent wet conditions represented only 42% of the data. As the period of record is biased towards drier weather conditions, it is possible that large Lake Okeechobee water conveyances to the LOCAR reservoir and releases to the St. Lucie and Caloosahatchee estuaries may have been underestimated and water shortage cutbacks may have been overestimated in the RSMBN modeling of the alternatives.

The Panel also noted that additional analyses of the constructability of the Recommended Plan should be conducted that are focused on the intermediate stages during construction. These intermediate stages often create greater stress conditions than the final design and generate unsafe situations. Therefore, it is important to analyze and address the constructability of the Recommended Plan as presented in the FS.

Table ES-1. Overview of 14 Final Panel Comments Identified by the SFWMD LOCAR FS IEPR Panel

No.	Final Panel Comment
Significance – Medium/High	
1	The FS is unclear whether the Recommended Plan is actionable given that the acreage needed for this project is owned by a single corporate landowner who has indicated they are not willing to sell.
Significance – Medium	
2	The effects of changes to the habitats at the proposed project and alternative sites were not included in calculating the alternative's contribution to the NER plan.
3	Construction-associated costs related to sheetpile dewatering and bridge construction are underestimated.
4	Evidence that supports multiplying the PM score by the acreage of the entire lake was not provided.
5	The FS, Annexes, and Appendices do not identify if there are any minority or low-income populations present in the study area.
6	The FS, Annexes, and Appendices do not provide a plan for remediating the LOCAR Feature (reservoir) soils to reduce HTRW from entering the water column once the reservoir is constructed.
7	Use of the 1965 to 2016 period of record in the RSMBN modeling potentially biased the results towards drier weather conditions than what is likely to occur in the LOCAR project life.
8	The constructability of the Recommended Plan needs to be analyzed and addressed.
Significance – Medium/Low	
9	The cumulative effects analysis for listed species impacted by the construction of the reservoir, as described in Annex A, is not sufficiently developed.
10	It is unclear whether the Recommended Plan meets the project objective of “increasing the availability of the water supply to existing legal water users of Lake Okeechobee commensurate with improving Lake Okeechobee ecology.”

Table ES-1. Overview of 14 Final Panel Comments Identified by the SFWMD LOCAR FS IEPR Panel (continued)

No.	Final Panel Comment
11	An evaluation of the performance of reservoir geometry, dam geometry, and reservoir water levels against risk and uncertainty from seiche has not been assessed.
12	Documentation that the proposed 12-inch thick soil cement layer on the water side and crest of the dam embankment will withstand 10-foot wave heights was not provided.
13	No explanation of the application of USACE Institute for Water Resources (IWR) Planning Suite CE/ICA is provided in the study documents.
Significance – Low	
14	It is unclear why the sensitivity analysis of a previous version of the Recommended Plan is being used to evaluate the effects of changing pool elevation and the top of embankment elevation rather than the current version.

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LIST OF ACRONYMS

ASA(CW)	Assistant Secretary of the Army for Civil Works
ATR	Agency Technical Review
BDR	Bridge Development Report
C&SF	Central and Southern Florida
CE/ICA	Cost Effectiveness/Incremental Cost Analysis
CEPP	Central Everglades Planning Project
CEQ	Council on Environmental Quality
CERP	Comprehensive Everglades Restoration Plan
CFS	Cubic Feet Per Second
COI	Conflict of Interest
EA	Environmental Assessment
EFH	Essential Fish Habitat
EJ	Environmental Justice
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ER	Engineer Regulation
ERDC	Engineer Research and Development Center
FEMA	Federal Emergency Management Agency
FS	Feasibility Study
H&H	Hydrologic and Hydraulic
HTRW	Hazardous, Toxic, and Radioactive Wastes
HU	Habitat Unit
IDS	Integrated Delivery Schedule
IEPR	Independent External Peer Review
IWR	Institute for Water Resources
LOCAR	Lake Okeechobee Component A Reservoir
MCACES	Micro-Computer Aided Cost Estimating System
NEPA	National Environmental Policy Act
NER	National Ecosystem Restoration
O&M	Operation and Maintenance

OEO	Outside Eligible Organization
OMB	Office of Management and Budget
PED	Pre-Construction Engineering and Design
PDT	Project Delivery Team
PM	Performance Measure
RSMBN	Regional Simulation Model BASINS
SFWMD	South Florida Water Management District
TBD	To Be Determined
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
WRDA	Water Resources Development Act

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1. INTRODUCTION

The south Florida ecosystem includes the Everglades, which encompasses 18,000 square miles from Orlando to the Florida Reef Tract. Everglades National Park (the largest national park east of the Mississippi River, comprising a significant portion of the greater Everglades Ecosystem) is a World Heritage Site, an International Biosphere Preserve and a Wetland of International Importance. The Everglades and the south Florida ecosystem are affected by many factors such as competing demands for recreation, development, and natural and commercial resources and include 68 federally listed threatened and endangered plants and animals.

The Central and Southern Florida (C&SF) project, authorized by Congress in 1948, expanded the existing network of canals, levees, water storage areas and water control structures in south Florida. Project objectives include flood control, regional water supply, prevention of saltwater intrusion, water supply to Everglades National Park, preservation of fish and wildlife, recreation and navigation. While fulfilling these objectives, the project has had unintended adverse effects on the natural environment by disrupting the pre-existing hydrologic regime of the Everglades and south Florida ecosystem. As a result, in 1996, the U.S. Army Corps of Engineers (USACE), in conjunction with the South Florida Water Management District (SFWMD), was directed to develop a comprehensive plan to restore, preserve and protect the south Florida ecosystem while providing for other water-related needs of the region such as water quality and flood protection. The resulting plan was submitted to Congress on July 1, 1999, and consists of proposed structural and operational modifications to the C&SF project.

The recommended plan, identified as the Comprehensive Everglades Restoration Plan (CERP), was approved to provide a framework for the restoration of the natural system under Section 601 of the Water Resources Development Act of 2000. The plan, as documented in the Comprehensive Review Study (Yellow Book), consists of 68 different components that work together, to restore, preserve and protect the south Florida ecosystem while providing for other water-related needs of the region. The CERP components will be implemented over an approximate 40-year period. Together, these components will benefit the ecological function of more than 2.4 million acres of the south Florida ecosystem by improving and/or restoring the proper quantity, quality, timing and distribution of water in the natural system while also addressing other concerns such as urban and agricultural water supply and maintaining existing levels of flood protection. The CERP intends to achieve more natural flows by re-directing current flows that go straight to tide, to a more restored flow of water that is distributed throughout the system similar to the pre-drainage conditions.

Since 2000, much progress has been made. Construction has begun on the first generation of CERP projects authorized by Congress. These include the Picayune Strand Restoration, Indian River Lagoon South, and C-44 Reservoir and Stormwater Treatment Area projects. Congressional authorization has been received for the second generation of CERP projects, including Biscayne Bay Coastal Wetlands-Phase 1, Caloosahatchee River (C-43) West Basin Storage Reservoir, and C-111 Spreader Canal Western Project, which are already under construction or are operational, and the Broward County Water Preserve Areas project, which is currently being designed. The Central Everglades Planning Project (CEPP) was authorized in 2016 and construction of the Everglades Agriculture Area Reservoir began in February 2023. All of these CERP projects contribute significant ecological benefits to the system and specific regional habitats in which they are located. Although substantial progress has been made through the previously authorized projects, additional storage features north of Lake Okeechobee are needed to achieve CERP goals.

CERP Component A. The Lake Okeechobee Component A Reservoir Feasibility Study (LOCAR FS), or Component A in the Yellow Book, is included in CERP, which was approved by Congress as a framework for the restoration of the natural system under Section 601 of Water Resources Development Act (WRDA) of 2000. CERP, as documented in the 1999 Restudy, consists of 68 components. The purpose of Component A is to detain water in a 200,000 acre-foot aboveground storage reservoir during wet periods for later use during dry periods to Lake Okeechobee. Increased storage capacity, north of Lake Okeechobee, would reduce the duration and frequency of both high and low water levels in Lake Okeechobee that are stressful to the lake's littoral ecosystems and cause large discharges from the lake that are damaging to the downstream estuary ecosystems.

The Integrated Delivery Schedule (IDS) provides an overall strategy for project planning, design, and construction of federal projects that are cost-shared with local sponsors as part of the South Florida Ecosystem Restoration Program. The IDS, required as part of the CERP Programmatic Regulations, is based on ecosystem needs, benefits, costs, and available funding. It helps restoration planners, stakeholders, and public focus on priorities, opportunities, and challenges, and provides a path forward to complete construction on previously authorized projects while outlining the next projects to undergo planning and design. The current project planning and anticipated benefits for LOCAR are consistent with the sequencing of projects in the IDS and included in the next generation of CERP project features to provide restoration benefits.

Section 203 Feasibility Study. SFWMD, as local sponsor to CERP, has prepared this LOCAR FS and Environmental Impact Statement (EIS). The SFWMD initiated the LOCAR FS in 2023 as the non-federal interest in response to Florida Governor's Executive Order 23-06. The goal of LOCAR is to construct Component A of CERP. Similar aboveground storage reservoirs are being constructed to the east, south, and west of Lake Okeechobee.

The SFWMD is preparing this FS pursuant to Section 203 of the WRDA of 1986, as amended, for submission to the Assistant Secretary of the Army for Civil Works (ASA[CW]). The Jacksonville District, USACE is the federal agency, acting on the SFWMD's behalf, and intends to prepare a National Environmental Policy Act (NEPA, Title 40 of the Code of Federal Regulations, Chapter V, Parts 1500 through 1508) EIS to support the ASA(CW) review of the FS. Section 203 authorizes non-federal interests to undertake feasibility studies of proposed water resources development projects for submission to the ASA(CW). Upon approval of the SFWMD LOCAR FS by the Governing Board of the SFWMD and the ASA(CW), the recommended plan will be submitted to Congress for authorization.

LOCAR expands upon previously authorized projects and ongoing studies to continue progress towards achievement of the level of restoration envisioned for CERP. LOCAR is focused on aboveground water storage north of Lake Okeechobee. Since the original CERP planning was completed in 1999, new studies, policy guidance, data collection, pilot projects, and improvements in hydrologic systems modeling capabilities allowed for refining the knowledge base and approach in ecosystem restoration. This refined approach is used to maximize project benefits and reduce costs and risks to achieve the CERP goals.

The project area covers a portion of the Lake Okeechobee Watershed in Florida including Glades and Highlands Counties, along with the Seminole Tribe of Florida Brighton Reservation. The study area includes the project area in the Indian Prairie Basin, along with Lake Okeechobee and the Caloosahatchee and St. Lucie estuaries.

Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analysis. The objective of the work described here was to conduct an Independent External Peer Review (IEPR) of the North of Lake Okeechobee Storage Reservoir Section 203 Study LOCAR FS (hereinafter: SFWMD LOCAR FS IEPR) in accordance with procedures described in the Department of the Army, USACE, Engineer Regulation (ER) *Civil Works Review Policy* (ER 1165-2-217) (USACE, 2021) and the Office of Management and Budget (OMB), *Final Information Quality Bulletin for Peer Review* (OMB, 2004). Supplemental guidance on evaluation for conflicts of interest (COIs) was obtained from the *Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports* (The National Academies, 2003).

For this project, an initial IEPR was conducted on the publicly released draft version of the project documents and, at USACE's request, a supplemental review was conducted on changes made to the project documents after the release. The entire Panel reviewed the initial documents. The supplemental review was performed by the hydraulic engineer and the geotechnical engineer as the only portions that changed were related to the engineering of the impoundment area and cost changes associated with the change in construction.

This final report presents the Final Panel Comments of the IEPR Panel (the Panel) on the existing engineering, economic, environmental, and plan formulation analyses contained in the SFWMD LOCAR FS review documents (see Appendix A for a listing of the initial documents reviewed and the supplemental documents reviewed). Appendix A describes in detail how the IEPR was planned and conducted, including the schedule followed in executing the IEPR. Appendix B provides biographical information on the IEPR panel members and describes the method Battelle followed to select them. Appendix C presents the final charge to the IEPR panel members for their use during the review; the final charge was submitted to SFWMD in the final Work Plan according to the schedule listed in Table A-1.

2. PURPOSE OF THE IEPR

To ensure that documents USACE relies upon to make decisions are supported by the best scientific and technical information, USACE has implemented a peer review process that uses IEPR to complement the Agency Technical Review, as described in USACE (2021). This process is also required to be implemented to project documents prepared under authorization of Section 203 of the WRDA.

In general, the purpose of peer review is to strengthen the quality and credibility of the SFWMD-developed decision documents for water resource projects in support of the USACE Civil Works program. IEPR provides an independent assessment of the engineering, economic, environmental, and plan formulation analyses of a project study. In particular, IEPR addresses the technical soundness of the project study's assumptions, methods, analyses, and calculations and identifies the need for additional data or analyses to make a good decision regarding implementation of alternatives and recommendations.

In this case, the IEPR of the SFWMD LOCAR FS was conducted and managed using contract support from Battelle, which is an Outside Eligible Organization (OEO) (as defined by ER 1165-2-217). Battelle, a 501(c)(3) organization under the U.S. Internal Revenue Code, has experience conducting IEPRs for USACE, for state and local agencies, and for industrial clients. Prior to contracting for the SFWMD LOCAR IEPR, Battelle completed an internal organizational COI screening to ensure that Battelle was free from COIs before conducting the IEPR.

3. METHODS FOR CONDUCTING THE IEPR

The methods used to conduct the IEPR are briefly described in this section; a detailed description can be found in Appendix A. The original IEPR was completed in accordance with established due dates for milestones and deliverables as part of the final Work Plan; the due dates are based on the award/effective date and the receipt of review documents. The supplemental review was conducted based upon receipt of the updated review documents.

Battelle identified, screened, and selected four panel members to participate in the IEPR based on their expertise in the following disciplines: Civil Works planning/economics, environmental/ecological evaluation, hydraulic engineering, and geotechnical engineering. As noted above only the hydraulic engineer and geotechnical engineer participated in the supplemental document review. During the original IEPR, the Panel reviewed the SFWMD LOCAR FS documents and produced 14 Final Panel Comments in response to 12 charge questions provided by SFWMD for the review. This charge also included two overview questions added by Battelle, for a total of 14 questions. For the supplemental review, the two engineers used the same set of charge questions. No additional Final Panel Comments were identified during this review.

Battelle instructed the Panel to develop the Final Panel Comments using a standardized four-part structure:

1. Comment Statement (succinct summary statement of concern)
2. Basis for Comment (details regarding the concern)
3. Significance (high, medium/high, medium, medium/low, or low; in accordance with specific criteria for determining level of significance)
4. Recommendation(s) for Resolution (at least one implementable action that could be taken to address the Final Panel Comment).

Battelle reviewed all Final Panel Comments for accuracy, adherence to USACE regulations (ER 1165-2-217), and completeness prior to determining that they were final and suitable for inclusion in the Final IEPR Report. There was no direct communication between the Panel and SFWMD during the preparation of the Final Panel Comments. The Panel's findings are summarized in Section 4.1; the Final Panel Comments are presented in full in Section 4.2.

4. RESULTS OF THE IEPR

This section presents the results of the IEPR and the supplemental review. A summary of the Panel's findings and the full text of the Final Panel Comments are provided.

4.1 Summary of Final Panel Comments

The panel members agreed on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE, 2021) in the SFWMD LOCAR FS review documents. The following summarizes the Panel's findings.

Based on the Panel's review, the report is well-written, comprehensive, and presents well supported engineering and environmental analysis and plan formulation. The report provided a balanced assessment of the economic, engineering, and environmental issues of the overall project; however, the

Panel identified several elements of the project where additional analysis is warranted and places where clarification of project findings, objectives, and assumptions need to be documented or revised.

Plan Formulation/Economics: While the plan formulation process generally followed normal procedures of identifying a variety of alternatives and assessing them against the project objectives, the Panel is concerned whether the Recommended Plan will actually be actionable. Throughout the FS and Appendix E, there are repeated statements that SFWMD sought willing sellers for the purchase of the required acreage to implement the Recommended Plan. However, Appendix D indicates that there is a single corporate landowner who has indicated that they are not willing to sell. Without the property to build the reservoir on, the Recommended Plan will not be actionable as currently proposed. Given the time and cost it takes to go through other actions such as legal condemnation, the Panel is concerned about the ability of this plan to move forward.

Although stated as being a part of Appendix G LOCAR Benefit Model, the cost effectiveness and incremental cost analysis (CE/ICA) was not provided in the document. Therefore the Panel could not assess the CE/ICA for risk, uncertainty, or accuracy during this review.

Environmental: The positive and negative effects of implementing LOCAR on the natural resources in Lake Okeechobee were thoroughly detailed, well documented, and consistent with the analyses used in other CERP projects. The Panel noted that the conversion of uplands to aquatic environment in each of the Alternatives represents a significant land use change that has not been accounted for during selection of the National Ecosystem Restoration (NER) Plan. The impacts on the habitats at the proposed reservoir sites should be expressed in terms of habitat units (HUs) lost or gained and should be added to the values in the FS to provide a more complete picture of the net HUs created from each alternative.

The Panel is also concerned about how the HUs are currently calculated. Appendix G states the combined performance measure (PM) score is multiplied “by 450,000 acres, as lake state conditions are considered to impact the entire lake” (page G-9). However, when discussing the benefits of LOCAR to Lake Okeechobee within the FS, the discussion focuses on lake stages and how that impacts the vegetation in the lake’s littoral zone and the wildlife that use this area. What is unclear is if changes to lake levels really impact the entire lake therefore supporting the use of the entire 450,000 acres in the calculation of HUs or whether only the littoral zone should be used in that calculation.

Two additional topics that the Panel believes need further discussion in the EIS are environmental justice (EJ) and planning for identification and cleanup of hazardous, toxic, and radioactive wastes (HTRW). Appendix C states the project does not adversely affect any minority or low-income population. However, the EJ analysis does not appear to be based on currently accepted methodology for determining if an EJ population is present. The Panel also noted that activities conducted over the past 100 years in this area will likely have resulted in HTRWs being present in at least some of this land. Based on regional limitations on fish consumption, if left in the soil there is a likelihood of these chemicals ending up bioaccumulating in species targeted by recreational fishermen as has been experienced in other local areas including Lake Okeechobee.

Engineering: The hydraulic analysis and modeling done for the preliminary conceptual design of the perimeter and interior dams used the latest science, guidance, and state-of-the-art models. The Panel also noted that the seepage and stability analysis modeling is comprehensive. However, there were several instances where the Panel was concerned that assumptions used in the analysis of alternatives

could be incorrect and potentially will result in an underestimation of costs or an inability to meet the expected benefits.

The Panel is concerned that some of the construction costs are underestimated. For example, based on real world experiences over the past several years, the fuel costs are underestimated. In another instance, bridge construction costs from 10 to 20 years ago have been presented but it is unclear how they have been used or adjusted to reflect current market costs. If not properly escalated, these costs could be a lot lower than incurred.

When reviewing the Regional Simulation Model BASINS (RSMBN) modeling the Panel identified that approximately 58% of the data used were from dry years while the more recent wet conditions represented only 42% of the data. As the period of record is biased towards drier weather conditions, it is possible that large Lake Okeechobee water conveyances to the LOCAR reservoir and releases to the St. Lucie and Caloosahatchee estuaries may have been underestimated and water shortage cutbacks may have been overestimated in the RSMBN modeling of the alternatives.

The Panel also noted that additional analyses of the constructability of the Recommended Plan should be conducted that are focused on the intermediate stages during construction. These intermediate stages often create greater stress conditions than the final design and generate unsafe situations. Therefore, it is important to analyze and address the constructability of the Recommended Plan as presented in the FS.

4.2 Final Panel Comments

This section presents the full text of the Final Panel Comments prepared by the IEPR panel members.

Final Panel Comment 1

The FS is unclear whether the Recommended Plan is actionable given that the acreage needed for this project is owned by a single corporate landowner that has indicated they are not willing to sell.

Basis for Comment

The FS and Appendix E Plan Formulation Screening repeatedly state that SFWMD sought willing sellers for the purchase of the required acreage to implement the Recommended Plan. These statements can be found in FS Sections 4.1.2 Acceptability, 4.3.4 Other Social Effects Table 4-26, and Section 7.4 Compliance with Florida Statutes. In Appendix E Section E.4.2.7 Private Property, it states "The presence of privately owned land was not a reservoir siting constraint. However, public scoping response did highlight concerns about private property ownership. The SFWMD identified willing landowners for potential reservoir locations to minimize concerns" (page E-14).

However, Appendix D Real Estate Section D.22 Attitude of Landowners states

> As the single landowner of the acreage needed for this project, the corporate owner has indicated that they are not willing to sell this portion of their much larger contiguous land holdings at market value. Therefore, condemnation proceedings will likely be required to acquire the lands.

The statements throughout the FS and Appendix E contradict the statement within Appendix D and raise concerns as to whether the Recommended Plan is actionable as currently proposed.

Significance – Medium/High

A single landowner holding all of the acreage required for the project not being willing to sell is a major issue that has a strong probability of influencing the ability to implement the Recommended Plan.

Recommendations for Resolution

1. Please clarify throughout the FS and Appendices whether the Recommended Plan relies solely on property that will not be sold willingly by landowners.
2. Initiate legal condemnation proceedings to determine cost and schedule impacts to the project.

Final Panel Comment 2

The effects of changes to the habitats at the proposed project and alternative sites were not included in calculating the alternative's contribution to the NER plan.

Basis for Comment

As stated in ER 1105-2-100, the USACE uses NER benefits to compare alternatives and select plans for ecosystem restoration projects. Using HUs to demonstrate the benefits of taking no action and the three alternatives, the FS provides a detailed description and justification for selecting the NER Plan. However, the effect of converting uplands to an aquatic environment at the sites of the proposed reservoir described in the alternatives should be a factor in selecting the NER Plan.

The conversion of 13,000 acres (Alternative 1), 20,500 acres of land (Alternative 2), or 14,900 acres (Alternative 3) from uplands to an aquatic environment represents a significant land use change. The importance of this change is due, in part, to the loss of habitat for federal- and state-listed species that will result from implementing any of the LOCAR alternatives. Neither the FS nor Appendix G addressed the effect of converting such a large area of uplands to an aquatic environment when selecting a NER Plan.

The impacts on the habitats at the proposed reservoir sites can be expressed in terms of HUs. The HUs lost or gained can be added to the values in the FS to provide a more complete picture of the net HUs created from each alternative.

Significance – Medium

The results of including the HUs gained/lost from constructing the reservoir could result in a different alternative being selected and/or determining that additional alternatives should be considered.

Recommendations for Resolution

1. Calculate the HUs lost/gained at the proposed project site for each alternative and update the FS, Annexes, and Appendices.

2. Reevaluate the alternatives to determine if Alternative 1 should remain the NER Plan.

Literature Cited

USACE (2000). Planning – Planning Guidance Notebook. Engineer Regulation (ER) 1105-2-100. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. April 22.

Final Panel Comment 3

Construction associated costs related to sheetpile dewatering and bridge construction are underestimated.

Basis for Comment

Appendix B presents the cost estimates for the Recommended Plan. As stated in Section B.1, the primary goal is to present a total project cost (i.e., construction and non-construction cost) for the Recommended Plan, in today's dollars, for project justification/authorization. Additionally, the total project cost summary sheet calculates a fully funded estimate (escalated for inflation through project completion) for budgeting purposes. The intent of these costing efforts is to produce a final product (i.e., cost estimate) that is reliable and accurate and that supports the definition of the government's and the non-federal sponsor's obligations based on the current design plan.

Appendix B.2.4 presents the contracting plan which breaks down the project into 8 separate construction contracts (Contract 1 through 8). Appendix B Attachment 1 – Quantity Take-offs includes quantity calculations currently developed for use in the estimate for all the contracts, sorted by proposed feature. These quantities include assumptions and sources of data used for the cost development (MCACES Summary Printout in Attachment 3 which includes all the unit costs). Under Structure PS-1: 1,500 CFS Diesel Electric Pump Station, the sheetpile dewatering assumes 20 ft deep for dewatering and 40 ft deep for the sheetpile. The number of dewatering pumps for the sheetpile dewatering is stated as TBD (interpreted as "to be determined"). The fuel unit cost used for off-road supply is $3.89/gal. Based on our recent experience with Orlando International Airport and Brightline Highspeed Rail construction projects in 2019-2020 and Patrick Space Force Base in 2023, the above cited fuel unit cost is underestimated. Item 01 09 01 01 01 on Page 3 of Attachment 3 indicates a dewatering duration of 500 days, which translates into using 4-6" pumps for dewatering pumping and a fuel burn rate of approximately 0.5 gal/hr/pump, which is an underestimation of fuel consumption and thus the estimated fuel cost. The pump and hose rental cost of $660/day may be fair but the estimate does not include any installation cost which is likely to be a significant factor. The above dewatering cost estimate is repeated for all other applicable Contracts. Therefore, the dewatering cost for the Recommended Plan is underestimated. This may be compounded with the long duration of the tentative project schedule spanning over 7 years (2024 to 2031).

In Appendix B Attachment 1 – Quantity Take-offs under Feature of Work: Bridges SFWMD has included what appears to be pages from a document titled Structures Design Guidelines Topic No. 625-020-018, Chapter 9 – BDR Cost Estimating from January 2023. This appears to be a Florida Department of Transportation document. Sections 9.3.1 through 9.3.5 within these pages present the unit cost for various types of bridges and slabs based on historical projects in the general geographical area. As listed in the tables in these sections, the letting dates of these projects vary from 1997 to 2012 with at least half of the projects' letting dates being more than 20 years old (1997 to 2002) and the other half having letting dates more than 10 years old (2007 to 2012). Even the cast-in-place flat slab projects in Section 9.3.5 had letting dates more than 10 years old. Currently, there is no explanation as to how this information was used or whether any sort of escalation due to inflation, etc. has been applied. Considering the age of these projects, the prepared estimated cost may be underestimated.

Final Panel Comment 3

Significance – Medium

Some of the assumptions in planning level cost estimates for the construction phase are based on old data and likely underestimate the actual needs of the project during construction.

Recommendation for Resolution

1. Adjust the fuel and operation cost upwards considering the extraneous conditions experienced in the recent past. Revisit the quantity takeoff for dewatering and quantify (to the best possible) more realistic dewatering cost.

2. Consider using unit costs from more recent projects and adjust for the extraneous conditions that were experienced in the recent past.

Final Panel Comment 4

Evidence that supports multiplying the PM score by the acreage of the entire lake was not provided.

Basis for Comment

Appendix G Benefit Model, Section G.3.2 describes the Lake Okeechobee HU calculation stating "3) Calculate HUs—multiply the combined PM score by 450,000 acres, as lake stage conditions are considered to impact the entire lake" (page G-9).

When discussing the benefits of LOCAR to Lake Okeechobee, the discussion focuses on lake stages and how that impacts the vegetation in the lake's littoral zone and the wildlife that use this area. Other CERP projects that impact the lake also focus on changes in vegetation along the shoreline and how this affects wildlife. It is the lake's stage that is the primary factor related to the ecological functioning of the lake.

Calculating the PM score is based on lake stage, and lake stage is of most concern in the littoral zone. This is the habitat that matters when calculating HUs for the lake. To understand if changes to lake level in the open water portion have an impact on the species found in this area, some data and analysis of the data are needed. Appendix G does not provide evidence to support how lake stages are considered to impact the entire lake when calculating HUs.

Significance – Medium

If justification for using the entire lake area when calculating HUs is not provided, the HUs generated for the alternatives will need to be revised and potentially would result in significantly different outcomes.

Recommendations for Resolution

1. Provide evidence that lake stage conditions are considered to impact the entire lake, thus supporting using the lake's entire acreage when calculating HUs.

   OR

2. Recalculate HUs for the lake based on using the acreage in the littoral zone.

Final Panel Comment 5

The FS, Annexes, and Appendices do not identify if there are any minority or low-income populations present in the study area.

Basis for Comment

By not defining if there are recognized minority or low-income populations, the EJ analysis is incomplete. The FS states, “As displayed in Figure 4-3 and listed in Table 4-20 through Table 4-24, communities with people of color and low-income populations are in the Study Area.” These tables provide information on the percentage of minority and low-income populations but never state if any Block Groups or Highlands County have minority or low-income populations based on the accepted definition of a minority or low-income population for an EJ analysis.

Two reports provide the best guidance on defining a minority and low-income population for an EJ analysis and how to determine if a minority or low-income population is present in a designated area. The 1997 Environmental Justice Guidance Under the National Environmental Policy Act (EJ Guidance, CEQ, 1997) report from the CEQ describes procedures for assessing if a minority or low-income population is present.

Guidance in the 1997 EJ report specifies that low-income populations are to be identified using the annual statistical poverty threshold from USCB Current Population Reports Series P-60 on Income and Poverty. Many agencies define a low-income population as twice the poverty rate using the poverty threshold. The FS does not articulate the difference between a low-income population and those living in poverty.

The 2016 report, Promising Practices for EJ Methodologies in NEPA Reviews (Promising Practices), prepared by the Federal Interagency Working Group on Environmental Justice & NEPA Committee (Working Group), recommends using multiple methods to determine if minority or low-income populations are present in the area being studied (Working Group, 2016). The report also provides specific guidance on how to conduct the analyses. Numerous federal agencies support using these reports when determining if minority or low-income populations are present in a project area.

Last, the text in Appendix C suggests that EPA’s tool, EJScreen, was used in the EJ analysis. However, no explanation or details are provided in the text that explains the EJScreen or how it was used to identify minority or low-income populations. The only mention of EJScreen is as a reference in Appendix C.

Significance – Medium

Analysis of EJ issues is a requirement of NEPA that must be met for every project. A lack of an EJ assessment can result in an incomplete report determination.

Recommendations for Resolution

1. Implement the analyses described in the Promising Practices report to identify if there are any minority or low-income populations present that would require an EJ analysis.

Final Panel Comment 5

2. To demonstrate that the proper methods were used to identify minority and low-income populations, include a discussion of EJScreen, how it was used in the EJ analysis, and the results of the EJScreen report.

Literature Cited

Council on Environmental Quality (CEQ). (1997). Environmental Justice. Guidance Under the National Environmental Policy Act. https://www.epa.gov/sites/default/files/2015-02/documents/ej_guidance_nepa_ceq1297.pdf

Federal Interagency Working Group on Environmental Justice & NEPA Committee. (Working Group). (2016). Promising Practices for EJ Methodologies in NEPA reviews. https://www.epa.gov/sites/default/files/2016-08/documents/nepa_promising_practices_document_2016.pdf

Final Panel Comment 6

The FS, Annexes, and Appendices do not provide a plan for remediating the LOCAR Feature (reservoir) soils to reduce HTRW from entering the water column once the reservoir is constructed.

Basis for Comment

Table 2-7 of the FS recognizes that “Lands potentially used for this Project are likely to have a past or present agricultural land use. Activities conducted over the past 100 years will likely have resulted in HTRWs being present on some of this land. State and federal databases include information on known HTRW contamination sites.” The FS project team confirmed that a Phase I Environmental Site Assessment has not been completed on any portion of the project site since 1999. The FS notes, "Phase I and II environmental site assessments will be used to identify unknown HTRW sites and test cultivated areas for the presence of residual agricultural chemicals.” While this is the appropriate step before the LOCAR Feature is constructed, the FS and related documents do not describe how the project site will be remediated or what alternative plans may exist if the preferred site is too contaminated to use.

If the LOCAR feature is constructed and the contaminants in the soil are not removed before construction, these chemicals could become suspended in the water, where they could become available for organisms in the reservoir and possibly accumulate in species occupying higher trophic levels of the food web.

Significance – Medium

High levels of HTRWs could accumulate in species targeted by recreational fishermen and women, resulting in adverse health issues for some people and causing the issuance of “do not consume” warnings. Also, some federally listed species could accumulate elevated levels of HTRWs from feeding on species living in the reservoir.

Recommendations for Resolution

1. Conduct studies to identify the levels of HTRWs in the soil at the proposed project site and their potential to become suspended in the reservoir’s water.
2. Determine the effort needed to remediate the soils to reduce HTRWs to a level that will not create potential health hazards for people or species.
3. Develop an alternative to the project site if it is unusable due to excessively high levels of HTRWs.

Final Panel Comment 7

Use of the 1965 to 2016 period of record in the RSMBN modeling potentially biased the results towards drier weather conditions than what is likely to occur in the LOCAR project life.

Basis for Comment

The SFWMD RSMBN used a 52-year period (1965 to 2016) of climatological inputs (rainfall and evapotranspiration) to simulate in a regional setting the inflows to, outflows from, and operations of the LOCAR reservoir. The FS states "the period of simulation (i.e., 1965 to 2016) used for the LOCAR hydrologic modeling encompasses a wide range of historical climatologic and meteorologic conditions that are representative of central and south Florida hydrology" (FS, Page 5-19). However, the period of record from 1965 to 2016 contains a hydrologically much drier first 30 years from 1965 to 1994, than the next 22 years from 1995 to 2016. This later period had more precipitation, more tropical storms, and many more high-runoff years into Lake Okeechobee. In addition, FS Appendix H Annex H states that Florida experienced generally wetter normal conditions since the early 1990s (page H-26).

As the period of record is biased towards drier weather conditions, it is possible that large Lake Okeechobee water conveyances to the LOCAR reservoir and releases to the St. Lucie and Caloosahatchee estuaries may have been underestimated and water shortage cutbacks may have been overestimated in the RSMBN modeling of the alternatives. The FS does not provide how the 58% dry and 42% wet characteristics of the period of record affected benefits and cost estimates for the Recommended Plan. Also, the FS does not provide how a more evenly distributed period of record between dry and wet years would have affected flood control and water supply benefits for the alternatives. It might be possible that a RSMBN modeling using a period of record that evenly has dry and wet years will provide larger flood control and water supply benefits than the period 1965 to 2016.

The modeled period of record likely does not represent the future and long-term dry and wet year conditions during the life of the LOCAR reservoir project.

Significance – Medium

Using a model biased towards drier years than have been experienced in the last 25 years or more is a potential risk of the Recommended Plan not meeting the stated benefits.

Recommendations for Resolution

1. Document in the FS the potential effects of wetter years than modeled using the period of record (1965 to 2016) on:
    a) Lake Okeechobee water conveyances to the LOCAR reservoir
    b) releases to the St. Lucie and Caloosahatchee estuaries
    c) water shortage cutbacks
    d) flood control.

Final Panel Comment 7

2. State in the FS how benefits for the Recommended Plan would change if a more evenly distributed period of record between dry and wet years was used instead of the period 1965 to 2016.

Final Panel Comment 8

The constructability of the Recommended Plan needs to be analyzed and addressed.

Basis for Comment

Appendices A.7 through A.9 present the geotechnical considerations for construction including preliminary design parameters for LOCAR construction and seepage and stability analyses of the Recommended Plan. Sections A.8.3.2, A.8.4.2, A.8.4.3, and A.9 appropriately use the final design conditions which are essential to the analysis. However, an analysis of the intermediate conditions reaching the construction of the final design is missing.

In other words, constructability or practicality of constructing the design structures for the project is not presented. The constructability of the Recommended Plan needs to be analyzed and addressed for each of the eight contracts documented in the LOCAR FS. It needs a detailed discussion on the safety factors during the intermediate stages of the construction phase for each contract. This will provide not only credibility of the project design but also critical information to the potential contractors to better control the construction cost and implementation strategy.

It is important to note that intermediate stages during construction often create greater stress conditions and generate unsafe situations than the final design. It is therefore important to analyze and address the constructability of the Recommended Plan as presented in the FS.

Significance – Medium

Understanding the stress conditions and unsafe situations that may occur during the intermediate stages of construction will determine if there are any unexpected risks to final project completion.

Recommendation for Resolution

1. List the critical stages of the construction phase for each contract (sub-project) and perform engineering analyses of each stage of each contract.
2. Document the analyses and associated results demonstrating the constructability of the project.
3. Provide the constructability analyses results to each potential contractor during the construction bid process.

Final Panel Comment 9

The cumulative effects analysis for listed species impacted by the construction of the reservoir, as described in Annex A, is not sufficiently developed.

Basis for Comment

Annex A describes the "Harm Resulting from Habitat Loss" for each listed species that is or may be found within the area for the proposed reservoir. This section of the Annex lists large tracts of habitat loss for several species (e.g., 7,567 acres for the caracara, 7,534 acres for the Florida grasshopper sparrow, and 9,502 acres for the Eastern indigo snake).

The cumulative effects analysis concludes that the cumulative effects will result in populations of listed species being maintained in the future and, for some species, increasing their habitat. While this may be correct, the cumulative effects analysis does not provide sufficient quantitative details to support the conclusions. Details of the acres of habitat lost/gained for listed species from past and present projects and predictions of habitat gained/lost for future projects listed in Annex A should be available.

Summarizing these acreages in a table would provide a realistic estimate of the cumulative habitat changes for listed species that the proposed action and past, present, and future projects will impact. This additional analysis could reveal currently unknown impacts (positive and negative) on the acres of habitat for the listed species.

Significance – Medium/Low

Additional details are needed to increase confidence about the conclusion of the cumulative effects analysis.

Recommendations for Resolution

1. Collect, analyze, and summarize quantitative data about the habitat lost/gained from the past, present, and known future projects.
2. Add additional discussion describing the net result of the past, present, and known future projects on the long-term impact on the listed species and, if necessary, revise the conclusions.

Final Panel Comment 10

It is unclear whether the Recommended Plan meets the project objective of "increasing the availability of the water supply to existing legal water users of Lake Okeechobee commensurate with improving Lake Okeechobee ecology."

Basis for Comment

The FS states one of the objectives of the LOCAR is to "increase the availability of the water supply to existing legal water users of Lake Okeechobee commensurate with improving Lake Okeechobee ecology" (FS, page 1-9). The FS Abstract states "The Recommended Plan creates additional water storage north of Lake Okeechobee to facilitate improved flexibility in the timing and distribution of water. Water can be drawn from Lake Okeechobee and stored during wet times to reduce damaging high lake stages and later be released back to the lake to reduce the impacts of low stages during dry times."

The water supply benefits come from LOCAR's contribution in keeping the Lake Okeechobee water levels within the ecologically preferred band. Thus, LOCAR provides the extra volume to store water when lake levels rise above water levels desirable for lake ecology. This stored water can be used for water supply, if needed.

However, throughout the FS, there are statements of Alternative 1 having negligible effects on water supply indicating that it only "maintains pre-Project levels of service" (FS Section 5.13.1, 5-19 and 5-20). This FS section also states "the effects from both increased volumes of water available and water shortages are influenced by the timing and routing of other projects. Therefore, the effects to water supply from Alternative 1 would be negligible."

The Recommended Plan is basically Alternative 1 with refinements for a reduced footprint to avoid environmentally sensitive uplands. However, based on the statement in Section 5.13.1, it appears that the Recommended Plan does not meet the objective of increasing the availability of the water supply to existing legal water users. The FS should be clarified as to whether the Recommended Plan meets the objective noted above or not.

Significance – Medium/Low

Whether the Recommended Plan meets all of the project objectives needs to be clear throughout the FS.

Recommendation for Resolution

1. Clarify in the FS if the Recommended Plan meets or does not meet the objective of increasing the availability of the water supply to existing legal water users.

2. If the Recommended Plan does not meet the objective of increasing the availability of the water supply to existing legal water users, please explain how the application of the period of record that is biased towards drier weather conditions contributed to the Recommended Plan not meeting its objective related to water supply.

Final Panel Comment 11

An evaluation of the performance of reservoir geometry, dam geometry, and reservoir water levels against risk and uncertainty from seiche has not been assessed.

Basis for Comment

Seiche—a standing wave or oscillating water level in an enclosed or partially enclosed water body—can occur at the LOCAR during changes in atmospheric pressures, wind setup, or earthquakes. The Panel notes that seiche from changes in atmospheric pressure is unlikely to occur because the LOCAR is not large enough to experience substantial changes in atmospheric pressure. Appendix H Annex A-1 presents extensive evaluation of wind setup and the dam design already accounts for wind-induced water overtopping. Seiche from wind setup will likely not oscillate higher than the highwater elevation estimated for wind setup. Thus, wind-induced seiche will likely not cause overtopping of the dam. However, a seiche can occur in the reservoir compartments during earthquakes if the earthquake frequency is near the natural frequency of the reservoir compartment.

The FS Appendix A (Engineering Appendix) Section A.7.5 (Seismicity) states that although southern Florida is a low seismicity region, the possibility exists for earthquake imposed seismic loads on Project structures. Section A.8.4.4 states that pseudo-static analyses that simulate earthquake activity will be performed in the future pre-construction engineering and design (PED) phase of the Project. Thus, although very rare, earthquakes can occur in the LOCAR project area and the PED acknowledges the possibility of earthquake occurrence. An earthquake with a frequency near the natural frequency of any of the two LOCAR compartments when LOCAR is at its Normal Full Storage Level (i.e., at a time when the freeboard before dam overtopping occurs is smallest) can cause seiche-induced oscillations of the LOCAR water surface.

Significance – Medium/Low

If seiche occurs when the LOCAR is at its Normal Full Storage Level, the water oscillations from a seiche can increase such that it can overtop the perimeter and/or internal dams. The dam overtopping can cause erosion and damage to the dam structure.

Recommendations for Resolution

1. Estimate the highwater in each LOCAR compartment due to seiche-induced water surface oscillations during an earthquake.

2. Evaluate if dam overtopping can occur from water surface oscillations from seiche. If so, evaluate if there is a need to design the perimeter and internal dams to protect these from possible erosion/damage from seiche-induced water overtopping.

Final Panel Comment 12

Documentation that the proposed 12-inch thick soil cement layer on the water side and crest of the dam embankment will withstand 10-foot wave heights was not provided.

Basis for Comment

In Appendix A of the FS, Section A.8.10.2 describes a 12-inch thick soil cement layer as an appropriate erosion protection for the embankments. The proposed option includes shrinkage and crack control mechanisms along with a drainage layer beneath the soil cement to remove water from behind the system.

The 12-inch thick soil cement may provide adequate protection against wave erosion on the water side and crest of the dam embankment. However, the Panel did not see an investigation of the wave erosion and erosion protection design in the FS or the associated appendices. The proposed design may be conceptually sound but needs supporting analyses for design verification and acceptability.

Significance – Medium/Low

Providing the details of the soil cement design allows understanding and confirmation of the adequacy of the design of the 12-inch thick soil cement against wave-induced erosion.

Recommendations for Resolution

1. Include the details of the soil cement design analyses to improve confidence in the conceptual design of the dam erosion protection.

2. Describe in the FS the maintenance of the soil cement to minimize cracking over time.

Final Panel Comment 13

No explanation of the application of IWR Planning Suite CE/ICA is provided in the study documents.

Basis for Comment

The Panel is not able to assess the adequacy and acceptability of the study analyses used to identify Best Buy alternatives or select the Recommended Plan. Appendix G LOCAR Benefit Model, Section G.3.3 Lake Okeechobee Alternative Performance, page G-16 states: "The AAHUs for Lake Okeechobee will be combined with the Northern Estuaries HUs for the storage cost effectiveness and incremental cost analysis (CE/ICA). The CE/ICA is evaluated in Section G.5.4." There is no Section G.5.4.

Section G.5 Summary of Alternative Performance, page G-28 presents Table G-13. Total Storage HUs for Each Storage Alternative and Table G-14. Cost-effectiveness and Incremental Cost Analysis Inputs along with Figure G-17. Annual average habitat units and Figure G-18. Annual average habitat units but no explanation of what they mean or how they are used to select the Recommended Plan is provided.

Significance – Medium/Low

This missing or incomplete technical information affects the understanding and completeness of the study documents, and there is uncertainty whether the missing information will affect the Recommended Plan.

Recommendation for Resolution

1. Include a narrative description of the CE/ICA analysis in Appendix G with references to support interpretation of the model output and selection of the Recommended Plan.

Final Panel Comment 14

It is unclear why the sensitivity analysis of a previous version of the Recommended Plan is being used to evaluate the effects of changing pool elevation and the top of embankment elevation rather than the current version.

Basis for Comment

Appendix A Section A.8.9 presents a sensitivity analysis for various scenarios of the design alternative but does not present a sensitivity analysis of the proposed Recommended Plan. The section states “A sensitivity analysis was performed on a previous version of the analyses to evaluate the effects of changing pool elevation and the top of embankment elevation” (Appendix A, page A.8-12).

Without information on how the previous version differs from the proposed version, it is not possible to determine if the sensitivity analysis that was conducted accurately represents the effects of changing pool elevations and top of embankment elevations for the proposed Recommended Plan. Information on how the previous version differs from the current version should be included along with an explanation of why the PDT believes the sensitivity analysis accurately represents the proposed version of the Recommended Plan.

Significance – Low

Clarifying the differences between the previous version and the proposed version of the Recommended Plan and documenting why the reported version accurately represents the current version allows for a complete understanding of why the previous version analysis was used.

Recommendation for Resolution

1. Provide a detailed discussion clarifying the difference between the two versions of the Recommended Plan (previous and current) and any explanations as to why the previous version accurately represents the current version.

5. REFERENCES

Council on Environmental Quality (CEQ). (1997). Environmental Justice. Guidance Under the National Environmental Policy Act. https://www.epa.gov/sites/default/files/2015-02/documents/ej_guidance_nepa_ceq1297.pdf

Federal Interagency Working Group on Environmental Justice & NEPA Committee. (Working Group). (2016). Promising Practices for EJ Methodologies in NEPA reviews. https://www.epa.gov/sites/default/files/2016-08/documents/nepa_promising_practices_document_2016.pdf

OMB (2004). Final Information Quality Bulletin for Peer Review. Executive Office of the President, Office of Management and Budget, Washington, D.C. Memorandum M-05-03. December 16.

The National Academies (2003). Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports. The National Academies (National Academy of Science, National Academy of Engineering, Institute of Medicine, National Research Council). May 12.

USACE (2000). Planning – Planning Guidance Notebook. Engineer Regulation (ER) 1105-2-100. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. April 22.

USACE (2021). Water Resources Policies and Authorities: Civil Works Review Policy. Engineer Regulation (ER) 1165-2-217. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. May 1.

APPENDIX A

IEPR Process for the SFWMD LOCAR FS Project

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A.1 Planning and Conduct of the Independent External Peer Review (IEPR)

Table A-1 presents the major milestones and deliverables of the Independent External Peer Review (IEPR) of the North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study (hereinafter: SFWMD LOCAR FS IEPR). Due dates for milestones and deliverables are based on the award/effective dates listed in Table A-1 and A-2. The review documents for the initial review were provided by South Florida Water Management District (SFWMD) on August 18 and 21, 2023. The review documents for the supplemental review were provided by SFWMD on December 11, 13, and 19, 2023. Battelle submitted a revised final report to SFWMD on January 10, 2024. At that time all activities for this IEPR were completed. The Final Project File submitted to SFWMD on September 27, 2023, containing the Final Panel Comments and their final disposition, remains an accurate representation of the final deliverable on this IEPR.

Table A-1. Major Milestones and Deliverables of the original SFWMD LOCAR FS IEPR

Task	Milestones and Deliverables	Completion Date
1	Award/Effective Date	6/14/2023
	Review documents available	8/21/2023
	Battelle submits draft Work Plan[a]	6/22/2023
	SFWMD provides comments on draft Work Plan	6/23/2023
	Battelle submits final Work Plan[a]	7/6/2023
2	Battelle requests input from SFWMD on the conflict of interest (COI) questionnaire	6/19/2023
	SFWMD provides comments on COI questionnaire	6/19/2023
	Battelle submits list of selected panel members[a]	6/28/2023
	SFWMD confirms the panel members have no COI	6/29/2023
	Battelle completes subcontracts for panel members	7/17/2023
3	Battelle convenes kick-off meeting with SFWMD	6/20/2023
	Battelle sends review documents to panel members	8/21/2023
	Battelle convenes kick-off meeting with panel members	8/17/2023
	Battelle convenes kick-off meeting with SFWMD and panel members	8/18/2023
	Battelle convenes mid-review teleconference for panel members to ask clarifying questions of SFWMD	8/28/2023
4	Panel members complete their review of the documents	8/30/2023
	Battelle provides talking points to panel members for Panel Review Teleconference	8/31/2023
	Battelle convenes Panel Review Teleconference	8/31/2023
	Battelle provides Final Panel Comment templates and instructions to panel members	8/31/2023
	Panel members provide draft Final Panel Comments to Battelle	9/5/2023

Table A-1. Major Milestones and Deliverables of the initial SFWMD LOCAR FS IEPR (continued)

Task	Milestones and Deliverables	Completion Date
4	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	9/06/2023 - 9/07/2023
	Panel finalizes Final Panel Comments	9/8/2023
5	Battelle provides Final IEPR Report to panel members for review	9/8/2023
	Panel members provide comments on Final IEPR Report	9/12/2023
	Battelle submits Final IEPR Report to SFWMD[a]	9/13/2023
6	Battelle provides Final Panel Comment response template to SFWMD	9/13/2023
	Battelle convenes teleconference with SFWMD to review Comment Response process	9/14/2023
	Battelle convenes teleconference with Panel to review Comment Response process	9/14/2023
	SFWMD provides draft PDT Evaluator Responses to Battelle	9/20/2023
	Battelle provides draft Evaluator Responses to panel members	9/20/2023
	Panel members provide draft BackCheck Responses to Battelle	9/21/2023
	Battelle convenes teleconference with panel members to discuss draft BackCheck Responses	9/22/2023
	Battelle convenes Comment Response Teleconference with panel members and SFWMD	9/25/2023
	SFWMD provides final Evaluator Responses	9/26/2023
	Battelle provides final Evaluator Responses to panel members	9/26/2023
	Panel members provide final BackCheck Responses to Battelle	9/27/2023
	Battelle compiles the panel members' final BackCheck Responses	9/27/2023
	Battelle submits final PDF project file to SFWMD[a]	9/27/2023
	Contract End/Delivery Date	12/29/2023

[a] *Deliverable.*

Table A-1. Major Milestones and Deliverables of the supplemental SFWMD LOCAR FS IEPR

Task	Milestones and Deliverables	Completion Date
1	Award/Effective Date	12/5/2023
	Review documents available	12/11/2023 12/13/2023 12/19/2023
2	Battelle completes subcontracts for panel members	12/11/2023
3	Battelle sends review documents to panel members	12/11/2023 12/13/2023 12/19/2023
	Battelle convenes kick-off meeting with SFWMD and panel members	12/11/2023

Table A-1. Major Milestones and Deliverables of the supplemental SFWMD LOCAR FS IEPR (continued)

Task	Milestones and Deliverables	Completion Date
4	Panel members complete their review of the documents	1/8/2024
	Panel members provide draft Final Panel Comments to Battelle	1/8/2024
	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	1/9/2024 - 1/10/2024
	Panel finalizes Final Panel Comments	1/11/2024
5	Battelle provides Final IEPR Report to panel members for review	1/15/2024
	Panel members provide comments on Final IEPR Report	1/16/2024
	Battelle submits revised Final IEPR Report to SFWMD[a]	1/10/2024
	Contract End/Delivery Date	3/31/2024

[a] *Deliverable.*

At the beginning of the Period of Performance for the SFWMD LOCAR FS IEPR, Battelle held a kick-off meeting with SFWMD to review the preliminary/suggested schedule, discuss the IEPR process, and address any questions regarding the scope (e.g., terminology to use etc.). Any revisions to the schedule were submitted as part of the final Work Plan. The final charge consisted of 12 charge questions provided by SFWMD, and two overview questions added by Battelle (all questions were included in the draft and final Work Plans), and general guidance for the Panel on the conduct of the peer review (provided in Appendix C of this final report).

Prior to beginning their review and after their subcontracts were finalized, all the members of the Panel attended a kick-off meeting via teleconference planned and facilitated by Battelle in order to review the IEPR process, the schedule, communication procedures, and other pertinent information for the Panel. Battelle planned and facilitated a second kick-off meeting via teleconference during which SFWMD presented project details to the Panel. Before the meetings, the IEPR Panel received an electronic version of the final charge, as well as the review documents and reference/supplemental materials listed in Table A-2.

Table A-2. Documents Reviewed and Provided as Reference/Supplemental Information for the original IEPR

Review Documents	No. of Review Pages
Preliminary Draft EIS Lake Okeechobee Storage Reservoir Section 203 Study	210
Draft Lake Okeechobee Storage Reservoir Section 203 Feasibility Study and Report	212
Appendix A: Engineering Appendix	202
Appendix A Annex A-1 Hydraulic Design	291
Appendix B: Cost Engineering and Risk Analysis	320
Appendix C: Environmental & Cultural Resources	251

Table A-2. Documents Reviewed and Provided as Reference/Supplemental Information for the original IEPR (continued)

Review Documents	No. of Review Pages
Appendix C Annex A: FWCA & ESA Compliance	123
Appendix C Annex B – Part 1: Analyses Required by WRDA	28
Appendix C Annex B – Part 2: State Compliance Report	74
Appendix C Annex C: Draft Project Operations Manual	28
Appendix C Annex D: Adaptive Management and Monitoring Plans	65
Appendix C Annex E: RECOVER Review	3
Appendix C Annex F: Invasive and Nuisance Species Management Plan	36
Appendix C Annex G: Hazardous, Toxic, and Radioactive Waste	169
Appendix C Annex H: Climate Change Assessment	64
Appendix C Annex I: PLSM Alternatives	9
Appendix D: Real Estate	14
Appendix E: Plan Formulation	52
Appendix F: Recreation	17
Appendix G: Benefit Model	70
2023_SFWMD Section 203 Study Prime Farmland Form AD-1006	6
Total # of pages to be reviewed	**2244**

In addition to the materials provided in Table A-2, the panel members were provided the following USACE guidance documents.

- Civil Works Review Policy (ER 1165-2-217, May 1, 2021)
- Office of Management and Budget's Final Information Quality Bulletin for Peer Review (December 16, 2004)
- Foundations of SMART Planning
- Feasibility Study Milestones (PB 2018-01, September 30, 2018 and PB 2018-01(S), June 20, 2019)
- SMART – Planning Overview
- Planning Modernization Fact Sheet
- USACE Climate Change Adaptation Plan (2015)
- Procedures to Evaluate SLR Change Impacts Responses Adaptation (ETL 1100-2-1 – June 30, 2014)
- Incorporating SLR Change in CW Programs (ER 1100-2-8162 – December 31, 2013).

Throughout the review, the Panel developed 11 questions for SFWMD. These were provided to SFWMD by Battelle through email. SFWMD was able to provide responses to all of the questions prior to the end of the review.

In addition, throughout the review period, SFWMD provided documents at the request of panel members. These documents were provided to Battelle and then sent to the Panel as additional information only and were not part of the official review. A list of these additional documents requested by the Panel is provided below.

- 00_Appendix A Annex LOCAR_MDR_20230725.pdf
- 20230811_LOCAR_Alt1_PMF_HECRASmodelfiles.zip
- 20230811_LOCAR_PMP_HECMetVue_modelfiles.zip
- LOCAR-Typical_Cross_Sections_Alt-1_Aug_updt_modtoe.gsz
- 20230814_LOCAR_3D_Seepage_Model_Files.zip.

A.2 Review of Individual Comments

The Panel was instructed to address the charge questions/discussion points within a charge question response form provided by Battelle. At the end of the review period, the Panel produced individual comments in response to the charge questions/discussion points. Battelle reviewed the comments to identify overall recurring themes, areas of potential conflict, and other overall impressions. At the end of the review, Battelle summarized the individual comments into a preliminary list of overall comments and discussion points. Each panel member's individual comments were shared with the full Panel.

A.3 IEPR Panel Teleconference

Battelle facilitated a teleconference with the Panel so that the panel members could exchange technical information. The main goal of the teleconference was to identify which issues should be carried forward as Final Panel Comments in the Final IEPR Report and decide which panel member should serve as the lead author for the development of each Final Panel Comment. This information exchange ensured that the Final IEPR Report would accurately represent the Panel's assessment of the project, including any conflicting opinions. The Panel engaged in a thorough discussion of the overall positive and negative comments, added any missing issues of significant importance to the findings, and merged any related individual comments. At the conclusion of the teleconference, Battelle reviewed each Final Panel Comment with the Panel, including the associated level of significance, and confirmed the lead author for each comment.

A.4 Preparation of Final Panel Comments

Following the teleconference, Battelle distributed a summary memorandum for the Panel documenting each Final Panel Comment (organized by level of significance). The memorandum provided the following detailed guidance on the approach and format to be used to develop the Final Panel Comments for the SFWMD LOCAR FS IEPR:

- Lead Responsibility: For each Final Panel Comment, one panel member was identified as the lead author responsible for coordinating the development of the Final Panel Comment and submitting it to Battelle. Battelle modified lead assignments at the direction of the Panel. To assist each lead in the development of the Final Panel Comments, Battelle distributed a summary email detailing each draft final comment statement, an example Final Panel Comment following the four-part structure described below, and templates for the preparation of each Final Panel Comment.

- Directive to the Lead: Each lead was encouraged to communicate directly with the other panel members as needed and to contribute to a particular Final Panel Comment. If a significant comment was identified that was not covered by one of the original Final Panel Comments, the appropriate lead was instructed to draft a new Final Panel Comment.

- Format for Final Panel Comments: Each Final Panel Comment was presented as part of a four-part structure:

  1. Comment Statement (succinct summary statement of concern)
  2. Basis for Comment (details regarding the concern)
  3. Significance (high, medium/high, medium, medium/low, and low; see description below)
  4. Recommendation(s) for Resolution (see description below).

- Criteria for Significance: The following were used as criteria for assigning a significance level to each Final Panel Comment:

  1. **High:** There is a fundamental issue within study documents or data that will influence the technical or scientific basis for selection of, justification of, or ability to implement the recommended plan.
  2. **Medium/High:** There is a fundamental issue within study documents or data that has a strong probability of influencing the technical or scientific basis for selection of, justification of, or ability to implement the recommended plan.
  3. **Medium:** There is a fundamental issue within study documents or data that has a low probability of influencing the technical or scientific basis for selection of, justification of, or ability to implement the recommended plan.
  4. **Medium/Low:** There is missing, incomplete, or inconsistent technical or scientific information that affects the clarity, understanding, or completeness of the study documents, and there is uncertainty whether the missing information will affect the selection of, justification of, or ability to implement the recommended plan.
  5. **Low:** There is a minor technical or scientific discrepancy or inconsistency that affects the clarity, understanding, or completeness of the study documents but does not influence the selection of, justification of, or ability to implement the recommended plan.

- Guidelines for Developing Recommendations: The recommendation section was to include specific actions that USACE should consider to resolve the Final Panel Comment (e.g.,

suggestions on how and where to incorporate data into the analysis, how and where to address insufficiencies, areas where additional documentation is needed).

Battelle reviewed and edited the Final Panel Comments for clarity, consistency with the comment statement, and adherence to guidance on the Panel's overall charge, which included ensuring that there were no comments regarding either the appropriateness of the selected alternative or USACE policy. At the end of this process, 14 Final Panel Comments were prepared and assembled. There was no direct communication between the Panel and USACE during the preparation of the Final Panel Comments. The full text of the Final Panel Comments is presented in Section 4.2 of the main report.

A.5 Final IEPR Report

After concluding the review and preparation of the Final Panel Comments, Battelle prepared a final IEPR report (this document) on the overall IEPR process and the IEPR panel members' findings. Each panel member and Battelle technical and editorial reviewers reviewed the IEPR report prior to submission to USACE for acceptance.

A.6 Comment Response Process

SFWMD will provide responses (Evaluator Responses) to the Final Panel Comments, and the Panel will respond (BackCheck Responses) to the Evaluator Responses. All SFWMD and Panel responses will be documented by Battelle. Battelle will provide SFWMD and the Panel with a pdf printout of all responses, as a final deliverable and record of the IEPR results.

A.7 Supplemental Review

After completion of the original review, design changes were made to the project that impacted portions of the engineering plan and associated cost assessment. At USACE's request, a supplemental review of the changes was conducted. Based on the information that was updated throughout the document, it was determined by Battelle and the panel members that only the hydraulic engineer and geotechnical engineer would need to review the changes. The two engineers reviewed the documents listed in Table A-3. At the end of the supplemental review, it was determined that no additional Final Panel Comments were necessary. The report from the original IEPR was updated to reflect that the supplemental IEPR was performed (i.e., this report).

Table A-3. Documents Reviewed and Provided as Reference/Supplemental Information during the Supplemental IEPR.

Supplement IEPR Review Documents	No. of Review Pages
Sections of the revised Feasibility Study dated December 18, 2023 (Executive Summary, Section 2, 5, 7, and 8, Annex B Part 1, Annex C, Annex I, Appendix C and Appendix F)	474
Appendix A: Engineering Appendix Sections A.0, A.03, A.05, A.07, A.08, A.09, and A.19 dated December 13, 2023 and A.01 and A.06 dated December 18, 2023	152
Appendix A Annex A Sections A-2.2, A-2.5, and A-2.7 dated December 13, 2023	89
Appendix A Annex B-1 and B-2 dated December 13, 2023	329
Appendix A Annex C-1 dated December 18, 2023	28
Appendix B Cost plus two spreadsheets and a copy of the MCACES model dated November 13, 2023	290+
Total # of pages to be reviewed	**1,362**

APPENDIX B

Identification and Selection of IEPR Panel Members for the SFWMD LOCAR FS Project

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B.1 Panel Identification

The candidates for the Independent External Peer Review (IEPR) of the North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study (hereinafter: SFWMD LOCAR FS IEPR) Panel were evaluated based on their technical expertise in the following key areas: Civil Works planning/ economics, environmental/ecological evaluation, hydraulic engineering, and geotechnical engineering. These areas correspond to the technical content of the review documents and overall scope of the SFWMD LOCAR FS project.

To identify candidate panel members, Battelle reviewed the credentials of the experts in Battelle's Peer Reviewer Database, sought recommendations from colleagues, contacted former panel members, and conducted targeted Internet searches. Battelle evaluated these candidate panel members in terms of their technical expertise and potential conflicts of interest (COIs). Of these candidates, Battelle chose the most qualified individuals, confirmed their interest and availability, and ultimately selected four experts for the final Panel. The remaining candidates were not proposed for a variety of reasons, including lack of availability, disclosed COIs, or lack of the precise technical expertise required.

Candidates were screened for the following potential exclusion criteria or COIs. These COI questions were intended to serve as a means of disclosure in order to better characterize a candidate's employment history and background. Battelle evaluated whether scientists in universities and consulting firms that are receiving USACE-funding have sufficient independence from USACE to be appropriate peer reviewers. Guidance in OMB (2004, p. 18) states,

> "…when a scientist is awarded a government research grant through an investigator-initiated, peer-reviewed competition, there generally should be no question as to that scientist's ability to offer independent scientific advice to the agency on other projects. This contrasts, for example, to a situation in which a scientist has a consulting or contractual arrangement with the agency or office sponsoring a peer review. Likewise, when the agency and a researcher work together (e.g., through a cooperative agreement) to design or implement a study, there is less independence from the agency. Furthermore, if a scientist has repeatedly served as a reviewer for the same agency, some may question whether that scientist is sufficiently independent from the agency to be employed as a peer reviewer on agency-sponsored projects."

The term "firm" in a screening question referred to any joint venture in which a firm was involved. It applied to any firm that serves in a joint venture, either as a prime or as a subcontractor to a prime. Candidates were asked to clarify the relationship in the screening questions.

Panel COI Screening Questionnaire for the IEPR of the North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study
1. Previous and/or current involvement by you or your firm in the North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study (hereinafter: LOCAR FS) and related projects.
2. Previous and/or current involvement by you or your firm in water storage projects in the central Everglades region.

Panel COI Screening Questionnaire for the IEPR of the North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study

3. Previous and/or current involvement by you or your firm in the conceptual or actual design, construction, or operation and maintenance (O&M) of any projects related to the LOCAR FS.
4. Current employment by the SFWMD.
5. Previous and/or current involvement with paid or unpaid expert testimony related to the LOCAR FS or central Everglades region.
6. Previous and/or current employment or affiliation with the non-Federal sponsors or any of the following cooperating Federal, State, County, local and regional agencies, environmental organizations, and interested groups *(for pay or pro bono):*
    - South Florida Water Management District
    - Everglades National Park
    - Florida Department of Environmental Protection
    - U.S. Fish and Wildlife Service (USFWS)
    - U.S. Geological Survey
    - Florida Department of Agricultural and Consumer Services
    - Florida Wildlife Conservation Commission
    - Any Florida Counties or Municipalities around Lake Okeechobee
    - USACE
    - members of RECOVER.
7. Past, current, or future interests or involvements (financial or otherwise) by you, your spouse, or your children related to Lake Okeechobee or the central Everglades.
8. Current personal involvement with other USACE projects, including whether involvement was to author any manuals or guidance documents for USACE. If yes, provide titles of documents or description of project, dates, and location (USACE district, division, Headquarters, Engineer Research and Development Center [ERDC], etc.), and position/role. Please highlight and discuss in greater detail any projects that are specifically with the Jacksonville District.
9. Previous or current involvement with the development or testing of models that were used for, or in support of, the LOCAR FS project.
    a. RSMBN (Regional Simulation Model BASINS)
10. Current firm involvement with other USACE projects, specifically those projects/contracts that are with the Jacksonville District. If yes, provide title/description, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role. Please also clearly delineate the percentage of work you personally are currently conducting for the Jacksonville District. Please explain.
11. Any previous employment by SFWMD or USACE Jacksonville District. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.

Panel COI Screening Questionnaire for the IEPR of the North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study
12. Any previous employment by SFWMD as a contractor (either as an individual or through your firm) within the last 10 years. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.
13. Previous experience conducting technical peer reviews. If yes, please highlight and discuss any technical reviews concerning the central Everglades region, and include the client/agency and duration of review (approximate dates).
14. Pending, current, or future financial interests in contracts/awards from SFWMD related to the LOCAR FS project.
15. Significant portion of your personal or office's revenues within the last three years came from SFWMD contracts.
16. Significant portion of your personal or office's revenues within the last three years came from USACE Jacksonville contracts.
17. Any publicly documented statement (including, for example, advocating for or discouraging against) related to the LOCAR FS project.
18. Participation in relevant prior and/or current Federal studies related to the LOCAR FS project.
19. Previous and/or current participation in prior non-Federal studies related to the LOCAR FS project.
20. Has your research or analysis been evaluated as part of the LOCAR FS project?
21. Is there any past, present, or future activity, relationship, or interest (financial or otherwise) that could make it appear that you would be unable to provide unbiased services on this project? If so, please describe.

Providing a positive response to a COI screening question did not automatically preclude a candidate from serving on the Panel. For example, participation in previous USACE technical peer review committees and other technical review panel experience was included as a COI screening question. A positive response to this question could be considered a benefit.

B.2 Panel Selection

In selecting the final members of the Panel, Battelle chose experts who best fit the expertise areas and had no COIs. Table B-1 provides information on each panel member's affiliation, location, education, and overall years of experience. Battelle established subcontracts with the panel members when they indicated their willingness to participate and confirmed the absence of COIs through a signed COI form. USACE was given the list of candidate panel members, but Battelle selected the final Panel.

Table B-1. SFWMD LOCAR FS IEPR Panel: Summary of Panel Members

Name	Affiliation	Location	Education	P.E.	Exp. (yrs)
Civil Works Planning / Economics (Dual Role)					
Don Ator	Independent Consultant	Baton Rouge, LA	M.S., Economics and Agriculture Economics; M.B.A., Concentration in Finance and Accounting	N/A	40+
Environmental/Ecological Evaluation					
Kris Thoemke	Eolas Consultants, LLC	Daytona Beach, FL	Ph.D., Biology	No	44
Hydraulic Engineering					
Michael Kabiling	Taylor Engineering, Inc.	Jacksonville, FL	Ph.D., Hydraulics and Coastal Engineering	Yes	30
Geotechnical Engineering					
Bijay K. Panigrahi	AMCON, Inc.	Orlando, FL	Ph.D., Civil Engineering	Yes	40

Table B-2 presents an overview of the credentials of the final four members of the Panel and their qualifications in relation to the technical evaluation criteria. More detailed biographical information on the panel members and their areas of technical expertise is given in Section B.3.

Table B-2. SFWMD LOCAR FS IEPR Panel: Technical Criteria and Areas of Expertise

Technical Criterion	Ator	Thoemke	Kabiling	Panigrahi
Civil Works Planning / Economist (Dual Role)				
Minimum 10 years of demonstrated experience in public works planning	X			
Very familiar with USACE plan formulation process, procedures, and standards	X			
Familiar with evaluation of alternative plans for ecosystem restoration projects	X			
Experience with high public and interagency interests and may have nearby project impacted sensitive habitats	X			
Familiarity with USACE standards and procedures is required	X			
At least ten years of experience directly related to water resource economic evaluation or review	X			
Minimum M.S. degree or higher in economics	X			
Familiar with the USACE planning process, guidance, and economic evaluation techniques including cost-effectiveness-incremental cost analyses and procedures associated with identifying the National Ecosystem Restoration plan	X			
Environmental/ Ecological Evaluation				
At least 10 years of experience directly related to water resource environmental evaluation or review and National Environmental Policy Act (NEPA) compliance		X		
Minimum M.S. degree or higher in a related field		X		
Extensive experience working with wetlands and estuarine ecosystems		X		
Familiar with USACE calculation and application of environmental impacts and benefits		X		
Experience in the South Florida region is preferred but not required		X		
Hydraulic Engineer				
Registered professional engineer			X	
Minimum of 10 years of experience in hydrologic and hydraulic engineering or as professors from academia with extensive background in hydrologic and hydraulic theory and practice			X	
Knowledge of south Florida hydrology and water management			X	
Minimum M.S. degree in engineering			X	
Familiar with the application of integrated surface water and groundwater models, including the capability to review typical data output from hydrologic models			X	

Table B-2. SFWMD LOCAR FS IEPR Panel: Technical Criteria and Areas of Expertise (continued)

Technical Criterion	Ator	Thoemke	Kabiling	Panigrahi
Prior experience with some of the hydrologic modeling tools selected for project application, including the RESOPS, LOOPS, RSMBN, SFWMM, RSMGL, DMSTA and HEC-RAS, is preferred but not required			X	
Active participation in related professional societies is encouraged			X	
Geotechnical Engineer				
At least 10 years of experience directly related to geologic processes in coastal environments				X
Minimum M.S. degree in a related field				X
Extensive experience working with geomorphic processes in wetlands and coastal ecosystems				X
Experience in the South Florida region is preferred but not required				X

B.3 Panel Member Qualifications

Detailed biographical information on each panel members' credentials, qualifications and areas of technical expertise is provided in the following paragraphs.

Name **Role** **Affiliation**	Don Ator Civil Works Planning/Economist (Dual Role) Independent Consultant

Mr. Ator is an independent consultant and serves as Research Associate, Professor, and Undergraduate Advisor in the Department of Agriculture Economics and Agribusiness at Louisiana State University. He earned his M.S. in economics and agriculture economics and his M.B.A. with a concentration in finance and accounting from Louisiana State University. His current research is in financial resiliency analysis and planning for local governments in Louisiana, Texas, Alabama, Mississippi, Florida, Georgia, Kentucky, and Nebraska.

Mr. Ator has 44 years of specialized experience conducting public works planning and water resource economic evaluations and technical reviews of USACE Civil Works Projects throughout the nation. His expertise includes planning, data assembly, analysis, and formulating and evaluating the economic feasibility of alternatives to identify a tentatively selected plan. Mr. Ator has performed technical analysis and reviews of project cost analyses, financial documentation for cost-sharing agreements, and risk and uncertainty analyses on hundreds of Civil Works projects. He has developed economic net benefits and benefit-cost ratios of alternatives for decision documents that authorize Congressional funding for civil works projects.

Mr. Ator's familiarity with the USACE plan formulation process is evidenced by his service as a team leader for the USACE New Orleans District while embedded in the Plan Formulation Branch. His responsibilities included directing the plan formulation activities of three plan formulators by providing project oversight and review to ensure compliance with USACE procedures and guidelines as set forth in ER 1105-2-100. Mr. Ator has experience directly dealing with the USACE SMART planning process as outlined in the Planning Manual Part II: Risk-Informed Planning and has worked closely with USACE since its implementation in 2015. Selected USACE project summaries are provided below.

- Caño Martín Peña (CMP) Ecosystem Restoration Feasibility Study and Integrated Environmental Impact Statement (EIS) in San Juan, Puerto Rico, USACE, Jacksonville District. Mr. Ator prepared the following sections of this report: recreation plan; the plan formulation; real estate plan; and economic analysis. He used the USACE IWR Planning Suite investment decision support tool to formulate and evaluate the monetary and non-monetary cost and benefits of the alternative plans to identify the Tentatively Selected Plan using Cost-Effectiveness and Incremental Cost Analysis (CE/ICA). In addition, he prepared the responses to comments from the District Quality Control, Agency Technical Review (ATR) and Independent External Peer Review (IEPR) comments for the report documents.
- Licking River Watershed and Dillon Lake Ecosystem Restoration Project, OH (Huntington District, USACE). For this project Mr. Ator was responsible for developing, evaluating, and recommending alternatives to restore the aquatic ecosystem of the Licking River Watershed and Dillon Lake. Trends in economic growth in the watershed had critically impaired the aquatic and riparian ecosystem and resulted in excessive sediment deposition in the reservoir. The IWR Planning Suite investment decision support tool was employed to formulate and evaluate the ecosystem restoration alternative plans involving monetary and non-monetary cost and benefits using CE/ICA.
- Grand and White Lakes Water Management Study, Southwest LA (New Orleans District, USACE). This project was conducted to assess the economic impacts of the quantity and quality of water under different management plans in the Grand and White Lakes system in the southwestern coastal area of Louisiana. The different management plans under consideration would affect water levels in the lakes and have economic impacts on coastal and shoreline erosion, commercial fisheries, wildlife (trapping industry), the quality of irrigation water (rice industry), and water levels in the Gulf Intracoastal Waterway (shipping industry). Over 160 surveys of farmers, navigation interests, irrigation companies, commercial fishers, hunters, trappers, and federal, state, and local government officials were conducted to collect information to assess the economic impacts of land loss due to erosion, factors causing erosion and water quality impacts (primarily salinity levels). Results of the project informed decision makers of the economic impacts of the alternative management plans under consideration for the lake system in identifying the Tentatively Selected Plan.

Mr. Ator has participated in the review of over two dozen water resource decision documents justifying construction efforts including Internal Technical Reviews, ATRs and IEPRs. Mr. Ator is actively involved in professional engineering and scientific societies, including the Society of American Military Engineers (SAME) and the American Society of Civil Engineers (ASCE).

Name	Kris Thoemke, Ph.D.
Role	Environmental/ Ecological Evaluation
Affiliation	Eolas Consultants, LLC

Dr. Thoemke is an independent consultant and part-time American Public University System faculty member. He received his Ph.D. in biology from the University of South Florida in 1979 and is a Certified

Environmental Professional. He has 44 years of experience as a professional ecologist in South Florida and has been a researcher and land manager for the State of Florida, a private ecological consultant, an environmental and outdoor communicator, and an Everglades project manager for a non-profit organization. He also teaches undergraduate- and graduate-level courses for the American Public University System.

His familiarity with water resource environmental evaluation is evident in his work with wetlands and estuarine ecosystems in South Florida and coastal Louisiana. Since 2005, Dr. Thoemke has been an environmental consultant working on freshwater, estuarine, and nearshore marine resources in Southwest Florida, emphasizing Lee, Collier, Charlotte, and Manatee Counties. His research focuses on evaluating the ecological performance of seagrasses and oyster communities from disturbances such as sedimentation, physical changes, and the impacts of excessive freshwater input.

Dr. Thoemke has assessed construction impacts on the marine and terrestrial ecology of coastal regions with emphasis on benthic invertebrates, seagrasses, shorebirds, and dune plant communities at Stump Pass, Big Carlos Pass, and Blind Pass, Florida. Dr. Thoemke has experience permitting and mitigating construction impacts resulting from coastal and upland development on seagrasses, beach and dune systems, nesting sea turtles, shorebirds, and upland species found in the coastal and beach/dune habitats. In addition, he has conducted post-storm analyses of beach and dune systems, completed Section 7 assessments for listed species under National Marine Fisheries Service jurisdiction, coordinated with the U.S. Fish and Wildlife Service (USFWS) on Biological Opinions, and conducted essential fish habitat (EFH) consultation for projects along the Gulf Coast in southwest and south central Florida.

He has experience with wetlands and estuarine ecosystems which are hydrologically connected to the Everglades. He was a member of the IEPR teams that reviewed the Lake Okeechobee System Operating Manual IEPR and Loxahatchee River Watershed Restoration Project, Draft Integrated Project Implementation Report and EIS. Dr. Thoemke also has 40 years of experience as an active recreational user of Lake Okeechobee, the Everglades and Big Cypress Swamp, and the coastal zone of Southwest Florida.

Dr. Thoemke is familiar with large, complex Civil Works projects with high public and interagency interests. His direct experience includes his work as a wetland scientist on the Florida Everglades restoration program, ongoing involvement as the environmental scientist for the Charlotte County Florida Erosion Control Project for Stump Pass, and participation on a team working on large Civil Works coastal restoration projects for the State of Louisiana in the Mississippi Delta region.

Before entering the consulting field, he was a professor and Program Chair of the Environmental Management MS program at Hodges University. For the past 11 years, he has taught undergraduate- and graduate-level courses in Environmental Policy, Regulation and Law, Conservation Biology, and Restoration Ecology. He instructs students on methods for evaluating ecological performance in various environments in these classes. The course material discusses temporal, spatial, and spatial–dynamic ecological models. Through teaching these classes, he has become conversant with the methods for evaluating ecological performance in upland, riverine, wetland, and estuarine ecosystems.

Dr. Thoemke is an active NEPA practitioner. He began preparing Environmental Assessments (EA) and EISs and assessing large, complex projects in 2012. Dr. Thoemke was the project manager on the Port Everglades Ocean Dredged Material Disposal Site EA, which included addressing Marine Mammals Protection Act listed species, preparing sections of the EIS for the Terrebonne Basin Barrier Island Shoreline Restoration Project, Louisiana, including the Endangered Species Act and EFH sections, and was the primary author of the West Grande Terre Beach Nourishment and Stabilization Project EA. He has also reviewed EISs and EAs for other coastal storm risk management projects in the Mississippi Delta and along the Gulf and Atlantic coasts.

He is familiar with all NEPA EA and EIS requirements. For the past 11 years, he has taught graduate-level classes in Environmental Impact Assessment, Environmental Policy, Regulation and Law, and NEPA. Through teaching these classes, he has read hundreds of EAs and EISs while working with students and reads extensively about NEPA in professional journals.

Specific to the LOCAR project, he is familiar with the Regional Simulation Model Basins (RSMBN) used on this project to calculate Habitat Units (HUs) based on performance measures for Lake Okeechobee and the Northern Estuaries. This model was used in the Lake Okeechobee System Operating Manual EIS that he reviewed as an IEPR member in 2022. He also has experience reviewing how HUs were developed and applied in the Loxahatchee River Watershed Restoration Project, Draft Integrated Project Implementation Report and Environmental Impact Statement; Central and Southern Florida Project, Comprehensive Everglades Restoration Plan, Lake Okeechobee Watershed Restoration Project; and Central Everglades Planning Project (CEPP) Draft Project Implementation Report and Environmental Impact Statement.

Dr. Thoemke is a member of the National Association of Environmental Professionals (NAEP) and the Academy of Board Certified Environmental Professionals. He presented papers on NEPA topics with his master's degree students at past annual NAEP conferences and, in 2019, was co-author of the paper, Implementing EO 13807 – Coordinating NEPA and Compliance with Other Federal Laws (Environmental Practice, 21:4, 159-170).

Name	Michael Kabiling, Ph.D., P.E., CFM
Role	Hydraulic Engineer
Affiliation	Taylor Engineering, Inc.

Dr. Kabiling is a senior engineer with Taylor Engineering, Inc. in Jacksonville, Florida, an engineering consulting firm that specializes in hydrology, hydraulic, and coastal engineering. Dr. Kabiling has more than 30 years of experience with advanced expertise in water resources engineering, coastal engineering, numerical modeling, and climate change resiliency. He earned his Ph.D. in hydraulic and coastal engineering from the Yokohama National University, Japan, in 1994; is a professional engineer (PE) licensed in Florida, Georgia, South Carolina, and Washington; and is a Certified Floodplain Manager. Specifically, he has over 15 years of experience in hydrologic and hydraulic (H&H) engineering, flood risk management, and H&H modeling. Dr. Kabiling has a good knowledge of south Florida hydrology and water management; understands the water storage and conveyance in south Florida; is knowledgeable of associated H&H model applications related to wetland restoration; and is familiar with the application of integrated surface water and groundwater models, including the capability to review typical data output from hydrologic models through his (a) IEPR work on USACE's Modified Water Deliveries to Everglades National Park and Canal 111 South Dade Projects Combined Operational Plan in Palm Beach and Miami-Dade Counties, (b) IEPR work on USACE's Lake Okeechobee System Operating Manual (LOSOM), and (c) flood risk engineering work in USACE's Lake Okeechobee/Herbert Hoover Dam Breach/Dam-Break Analysis project. As a steering committee member in the Federal Emergency Management Agency's (FEMA) coastal surge flood studies along coastal Georgia and northeast Florida, east central Florida, and south Florida; and as IEPR hydraulic engineer reviewer in various central and south Florida studies, Dr. Kabiling is experienced in evaluating project effects in accordance with various assessments and guidance from FEMA, USACE, SFWMD, and other agencies. As the consulting flood engineer and IEPR reviewer in the three projects mentioned above, he has prior experience/knowledge in the application of hydrologic modeling tools including the LOOPS, RSMBN, RSMGL, DMSTA, and HEC-RAS.

As the consulting flood engineer in the Herbert Hoover Dam Breach Dam-Break Analysis project, he has knowledge in the application of risk analysis specific to design of high hazard impoundments and dam safety design criteria for high hazard impoundments. As part of the Jordan Creek Feasibility Study Report and Environmental Assessment, Springfield Greene County, MO peer review panel, Dr. Kabiling applied the USACE's evaluation of H&H modeling completed under SMART planning and principles in the review process.

In 2011, Dr. Kabiling was a water resources engineer, reviewed previous water supply studies and data, conducted field reconnaissance to inspect existing reservoir levees and dam structures, and evaluated different reservoir development schemes for the Wolf-Pennywash Creek Reservoir Water Supply Permitting Project, Osceola County, Florida. Dr. Kabiling is a member of the ASCE, Association of State Floodplain Managers, Association of State Dam Safety Officials, and International Association for Hydro-Environmental Engineering and Research.

Name	Bijay K. Panigrahi, Ph.D., P.E., P.G., D.WRE, BCEE, CUC
Role	Geotechnical Engineer
Affiliation	AMCON, Inc.

Dr. Bijay K. Panigrahi is a Principal Engineer and President of AMCON, Inc. (formerly BPC Group). Dr Panigrahi is a licensed Professional Geologist (P.G.) in Florida and North Carolina, Certified Underground Utility and Excavation Contractor (CUC) in Florida, Board Certified Environmental Engineer (BCEE), Diplomate, Water Resources Engineering (D.WRE), and a registered Professional Engineer (P.E.) in Florida, Virginia, and Michigan. He received his Ph.D. in Civil Engineering from Drexel University in 1985 and an M.S. in Civil Engineering and Geology from Oklahoma State University in 1981.

He has more than 35 years of experience in projects involving civil infrastructures including design, evaluation and management of diversified geotechnical and geohydrological projects involving site investigations, feasibility studies, seepage evaluations, foundation analyses, slope stability analyses, soil stabilization, and construction specifications. His geotechnical experience includes soil suitability studies, slope stability analyses, foundation and settlement analyses including bridge foundations, sinkhole evaluation and mitigation, construction dewatering, sheet pile design, slurry wall design, and pavement and drainage system design. He has designed a number of roadways and flow control structures that include bridges, culverts, weirs, pump stations, stormwater retention ponds, infiltration basin, gypsum stacks, seepage control measures, canals, and levees/dikes. He has used statistical and geostatistical analyses in numerous modeling projects as a tool for accuracy assessments and data verification and validation.

Dr. Panigrahi has assessed and designed several canal conveyance systems and water resources control structures such as levees/dikes, culverts, reservoirs, and treatment systems. He has completed civil engineering infrastructure projects (Comprehensive Everglades Restoration Plan (CERP) and non-CERP) in Florida involving modeling and design of hydraulic structures (reservoirs/impoundments, canals, culverts, and pump stations) and hydraulic measurements and rating analyses.

He has also completed wave run analyses and scour evaluation for extreme hurricane conditions on Big Sand Lake to assist in the design of the Westgate Lakes resort in Orlando, Florida, developed high-level hydrologic restoration plan for a 92 sq-mi Yuca Pens watershed for SFWMD, and completed simulation of natural systems (pre-1950 conditions) and future conditions (2050 land use) for the Southwest Florida Feasibility Study area (> 5000 sq mi) for the SFWMD/USACE.

Dr. Panigrahi has worked on numerous planning, design, permitting, and construction projects. Most notably, they include gravity bypass, earthen cofferdam, dewatering and shoring, traffic control, erosion

control, environmental protection for C-44 Reservoir/STA System Discharge Project, SFWMD; feasibility study (hydrologic and hydraulic modeling, environmental and permitting issues, seepage and stability analyses, and retrofit alternatives) for replacement and/or retrofit of the coastal gated spillway structure S-46, SFWMD; and engineering services for design and construction of an 840 ft long temporary outer wall system in the ocean with more than 25 ft tidal head differential consisting of steel sheet pile cofferdam, shoring, and dewatering/rewatering system for WRA Land/Water Interface, Kings Bay Navy Submarine Base, US Navy.

His projects also include designs, plans, and permits for earthen cofferdams, sheet pile and shoring systems, dewatering, traffic control, erosion control, environmental protection for STA1W Expansion #2 project, SFWMD; design of seepage canal and reservoir impact evaluation on the surrounding community for the Site 1 Impoundment (Frein Reich Preserve) BODR project, SFWMD; civil and geotechnical engineering services (scour analysis, bank stabilization, erosion control, sheet piling and bridge foundations) for the Riverside Acres S/D Arch Pipe Replacement project for Orange County; and design of an optimal ground water recovery system and impact evaluation of the recovery system on Cone Ranch wellfield and the surrounding wetlands for the Plant City Phosphate Complex, CFI Industries (1200 ft deep, 282 sq mi).

Dr. Panigrahi has served on the Florida Board of Professional Engineers (Gubernatorial Appointment) from 2008 to 2012, and has authored more than 50 technical manuals, monographs, and peer-reviewed papers.

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APPENDIX C

Final Charge for the SFWMD LOCAR FS IEPR

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Charge Questions and Guidance to the Panel Members for the Independent External Peer Review (IEPR) of the North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study

This is the final Charge to the Panel for the SFWMD LOCAR FS IEPR. This final Charge was submitted to USACE as part of the final Work Plan, originally submitted on July 6, 2023. The dates and page counts in this document have not been updated to match actual changes made throughout the project.

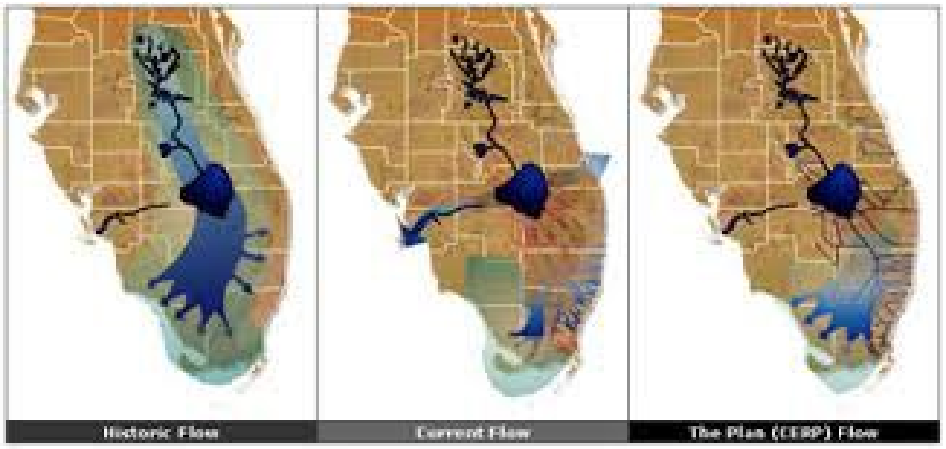
BACKGROUND

Overview of the Comprehensive Everglades Restoration Plan. The south Florida ecosystem includes the Everglades, which encompasses 18,000 square miles from Orlando to the Florida Reef Tract. Everglades National Park (the largest national park east of the Mississippi River, comprising a significant portion of the greater Everglades Ecosystem) is a World Heritage Site, an International Biosphere Preserve and a Wetland of International Importance. The Everglades and the south Florida ecosystem are affected by many factors such as competing demands for recreation, development, and natural and commercial resources and include 68 federally listed threatened and endangered plants and animals.

The Central and Southern Florida (C&SF) project, authorized by Congress in 1948 expanded the existing network of canals, levees, water storage areas and water control structures in south Florida. Project objectives include flood control, regional water supply, prevention of saltwater intrusion, water supply to Everglades National Park, preservation of fish and wildlife, recreation and navigation. While fulfilling these objectives, the project has had unintended adverse effects on the natural environment by disrupting the pre-existing hydrologic regime of the Everglades and south Florida ecosystem. As a result, in 1996, the U.S. Army Corps of Engineers (USACE) in conjunction with the South Florida Water Management District (SFWMD) was directed to develop a comprehensive plan to restore, preserve and protect the south Florida ecosystem while providing for other water-related needs of the region such as water quality and flood protection. The resulting plan was submitted to Congress on July 1, 1999 and consists of proposed structural and operational modifications to the C&SF project.

The recommended plan, identified as the Comprehensive Everglades Restoration Plan (CERP), was approved to provide a framework for the restoration of the natural system under Section 601 of the Water Resources Development Act of 2000. The plan, as documented in the Comprehensive Review Study (Yellow Book), consists of 68 different components that work together, to restore, preserve and protect the south Florida ecosystem while providing for other water related needs of the region. The CERP components will be implemented over an approximate 40-year period. Together, these components will benefit the ecological function of more than 2.4 million acres of the south Florida ecosystem by improving and/or restoring the proper quantity, quality, timing and distribution of water in the natural system while also addressing other concerns such as urban and agricultural water supply and maintaining existing levels of flood protection. The CERP intends to achieve more natural flows by re-directing current flows that go straight to tide, to a more restored flow of water that is distributed throughout the system similar to the pre-drainage conditions (Figure 1).

Figure 1. Pre-drainage, current and restored flows to illustrate CERP restoration



Since 2000, much progress has been made. Construction has begun on the first generation of CERP projects authorized by Congress. These include the Picayune Strand Restoration, Indian River Lagoon South, and C-44 Reservoir and Stormwater Treatment projects. Congressional authorization has been received for the second generation of CERP projects, including Biscayne Bay Coastal Wetlands-Phase 1, Caloosahatchee River (C-43) West Basin Storage Reservoir, and C-111 Spreader Canal Western Project, which are already under construction or are operational, and the Broward County Water Preserve Areas project, which is currently being designed. The Central Everglades Planning Project (CEPP) was authorized in 2016 and construction of the Everglades Agriculture Area Reservoir began in February 2023. All these CERP projects contribute significant ecological benefits to the system and specific regional habitats in which they are located. Although substantial progress has been made through the previously authorized projects, additional storage features north of Lake Okeechobee are needed to achieve CERP goals.

CERP Component A. The LOCAR, or Component A in the Yellow Book, is included in CERP, which was approved by Congress as a framework for the restoration of the natural system under Section 601 of WRDA 2000. CERP, as documented in the 1999 Restudy, consists of 68 components. The purpose of Component A is to detain water in a 200,000 acre-foot aboveground storage reservoir during wet periods for later use during dry periods to Lake Okeechobee. Increased storage capacity, north of Lake Okeechobee, would reduce the duration and frequency of both high and low water levels in Lake Okeechobee that are stressful to the lake's littoral ecosystems and cause large discharges from the lake that are damaging to the downstream estuary ecosystems.

The Integrated Delivery Schedule (IDS) provides an overall strategy for project planning, design, and construction of federal projects that are cost-shared with local sponsors as part of the South Florida Ecosystem Restoration Program. The IDS, required as part of the CERP Programmatic Regulations, is based on ecosystem needs, benefits, costs, and available funding. It helps restoration planners, stakeholders, and public focus on priorities, opportunities, and challenges, and provides a path forward to complete construction on previously authorized projects while outlining the next projects to undergo planning and design. The current project planning and anticipated benefits for LOCAR are consistent with the sequencing of projects in the IDS and included in the next generation of CERP project features to provide restoration benefits.

Section 203 Feasibility Study. South Florida Water Management District (SFWMD), as local sponsor to CERP, has prepared this LOCAR Feasibility Study and Environmental Impact Statement. The SFWMD initiated the LOCAR Feasibility Study in 2023 as the non-federal interest in response to Florida Governor's Executive Order 23-06. The goal of LOCAR is to construct Component A of CERP. Similar aboveground storage reservoirs are being constructed to the east, south, and west of Lake Okeechobee.

The SFWMD is preparing this Feasibility Study pursuant to Section 203 of the Water Resources Development Act (WRDA) of 1986, as amended, for submission to the Assistant Secretary of the Army for Civil Works (ASA[CW]). The Jacksonville District, U.S. Army Corps of Engineers (Corps) is the federal agency, acting on the District's behalf, and intends to prepare a National Environmental Policy Act (NEPA, Title 40 of the Code of Federal Regulations, Chapter V, Parts 1500 through 1508) Environmental Impact Statement to support the ASA(CW) review of the Feasibility Study. Section 203 authorizes non-federal interests to undertake feasibility studies of proposed water resources development projects for submission to the ASA(CW). Upon approval of the LOCAR Feasibility Study by the Governing Board of the SFWMD and the ASA(CW), the recommended plan will be submitted to Congress for authorization.

LOCAR expands upon previously authorized projects and ongoing studies to continue progress towards achievement of the level of restoration envisioned for CERP. LOCAR is focused on aboveground water storage north of Lake Okeechobee. Since the original CERP planning was completed in 1999, new studies, policy guidance, data collection, pilot projects, and improvements in hydrologic systems modeling capabilities allowed for refining the knowledge base and approach in ecosystem restoration. This refined approach is used to maximize project benefits and reduce costs and risks to achieve the CERP goals.

The project area covers a portion of the Lake Okeechobee Watershed in Florida including Glades and Highlands counties, along with the Seminole Tribe of Florida Brighton Reservation (Figure 2). The study area includes the project area in the Indian Prairie Basin, along with Lake Okeechobee and the Caloosahatchee and St. Lucie estuaries.

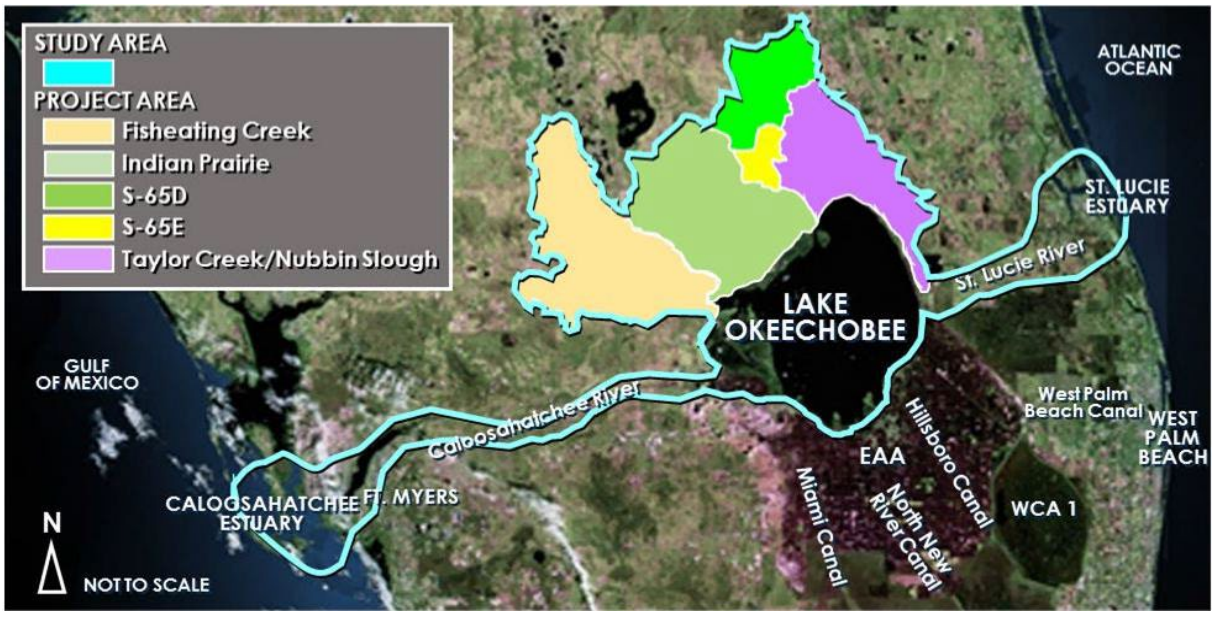


Figure 2. Project and study areas.

OBJECTIVES

The objective of this work is to conduct an independent external peer review (IEPR) of the North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study (hereinafter: LOCAR FS IEPR) in accordance with the Department of the Army, U.S. Army Corps of Engineers (USACE), Water Resources Policies and Authorities' *Review Policy for Civil Works* (Engineer Circular [EC] 1165-2-217, May 1, 2021), and the Office of Management and Budget's (OMB's) *Final Information Quality Bulletin for Peer Review* (December 16, 2004). Peer review is one of the important procedures used to ensure that the quality of published information meets the standards of the scientific and technical community. Peer review typically evaluates the clarity of hypotheses, validity of the research design, quality of data collection procedures, robustness of the methods employed, appropriateness of the methods for the hypotheses being tested, extent to which the conclusions follow from the analysis, and strengths and limitations of the overall product.

The purpose of the IEPR is to "assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, economic analyses, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, models used in evaluation of economic or environmental impacts, and any biological opinions" (EC 1165-2-217; p. 39) for the decision documents. The IEPR will be limited to technical review and will not involve policy review. The IEPR will be conducted by subject matter experts (i.e., IEPR panel members) who meet the technical criteria and areas of expertise required for and relevant to the project.

The Panel will be "charged" with responding to specific technical questions as well as providing a broad technical evaluation of the overall project. Per EC 1165-2-217 (p.41), review panels should identify, explain, and comment upon assumptions that underlie all the analyses, as well as evaluate the soundness of models, surveys, investigations, and methods. Review panels should be able to evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable. Reviews should focus on assumptions, data, methods, and models. The panel members may offer their opinions as to whether there are sufficient analyses upon which to base a recommendation.

DOCUMENTS PROVIDED

The following is a list of documents, supporting information, and reference materials that will be provided for the review. The review assignments for the panel members may vary slightly according to discipline.

Review Documents	No. of Review Pages	Subject Matter Experts			
		Civil Works Planner/ Economics	Environmental /Ecological Evaluation	Hydraulic Engineer	Geotechnical Engineering
Feasibility Study	300	300	300	300	300
Hydrology and Hydraulics Appendix	100			100	
Engineering Appendix	200			200	
Geotechnical Appendix	200				200
Cost Engineering Appendix	50				50
Real Estate Appendix	30	30			
Recreation Appendix	30	30	30		
Environmental, Cultural, and NEPA Appendix	300		300		
Plan Formulation Appendix	90	90	90	90	90
HTRW and Agricultural Chemicals Appendix	170		170		
Adaptive Management and Monitoring Appendix	190		190		
Environmental Benefits Model Appendix	140		140		
Invasive Species Management Plan Appendix	40		40		
Total Number of Review Pages	**1,840**	**450**	**1260**	**690**	**640**

Documents for Reference

- USACE, Water Resources Policies and Authorities' *Review Policy for Civil Works* (Engineer Circular [EC] 1165-2-217, May 1, 2021)
- Office of Management and Budget's Final Information Quality Bulletin for Peer Review (December 16, 2004)

SCHEDULE & DELIVERABLES

This schedule is based on the receipt date of the final review documents and may be revised if review document availability changes. This schedule may also change due to circumstances out of Battelle's control such as changes to SFWMD's project schedule and unforeseen changes to panel member and SFWMD availability. As part of each task, the panel member will prepare deliverables by the dates indicated in the table (or as directed by Battelle). All deliverables will be submitted in an electronic format compatible with Microsoft® Word (Office 2003).

Task	Action	Due Date
Meetings	Battelle sends review documents to panel members	7/21/2023
	Battelle convenes kick-off meeting with panel members	7/18/2023
	Battelle convenes kick-off meeting with SFWMD and panel members	7/21/2023
	Battelle convenes mid-review teleconference for panel members to ask clarifying questions of SFWMD	7/28/2023
Review	Panel members complete their individual reviews	8/1/2023
	Battelle provides talking points for Panel Review Teleconference to panel members	8/2/2023
	Battelle convenes Panel Review Teleconference	8/2/2023
	Battelle provides Final Panel Comment templates and instructions to panel members	8/2/2023
	Panel members provide draft Final Panel Comments to Battelle	8/4/2023
	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	8/05/2023 - 8/08/2023
	Panel finalizes Final Panel Comments	8/9/2023
Final Report	Battelle provides Final IEPR Report to panel members for review	8/11/2023
	Panel members provide comments on Final IEPR Report	8/14/2023
	*Battelle submits Final IEPR Report to SFWMD	8/15/2023
Comment Response Process	Battelle provides Final Panel Comment response template to SFWMD	8/17/2023
	Battelle convenes teleconference with Panel to review the Comment Response process	8/18/2023
	SFWMD provides draft PDT Evaluator Responses to Battelle	8/21/2023
	Battelle provides draft PDT Evaluator Responses to panel members	8/21/2023
	Panel members provide draft BackCheck Responses to Battelle	8/22/2023
	Battelle convenes teleconference with panel members to discuss draft BackCheck Responses	8/23/2023
	Battelle convenes Comment Response Teleconference with panel members and SFWMD	8/24/2023
	SFWMD provides final Evaluator Responses	8/25/2023
	Battelle provides final Evaluator Responses to panel members	8/28/2023
	Panel members provide final BackCheck Responses to Battelle	8/30/2023
	Battelle compiles the panel members' final BackCheck Responses	9/7/2023
	Battelle submits final PDF project file to SFWMD*	9/8/2023

Task	Action	Due Date
	Contract End/Delivery Date	12/29/2023

* Deliverables

CHARGE FOR PEER REVIEW

Members of this IEPR Panel are asked to determine whether the technical approach and scientific rationale presented in the decision documents are credible and whether the conclusions are valid. The Panel is asked to determine whether the technical work is adequate, competently performed, and properly documented; satisfies established quality requirements; and yields scientifically credible conclusions. The Panel is being asked to provide feedback on the economic, engineering, environmental resources, and plan formulation. The panel members are not being asked whether they would have conducted the work in a similar manner.

Specific questions for the Panel (by report section or appendix) are included in the general charge guidance, which is provided below.

General Charge Guidance

Please answer the scientific and technical questions listed below and conduct a broad overview of the decision documents. Please focus your review on the review materials assigned to your discipline/area of expertise and technical knowledge. Some sections have no questions associated with them; however, you may still comment on them. Please feel free to make any relevant and appropriate comment on any of the sections and appendices you were asked to review. In addition, please note that the Panel will be asked to provide an overall statement related to 2 and 3 below per USACE guidance (EC 1165-2-217).

1. Your response to the charge questions should not be limited to a “yes” or “no.” Please provide complete answers to fully explain your response.
2. Assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, and any biological opinions of the project study.
3. Assess the adequacy and acceptability of the economic analyses, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, and models used in evaluating economic or environmental impacts of the proposed project.
4. If appropriate, offer opinions as to whether there are sufficient analyses upon which to base a recommendation.
5. Identify, explain, and comment upon assumptions that underlie all the analyses, as well as evaluate the soundness of models, surveys, investigations, and methods.
6. Evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable.
7. Please focus the review on assumptions, data, methods, and models.

Please **do not** make recommendations on whether a particular alternative should be implemented, or whether you would have conducted the work in a similar manner. Also, please **do not** comment on or make recommendations on policy issues and decision making. Comments should be provided based on your professional judgment, **not** the legality of the document.

1. If desired, panel members can contact one another. However, panel members **should not** contact anyone who is or was involved in the project, or prepared the subject documents.
2. Please contact the Battelle Project Manager Lynn McLeod (mcleod@battelle.org) for requests or additional information.
3. In case of media contact, notify the Battelle Project Manager, Lynn McLeod (mcleod@battelle.org) immediately.
4. Your name will appear as one of the panel members in the peer review. Your comments will be included in the Final IEPR Report but will remain anonymous.

Please submit your comments in electronic form to the Project Manager, no later than 10 pm ET by the date listed in the schedule above.

Independent External Peer Review of the North of Lake Okeechobee Storage Reservoir Section 203 Study Lake Okeechobee Component A Reservoir Feasibility Study

Charge Questions and Relevant Sections as Supplied by SFWMD

The following Review Charge to Reviewers outlines the objectives of the Independent External Peer Review (IEPR) for the subject study and identifies specific items for consideration for the IEPR Panel.

The objective of the IEPR is to obtain an independent evaluation of whether the interpretations of analysis and conclusions based on analysis are reasonable for the subject study. The IEPR Panel is requested to offer a broad evaluation of the overall study decision document in addition to addressing the specific technical and scientific questions included in the Review Charge. The Panel has the flexibility to bring important issues to the attention of decision makers, including positive feedback or issues outside those specific areas outlined in the Review Charge. The Panel can use all available information to determine what scientific and technical issues related to the decision document may be important to raise to decision makers.

The Panel review is to focus on scientific and technical matters, leaving policy determinations for the SFWMD, and subsequently to USACE and the Army, following submittal of the report to the Assistant Secretary of the Army (Civil Works) in accordance with section 203 of the Water Resources Development Act of 1986, as amended. The Panel should not make recommendations on whether a particular alternative should be implemented or present findings that become “directives” in that they call for modifications or additional studies or suggest new conclusions and recommendations. In such circumstances, the Panel would have assumed the role of advisors as well as reviewers, thus introducing bias and potential conflict in their ability to provide objective review.

Panel review comments are to be structured to fully communicate the Panel’s intent by including the comment, why it is important, any potential consequences of failure to address, and suggestions on how to address the comment.

The Panel is asked to consider the following items as part of its review of the decision document and supporting materials.

Broad Evaluation Review Charge Questions

1. Is the need for, and intent of, the decision document clear?
2. Does the decision document adequately address the stated need and intent relative to scientific and technical issues?
3. Assess the adequacy and acceptability of the project evaluation data used in the study analyses.
4. Assess the adequacy and acceptability of the economic, environmental, and engineering assumptions that underlie the study analyses.
5. Assess the adequacy and acceptability of the economic, environmental, and engineering methodologies, analyses, and projections.

6. Assess the adequacy and acceptability of the models used in the evaluation of existing and future without-project conditions and of economic or environmental impacts of alternatives.
7. Assess the adequacy and acceptability of the methods for integrating risk and uncertainty.
8. Assess the adequacy and acceptability of the formulation of alternative plans and the range of alternative plans considered.
9. Assess the adequacy and acceptability of the quality and quantity of the surveys, investigations, and engineering sufficient for conceptual design of alternative plans.
10. Assess the adequacy and acceptability of the overall assessment of significant environmental impacts and any biological analyses.
11. Evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable.
12. Assess the considered and tentatively selected alternatives from the perspective of systems, including systemic aspects being considered from a temporal perspective, including the potential effects of climate change.

Battelle Summary Charge Questions to the Panel Members[1]

Summary Questions

13. Please identify the most critical concerns (up to five) you have with the project and/or review documents. These concerns can be (but do not need to be) new ideas or issues that have not been raised previously.
14. Please provide positive feedback on the project and/or review documents.

[1] Questions 13 and 14 are Battelle-supplied questions and should not be construed or considered part of the list of USACE-supplied questions. These questions were delineated in a separate appendix in the final Work Plan submitted to USACE.

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BATTELLE

It can be done

August 2023 Technical and Quality Review

January 2024 Agency Technical Review

AGENCY TECHNICAL REVIEW REPORT – LOCAR FEASIBILITY STUDY

Lake Okeechobee Component A Storage Reservoir

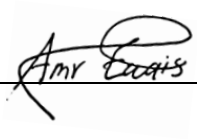
BLACK & VEATCH PROJECT NO. 418143

PREPARED FOR

South Florida Water Management District

24 JANUARY 2024

BLACK & VEATCH

Reviewed by:  1/24/2024

Signature **Date**

Amr Ewais

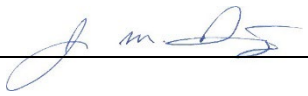
Printed Name

Reviewed by:  1/24/2024

Signature **Date**

Jeffrey A. Beriswill

Printed Name

Approved by:  1/24/2024

Signature **Date**

Jon Dinges

Printed Name

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LIST OF APPENDICES

LIST OF TABLES

1.0 Introduction

The purpose of the Lake Okeechobee Component A Storage Reservoir (LOCAR) is to construct a 200,000-acre-feet (ac-ft) reservoir for storing water north of Lake Okeechobee during wet periods. This stored water will be used during dry periods, providing operational flexibility to draw and store water from both the lake and the basin to enhance its littoral ecosystems. LOCAR, also known as Component A in the US Army Corps of Engineers (USACE) Central and Southern Florida Project Comprehensive Review Study: Final Integrated Feasibility Report and Programmatic Environmental Impact Statement (a.k.a. Yellow Book), is a crucial element of the Comprehensive Everglades Restoration Project (CERP). CERP, approved by Congress as a framework for natural system restoration under Section 601 of WRDA 2000, comprises 68 components.

The primary objective is to detain water during wet periods, releasing it to Lake Okeechobee during dry periods, with a storage goal of 200,000 ac-ft. Augmenting storage capacity north of Lake Okeechobee will enhance flexibility in timing and water distribution to the lake, Northern Estuaries, and throughout the Lake Okeechobee Watershed. Storing water during wet periods will mitigate the duration and frequency of both high and low water levels in Lake Okeechobee, which are stressful to the lake's littoral ecosystems and result in damaging discharges from the lake affecting downstream estuary ecosystems.

The South Florida Water Management District (SFWMD) is the state agency responsible for managing water resources in south Florida and serves as the non-Federal sponsor for Federal water resources projects, including the Central Everglades Restoration Project (CERP).

SFWMD commissioned the development of a Feasibility Study (FS) to document the effects of implementing LOCAR. The FS has been prepared pursuant to Section 203 of the Water Resources Development Act (WRDA) of 1986, as amended, for submission to the Assistant Secretary of the Army for Civil Works (ASA[CW]). The Jacksonville District, U.S. Army Corps of Engineers (Corps), is the federal agency acting on the District's behalf and intends to prepare a National Environmental Policy Act (NEPA; Title 40 of the Code of Federal Regulations (CFR), Chapter V, Parts 1500 through 1508) assessment to support the ASA(CW) review of the FS. SFWMD initiated the LOCAR FS in 2023 as the non-federal interest in response to Florida Governor's Executive Order 23-06.

In accordance with USACE Engineer Regulation (ER) 1165-2-217, an Agency Technical Review (ATR) of the FS is required and the ER enables engagement of engineering consulting firms to conduct the ATR. Accordingly, SFWMD selected Black & Veatch Corporation (Consultant) to conduct the ATR services as independent review in accordance with the ATR process in Engineer Regulation (ER) 1165-2-217, Civil Works Review Policy, dated 1 May 2021. The purpose of this report is to provide a summary of the ATR as outlined in Section 5.10 of ER 1165-2-217.

As per the scope of work provided by Black & Veatch to SFWMD under EXHIBIT "B-9" STATEMENT OF WORK - CONTRACT NO. 4600003988-WO10 - Lake Okeechobee Component A Storage Reservoir (LOCAR) Feasibility Study, This ATR report is based on the following:

- The ATR team of reviewers is to perform an independent review of the PDT work and is not to make project decisions. The Project Delivery Team (PDT) of the South Florida Water Management District (SFWMD) is responsible for the work product/design.

- The corporate intent is for the ATR process to ensure overall technical analyses and approaches are correct and compliant with all pertinent USACE guidance to achieve high quality work products and facilitate vertical alignment early in work product development.
- The level of review provided in this report is commensurate with the significance of the information being provided by SFWMD.

2.0 ATR Reviewer Resumes

For all disciplines required for the ATR listed below, each of the personnel meet the requirements of Level 3 reviewers having a minimum of 15 years of specialized experience and being a recognized expert in their field except for Jhon Arbelaez-Novak, who has 12 years of experience. The following is the list of reviewers and their associated disciplines.

Table 1 List of Reviewers

Reviewer Name	Discipline
John Bianco, PE	ATR Project Manager/Environmental Engineer
Jeff Beriswill, PE	Team Leader/Geotechnical Engineer
Amr Ewais, PhD, PE	Geotechnical Engineer
Todd Schellhase	Structural Engineer
Heriberto Torres	Civil/Construction Engineer
Zan Kugler	Mechanical Engineer
Joe Santogatta	Electrical Engineer
Kevin Shelton	Environmental Scientist
Renee Murch	Hydrologic & Hydraulic Modeler
Terry Hull	Hydrologic & Hydraulic Modeler
Todd Bednar	Cost Estimator
Bryce Weinand	Climate Change
Dave Friesen	Real Estate
Drew Ackerman	Water Quality Modeling
Dusty Miller	Environmental
Eric Gates	Environmental
Jhon Arbelaez-Novak	Environmental

Resumes for each of the reviewers are provided in **Appendix A**. The list of reviewers and their resumes were provided to SFWMD on December 14, 2023. Additional reviewers were added for specific areas of expertise in climate change, real estate, water quality modeling, and other environmental/permitting issues. The mechanical engineer was also changed due to staff availability.

3.0 Charge Questions

The ATR Team reviewed the work products against published guidance in general accordance with Appendix C.2 of ER 1165-2-217. In addition, a brief Guidance for Reviewers document was developed and provided to the ATR Team during project orientation (see **Appendix B**).

4.0 Summary of Review

4.1 Document Quality Control

The Document Quality Control (DQC) procedure was implemented to ensure the ATR was conducted in accordance with ER 1165-2-217 and aligned with the scope provided by Black & Veatch to SFWMD under EXHIBIT "B-9" STATEMENT OF WORK - CONTRACT NO. 4600003988-WO10 - Lake Okeechobee Component A Storage Reservoir (LOCAR) Feasibility Study. The quality control procedures were conducted by both by Black & Veatch and SFWMD.

DQC was conducted by the Reviewers' team lead in Black & Veatch and the SFWMD technical lead or under their supervision ensuring:

- All sections of the feasibility study were reviewed in timely manner.
- Each reviewer provided at least one comment.
- Each reviewer considered the Charge Questions described in **Section 3**.
- All reviewers adhered to the Guidance for Reviewers in providing their comments outlined in **Appendix B**.
- Timely delivery of all specified deliverables.

4.2 Table of Comments and Resolutions

The ATR Team had 163 comments on the FS documents provided by SFWMD. The comments were input in the spreadsheet template provided by SFWMD and are provided in **Appendix C**. For each comment the significance, basis for the concern, and suggested remedy were provided.

All of the 163 comments were resolved as documented in **Appendix C.** The Project Development Team(PDT) reviewed each comment and provided a response. If necessary, the ATR Team provided a backcheck comment to the response, which was then followed by a second response from the PDT. When the PDT made a modification to the existing documentation, the ATR Team reviewed the modifications that were provided using "Track Changes". Many of the comments were agreed by SFWMD and the PDT to be addressed in the subsequent preconstruction engineering and design (PED) phase of the project.

4.3 Significant or Unresolved Comments

The level of significance was based on the guidelines provided in **Table 2**.

Table 2 Review Comment Level of Significance

Level	Description
Critical	Fundamental issue highly likely (near certain) to influence plan selection, justification, or ability to implement. Tagged as critical in comments.
High	Fundamental issue that has a 50% or greater chance to influence plan selection, justification, or implementation
Medium	Fundamental issue that has less than 50% chance to influence plan selection, justification, or implementation
Low	Technical, legal, or policy discrepancy/inconsistency that affects clarity, understanding, or completeness of study documents, but does not influence plan selection, justification, or implementation

Based on the criteria in **Table 2** most of the comments were low to medium levels of concern. Ten comments were considered to be high levels of concern in the areas of Real Estate, Socioeconomics, Pump Station Design, Groundwater, and Geotechnical, as detailed in **Appendix C.** All the high concern comments were resolved.

5.0 Significant Correspondences

The ATR review was expedited with the majority of the correspondences relating to schedule and information sharing. Three key correspondences from early in the review process consisted of the following:

- Submittal and Acceptance of Reviewer Qualifications
- Submittal and Acceptance of Work Plan
- Orientation Meeting Memorandum

Appendix D includes emails for the submittal and acceptance of the Reviewer Qualifications and the Work Plan, as well as the Orientation Meeting Memorandum.

6.0 Technical Review and ATR Certification

The ATR Technical Review Certification and the ATR Certification are provided in **Appendices E and F**, respectively. They were prepared based on the templates provided in Appendix D of ER 1165-2-217.

7.0 Limitation

The ATR was performed in accordance with ER 1165-2-217, dated 1 May 2021 and in accordance with generally accepted engineering principles and practices. The review is limited to the information provided by SFWMD and our understanding of the project. Neither design calculations nor field investigations were conducted by Black & Veatch. No other warranty is expressed or implied.

Appendix A. Reviewer Resumes

John Patrick Bianco, PE

Civil Works PM | Dam & Levee Safety | Black & Veatch

OFFICE LOCATION
Overland Park, Kansas

EDUCATION
MS, Environmental Engineering, Johns Hopkins University, 1982

BS, Civil Engineering, Rutgers University, 1977

PROFESSIONAL REGISTRATION
PE – Civil - 1984, NJ, 24GE02966900

PROFESSIONAL ASSOCIATIONS
ASDSO
USSD

YEAR CAREER STARTED
1977

YEAR STARTED WITH B&V
2020

John Bianco is a **Senior Civil Works Project Manager at Black & Veatch [August 2020 – Present]** possessing over 40 years of US Army Corps of Engineers (USACE) experience involving water resource projects. John most recently served as the HQUSACE's Senior Technical Advisor for Dams/Levees as well as the Special Assistant for Dam Safety. Previously he was a key strategic leader within USACE's North Atlantic Division (CENAD) as the Chief, Business Technical Division (BTD) and Chief, Sandy Coastal Management Division. At CENAD he executed the Technical Director duties for CENAD's Regional Production Center (RPC) and was the Regional Dam Safety (DSO) and Levee Safety Officer (LSO). Was technically responsible for the structural integrity and the key life safety aspects of over 50 dams (USACE owned) and 200+ levee segments/systems (either federally owned & operated by USACE or were federally designed and turned over to local sponsors for operations and maintenance (O&M) activities). During the past 5 years, John served 4 of those years as the USACE (DoD) representative on multiple National Committees for FEMA that included the Interagency Committee on Dam Safety (ICODS) and the National Dam Safety Review Board (NDSRB). He was also the lead USACE Senior Advisor for DoD dams located on Army, Air Force, Navy and Marine Installations and was instrumental in the Army's adoption, utilization and application of Portfolio Management, Consequence Assessments, and Risk-Informed Decision Making. During his career, Mr. Bianco has performed detailed technical hydrology and hydraulic design on numerous levee/floodwall projects located within Northeastern US that included the Passaic River Main-Stem Flood Damage Reduction project (> $2 B), located in Northern, NJ; the Green Brook Flood Damage Mitigation Project (> $ 500 M), and numerous others. He has extensive experience with civil works dams, levees, floodwalls, fill/dune coastal projects, large size diversion tunnels, channels, bridges and various line-of-protection interior drainage facilities. He also has strong familiarity with USACE's planning, design, construction, rehabilitation and major modifications repairs associated with civil works infrastructure.

WORK EXPERIENCE

United States Army Corps of Engineers (USACE); Washington, DC & Avon-by-the-Sea, NJ | June 2016 – June 2020

USACE Senior Technical Advisory and Special Assistant for Dam Safety. Served at HQUSACE performing a wide variety of National leadership roles within the USACE Dam Safety Community of Practice (CoP). Assigned as the lead for USACE responses to Congressional inquiries related to the Oroville Dam Spillway Incident; designated lead coordinator for Inter-Agency collaboration effort seeking to synchronize responses between USACE, FERC, FEMA and BoR; has supported the USACE PROSPECT Training course in developing newly improved training module sessions for USACE internal Dam Safety DS-101 and DS-102 training sessions; has been the HQ proponent assigned to improve effectiveness and efficiencies within the geographically dispersed Regional Dam Safety Production Centers; member of the USACE Dam Senior Oversight Group (DSOG); Chair of the Dam Safety Steering Committee (DSSC); have led, participated on and been heavily engaged in key project decisional briefs with HQUSACE Senior leadership and ASA(CW) staff members. Has also briefed HQ Senior leadership with regard to USACE's Response and Recovery actions for past and many recent large scale hurricane activities (Harvey, Irma, Maria, Florence, Michael) and other major natural disasters across the Mid-west, the Central US, PR and in North/South Carolina.

Key and/or selected assigned activities from June 2016 to June 2020:

Lead USACE Senior Technical Advisor with regard to Department of Defense (DoD) - Dams on Installations. Lead USACE senior level technical support individual assigned to drive, coordinate and standardize USACE-wide support to the DoD Dam Safety Programs for Army, Air Force, Navy and Marines. Support plans developed have included the application/utilization of USACE support services to include Portfolio Management (PM), Consequence Assessments (CAs), Risk-Informed Decision Making (RIDM) processes aimed to improve effective use of limited resources (manpower and funding) in strategic investment decisions. Efforts have been designed to enhance USAC's critical dam safety technical support to G9 (formerly

OACSIM), HQIMCOM and Land Holding Commands (LHCs) while creating new methodologies, processes and procedures for use within the Army Command levels. Currently working with Army command in finalizing development of USACE Support Plan for Army Dams that includes the rewriting of AR 420-1 and DA Pamphlet 420-1-3. Have developed & led presentations for USACE Support Plan to DSSC, DSOG and HQUSACE Senior Leadership. Led activities with regard to the selection and adoption of USACE's Lead District (Ft Worth) in support to the Army Dam Safety Program.

Lead USACE individual assigned to the 2016 Independent External Peer Review (IEPR). Assignment included the initiation, coordination and finalization of all sites to be visited during 1-year review of the USACE Dam Safety program including HQUSACE, RMC (East & West), DSO Workshop (Galveston, TX), DSOG briefings, three MSC's, three Districts and three Projects, as well as the Agency wide coordinator for the development of USACE detailed Responses Plan to the IEPR's 14 findings/35 recommendations. Worked to establish with USACE a continual follow-up action plan to ensure implementation of the 2016 IEPR Dam Safety improvements occur within a time phased approach across the Agency.

RMC Activities, DSOG's and RARG's. Have attended and actively engaged thru participation at multiple DSOG meetings in support to RMC Director (Chair). Have participated and dialoged with regard to USACE Safety Program Priority meetings that generate a rank-ordered listing of Fiscal Year planned activities to include Work Plans for current budgetary funding opportunities. Acted as the technical champion within USACE by urging the study of Non-breach flooding scenarios associated with operational releases in light of risk communication workshop priorities. Have attended, participated and led research related discussions at USACE's 2019 Engineering Research Development Center (ERDC) Innovation Summit (Sept 2019) that linked cross cutting technologies spanning multiple organizational and Engineering disciplines. Was heavily involved with USACE's Research Area Review Group (RARGs) by aiding in the development of critical R&D strategies investing limited funding by priority for the Navigation business line, the Flood Risk Management (FRM) business line, the Dam and Levee Safety program and the Environmental Community of Practice. Utilized "Engineering with Nature" concepts to bridge items of concern among the key entities.

National Committees – Assigned as the USACE lead to FEMA's Interagency Committee on Dam Safety (ICODS) and the USACE alternate to the National Dam Safety Review Board (NDSRB). These committees/organizations are assigned to collaborate with and fully support FEMA's mission within the National Dam Safety Act. Served as the Department of Defense (DoD) representative at ICODS/NDSRB Meetings, which includes levee safety. Coordinated and reported back to FEMA and other Federal, State, Local and Academia participants on all assigned USACE efforts spanning from sub group proceedings to special high-level Board actions. Worked closely with FEMA dam safety representatives in developing key implementation guidance for roll-out methodologies of their $400 Million High Hazard Potential Dams Grants Program that spans across all 50 States. Prepared presentations, briefings and assigns tasks, as necessary, to USACE subject matter experts (SME) to assist ICODS or NDSRB with their understanding of the technical challenges, potential issues and realistic opportunities in the advancement of the National Dam Safety Program within the United States.

AECOM Technical Engineering Services; Piscataway, NJ | September 2013 – June 2016

Senior Manager for Major Projects: After joining AECOM in September 2013, Mr. Bianco continued with design, development and coordination of large scale life safety projects that included the performing of dam and levee safety inspections; review and oversight of the Northampton Levee/Floodwall Project, in MA and the Port Alleghany Levee/Floodwall System in PA; independent technical review of the South River Levee/Tidal Gate facility in northern NJ; performed detailed inspections and report documentation on the North Ellenville Levee System in upstate New York and the South Orange Levee System in Orange, NJ; and, was the lead technical designer for the Passaic Valley Sewage Commission (PVSC – Newark, NJ) for their Levee/Floodwall design. He also served played a key role as a National Technical Advisor within AECOM's Dam/Levee Safety Programs and development of the Flood Response/Recovery Strategies. Has been working with and leading design teams associated with projects for Federal, State and Municipal clients that own and operate a portfolio of dams and levee systems. Has been actively engaged in supporting State Agencies connected with FEMA's Emergency Action Response and Recovery efforts following major disasters.

Colorado Front Range Flooding, Project Management Office (PMO) Assistance to State of Colorado [Sept2013 – Dec2013] - Served as AECOM's senior technical advisor to the Governor appointed Colorado Recovery Officer (CRO) and Governor's staff. Provided hands-on technical support to the State's response and recovery efforts associated with the devastating September 11-14, 2013 flooding along the Front Range. Developed processes to streamline and provide the CRO with real-

time situational awareness for timely and prioritized assignments of limited field resources. Strategies targeted areas that were severely devastated from the flood event with water, food and shelter given the highest response priorities. AECOM support to the CRO PMO effort was ultimately intended to assist the State of Colorado in expediting the short, mid and long-term recovery process of impacted entities (residents, municipalities, communities and counties) to normalcy and maximize efficient and effective use of FEMA's Hazard Mitigation and HUD's Community Development Block Grant – Disaster Recovery funds (CDBG-DR).

Air Force Dam Safety Management Program Facility Criteria (AF-DSMP) [Sept2014 - Dec2015]. Was the principal writer/developer of this assignment to Air Force by developing a comprehensive and streamlined plan to effectively, efficiently and safely manage their National inventory of dams. Prepared the Facility Criteria (FC) document (FC 3-310-09) to bring AF policies, procedures and methodologies into compliance with FEMA's Federal Guidelines for Dam Safety. The FC guidelines encourage that strict dam safety standards, practices and procedures be employed by all AF field offices having projects identified within the National Inventory of Dams (NID). Visited 22 of 39 Air Force dams including all designated high (5) and significant (3) hazard potential dams located at the US Air Force Academy, Colorado Springs, CO; Arnold Air Force Base, Manchester, TN; and, Joint Base McGuire-Dix-Lakehurst (JB-MLD) in Central, New Jersey. Coordinated closely with USACE, the USBoR and FEMA dam safety engineers during the early development phase to rapidly develop an understanding of the latest technical guidance (if any), identification of major revisions under consideration and an estimation of what/when new guidance may be issued potentially impacting the direction of the Air Force FC. Prepared the FC emphasizing that life and public safety are paramount but fully recognized that detrimental consequences to economic concerns (property damage), environmental issues and the loss-of-use of the facility (inability to meet mission execution) are significant and contributing factors when considering how to manage their existing inventory of dams. Documented and initiated the strategic framework for portfolio prioritization schemes to aid Air Force in racking and stacking projects.

NYCDEP Class B Dams within New York State – Technical Engineering Assessments [Mar2015 - Sept2015]. Performed duties as the technical design manager for the development of five (5) engineering assessments for Seven Hills, Muscoot, Lake Gleneida, Lake Gilead, and Kirk Lake Dams. Analysis were prepared in response to NYSDEC regulatory guidance and team was provided a very short timeline to produce these technical documents. Assembled and lead the technical team that assessed the geotechnical and structural stability of each dam, oversaw and reviewed the hydraulic assessments of the hazard classification (dam break analysis) at each dam, as well as the hydrologic and hydraulic ability of each project to pass the criteria designated Spillway Design Flood (SDF) and ability to meet NYSDEC drawdown criteria timelines for the spillway and outlet work structures. Led the writing, documenting and preparation of individual reports for delivery to the client and NYSDEC on a very tight timeline (five months – start to finish).

Passaic Valley Sewage Commission (PVSC) PMO – Design of Levee/Floodwalls, Newark, NJ [Apr2015 – June 2016]. Assigned as the Design Leader within the AECOM|HDR JV for the floodwall portion of a suite of FEMA related funding projects (powerplant, storm drainage system, pump stations and floodwall). Projects are to substantially improve PVSC's plant resiliency and operational capability during future flood/storm surge events. Contributing FEMA funding is a direct response to the PVSC facility being heavily damaged and taken off line during Superstorm Sandy in late October of 2012. The JV team is currently developing the preliminary design (~ equal to a 30 % Concept) for two (2) independent ring floodwalls to protect the Nation's 5th largest Water and Waste Water Treatment Plant (WWTP). Technical design includes coastal engineering analysis and modeling (wave dynamics, wave forces, MIKE21 modeling, vessel impact analysis and developing overtopping rates), accommodating sea level change (SLC) and freeboard determination with technical support encompassing structural design and analysis (floodwall geometry, foundations, width, pile support techniques that include either micro-piles or H-piles or soil founded support over existing tunnel features, swing and roller gate at closure sites, man-door gates at Newark Bay frontage; geotechnical design and analysis for seepage and stability analysis of an existing berm feature, developing pile capacity curves as floodwall support features; civil site layout including plans and profiles, gate closure features, layouts and sizing, and preliminary and detailed cost engineering and estimating. Leading the team to develop a detailed Basis of Design Report (BODR) to be utilized within an RFP to acquire the Final Designer for the floodwall. CWE ~ $ 100 million.

North Ellenville Levee/Floodwall Systems (New York) & the South Orange Levee/Floodwall Systems (New Jersey) – Periodic Inspection Reports (PIR) [October 2015 – June 2016]: Performed and led the technical aspects of the Periodic Inspections (PI) of the North Ellenville Flood Risk Management Project (FRMP) to include assessments of the general condition based on a review of available data and visual on-site inspections. The PI process included a thorough review of

operations and maintenance (O&M), operational adequacy, structural stability, and historical design criteria. Inspections were intended to identify pertinent levee safety issues, to facilitate an understanding the changes in current design standards and to foster communication with the public sponsor about the FRMP's overall condition. The integrity (to function as intended) of a flood damage reduction system depends on numerous and constantly changing internal and external conditions and is evolutionary in nature and through continued inspection, maintenance, repair, and rehabilitation can there be a reasonable chance that safe conditions can be maintained. USACE has moved to a more pronounced risk analysis process to manage levee systems that includes (1) risk assessment, (2) risk communication, and (3) risk management. For levee systems, the risk is the likelihood of inundation of the protected area and its adverse consequences. Inundation can result from levee breaches, overtopping, or poor interior drainage. Adverse consequences include the loss of life, property and income, undesirable environmental effects and the loss of use of the system if significantly damaged or rendered non-functional against a future storm event.

Rebuild by Design (RBD) – New Meadowlands Project, Feasibility Study, EIS, Design and Construction Administration Services [February 2016 – June 2016]. Assigned as the Flood Risk Mitigation Design Leader and was responsible for the initial layout and design of coastal impacted levee/floodwall systems being proposed along the Hackensack River. Utilized prior technical experience related to civil works facilities that included dams, levees, floodwalls, seawalls, bulkheads, beach-fill/dune coastal projects, large size diversion tunnels, channels, bridges and various types of interior drainage facilities for these levee/floodwall systems. Gathered, reviewed and acquired relevant existing data and documents pertaining within the project area to develop conceptual layouts into workable and logical alternative project alignments. Initiated evaluation on a potential surge barrier to be located downstream of the proposed project site. Reported data and data gaps to NJDEP with a detailed collection plan to fill data gaps. Led design team efforts in preparing plans for feasible alternative components associated with levee/floodwall alignments. Prepared design assessments for consolidated progress actions to meet upward NJDEP and HUD reporting requirements. Attended, detailed and presented key levee/floodwall layout concepts/alignments at meetings with NJDEP staff supporting the updating of impacted community relation efforts.

United State Army Corps of Engineers (USACE); Brooklyn, NY | 2003-2013

Chief, Business Technical Division, GS-0810-15. Planed, directed and independently managed resources, fiscal allocations and activities of CENADs Business Technical Division (BTD). Set broad policies, objectives and strategic goals of subordinate staff in developing the technical members of the region's 1,400-member Engineering and Construction (E&C) involved in workload exceeding $2.0 billion per year. Actively led regional subject matter experts consisting of 10-18 technical members including: Dam & Levee Engineers, Geotechnical, Structural, Mechanical, Electrical, Architectural, Construction Management, Hydrology, Hydraulic, Coastal, Environmental, Cost and Value Engineering disciplines. Maintained close contact with national BTD Chiefs, HQUSACE and North Atlantic regional E & C technical leadership. Worked through the regional and/or national teams to influence policies and procedures by elevating/bringing regional issues to national forums for discussion, debate and resolution. Maintained Life and Public Safety issues (within regional Dam, Levee, Bridge and Hydraulic Steel Structures Safety programs) as highest priority; worked to increase utilization of Regional Technical Specialists (RTS) to improving the overall quality of engineering and construction products delivered to Military, Local, State and Federal customers. Executive Technical Director with final and authoritative Leadership over the North Atlantic Division (CENAD) Regional Production Center (RPC) - New England District (Dams and Hydraulic Steel Structures (HSS)), Philadelphia (Bridges) and Baltimore (Levees) Districts. Briefed, interacted and led technical discussions within CENAD's and USACE's executive leadership and governance boards: Regional Command Council (RCC); Regional Management Board (RMB); National Management Board & National Command Council. Chaired A/E Section Panels as requested/required to assist subordinate Districts in executing their complex mission responsibilities. Deployed in support of USACE efforts to assist hurricane teams for Katrina, Irene, Lee & Sandy for response and recovery efforts within the impacted areas.

Key Project via USACE - Hurricane Sandy Recovery Efforts [November 2012 - June 2013]. Assigned to lead a new mission as the Chief of the North Atlantic Division's Sandy Coastal Management Division. Responsibilities included the establishment of the organization; locating office space for 22 new team members; hiring temporary and permanent staffs; managing 5 major program areas (Flood Control and Coastal Emergencies; Operations & Maintenance; General Investigations, Authorized but Unconstructed projects; & On-Going Project Studies); overseeing multi-State Public Affairs efforts/Strategic Messaging for media interests. Provided technical management and oversight to the $4.5 B recovery efforts assigned to the North Atlantic region by establishing Command & Control over Sandy mission response & recovery efforts that include an Integrated Master Schedule (centerpiece for Mission Execution) for 153 discrete USACE projects; coordinated relationships among numerous Federal, State and local Agencies, Local Sponsors, Academia, Non-Governmental groups and the general public, incorporated

National Disaster Recovery Framework efforts (Presidential Task Force) and the Federal Disaster Coordinating Officer, Joint and Recover Field Offices within the New York/New Jersey impacted area. Led a national USACE technical team to revise current engineering & scientific design criteria/standards within USACE's Coastal Engineering Manual (CEM) to properly account for global Sea Level Rise (SLR) and Climate Change (CC).

United State Army Corps of Engineers (USACE); Brooklyn, NY | 1998-2003

Infrastructure Team Leader; GS-0810-14. Technically managed all team activities in support of CENADO's E&C mission by supervising a staff of 10-12 technical specialists in the areas of Architecture, Environmental, Geotechnical, Mechanical and Structural Engineering. Served as a Divisions regional technical specialist identifying/assembling national USACE teams to accomplish difficult and/or complex missions assigned to CENAD. Actively leader within Corps team of Hydrology and Hydraulic experts focusing on returning the Corps of Engineers to a world-class engineering organization. Designated as Project Manager by HQUSACE's to lead a national Corps-wide review team in support of the FTA's & NYC's $4.3 Billion MTA/LIRR East Side Access project. Was engaged and a supportive Corps member in response to the World Trade Center, Pentagon attacks and follow-up global Army operations. Developed and implemented strategies for detailed thematic enterprise GIS overlays in connection with Future Operations assessment analysis dealing with Military Planning purposes. Maintained a strong commitment to subordinate employees by working with them to reshape/adjust their professional careers due to mission and functional changes.

United State Army Corps of Engineers (USACE); Various Locations | 1990-1998

Senior Hydraulic Engineer. Served as a key senior USACE National independent technical consultant in the fields of hydrology, hydraulics (H&H) and coastal engineering for all USACE for the planning, design and operation of water resource projects and planning investigations. Applied technical expertise against a broad range of policies, laws and regulations, procedures and methods. Developed technical criteria and guidelines for national policy implementation dealing with risk and uncertainty applicable to dams, levees, flood-risk damage reduction projects and the Corps Coastal Engineering Program. Served as HQ's R & D Program Manager for the Coastal Engineering program and co-chaired the national Tidal Hydraulics Committee. Worked with HQ's staff on full development of technical engineering and operational policy modifications pertaining to highly controversial levee vegetation management practices. Provided authoritative technical policy interpretation in response to MSC and District questions regarding H&H design within programs or individual project elements as well as large complex systems.

Passaic River Basin Levee/Floodwall Project & Multi-Intake Diversion Tunnel designs: Served as final technical authority and was fully responsible for planning, scheduling and the adequacy of all portions of the hydrology, hydraulic, civil site layout, cost engineering and structural elements of the $2 Billion Passaic River Flood Damage Reduction Project. Used independent and technical engineering judgment while exercising a full range of supervisory control over 14-28 civil, hydrologic, hydraulic, coastal, structural, CADD specialist & cost estimating personnel. Developed detailed Scope of Works (SOW's) & negotiated numerous task orders for large scale brokered segments with 5-7 Corps Districts (US wide) and 8-12 National/Local A/E firms. Planned & negotiated A/E design support contracts for levee designs, flood gates, hydraulic grade control weirs, CADD support contracts, tunnel design and complex inlet/outlet structures. Coordinated, scheduled & reviewed detailed multi-dimensional numerical models developed by Engineering Research Developmental Center (USAC E – Vicksburg) and St. Anthony Falls Hydraulic Labs. Directed and performed risk & uncertainty studies for critical levee & tunnels elements. Worked closely with widely dispersed virtual design teams to minimize feature cost, reduce environmental impacts, gain resource agency approvals and local sponsor acceptance of the Passaic Recommended Plan. Articulated technical policies & design features within USACE, resource agencies, other federal, state and local agencies as well as the local sponsor - NJDEP. Attended and presented as the technical leader at over 100 public meetings throughout northern New Jersey.

Earlier Federal Service - - - ALL Employment with USACE:

- Hydraulic Engineer; New York City, NY | 1985-1990
- Hydraulic Engineer; Baltimore, MD | 1978-1985
- Junior Engineer in Training (JET); Tulsa, OK | 1977-1978

Jeffrey A. Beriswill, P.E.

Southeast Dams Practice Lead

Mr. Jeffrey Beriswill has more than 37 years of geotechnical design and construction experience. His expertise includes numerous types of water supply reservoirs, tailings dams, process water cooling ponds, and dredged materials management areas within a variety of geologic settings. In addition, Mr. Beriswill has been involved in dam inspections, forensic evaluations, and dam rehabilitation projects. He has also been involved in geotechnical investigations and foundation designs for a variety of structures such as pipelines, intake structures, retaining walls, spillways, and commercial buildings. He has managed the design and/or construction QA/QC of over 60 miles of cutoff wall systems in a variety of geologic settings and 70 miles of soil-cement and roller compacted concrete dam facings. His experience includes the design and construction of construction shoring systems, cofferdams, and several deep cutoff wall systems.

Mr. Beriswill's extensive knowledge and experience directing activities associated with water resources and geotechnical projects range from market development, technical reviews, engineering analyses and supervision, and organization of field and laboratory testing programs. His broad background allows him to effectively and efficiently plan and operate projects on time and within budget. He is responsible for all aspects of project management for geotechnical and multidisciplinary projects.

PROJECT EXPERIENCE

South Florida Water Management District | C-43 Reservoir Package 4 Engineering During Construction; La Belle, Florida | 2019 - ongoing

Project Manager – Black & Veatch. Providing Engineering During Construction (EDC) services for the $530 million construction of 19 miles of reservoir embankment, canal improvements, and 15 ancillary water control structures for the 10,500-acre C-43 Reservoir located adjacent to the Caloosahatchee River. The dam is an earthen embankment with soil-cement slope protection within the interior. Seepage control consists of 19 miles of an approximately 70-foot deep soil-bentonite cutoff wall, vertical chimney and horizontal sand drains, and a toe drain. Work includes review of submittals and requests for information by the contractor, evaluation of potential change orders and value engineering proposals, and completion of design changes, as required. Full-time resident engineers verify and review results of the contractor's quality control program and the District's quality assurance program. $9.3M

Palm Beach Aggregates, LLC | C-51 Reservoir; Palm Beach County, Florida | 2010 - ongoing

Project Manager – Black & Veatch. Design, permitting and engineering during construction for a water supply reservoir with more than 70,000 acre-feet of storage volume constructed in a limestone quarry. The project includes over 5 miles of soil-bentonite cutoff wall through limestone and soil, and 250,000 cubic yards of roller compacted concrete within a 6,000-foot long auxilary spillway and the interior slope of the perimeter embankment. $5M.

OFFICE LOCATION

Tampa, Florida

EDUCATION

Master of Civil Engineering (Geotechnical), University of Florida, 1987

Bachelor of Science, Civil Engineering, University of Florida, 1984

PROFESSIONAL REGISTRATION

PE – 1989, FL, 41823
PE – 1991, GA, 021237
PE – 2015, NC, 022671
PE – 2019, SC, 36971
PE – 2016, IL, 062.067791

PROFESSIONAL ASSOCIATIONS

- Society for Mining, Metallurgy, and Exploration
- American Society of Dam Safety Officials

YEAR CAREER STARTED

1986

YEAR STARTED WITH B&V

2018

South Florida Water Management District | L-8 Reservoir, Pump Station, and Inflow Structure Design/Build; Palm Beach County, Florida | 2012 - 2014

Project Manager – Amec Foster Wheeler. Supported the Archer Western/Jacobs design-build team by directing portions of the final geotechnical design and development of construction plans associated with the modifications to the existing L-8 Reservoir in Palm Beach County to include a pumping station and associated inflow structure more than 40 feet below sea level. The project also included placement of revetment materials on the upstream embankment slope to protect against wave action. The lower portion of the earthen embankment was armored with roller compacted concrete utilizing on-site processed aggregates, while anchored turf reinforced vegetative mat was used on the upper portion of the slope and crest road. Provided assistance in seepage and stability modeling for dewatering and rapid drawdown conditions. Also, assisted in the roller compacted concrete mix design and development of detailed construction specifications and drawings.

South Florida Water Management District | STA-1W Expansion No. 1 Design and Construction; Palm Beach County, FL | 2014-2018

Project Director - Amec Foster Wheeler. Provided geotechnical engineering support services to MWH Americas, Inc. for the site investigation and design of a 6,500-acre expansion of the STA-1W stormwater treatment area located immediately west of the Arthur R. Marshall Loxahatchee National Wildlife Refuge. The project is a component of the Restoration Strategies projects identified to assist in meeting the Water Quality Based Effluent Limit (WQBEL) that would achieve compliance with the State of Florida's numeric phosphorus criterion as determined by the EPA. The project included the design of embankments, canal conveyances, spreader canals, culverts, and spillways. Directed the collection of field and laboratory test data, lead the development of the geotechnical data report and the geotechnical design report, completed seepage analyses for selected levee and control structures, and assisted in the development of the preliminary design report. Also provided the resident engineer and engineering support services during construction. $2M

U.S. Army Corps of Engineers | C-44 Reservoir Phase 1 Construction; Martin County, Florida | 2013 - 2015

Project Director – Amec Foster Wheeler. Responsible for providing geotechnical support to the construction contractor, Phillips & Jordan, Inc., for the first phase of construction of a water supply reservoir and associated stormwater treatment areas. The project included construction of an intake canal from the existing C-44 Canal and two permanent access roads. Tasks included development of the construction quality control plan, set up and operation of an on-site laboratory approved by USACE, field inspection and testing of earthwork and concreter, and engineering support relating to design and constructability issues associated with the project.

Manatee County | Lake Manatee Dam Phase I Repairs; Bradenton, Florida | 2014 - 2015

Project Director – Amec Foster Wheeler. Oversaw design, permitting, and construction management of emergency repairs associated with an in-stream reservoir constructed in the 1960s. Repairs predominately consisted of the construction of temporary work platforms, a 3,000-foot-long, 90- to 110-foot-deep trench remix deep (TRD) cutoff wall through the central portion of the earth embankment, and a 300-foot-long jet grout wall in the vicinity of the principal spillway. Close cooperation was required between the owner, state, contractor, and engineer to meet the accelerated repair schedule. $1.5M

Peace River Manasota Regional Water Authority | Peace River Reservoir; Manatee County, Florida | 2007 - 2009

Project Manager – Dunkelberger Engineering & Testing, Inc. Geotechnical support to MWH for the construction quality assurance and quality control for a 600-acre water supply reservoir. The project included operation of a CMEC-certified on-site materials testing laboratory, installation of 5 miles of soil-bentonite cutoff wall, placement of compacted earthfill, and both flat plate and stair stepped soil-cement on the upstream slope of the embankment as erosion protection.

Amr Ewais, PhD, P.E.

Geotechnical Engineer

Dr. Amr Ewais serves as the geotechnical engineer for Black & Veatch. He has more than 18 years of diverse practical (9 years) and research expertise in geotechnical, geo-environmental and structural engineering. He is registered professional engineer in Ontario, Canada and Colorado, USA as well as being nationally certified tunnel inspector (NCTI).

He has a strong background in liner systems and numerical modelling of complex geotechnical and geo-structural (tunnelling) problems. Dr. Ewais was responsible for planning and execution of geotechnical studies, analysis, and evaluation of field data, reviewing of formal reports outlining foundation and site preparation recommendations, and field inspection of foundation construction. He participated in projects ranged from earthen embankments and water impoundments structures, abandoned mine lands mitigations, geosynthetics, pipe rehab, tunnelling, ground, and infrastructural modelling, to structural design and analysis. Dr Ewais's main tasks included managing geotechnical design projects, developing, and executing field and laboratory inspections and investigation, project budgeting, performing engineering analyses, preparing, and reviewing geotechnical reports and proposals, and consulting with clients.

Dr. Ewais has strong experience in collecting and analysing data resulting in publishing 9 journal, 4 conference papers and many unrefereed publications in geotechnical and geo-environmental engineering fields (h-index=10 & i10-index=10). He gave over thirty presentations and participating in workshops and conferences as panellist, presenter and/or attendee. E.g., Being a panellist in a workshop with leading experts in the field of geosynthetics at BAM Institute in Berlin, Germany.

PROJECT EXPERIENCE

Lake Manatee Dam Phase II Repairs, $4.4 million, Manatee County, Florida,

Senior Geotechnical Engineer providing geotechnical support and field supervision for installation of deep soil mixing columns and stability and seepage analysis from riverbanks at for repairing spillway of 4,700-foot-long, 27-foot-high earth embankment dam.

Natural Resources Conservation Service and Spanish Trail Land and Cattle Company, LLC, Spanish Trails Ranch, $640,766, Charlotte County, Florida.

Lead Geotechnical Engineer for the geotechnical field and laboratory investigations, engineering analysis and reporting for 3.5-acre water impoundment area includes analysis for embankment up to 18-foot-high to restore historic, natural ecological condition which existed prior to agricultural manipulation. The project included designing seven water control structures.

Florida Inland Navigation District, IR-14, $163,888, Vero Beach, Indian River County, Florida.

Lead Geotechnical Engineer for the geotechnical field and laboratory investigations, geophysical surveys, engineering analysis and reporting for 30-acre Dredged Material Management Area.

Florida Department of Environmental Protection, Well Grade Road Improvements 85,805, Fakahatchee Strand State Preserve, Florida.

Lead Geotechnical Engineer for the geotechnical field and laboratory investigations, engineering analysis and reporting for Restoration Design and Permitting Dan House Prairie. The project included designing of culverts and embankments for surface water control.

OFFICE LOCATION

Tampa, Florida

EDUCATION

Ph.D. in Civil Engineering – Queen's University, Ontario, Canada, 2014.

M.Sc. in Geotechnical Engineering – Ain-Shams University, Cairo, Egypt, 2007.

B.Sc. in Civil Engineering – Ain-Shams University, Cairo, Egypt, 2004.

PROFESSIONAL REGISTRATION

PE – Colorado, PE.0059128
PE- Ontario, Canada, 100213728

PROFESSIONAL CERTIFICATION

OSHA10

SOFTWARE

Seepage and Slope analysis: GeoStudio.
Numerical model: MIDAS GTS NX, SAP2000, RISA.
Contaminant migration: POLLUTE.
Pile modelling: ENSOFT LPILE.
Lidar/Cloud analysis: CloudCompare.

LANGUAGES

English
Arabic

YEAR CAREER STARTED

2004

YEAR STARTED WITH B&V

Grove Land Reservoir and Stormwater Treatment Area, Project Development and Environment Study Phase III, Okeechobee and Indian River Counties, Florida.

Senior Geotechnical Engineer involved in geotechnical investigations for a 5,683-acre parcel that will be used as reservoir (including dams and control water structures) to provide average annual daily water supply of between 84.5 mgd and 100 mgd to the St. Johns River. The north portion of the reservoir is in the St. Johns River Water Management District, Indian River County, whereas, the south portion is in South Florida Water Management District, Okeechobee County.

Manatee County, Environmental Site Assessment (ESA) and Geotechnical Investigations, Manatee County, Florida.

Lead Geotechnical Engineer performing the geotechnical field and laboratory investigations, geophysical surveys, engineering analysis and reporting to constructing a stormwater reservoir.

Denver Water, Goose Haven Reservoir Expansion, Cell 2A, Boulder County, Colorado.

Senior Geotechnical Engineer involved in designing the dam filters for dam of the reservoir. The expansion is meant to provide 5,000 acre-feet of permanent, year-round storage space available to Lafayette and Boulder.

Ministry of Agriculture and Fisheries of Sultanate of Oman, Wadi Al-Zyhimi Recharge Dam, Oman.

Geotechnical Engineer involved in designing and performing slope stability and seepage analysis for (~ 82 ft height and 6560 ft long) rockfill dam with impermeable core, Oman.

Discharge dam and drainage collection ponds, Alumbrera, Argentina

Geotechnical Engineer involved in assessing lifetime evaluation of exposed PE geomembrane liners. The evaluation included conducting testing and site investigation and analysis.

Fishpond, Middle East.

Geotechnical Engineer involved in assessing the lifetime evaluation of exposed PE geomembrane liners. The evaluation included conducting testing and site investigation and analysis.

Todd F. Schellhase, P.E., S.E.

Structural Engineer

Mr. Schellhase is a structural engineer with 33 years of experience performing structural analysis and design of hydraulic structures for hydropower, water supply, and water treatment projects.

As lead structural engineer for the $250 Million design/build Water Works Park II Water Treatment Plant in Detroit, Michigan and the $310 Million design/build Water Corporation wastewater treatment plant expansions in Perth, Australia Mr. Schellhase was responsible for all aspects of the structural design during his tenure; structural system selection, design standards, staffing and budget projections, quality control and construction conflict resolution.

In addition to Mr. Schellhase's extensive project experience he also has significant staff management experience. From 2004 to 2008 Mr. Schellhase was the Structural Engineering Department Manager for the Black & Veatch Water Division in North America.

Mr. Schellhase has additional experience inspecting existing structures, evaluating their condition and designing structural improvements to extend the structure's useful life.

Mr. Schellhase has also designed several bridges, the most notable being a 1,234-foot-long multi-span highway bridge for the Republic of El Salvador.

PROJECT EXPERIENCE

Tennessee Valley Authority| Pickwick Landing Dam Semi-Quantitative Risk Assessment; Hardin County, Tennessee | 2022

Structural Subject Matter Expert. Performed independent quality control review for the Pickwick Landing Dam SQRA report.

Metropolitan St. Louis Sewer District | Branch, Baden, Harlem, and Mill Creek Pump Station Gates; St. Louis, Missouri | 2016-2022

Structural Engineer and Gate Designer. The St. Louis pump station projects include replacement or rehabilitation of 18 flood control large gates and associated hydraulic actuators. The gates are part of the Mississippi River flood protection system protecting the City of St. Louis. Mr. Schellhase developed gate and actuator procurement documents as well as design/build tender documents.

California Department of Water Resources | Thermalito Part 12; Oroville, California | 2018-2019

Large Gate Subject Matter Expert. Served as the large gate subject matter expert at three one-week Potential Failure Mode Analysis Workshops for three hydro-electric system components downstream from Oroville Dam.

Water District No. 1 of Johnson County | Phase V Water Treatment Plant; Johnson County, Kansas | 2007

Preliminary Structural Design Engineer. Provided preliminary structural design for 30 mgd water treatment plant including operations building, high service pump station, residuals building and aerators.

Zone 7 Water Agency | Altamont Water Treatment Plant; Livermore, California | 2007

Preliminary Structural Design Engineer. Provided preliminary structural design for 24 mgd water treatment plant including operations and maintenance building, membrane

OFFICE LOCATION

Overland Park, Kansas

EDUCATION

Master of Science, Civil and Environmental Engineering, University of Wisconsin - Madison, 1989

Bachelor of Science, Civil and Environmental Engineering, University of Wisconsin - Madison, 1987

PROFESSIONAL REGISTRATION

PE #18859, Idaho, 2019
PE #133829, Texas, 2019
PE #23648, Kansas 2014
PE #48467, Washington, 2011
PE #35502, Maryland, 2008
PE #GE04606500, New Jersey, 2006
SE #5619600-2203, Utah, 2004
SE #16048, Nevada, 2003
SE #72426PE, Oregon, 2003
PE #6201044888, Michigan, 1999
SE #081-005536, Illinois, 1998
PE #26209, Missouri, 1993
PE #28921, Wisconsin, 1992

YEAR CAREER STARTED

1990

YEAR STARTED WITH B&V

1990

and chemical buildings, flocculation and sedimentation basins, solids handling and dewatering facilities, pump stations, finished water reservoir, guard house and miscellaneous yard structures.

Las Vegas Valley Water District | Cactus Pump Station; Las Vegas, Nevada | 2007

Lead Structural Reviewer. Provided consultation and quality control review for 47 mgd pumping station and 30 MG reservoir.

Missouri-American Water Company | Shoal Creek Raw Water Pump Station; Joplin, Missouri | 2006

Lead Structural Engineer. Performed structural analysis and design for raw water pump station. Pump wetwell elevates pre-fabricated pump station above river flood level.

Southern Nevada Water Authority | IPS-1 Pump and Motor Replacements, Alfred Merrit Smith Water Treatment Facility; Las Vegas, Nevada | 2005

Lead Structural Engineer. Evaluated structural capacity of existing pump station bridge crane runway to support a new 35 ton bridge crane in addition to the existing 25 ton bridge crane. Reviewed anchorage design for 20 new vertical turbine pumps.

Little Cottonwood Water Treatment Plant Improvements | Metropolitan Water District of Salt Lake and Sandy; Salt Lake City, Utah | 2004

Lead Structural Engineer. Performed structural analysis and design for 7 MG 270’ diameter finished water reservoir, 110 mgd finished water pump station, flow control vault, connection structure, overflow and pig retrieval structure and meter vault.

Water District No. 1 of Johnson County | Missouri River Intake Low River Pumping Improvements; Johnson County, Kansas | 2003

Lead Structural Engineer. Performed structural analysis and design of foundation and cantilevered platform to suspend 4 low river level intake pumps over the Missouri River.

Heriberto A. Torres, PE

Engineering Manager

Heriberto has more than 30 years of field experience in civil and environmental engineering with hands on experience in different projects including chemical control programs, dams, roads, local and federal government and industrial. Heriberto's project management experience includes navigating complex projects, and successfully implementing forbearance schedules which decreased or eliminated liquidated damages while maximizing resources to stop project delays and cost overruns. He has outstanding inspection skills evidenced through a solid record of delivering projects ahead of schedule maintaining quality standards. This expertise and his skills as a project manager ensure the success of his projects. In addition, Heriberto is knowledgeable in environmental regulations such as local and federal laws/programs such as: Spill Prevention Control and Countermeasures (SPCC), Storm Water Pollution Prevention (SWPP), Erosion and Sedimentation Control Plan (CES Plan), Underground Storage Tanks (UIC), Emissions Permits for Power Generators (PFE), Occupational Safety and Health Administration (OSHA), Standard Contracting and other environmental regulations.

PROJECT EXPERIENCE

South Florida Water Management District | C-23 Estuary Discharge Diversion Indiantown, FL | 2023-

Construction Manager $46MM project for the construction of Pump Station, earth canal, two concrete culverts and spillway for the diversion of flow to the C44 storm treatment area. Performed construction management role coordinating contractor and SFWMD officers.

South Florida Water Management District | Sta 1 West-Water Treatment area construction; Belle Glade, FL | 2021- 2023

Project Manager/QC Manager. $96MM project for the construction of Sta 1 West-South Florida Water Management District Water Treatment area construction. Worked on the management of 5.6 miles of trapezoidal concrete lined canal serving as a liaison between the subcontractor and general contractor finishing the task in schedule. Performed quality control assessment and daily inspections for all aspects of construction and commissioning subsequent sections of the canal for immediate water conveyance in coordination with the quality assurance team.

U.S. Army Corps of Engineers | C10/C12 Culvert Construction HHD Reconstruction; Pahokee, FL | 2018-2021

Project Manager. Managed a $40MM USACE project for the reconstruction of Herbert Hoover Dike Culverts C10 and C12. Successfully took over a project from a notice to cure to a satisfactory evaluation in USACE's CPARS evaluation system and reducing for more than a year existing project delays. Responsibilities included, the preparation of forbearance schedule, progress payments, project cost control and general quality control of the project.

U.S. Army Corps of Engineers | C10A Culvert Construction HHD Reconstruction; Canal Point, FL | 2017 - 2018

Assistant Project Manager. Performed duties of project manager in $60MM project for USACE developing schedule updates and pay applications. Successfully developed a management team for the construction of culvert supervising multiple subcontractors.

OFFICE LOCATION

Coral Springs, FL

EDUCATION

MS, Environmental Engineering, New Mexico State University, Las Cruces, New Mexico, 1999

BS, Civil Engineering, New Mexico State University, Las Cruces, New Mexico, 1991

PROFESSIONAL REGISTRATION

PE – 2017, FL, PE80216
PE – 1998, PR, PE14527

PROFESSIONAL CERTIFICATES

Construction Quality Management Certificate US Army Corps of Engineers

OSHA 30-hour certificate.

Six Sigma Green Belt Certificate GE Water

YEAR CAREER STARTED

1993

YEAR STARTED WITH B&V

2023

Supervised the implementation and execution of the construction at a Culvert project and company safety programs and Accident Prevention Plan, providing support to the site safety officers in interpretations of EM 35-1-1 (USACE Safety Manual) and OSHA regulations.

U.S. Army Corps of Engineers | C5A/C5 Culvert Construction HHD Reconstruction; Moore Haven, FL | 2015 - 2017

Quality Control Manager. Successfully implemented Quality Control program for $35 million culvert USACE project. Supervised the implementation and execution of the construction at a Culvert project and company safety programs and Accident Prevention Plan, providing support to the site safety officers in interpretations of EM 385-1-1 (USACE Safety Manual) and OSHA regulations. Executed USACE Construction Quality Management of the Three Phase Construction Program (Preparatory Meeting, Initial Meeting and Follow up Meetings) for all definable features of works. Prepared, revised and submitted for Government all documentation regarding construction submittals, RFI's, supplemental design information (SDI's), as built drawings and O&M manuals final delivery to the owner as per contract requirement.

U.S. Army Corps of Engineers | Portugues Dam Operation; Ponce, Puerto Rico | 2014 - 2015

Quality Assurance Inspector. Performed warranty checks for equipment at all the facilities of the dam. Supervised contractors and subcontractors in the commissioning and repair of dam monitoring equipment. Successfully developed procedures and checklist for the operation of valves and releases of water from dam during and after rain events. Coordinated with municipal and state agencies the procedures to be followed in case of emergency. Performed operational testing to the valve house water control for the dam.

U.S. Army Corps of Engineers | Portugues Dam Construction, $350M Roller Compacted Concrete Dam; Ponce, Puerto Rico | 2011 - 2014

Quality Control Resident Inspector. Analyzed deficiencies and tests to determine causes and recommends/initiates corrective actions in contractor methods and/or materials as required. Supervised several engineers, construction inspectors and QC Lab technicians responsible for contract quality control functions. Successfully adjusted and maintained corrections and adjustments at (RCC) and conventional concrete for the dam and performed formula inputs to the computerized batching plant. Provided necessary provisions to ensure work quality, administration of contract provisions, and the solution of technical problems during structural site preparation and construction operations. Performed final testing for the water level control valve facility. Coordinated U.S. Army Corps of Engineers the quality and adherence to the construction specifications.

Puerto Rico Aqueduct and Authority | Various Civil Work Projects; San Juan, Puerto Rico | 2009 - 2011

Engineering Consultant. Performed civil work projects related to construction of concrete, steel and timber pumping stations, spillways, culverts, and bridges and skill in site preparation to find technical solutions under difficult soil, foundation. Prepared hydraulic and chemical balance engineering design analyses, plans, specifications and cost estimates for water or wastewater treatment facilities. Performed construction inspections for sanitary sewers and pump lift stations for Puerto Rico Aqueduct and Authority. Person in charge of chemical cleanings of desalination units done in budget and schedule. Performed all the chemical analyses for process control and performing all the necessary field adjustments. Performed Phase 1 Environmental Site Assessments for property transactions for 1-acre single sites. Prepared and obtained environmental and construction permits and was involved in the development process con construction projects.

PREPA | Design and Mechanical Chemical Treatment Programs; Sa| 1999-2009

Technical Sales Representative. Successfully designed and applied mechanical chemical treatment programs for treatment of sea water surface condensers at PREPA polinas, Puerto Ricower plants, maintaining chemical and mechanical cleaning programs within budget and allowing high vacuum results. Maintained key customer accounts during highly competitive situations without decreasing sales margins. Installed and maintained chemical feed systems with automatic feedback control for boiler, cooling and wastewater systems. Installed and serviced water treatment equipment such as softeners and reverse osmosis systems. Provided comprehensive engineering reports to highlight treatment results for in accordance with various industry standards. Successfully provided service and support to pharmaceutical, power, food, public utility, rum distilleries and breweries, adapting and learning the specifics of each industry providing value added service for the chemical treatments.

Puerto Rico Aqueduct and Sewer Authority | Various Civil Work Projects; San Juan, Puerto Rico | 1999

Civil Engineer. Revised PRASA Sewer and Treatment Plant plans and specifications for construction approval. Performed field inspections during constructions of sanitary sewer systems and pump lift stations. Reviewed the plans and specifications for sanitary sewer systems for the assignment of federal funds under the Federal Grant and State Revolving Funds programs. Construction inspection of sanitary sewer for Puerto Rico Aqueduct and Sewer Authority.

ZAN KUGLER P.E. LLC
Water Resource Engineering

Zan Kugler West Palm Beach, Florida (561) 718-5037
zkugler@yahoo.com

EDUCATION: B.S. Civil Engineering, University of Pittsburgh, 1971
M.S. Civil Engineering, New Jersey Institute of Technology, 1979

EMPLOYMENT HISTORY:

Zan Kugler, PE, LLC (2010 to Present): Established in 2010 to continue to provide water resource engineering for both private and governmental clients.

Powell Kugler, Inc. (2004 to 2010): (Retired) (6+) years as Chief Design Engineer and founding partner for the water resource engineering firm of Powell Kugler, Inc. Clients included both governmental and private firms with project scopes primarily for design of water supply and flood protection pump stations in the South Florida area. Assignments include numerous South & Central Florida Flood Control and Everglades Restoration projects for the South Florida Water Management District. The project scopes involve repair and restoration as well as design of new large capacity pump stations. Also provided engineering design services for local city, county as well as agricultural projects including sand transfer pump stations and farm drainage pump stations.

South Florida Water Management District (1984 to 2004): (Retired) (19+) years as Director, Engineering Division and Chief Design Engineer. The South Florida Water Management provides flood protection, water supply as well as restoration and management of natural ecosystems for an area that encompasses all or part of 16 Florida counties. The Engineering Division provided design, environmental permitting, survey, and project management services for the construction of flood control and water supply works, constructed wetlands and environmental restoration projects, emergency operation and recovery projects, repair, modification, or replacement of field operations and administration facilities, inspection and assessment of water control works and administration facilities, findings of fact and technical support for legal claims and litigation, site development, road and bridge construction.

US Army Corps of Engineers (1972 to 1984): (12) years with the US Army as a Civil Engineer, the last (4) years as Chief, Construction Section, US Army Corps of Engineers, Miami Area Office, JAX District. Construction projects supervised included the Miami Beach Restoration, Port Everglades Harbor Deepening and a number of other ICWW dredging projects, Fort Jefferson Restoration, Krome Avenue Refugee Center, and the construction of a number of flood control structures and large capacity pump stations of the South & Central Florida Flood Control Project.

ORGANIZATIONS: **Hydraulic Institute:** (20+) years as a standards committee member of the Hydraulic Institute. Participated as a member for the intake, pump acceptance, and vibration standards committees. Was member of first intake standards committee that developed the original standard ANSI/HI 9.8 for the design of pump intakes.

CERTIFICATIONS: Professional Engineer - Florida

Joe Santogatta, P.E.

Regional Design Lead Electrical Engineer

Mr. Santogatta is a senior electrical engineer with 16+ years of design, field, and management experience in both commercial and industrial industries ranging from water and wastewater, power distribution, renewable energy, and oil and gas to aerospace, life sciences, and chemical processing.

Some of Mr. Professional's key recent assignments have included:

- Lead Electrical designer for a stormwater pump station upgrade project in Charleston, SC.
- Lead Electrical designer for a wastewater treatment plant expansion project in Ridgeland, SC.
- Lead Electrical designer for a water treatment plant expansion project in Hanahan, SC.

PROJECT EXPERIENCE

Charleston Water System | HWTP Master Plan CIP Optimization; Hanahan, SC | 2023

Lead electrical designer responsible for analyzing the electrical distribution system at the Hanahan Water Treatment Plant as part of an overall Capital Improvements Program master plan being developed for Charleston Water System. Responsibilities include the analysis of the existing distribution system, the distribution master plan, and an analysis of the existing electrical power equipment on site in order to provide recommendations for electrical upgrades necessary to ensure the efficient operation of the existing plant and provide new capacity for expansion projects included in the overall CIP plan.

Charleston Water System | HWTP Gibson RWPS and Dewatering Improvements Project; Hanahan, SC | 2022-Current

Lead electrical designer responsible for the design of a new electrical distribution system associated with a raw water pump station and dewatering improvement project. Responsibilities include specification of electrical equipment for early procurement, design of a medium and low voltage electrical distribution system, and the design of a new electrical building.

City of Charleston, SC | Concord Street Pump Station Rehabilitation; Charleston, SC | 2022-Current

Lead electrical designer responsible for the design of a new electrical distribution system for a stormwater pump station rehabilitation. Responsibilities include the specification and recommendation of electrical equipment for CMAR early procurement, the analysis of proposed equipment, and the design of the electrical distribution and control system for the pump station and electrical building.

Beaufort-Jasper Water & Sewer Authority | Cherry Point WRF Expansion; Okatie, SC | 2022-Current

Lead electrical designer responsible for the electrical design of a wastewater plant expansion project from 7.5 mgd to 11.25 mgd with future plans to expand to 15 mgd. Responsibilities include an analysis of the existing site distribution and backup generation system and the electrical design associated with new backup generation as well as a new UV facility, pump station, EQ system, dewatering building, bioreactor, and other systems necessary for the capacity expansion.

OFFICE LOCATION
Charleston, SC

EDUCATION
BS, Electrical Engineering, Clarkson University, 2006

PROFESSIONAL REGISTRATION
PE – 2014, SC, 31781

YEAR CAREER STARTED
2006

YEAR STARTED WITH B&V
2022

National Aeronautics and Space Administration (NASA) | Various Jet Propulsion Laboratory Facility Projects; Pasadena, CA | 2018-2022

Electrical facilities engineer for JPL responsible for the planning, design, and management of engineering projects on lab ranging from routine improvement projects to entire laboratory and clean room designs to facilitate the needs of new state of the art research and development projects including mission critical facilities. Responsibilities on all projects included preliminary research and design, generation of a cost estimate for design and construction, complete design including CAD drawings and modeling, coordinate review sessions with in-house safety and code compliance teams, and provide construction design support through to project completion.

Amgen Inc. | Laboratory and cold room upgrades; Thousand Oaks & San Francisco, CA | 2015-2017

Lead electrical engineer and engineer of record on several biopharmaceutical laboratory and cold room upgrades for Amgen facilities in Thousand Oaks and San Francisco, California. Responsibilities included the design of both the electrical distribution system and lighting design for various facility projects to meet the requirements of the client and the stringent California Title 24 energy code.

Dyno Nobel | St Helens Nitrogen Plant; St Helens, OR | 2015

Electrical field engineer responsible for coordinating the installation of a new medium voltage smart Motor Control Center and other electrical plant upgrades with the Dyno Nobel turnaround team.

Southern Company Nicor Gas | Natural Gas Compressor Facility; Naperville, IL | 2012-2014

Lead electrical engineer and engineer of record responsible for the complete electrical design for new natural gas compressors at various Nicor Gas compressor stations throughout Illinois.

Western Area Power Administration (DOE) | 115kV Substation Bay Addition; Lakewood, CO | 2010

Lead electrical engineer responsible for the design of an addition to a high voltage substation for the Department of Energy.

United States Department of Defense | Pueblo Chemical Agent-Destruction Pilot Plant; Pueblo, CO | 2006-2009

Electrical field engineer responsible for field engineering work as part of a multi-billion dollar one of a kind chemical weapons destruction plant in Pueblo, CO. Responsibilities included design of work packages, field sketches, schedules, material take-offs, and cable pulling plans and tension calculations. Responsibilities also included the inspection and testing of grounding systems, conduit layouts, megger and hi-pot testing, visual inspections, and equipment testing prior to start-up activities.

Kevin Shelton, PWS, CERP

Senior Scientist/Project Manager

Mr. Kevin Shelton has 34 years of ecological experience with a focus on state and federal regulatory permitting requirements. He has created master plans for mitigation and restoration of large tracts of land and designed small and innovative on-site mitigation efforts. His work in incorporating public education and recreation in his mitigation and public interest designs has resulted in improved mitigation success as well as cost savings to his clients. Mr. Shelton has experience in wetland delineations including use of methods defined by 62-340, F.A.C. and USACE 1987 Manual and its regional supplements. He has conducted benthic surveys including seagrasses, benthic infauna, and corals. He has a wide variety of experience with wildlife surveys and monitoring including listed species such as crested caracara, Florida sand skink, shorebirds, and manatees. He is an FWC-approved primary observer for marine endangered species observations for explosive underwater demolitions and aerial surveys as well as an FWC-authorized Gopher Tortoise Agent. Additionally, Mr. Shelton has more than 16 years of experience with zoo and aquarium operation and design.

PROJECT EXPERIENCE

Manatee County/Carollo Engineers, Lake Manatee Dam Phase II Final Repairs, Manatee County, Florida, $1.5 million (July 2020 to Ongoing)

Permitting Task Lead/Senior Ecologist. Responsible for ecological/environmental evaluation of the project and permitting the project through the FDEP and USACE. Project addressed the heavily damaged seepage control system for the Service Spillway and downstream riverbank stability.

Stream and Lake Biological Monitoring, Orange County, Florida, $151,000, WSP (2018 to 2019)

Senior Scientist. This project consists of biological sampling at 10 streams and 20 lakes in Orange County as assigned by the Orange County Environmental Protection Division (OCEPD) to assess the biological health of the subject waterbodies and to assist OCEPD in future management efforts. Macroinvertebrate sample collection using the SCI method has been completed at 10 locations, including streams in reference locations with limited human impacts and streams in more urbanized locations. During sampling events, WSP provided SCI sampling methodology training to OCEPD staff. In addition to the SCI, a habitat assessment (HA), rapid periphyton surveys (RPS/algal survey), and linear vegetation surveys (LVS) were conducted during each stream sampling event. SCI samples were shipped to and analyzed by WSP's in-house taxonomic laboratory. Aquatic macroinvertebrates were collected, preserved, and identified in the laboratory to the lowest practical taxonomic level following FDEP SOPs. WSP is also performing aquatic vegetation sampling using the lake vegetation index (LVI) on up to 20 lakes throughout the County.

South Fort Meade Mine Stream Reclamation and Monitoring, Mosaic Fertilizer, LLC, Florida, WSP (2009 to Ongoing)

Senior Scientist. WSP developed natural channel designs for stream construction or enhancement of various reclaimed stream systems within the SFM Mine. Following construction, biological, water quality, and hydrologic monitoring were conducted. Biological monitoring includes collecting and identifying fish species, and conducting FDEP HA, SCI, LVS, and RPS to assess macroinvertebrate, algal, and floral communities. Water quality monitoring includes collecting water quality samples and measuring

OFFICE LOCATION
Tampa, Florida

EDUCATION
Bachelor of Science, Environmental Science and Policy, University of South Florida, 2015, United States
Associate of Arts, Biology, Santa Fe College, 1993, United States
Associate of Science, Zoo Animal Technology, Santa Fe College, 1993, United States

PROFESSIONAL ASSOCIATIONS
Society of Wetland Scientists - Professional

Society for Ecological Restoration International - Professional

Tampa Bay Association of Enviromental Professionals - Member

Florida Association of Enviromental Professionals - Member

The Wildlife Society - Florida Chapter - member

American Association of Zoo Keepers – Member

YEAR CAREER STARTED
1989

YEAR STARTED WITH B&V
2023

water quality field parameters with a multiparameter sonde to determine the stream's physicochemical properties. Hydrologic monitoring activities include installing and monitoring staff gages, measuring flows with an ADV, and developing/maintaining rating curves.

Synoptic Biological Monitoring of Springs, St. Johns River Water Management District, Florida, $308,000, WSP (2015)

Senior Scientist and Dive Supervisor. Assisted with this large-scale project developing a baseline set of ecological data in 14 spring-fed rivers across the state. The scope of the project was highly interdisciplinary, including many facets of hydrological and biological monitoring, specifically to capture the variability of physicochemical parameters, submerged aquatic vegetation (SAV), benthic macroalgae, epiphytic algae, and macroinvertebrate communities. Project objectives included developing a baseline set of biological community and distribution data that can be used to assess current ecological conditions to compare to historical and future conditions in spring ecosystems. Collected SAV and algae from the benthic zone in each spring-fed river, which required the services of the WSP Dive Team at deeper locations. Divers or snorkelers conducted observational monitoring for percent coverage estimates and biomass collection of all SAV species, and epiphytic and macroalgal communities. Detailed current velocity profiles were conducted across river channels, along with densiometer estimates for riparian canopy cover. Water chemistry measurements were taken using in-situ water quality multiparameter sondes.

Roosevelt Creek Stormwater Facility Improvements, Pinellas County, Florida, $77,953, WSP (2017 to 2020)

Project Scientist. Conducted wetland delineations and habitat evaluations in the proposed project area. Evaluated potential wildlife conflicts. Developed wetland restoration plans for a 68-acre site and assisted with stormwater designs to ensure appropriate hydrology. Provided preliminary permitting feasibility analysis and conducted pre-application meetings with regulatory agencies.

Cranberry Lane Drainage Improvements, Hillsborough County, Florida, $78,897, WSP (2017)

Senior Scientist. Conducted a wetland delineation and functional evaluation for expansion of a stormwater treatment wetland. Provided environmental resource permitting services through the Southwest Florida Water Management District.

Hilochee WMA Hydrologic Restoration, Florida Fish and Wildlife Conservation Commission, $119,543, WSP (Ongoing)

Senior Scientist. Conducted wetland delineations and habitat evaluations within the Hilochee Wildlife Management Area to support hydrologic restoration of the property. Evaluated potential wildlife benefits of the project. Assisted with hydrologic improvement designs. Developed a report summary of project benefits and preliminary permitting feasibility analysis. Provided environmental resource permitting services for the hydrologic improvement projects within the WMA.

Lake Conine Treatment Wetland Modifications, Polk County Parks & National Resources, Florida, $89,700, WSP (2015 to 2017)

Senior Scientist. Provided design and permitting services for the development and restoration of a 34-acre treatment wetland to restore a low quality, dehydrated wetland along the southeast shore of Lake Conine in Winter Haven, Polk County. The design was intended to improve lake water quality via nutrient load reductions. Provided wetlands delineation and functional assessments, wetland hydrology and planting plans, and park design. Provided environmental resource permitting services for state and federal authorizations.

Lake Gwyn Restoration and Flood Protection (West), Polk County Parks & National Resources, Florida, $150,000, WSP (2015)

Senior Scientist. Provided wetland restoration design and permitting services to restore a historic lake that had been dewatered by the introduction of a large ditch in the 1940s. Designed excavation contours to maximize wetland function and diversity of wildlife habitats. Developed bid specifications including planting plans and exotic species removal and controls. Designed recreational and educational components of the park. Provided environmental resource permitting services for state and federal authorizations.

Lake Gwyn Restoration Construction Services, Polk County Parks & National Resources, Florida, WSP

Senior Scientist. Provided construction inspection services for this wetland restoration project. Primary concerns were soil management, plantings, and exotic species eradication.

Lake Gwyn Restoration and Flood Protection (East), Polk County Parks & National Resources, $180,000, WSP (Ongoing)

Senior Scientist. Provided wetland restoration design and permitting services to restore a historic lake that had been dewatered by the introduction of a large ditch in the 1940s. Provided wetlands delineation and functional assessments, determined seasonal high water and normal pool elevations. Designed excavation contours to maximize wetland function and diversity of wildlife habitats. Developed bid specifications including planting plans and exotic species removal and controls. Designed recreational and educational components of the park. Provided environmental resource permitting services for state and federal authorizations.

Gilshey Branch Wetland Monitoring, Mosaic Fertilizer, LLC, $6 million, WSP (2005 to Ongoing)

Project Scientist. Conducted mitigation success monitoring services for 265 acres of reclaimed wetlands including depressional marshes, headwater cypress swamp, and riparian corridors. Quantitative measures of vegetative cover included square-meter and belt transect sampling. Calculated relative cover of each species as well as total cover and qualitatively compared to field observations. Performed a wildlife utilization survey of each wetland. Prepared reports for submittal to the regulatory agencies including narratives, table, graphs, and figures. Provided recommendations for wetland improvements such as exotic species controls and hydrology modifications.

Lake Seminole Environmental Restoration Dredge, Pinellas County, Florida, $1 million, WSP (2016)

Project Scientist. Conducted data collection and interpretation, environmental resource permitting, and construction design services. Provided professional environmental resource permitting services in support of County's Lake Seminole Sediment Removal Project involving dredging of one million cubic yards of nutrient laden sediments, dewatering, and disposal.

Lake Apopka Experimental Dredging Restoration Project, Orange and Lake Counties, Florida, WSP (2016)

Project Scientist. Provided professional environmental resource permitting services in support of St. Johns River Water Management District's dredging of Lake Apopka and deposition of material in Cells F & G. Coordinated ERP applications for FDEP and USACE approvals. Coordinated Section 106 Cultural Resource surveys and clearances. Conducted agency meetings and negotiations. Assisted with investigations of future disposal options within the North Shire Restoration Area.

Mosaic Desoto Mine USACE Permitting, Mosaic, Desoto County, Florida, WSP (2013)

Project Scientist. Assisted Mosaic with the permitting of a large phosphate mine in Desoto County. Developed permitting support documentation, including alternatives analyses, mitigation strategies, and USACE Section 404 applications.

Jahna Maclenney Sand Mine, E.R. Jahna, Baker County, Florida, WSP (2012 to Ongoing)

Project Scientist. Conducted extensive wetland delineation and evaluation, as well as an ecological survey, on a 960-acre site in preparation for environmental permitting for a proposed sand mine. Effort included wetland delineation based on 62-340, F.A.C. and USACE 1987 Manual with formal determination conducted by FDEP and USACE. Site was also surveyed for the presence of T&E species involving literature searches, mapping, and on-site surveys.

Jahna Mills Mine Expansion, E.R. Jahna, Hernando County, Florida, WSP (2012)

Project Scientist/Manager. Conducted preliminary wetland delineation and evaluation and an ecological survey on the 112-acre site in preparation for environmental permitting for the proposed sand mine expansion. Performed wetland determination based on 62-340, F.A.C. Site was also surveyed for presence of T&E species involving literature searches, mapping, and on-site surveys. An environmental constraints report was delivered to client that included narrative, maps, figures, and photographs.

Westshore Waterway Environmental Enhancement: Data Collection and Interpretation, Preliminary Design and Permitting, City of Tampa, Florida, $615,000, WSP (Ongoing)

Project Manager. Provided professional environmental resource permitting services in support of City's Waterway Management Project involving dredging of several residential canals. Conducted extensive existing data collection and interpretation, compilation of a preliminary design report, and environmental resource permitting services. Navigated through very contentious public involvement and negotiated atypical permitting methods for expedited processing.

Lake Seminole Sediment Removal: Design and Permitting, Pinellas County, Florida, $1.2 million, WSP (2010 to Ongoing)

Project Scientist. Provided professional environmental resource permitting services in support of the County's Lake Seminole Sediment Removal Project involving dredging of 1 million cubic yards of nutrient laden sediments, dewatering, and disposal. Conducted data collection and interpretation, environmental resource permitting, and construction design services. Conducted tree, wetland, gopher, and wildlife surveys and assisted with gopher tortoise relocation.

Renee R. Murch, PE

Planning and Water Resources Project Manager

Ms. Murch joined Black & Veatch in 2022 and has worked on a variety of projects including regional, sub-regional, and site-specific modeling applications. Her areas of expertise include the development and application of hydraulic, hydrologic, groudwater, integrated, and statistical models to support minimum flow and level (MFL) development, flow equalization basin (FEB) design, restoration of surface water resources, simulation of regional- and local-scale hydrologic conditions, and application of statistical modeling and machine learning applications including regressive models, artificial neural networks, trend analysis, and Markov Chain Monte Carlo (MCMC) probabilistic simulations.

PROJECT EXPERIENCE

Water Resources Projects

St. Johns River Water Management District | Indian Lake System Hydrologic Modeling in Support of Determining Minimum Flows and Levels; Volusia County, FL | 2020-2022

Project Manager and Project Engineer. Collected site-specific data and develop a revised model of the Indian Lake system including Indian Lake, Scoggin Lake, and Coon Pond and their contributing basins using HSPF. New basin boundaries were developed using available LIDAR and contour data. Lake bathymetry of Scoggin Lake, Indian Lake, and Coon Pond was surveyed to better represent the stage/storage/surface area relationships of each waterbody. HSPF special actions were used to account for the lake leakage. Leakage into or out of the lakes is dependent on the head gradient between the lake stage and the aquifer elevation. Responsibilities included data review, basin field verification, data collection of lake bathymetry, model conceptualization, documentation of all project tasks, and project management.

Tampa Bay Water | Integrated Hydrologic Model and Integrated Northern Tampa Bay Model Training; Clearwater, FL | 2017-Present

Project Manager and Project Engineer. Assisting Tampa Bay Water (TBW) staff in the development and presentation of material for several IHM/Integrated Northern Tampa Bay (INTB) trainings. Working alongside TBW, was responsible for preparation of training material, including slide decks, example model scenarios, and post-processing utilities. Developed an R script to create shapefiles of IHM Binary Reader post-processed output using IHM Extra Action within the IHM User Interface (UI). Trainings were grouped into several major topics, including IHM basic skills, consolidated wellfield scenarios, and diversion and irrigation scenarios with the INTB. Training material was presented over training sessions ranging from 1-day to 4-day, both in-person and online. Training exit surveys taken by attendees indicated that the training was well-organized, easy to understand, and presented by knowledgeable facilitators.

South Florida Water Management District | Internal Works and Dam Breach Modeling for Flow Equalization in the C-139 Basin; Hendry County, FL | 2018-2019

Project Engineer. The South Florida Water Management District desired a low hazard low head reservoir to serve as a flow equalization basin (FEB) in Hendry County located in the C-139 Annex. The FEB would store excess water that would exceed the capacity of the neighboring stormwater treatment areas (STA5 and STA6). Hydraulic models were developed to represent the internal works and perform a breach analysis for the proposed FEB. ICPRv4 was used to develop two models to represent the internal embankments of the proposed FEB and model the draining and filling of the FEB at the design flow rate of 690 cubic feet per second. The design scenarios examined the

OFFICE LOCATION

Tampa, FL

EDUCATION

MSCE, Civil Engineering, Water Resources, University of South Florida, 2002

BS, Civil Engineering, University of South Florida, 2000

PROFESSIONAL REGISTRATION

PE – 2006, FL, PE 64678

YEAR CAREER STARTED

2002

YEAR STARTED WITH B&V

2022

hydraulic efficiency of the inflow and outflow canals, potential scour, and the time required to fill the reservoir to capacity. An additional 4 ICPRv4 models were developed to perform a dam breach analysis to examine multiple failure scenarios of the earthen dam. The dam breach simulations utilized LIDAR data and estimated the flood wave propagation across the landscape. Maps of inundated areas were identified and documented. Responsibilities included all ICPRv4 modeling and documentation of results.

South Florida Water Management District | Mecca Hydrogeologic Study and Groundwater Flow Modeling Strategy Plan; West Palm Beach, FL | 2015-2018

Project Engineer. The Mecca Farms property owned by the district is approximately 1,920 acres of land that was once a former citrus grove located in northern Palm Beach County. The district's plan for the property is to design and construct a water storage facility at the site. MODFLOW groundwater modeling of the proposed Mecca Reservoir will aid in the evaluation of wetland and aquifer impacts and recovery due to the reservoir construction. The groundwater modeling is designed to supplement the seepage modeling and hydrologic and surface water modeling. The overall objective is to assess the effects of the proposed Mecca impoundment on groundwater elevations adjacent to the project site and to assist in the design of project features. Utilized Perl scripts for post-processing of groundwater model results which were compared to the District's results as a proof-of-concept and incorporated into a submittal of a groundwater modeling strategy plan for the Design Documentation Report for the Restoration Strategies Loxahatchee River Watershed Restoration Replacement Mecca Project. Developed and calibrated 3 micro-scale transient MODFLOW models to simulate field pump tests in order to determine realistic calibration ranges for aquifer and canal parameters. Performed quality assurance/quality control (QA/QC) on MODFLOW packages, post-processed model simulation results and documented model development and simulations.

South Florida Water Management District | Peer Review for Caloosahatchee River (C-43) West Basin Storage Reservoir Freeboard Analysis and Separator Dam Update; West Palm Beach, FL | 2016

Project Manager and Peer Reviewer. Provided peer review services for a freeboard analysis and separator dam design of C-43 West Basin Storage Reservoir. Recommendations based on review of the model documentation included modifying the analysis to assume that outlet structures are wide open during the design event, the need to recommend a final freeboard height in the documentation and modifications to the documentation to provide additional modeling details. Responsibilities included review of consultant reports, participation in conference calls, and documentation of the peer review.

South Florida Water Management District | Peer Review for In Situ Vegetation Resistance Studies of Water Conservation Areas; West Palm Beach, FL | 2014

Project Engineer and Project Manager. This project provided the district with peer review services for several publications that focused on the characterization of in-situ vegetation resistance in water conservation areas (WCAs). The peer review focused on the review of field experiments and the appropriate generalization of those experiments to other systems. Responsibilities included review of district reports, participation in conference calls, and documentation of the peer review.

South Florida Water Management District | Peer Review for Dam Breach Study for L-36, L-35A, L-37, and L-30 Levees in Broward and Miami Dade Counties; West Palm Beach, FL | 2015

Project Engineer and Peer Reviewer. Provided peer review services for a levee breach study using FLO-2D models to perform breach and floodplain analyses. The peer review focused on model conceptualization, calibration, and breach and floodplain simulations. Recommendations based on review of the model documentation included the consideration of multiple breaches, additional discussion on selection/calibration of Manning's *n* values, and additional discussion of empirical equation validation. Responsibilities included review of District reports, participation in conference calls, and documentation of the peer review.

South Florida Water Management District | Everglades Landscape Model Application Simulations: Alternative Scenarios for WCA-2 and WCA-3; West Palm Beach, FL | 2009

Project Engineer. This project assisted the district in the evaluation of ecosystem restoration scenarios using the Everglades Landscape Model (ELM). The sub-regional ELM was temporally extended for Water Conservation Area 2 (WCA-2) to 2005 for alternative analyses, and the 1-kilometer grid regional ELM was modified in order to evaluate the effect of hydraulic changes on Water Conservation Area 3 (WCA-3). It was desired to examine the effect that these hydraulic changes would

have on the amount of total phosphorous (soil TP) in the area surrounding the Miami Canal, as well as in WCA-2. Results assisted the District in proceeding with ecosystem restoration and decompartmentalization strategies for the Everglades.

South Florida Water Management District | Preliminary Water Quality Treatment Analysis for the Lake Point Property; Martin County, FL | 2008

Project Engineer. This project involved the application of DMSTA2, to conduct a flow analysis for a system of proposed stormwater treatment areas in Martin County, FL. An uncertainty analysis was conducted by interfacing DMSTA2 with uncertainty analysis software Crystal Ball in order to produce a range of expected values for the expected total phosphorous (TP) removal (tons/year) based on expected TP loading rates and net settling rates for phosphorous removal. Results of this project assisted the District in determining the feasibility and practicality of converting the Lake Point Ranch area into a stormwater treatment area (STA) over the next few decades.

Hillsborough County | Hillsborough County Wellhead Protection Study; Hillsborough County, FL | 2019-2020

Project Engineer. Hillsborough County's wellhead protection map was approximately 20 years old. Many changes to the municipal water system were made since the map was developed. The county contracted with Black & Veatch to develop a new wellhead protection map to more accurately zone land development based on updated modeling technology and current pumping practices. The Integrated Hydrologic Model (IHM) is the best available process model defining the hydraulics for the region including the County and surrounding area. The IHM was used to develop a single layer MODPATH model of the Floridan Aquifer System. The IHM provided all the boundary conditions for the MODPATH model including upper face flux, lateral fluxes, river fluxes, and General Head Boundary fluxes. The MODPATH model was verified with against the IHM results to prove it was identical to the IHM results. The MODPATH model was used to develop the 10-year travel paths for the potable supply wells in and around Hillsborough County. Responsibilities included IHM simulations, extraction of water balance terms from the IHM, transfer of water balance terms to MODPATH model, and visualization and documentation of methodology.

City of Zephyrhills | Consumptive Use Permit Renewal; Zephyrhills, FL | 2018 - 2019

Project Engineer. The City of Zephyrhills, as part of their water supply plan, requested a modification to their municipal water supply permit. The modification included increases in pumping as well as the relocation of one of their wells to address water quality issues. This project utilizes the IHM to predict impacts in both the surface water system and the groundwater system. The alternative simulations involved the incorporation of pumping seasonality and return flows into the City's rapid infiltration basins (RIBs). MFL sites near Zephyrhills (Hillsborough River above Crystal Springs and Crystal Springs) have long term measurements and have significant surface water and groundwater interactions. The Southwest Florida Water Management District has allowed only insignificant impacts throughout the entire Hillsborough River watershed and has prevented measurable impacts in both surface water flows and groundwater heads. The Integrated Hydrologic Model was used to evaluate the impacts associated with changes in pumping in the area. Responsibilities include all model pre-processing, simulation, post-processing, and documentation.

St. Johns River Water Management District | Peer Review of the Lake Weir HSPF Model; Palatka, FL | 2019

Project Manager and Project Engineer. Performed a review of an HSPF model developed for Lake Weir, located within the St. Johns River Water Management District. The review focused on available data, model conceptualization, and model calibration. It was found that overall, the model generally follows standard engineering practice and uses the best available data. Several recommendations were made, including the reconsideration of DCIA percentages, modifications to the long-term simulation UCI, and a sensitivity analysis. Responsible for all model review and documentation of the review.

Southwest Florida Water Management District | Microsoft Access Training; Brooksville, FL | 2019

Project Manager and Project Engineer. Developed and facilitated a 1-day workshop for District staff focusing on database development and application in Microsoft Access. The first half of the workshop focused on database background and design. The second half of the workshop focused on the IHM database and updates to the database using update and append queries. The workshop was developed due to the District's need to increase staff proficiency in Microsoft Access since it is used for the IHM.

Terry Hull, P.E.

Technical Lead

Terry Hull has 37 years of experience in hydrology and hydraulics including multidimensional dynamic modeling; water supply; shoreline stability/protection; levee fragility; sediment transport, sedimentation, and geomorphology; hurricane surge; wave mechanics and loading; littoral processes; bridge scour; and water quality in streams, estuaries, and marinas. His experience also includes modeling and design of projects involving environmental and ecosystem restoration, flood control, dredging, recreation, and navigation projects. Mr. Hull has applied a wide variety of numerical modeling tools that include the U.S. Army Corps of Engineers (USACE) RMA-2, RMA-4, HEC-RAS, HEC-ResSim, ADCIRC, and STWAVE; DHI's MIKE-SHE, MIKE-11, and MIKE-21; the U.S. Environmental Protection Agency's (EPA) SWMM and EFDC; and others. He has applied these models for over 5,000 miles of water bodies. Mr. Hull brings a proven ability to manage and execute complex engineering and scientific projects from planning and permitting through design and construction. Mr. Hull has primarily served local, state, and federal clients, including all five Florida water management districts, the Florida Department of Environmental Protection, the South Carolina and Florida Departments of Transportation, Louisiana Department of Natural Resources, USACE, and the Federal Emergency Management Agency (FEMA). He was recently selected by the National Institute of Building Sciences for three panels of experts to perform an independent review of scientific and technical data used by FEMA to develop Flood Insurance Rate Maps and offer scientific and technical expertise to determine the appropriateness of the study methods and results. An active member of the engineering profession, he has received honors that include the 2013 National Society of Professional Engineers (NSPE) Distinguished Service Award, the 2012 James F. Shivler, Jr., P.E. Award for Outstanding Service to the Engineering Profession, the 2012 Florida Engineering Society (FES) Award for Outstanding Service to the Engineering Profession, the 2009 State FES Engineer of the Year, and the 2008 FES Outstanding Service to a Student Chapter Award

PROJECT EXPERIENCE

Boma Flow Equalization Basin (FEB) Conceptual Design, South Florida Water Management District, Glades County, FL, 2021

H&H Engineer. Reviewed and ranked 6 design alternatives to expand regional storage in the Caloosahatchee River Watershed to mitigate harmful freshwater releases to the Caloosahatchee Estuary. Criteria included cost, complexity, storage, water quality, adaptability, etc.

Computational Fluid Dynamics Modeling to Support Pump Station Designs, U.S. Army Corps of Engineers, Palm Beach and Dade Counties, FL 2022

Quality Manager. Provided quality assurance by overseeing a quality control team for CFD and physical modeling for two pump stations – S356 and S426 – in South Florida to support USACE designs. Also served as liaison with the physical modeler. Dr Checks was used to resolve comments from USACE and SFWMD.

Bridge Hydraulic Studies, Florida Department of Transportation, Various Rivers, FL. 1990 – 2023.

Project Manager, Principal-in-Charge, or Engineer of Record. Directed over 40 bridge hydraulic studies in Districts 2, 4, and 5. These studies included the dynamic hydraulic modeling of over 1,000 river miles, primarily using tools such as HEC-RAS (1- and 2-D), UNET, TRANQUAL (in-house developed 2D dynamic model), and RMA2. Performed and directed calculations of pier, abutment, and contraction scour, as well as potential channel migration.

OFFICE LOCATION

Jacksonville, FL

EDUCATION

MS, 1999, Engineering Mechanics (Fluid Mechanics with Coast Engineering emphasis), University of Florida

BS, 1985, Engineering Science and Mechanics (Bio-Fluid Mechanics), University of Tennessee

PROFESSIONAL REGISTRATION

PE – 1990, FL, 42600
PE – 2000, SC, 20436
PE – 2000, NC, 26116
PE – 2001, LA, 29663
PE – 2002, TX, 89819
PE – 2009, TN, 113541
PE – 2010, PR, 24330
PE – 2019, VA, 061914

PROFESSIONAL ASSOCIATIONS

Past-President 2014-15, Florida Engineering Society

Member, UNF College of Computing Engineering and Construction Dean's Leadership Council

SPECIALIZED TRAINING

- FES/FICE Leadership Institute
- Business Law, UNF
- Littoral Transport Processes, UF
- Public Speaking Certificate, UNF
- CPM-Based Project Planning and Control, UF
- Fundamentals of Accounting

YEAR CAREER STARTED

1986

YEAR STARTED WITH B&V

2023

Where necessary, studies included erosion protection design to protect against bank erosion. Erosion protection design included walls, rip rap, and gabion mattresses. Studies included bridges over Arlington, St. Johns, Matanzas, Tolomoto, Ft. George, Aucilla, San Sebastian, Middle, Nassau, Trout, and Indian Rivers, as well as numerous other waterways. Currently providing technical oversight and coordination with senior FDOT staff regarding ongoing bridge hydraulic studies including FEMA no-rise studies.

Hurricane Erosion and Wave Studies, Pinellas, Charlotte, Nassau, Duval, and St. Johns Counties, FL. 1986 – 2023.

Lead Engineer, Project Manager, Principal-in-Charge. Led or performed erosion and wave risk assessments, applying a variety of erosion and wave models, for dozens of private and public ocean-front properties to modify FEMA Flood Zones, obtain FEMA V-Zone fill permits, obtain Coastal Construction Control Line permits, or establish coastal design criteria – wave height, erosion, scour, and wave loads – for proposed structures. He recently directed a successful V-Zone Letter of Map Revisions for Eckerd College in Clearwater, FL and Summerhouse Condominiums in St. Augustine, FL.

Herbert Hoover Dike Dam-break Modeling and Mapping, FEMA and U.S. Army Corps of Engineers (USACE) Jacksonville District, Multiple South Florida Counties, FL. 2006 – 2012.

Principal-in-Charge. Directed coupled one- and two-dimensional (MIKE-11/MIKE-FLOOD) hydrodynamic and dam break modeling to simulate several levee/dam failure and inundation scenarios. Probabilistic flood hazard mapping coupled the lake level frequency with levee failure probability curves associated with each lake level failure scenario to produce 1% annual chance downstream flood depths and elevations. This project was jointly funded by USACE and FEMA.

Canal Conveyance Capacity Program North Region, South Florida Water Management District (SFWMD), Okeechobee, Highlands, Glades, Polk and Osceola Counties, FL. 2009.

Principal-in-Charge. Provided technical oversight for this task order (under a Dredging and Bank Stabilization Contract) to evaluate the current conveyance capacity conditions and deficiencies in canal segments spanning 92 miles of SFWMD canals. Compared current conditions to design canal conditions. Recommended repair or monitoring for deficient segments and dredging for canals with 10% or greater reduction in canal conveyance capacity (defined by HEC-RAS hydraulic modeling).

Saturnia Falls Slough Modeling, GL Homes, Collier County, FL. 2006.

Expert Witness and Principal-in-Charge. Provided quality assurance and quality control (QA/QC) and successful administrative hearing expert witness testimony (supporting the South Florida Water Management District for their permit approval) for one- and two-dimensional hydrodynamic modeling (HEC-RAS and FESWMS) of rainfall runoff through a portion of the Corkscrew Swamp system that feeds the Cocohatchee Canal. Modeling addressed the effects of the proposed development on flood levels in the swamp and identified flood level reductions created by proposed wetland restoration alternatives. Other modeling efforts addressed the development's stormwater management system designed to provide flood protection and improve swamp hydration during periods of low flow and seepage through the proposed berm surrounding the development.

Storage Treatment Area 2 Hydraulic Modeling and Design Criteria, South Florida Water Management District (SFWMD), Everglades Agricultural Area. 2005.

Project Principal. Directed the 2-D hydrodynamic sheet flow modeling (FESWMS) for a proposed expansion cell to increase the storage and treatment capacity of STA 2. Modeling simulated the effects of drainage structures, canals, and the District's regulation operations. Recommended modifications to the size and location of the inflow and outflow canals, the inflow and outflow control structures, and the elevation of internal works, such as relic ditches and roads, to produce optimal water levels and residence times, produce a uniform flow distribution (minimize short-circuiting that reduces water quality treatment objectives). Additional modeling of internal wind setup and wave runup determined levee height requirements under design storm conditions.

Levee Seepage Study, South Florida Water Management District, Multiple Sites, FL. 2002 – 2003.

Project Manager. Led a study to quantify seepage rates through 18 District levees. Tasks included conceptual development of two-dimensional, cross sectional seepage models characterizing levee and subsurface properties, analytical modeling of seepage rates (performed by a subcontractor), and detailed report production.

St. Lucie Estuary Muck Removal Demonstration Project, SFWMD, St. Lucie County, Florida. 1994.

Lead Coastal Engineer. Performed wave modeling (HISWA) and sediment resuspension analyses to quantify the turbidity reduction benefits of dredging to various depths for a range of wind/wave conditions. Wave modeling provided estimates of bottom shear stress (created by waves) under the various depth and wind scenarios. Estimated corresponding reduction of suspended sediment concentrations due to reduced bottom shear estimates.

West Palm Beach (L10/L12) Canal Conveyance Capacity Study, South Florida Water Management District, Palm Beach County, FL. 1993 – 1994.

Project Manager. Led this canal conveyance capacity (CCC) project to identify necessary canal improvements and dredging disposal alternatives. Directed field surveying and HEC-2 modeling of 20 canal miles (including eight bridges, one pump station and a flood control gate) of the District's flood control project to evaluate flood risk and sensitivity of Manning's n. Simulated U.S. Army Corps of Engineers regulatory discharge, irrigation/ water supply, and flood scenarios. Recommended and evaluated canal design and dredging/disposal alternatives to improve conveyance and flood control. The study report was officially recognized by the District's Executive Director as the best CCC report developed for the District. Subsequently developed a study approach for a District-wide CCC program.

SELECTED PUBLICATIONS

Hull, T.J., and R.B. Taylor, 1999. Effects of Aeolian Transport on the Ponce DeLeon Inlet Sediment Budget, In: Proc. Fourth International Symposium on Coastal Engineering and Science of Coastal Sediment Processes, ASCE, Reston, VA. (Presented at Coastal Sediments 99 in Long Island, NY).

Hull, T. J., 1999. Modification of a Hydrodynamics Model for Application to a Tidal Inlet, Masters Thesis, University Of Florida, Department of Aerospace Engineering, Mechanics, and Engineering Science, Gainesville.

Gosselin, M.S., P.E. Dompe, and T.J. Hull, 1999. Analysis of the Behavior of East Pass Inlet, Florida Using Hydrodynamic and Digital Bathymetric Modeling. In: Tait, L. S. (Ed.) The Florida Model, The Nation's First Statewide Beach Management Program, Proceedings of the 12th Annual National Conference on Beach Preservation Technology, St. Petersburg. Florida Shore and Beach Preservation Association.

Yanez, M.A., R.B. Taylor, and T.J. Hull, 1992. Analysis of Inlet Behavior Using Digital Terrain and Coastal Modeling Techniques: Ponce DeLeon Inlet, Florida. In: Proc. Fifth Annual Conference, Beach Preservation Technology. Tampa, FL.

Taylor, R.B., T.J. Hull, and W.F. McFetridge, 1986. Estuarine Hydrodynamic Modeling on a Microcomputer. In: Proc. Fourth Conference on Computing in Civil Engineering, ASCE, Boston, MA. (Publications) Boniface A; McKelvey J G and Nthako S: Planning and Design of the Transfer Tunnel, Lesotho Highlands Water Project: Proceedings SANCOT Tuncon 1992.

COST ESTIMATOR
Todd Bednar

Why Todd

- Lead Estimator for 35+ years on major infrastructure projects including 3 new pump station designs and involvement in cost estimation for numerous industrial and water related projects across North America
- Confident with providing cost estimation for complex reservoir, dams, & hydropower projects. Todd is capable of estimating cost for most phases of any industrial and hydropower/hydraulic project.
- Member of the Professional Construction Estimators Association and experienced with leading a multi-disciplinary team of estimators on various projects

Todd Bednar has a diverse career beginning with project field assignments then transitioning into estimating. These field assignments provided him with the knowledge, tools, and experience required for the transition into estimating. The knowledge gained, including labor and equipment productivities, crew sizes, man hour rates, & scheduling, on projects such as nuclear power plants, pharmaceutical, healthcare, & industrial, has provided him with valuable insight into how projects are built. All of this has led to his current assignment as principal estimator.

PROJECT EXPERIENCE

ABTP Integrated Pumping Station (IPS), City of Toronto | $1.2B, 2017-Ongoing

Lead Estimator – Oversight of all estimating functions. Management of discipline estimators, vendor solicitation, risk analysis, and labor productivities. Scope of work includes deep shafts and tunnels, yard pipe, pump house, odor control, screen building, septage receiving, generator & substation building, distribution chamber, diversion chambers, and integration with existing site facilities within an operating treatment plant.

Peace River Regional Reservoir No. 3, SFWMD | $335M, 2023

Lead Estimator – Technical cost review of an engineering & construction proposal for a new reservoir, river water intake, pump station, & transmission pipeline to the new and existing reservoir system.

CAREER

Black & Veatch (since 2015)

Bradley Construction Company (2014 to 2015)

The Roberts Company (2012 to 2013)

Helm Builders (2006 to 2011)

Turner Construction Company (2003 to 2006)

Lend Lease (1997 to 2003)

Yonkers Industries Inc. (1995 to 1997)

URS Corporation (1989 to 1995)

Fluor Corporation (1984 to 1989)

EDUCATION

Bachelors, Architectural Engineering & Construction Management, Kansas State University, 1984

YEARS EXPERIENCE

39 Years

PROFESSIONAL REGISTRATION

N/A

PROFESSIONAL ASSOCIATIONS

Associated Builders & Contractors

Professional Construction Estimators Association

C-25 Reservoir and Stormwater Treatment Area, SFWMD, St. Lucie County, FL | $275M, 2023

Lead Estimator – Technical cost review & freeboard analysis of an engineering & construction proposal for a new reservoir, pump stations, & related structures. Review also included freeboard alternatives to reduce embankment erosion due to the wave action of the reservoir during abnormal weather conditions.

Pensacola & Kerr Dam Renovations, Grand River Dam Authority, Oklahoma | $1M, 2023

Lead Estimator – Civil & structural renovations to the east & west ends of the dam and monitoring upgrades in the dam access tunnel.

Lago Cidra Dam Rehabilitation, Commonwealth of Puerto Rico | $3M, 2021

Lead Estimator – Estimating responsibility for renovations to the existing wet well, dry well, & filtration plant intake structure. Work included dredging to remove sediment buildup, work access using barges, and coordination with the local contractors.

Fontana & Melton Hill Dam Pump Back Stations, TVA, North Carolina & Tennessee | $231M / $235M, 2020

Lead Estimator – Project scope included new pump stations at the existing dams to pump water back into the reservoirs to replenish the water supply and power generation.

ABTP WAS Thickening Facility and Substation Upgrades, City of Toronto | $4M, 2018-2018

Lead Estimator – Estimating responsibility for the demolition of existing buildings & construction of a new Waste Activated Sludge building within an active treatment facility.

Upper York Water Reclamation Centre, York Region | $7M, 2019

Mechanical and Civil Estimator – Estimating responsible for the underground yard piping and process mechanical equipment and piping on the MF Feed System, Cloth Disk Filters, RO Concentrate Pump Station and Storage facilities.

Perris Desalination Facility, Eastern Municipal Water District, CA | $51M, 2018

Lead Estimator – Estimating responsibility for a new desalination facility for the County including microfiltration system, reverse osmosis, ultraviolet light, decarbonation, & chemical systems.

Groundwater Replenishment System, Orange County Water District, CA | $190M, 2018-2019

Lead Estimator – Expansion of existing 100-MGD Advanced Water Treatment Facility to 130-MGD capacity. New pump station, microfiltration system, chemical storage, reverse osmosis, ultraviolet light, decarbonation, & sodium bisulfite systems.

TransAlta Brazeau Gorge Reservoir Storage project, TransAlta | $3B, 2017

Lead Estimator – The project includes a new pump house and three penstocks, each 10 m in diameter.

Rocky Boys Water Treatment Plant, North Central Montana Regional Water System, Great Falls, MN | $35M, 2017

Lead Estimator – New water treatment plant to serve the northwest region of the state.

North Water Reclamation Facility, Fox River Water Reclamation District, Chicago, IL | $20M, 2017

Lead Estimator – Upgrade existing phosphorus removal facility and construct new support buildings.

Bryce J. Weinand, M.S., B.S.

Bryce J. Weinand is a Senior Air Permitting Specialist. Weinand has experience in air permitting regulations across several of Black & Veatch's global business lines including Power Generation, Water, Oil & Gas, and Federal Projects. Weinand specializes in air permit preparations, air regulation compliance assessments, air emissions calculations, hazardous air pollutant assessments, health risk assessments, greenhouse gas inventories and avoidance assessments, hydrogen feasibility studies, and meteorological and climatological studies.

Weinand is also excited to work with clients to achieve their sustainability goals. He specializes in conducting baseline greenhouse gas assessments, life cycle analysis, and greenhouse gas avoidance projects. Weinand understands the needs of clients and assist them with using the proper GHG methods, determining boundaries, identifying data sources, and conducting the GHG analysis. He is familiar with the many variants of the LCA including cradle to grave, cradle to gate, gate to gate, and many more.

Weinand also has significant experience in assisting clients with compliance of EPA's Risk Management Plan (RMP) and OSHA's Process Safety Management (PSM) regulation. He has performed as a scribe and facilitator for process
hazard analyses (PHAs) and Hazard Reviews (HRs) and in performing compliance audits for RMP programs at water, wastewater treatment facilities, and power plant facilities.

PROJECT EXPERIENCE

Navy ERCIP; NavFac; Confidential, United States; 2022-In-Progress

Air Permitting Assessment - Black & Veatch. Responsible for leading the air permitting team to provide federal and state rules related to air permitting for several Naval Facility locations. The air permitting assessment provides the project a summary of federal and state rules regarding air permitting that may impact the project.

USACE; Ft. Stewart Microgrid; Georgia, United States; 2021-In-Progress

Air Permitting Assessment - Black & Veatch. Weinand led the execution of the air permitting assessment for a microgrid project at Ft. Stewart, Georgia for the Army Corps of Engineers, Savannah District. In this role, Weinand led the development of the air permitting calculations and summarized the federal and the Georgia state air quality rules for the microgrid project at 15% and 35% design review. This microgrid project provides new natural gas generation (non-emergency engines), integration of existing natural gas generation, behind the meter (BTM) battery energy storage, and integration of utility scale solar PV. Weinand supported two design review presentations/meetings with the USACE and base environmental staff to discuss the air permitting path.

USACE; Ft. Benning Microgrid; Georgia, United States; 2021-In-Progress

Air Permitting Assessment - Black & Veatch. Weinand led the execution of the air permitting assessment for a microgrid project at Ft. Benning, Georgia for the Army Corps of Engineers, Savannah District. In this role, Weinand led the development of the air permitting calculations and summarized the federal and the Georgia state air quality rules for the microgrid project at 15% and 35% design review. This microgrid project

AIR QUALITY SCIENTIST

EXPERTISE:
Air Permitting; Air Quality Scientist; Consulting Engineering Services; Environmental Consulting; Meteorologist

EDUCATION
Masters, Science, Atmospheric Science, University of Illinois, 2000, United States
Bachelors, Science, Atmospheric Science, University of Missouri, 1998, United States

TOTAL YEARS OF EXPERIENCE
25.3

BLACK & VEATCH YEARS OF EXPERIENCE
16.3

PROFESSIONAL ASSOCIATIONS
Air & Waste Management Association - Member

LANGUAGE CAPABILITIES
English

OFFICE LOCATION
Overland Park, Kansas, USA: United States

provides new natural gas generation (non-emergency engines), integration of existing natural gas generation, behind the meter (BTM) battery energy storage, and integration of utility scale solar PV. Weinand supported two design review presentations/meetings with the USACE and base environmental staff to discuss the air permitting path.

Energy Services of Pensacola; Greenhouse Gas Reporting; Pensacola, Florida, United States; 2018-In-Progress

Air Quality Scientist - Black & Veatch. Responsible for estimating greenhouse gas (GHG) emissions from operation of the client's natural gas distribution system. The GHG emissions estimate prepared for 2017 and 2018 were calculated in accordance with 40 CFR 98, Subpart W and Subpart NN requirements based on data reported in the client's Annual Reports submitted to the U.S. Department of Transportation and U.S Energy Information Administration. The resulting data was input into the United States Environmental Protection Agency's (USEPA) electronic reporting system (e-GGRT).

Confidential Client; Air Permitting Services; St. Joseph, Missouri, United States; 2014-In-Progress

Air Quality Scientist - Black & Veatch. Black and Veatch conducts air permitting services with a leading Midwest manufacturer of a variety of herbicides, insecticides, and fungicides for agriculture applications. The work includes assisting the client with estimating volatile organic compound (VOC), hazardous air pollutant (HAP), and fugitive particulate matter emissions that would be released from new projects that install new storage and mixing tanks located at the client's facility. The method to estimate possible air emissions is based on an EPA document regarding batch process emissions from pesticide manufacturing. Black & Veatch will assist the client in determining the air permitting path for each project.

City of Topeka; RMP Services; Water Treatment Plant; Topeka, Kansas, United States; 2011-In-Progress

RMP Specialist - Black & Veatch. Responsible for assisting the WTP with maintaining compliance with the RMP regulation. The services include an ongoing program to assist the WTP with updating RMP documentation relevant to the WTP's chlorine process system whenever changes to staff, the chlorine process, or other documentation occur. Under this program Black & Veatch has conducted hazard reviews, conducted compliance audits, updated standard operating procedures (SOPs), updated chlorine process drawings, updated the RMP manual, and updated the Emergency Response Plan. Weinand also attended the EPA compliance audit conducted at the WTP and assisted the WTP with the compliance audit process. As a result the WTP did not receive any violations from the EPA compliance audit.

Various Confidential Clients; Due Diligence; United States; 2010-In-Progress

Air Permitting Specialist - Black & Veatch. Performed due diligence reviews of air permits, including construction, operation, and acid rain, as well as compliance histories of several facilities located throughout the United States. Facilities include biomass fired units located in Florida.

Google; Staff Augmentation Role with Google; Mountain View, California, United States; 2022

Senior GHG Specialist - Black & Veatch. Responsible for supporting Google's Sustainability Lead for Data Centers. Responsibilities include researching embodied carbon materials that are used in data center construction and reporting the research to google with Google Slides. Work has also included researching sustainability goals of other data center companies. Workload is determined during weekly calls with Google. Other responsibilities include overseeing projects and managing schedules with other employees at Google.

Sacramento Municipal Utility District (SMUD); EPA Renewable Identification Number (RIN) Application; Sacramento, California, United States; 2021-2022

Senior GHG Specialist - Black & Veatch. Assisted team in preparing EPA RINs application for client owned renewable electricity production facilities. Advised on RINs application and general EPA policy for client business strategy setting.

Smithfield Foods; Data Mapping Scope 1, 2, and 3 Emissions from Existing LCA; San Jose, California, United States; 2021-2022

Senior GHG Specialist - Black & Veatch. Responsible for leading team to develop methods for mapping out Scope 1, 2, and 3 emissions from the client's existing LCA. Responsible for working with client to identify organization boundaries and data gaps in their existing LCA. Assisted team in populating framework of GHG activities for the Power BI tool that will be developed for the client and allow them to track GHG emission for future years.

Google; Energy-Water Nexus Cooling Study; Mountain View, California, United States; 2021-2022

Senior GHG Specialist - Black & Veatch. Responsible for assisting the team in assessing the LCA impact for two different cooling tower technologies proposed for client's data centers. Work that will be conducted for this project include data processing, gathering data needed for the SimaPro model, assisting with conducting the environmental impact, and preparing a report that summarizes the project.

Orange County Sanitation District; P2-128 TPAD Digesters; Huntington Beach, California, United States; 2021-2022

Air Permit to Construct - Black & Veatch. Responsible for preparing the air permit to construct application for the installation of new anaerobic digesters, digester batch tanks, digester gas boilers, cooling tower, and odor control unit for digester sludge blending facility. Black & Veatch is currently supporting the preliminary design by outlining the South Coast Air Quality Management District (SCAQMD) that will apply to the emission source installed for the project. Black & Veatch is developing the emission calculations from facility data and will determine the associated emission increase to assess the applicability to SCAQMD Regulation XIII - New Source Review. Black & Veatch also is preparing the screening Health Risk Assessment (HRA) in accordance with SCAQMD Rule 1401.

City of Palo Alto; Palo Alto Regional Water Quality Control Plant; Palo Alto, California, United States; 2021-2022

Advanced Water Purification System Environmental Permitting - Black & Veatch. Responsible for preparing the air permit to construct

application for installation of a new odor control unit. Black & Veatch assessed the Bay Area Air Quality Management District (BAAQMD) rules that would apply to the project and provided regulation interpretation during the design of the project. Black & Veatch developed the emission calculation and BACT analysis for new equipment. Black & Veatch also performed the screening level Health Risk Analysis (HRA) for the new emissions from the odor control unit.

Confidential; Health Risk Assessment (HRA) Services; Bay Area, California, United States; 2019-2022

Health Risk Assessment (HRA) Risk Reduction Scenarios, Onsite HRA, and HRA On-Call Support Services - Black & Veatch. The wastewater treatment client requested additional Health Risk Assessment (HRA) services in advance of a new rule in the Bay Area Air Quality Management District (BAAQMD) to reduce toxic air contaminant (TAC) emissions from existing sources. The project included three separate HRA tasks. The first task included collaboratively working with the client to develop a list of health risk reduction scenarios to examine. Black & Veatch modeled eight separate HRA scenarios to determine possible strategies to reduce the baseline health risk determined in a previous project. After examining the risk reduction results, the client requested three combined risk reduction scenarios. Black & Veatch modeled the combined risk reduction scenarios, developed a risk reduction scenario report, and presented the risk reduction results to facility management, operators, and facility engineers.

The second task that the client requested includes developing the onsite health risk. Black & Veatch examined two separate scenarios that included a snapshot of the current onsite health risk and a projection of the health risk after two significant projects are completed. The health risk results from the two scenarios will assist the client in demonstrating the potential benefit of the two capital projects at the facility. Black & Veatch prepared a report that contains the method, inputs, and onsite HRA results. Black & Veatch also presented the results of the onsite HRA to client management staff.

The third task of the project involves Black & Veatch providing HRA on-call services to the client as needed. The client requested Black & Veatch be available to provide HRA support services for when the Bay Area Air Quality Management District (BAAQMD) approaches them for the official HRA. The client has requested HRA support services for the duration of BAAQMD Rule 11-18 activities, which may include reviewing the official HRA results, providing comments on the official HRA, and/or attending client meetings with the BAAQMD.

Southern Europe: EU Innovation Fund Application - GHG Avoidance Estimate; Confidential, Confidential; 2021

GHG Avoidance Estimate - Black & Veatch. Black & Veatch completed a “second stage” greenhouse gas (GHG) emission avoidance application for a proposed floating offshore wind and battery storage project being offered into a competitive solicitation for funding by the European Union (EU) Innovation Fund. The application required following a prescribed methodology set forth by the EU Innovation Fund that calculated an estimate of expected emissions during the operation and maintenance of the project, to be contrasted against baseline GHG emissions, which would be displaced. The process and inputs required knowledge and application of specific technical performance parameters of the proposed project, and associated expected maintenance support. Black & Veatch, with its

understanding of operational and maintenance requirements, developed sound estimates for such support from local ports. The application also required assessment of the scalability of the project, owning to its potential to be replicated and offer similar GHG avoidance benefits. While the methodology was prescriptive, it also allowed for innovation concepts, such as demonstration of new technologies for the benefit of building a sound foundation from which to grow a fleet demonstrating proven commercialization.

City of San Jose; San Jose-Santa Clara Regional Wastewater Facility; San Jose, California, United States; 2020-2021

New Dewatering Building Air Permit to Construct - Black & Veatch. Responsible for preparing the air permit to construct application for installation of a digested sludge dewatering building. The dewatering building new emission sources includes centrifuges, sludge cake conveyors, sludge cake bins, and sludge cake loading. Black & Veatch assessed the Bay Area Air Quality Management District (BAAQMD) rules that would apply to the project and provided regulation interpretation during the design of the project. Black & Veatch developed the emission calculation and BACT analysis for new equipment. Black & Veatch also performed the screening level Health Risk Analysis (HRA) for the dewatering building.

Natural Gas Utility; GHG Inventory Assessment; Pennsylvania, United States; 2020

Air Quality Scientist - Black & Veatch. Responsible for preparing the baseline greenhouse gas (GHG) inventory for the client's natural gas gathering, transmission, and distribution. The baseline inventory included gathering the data needed to estimate Scope 1 (direct GHG emissions) and Scope 2 (indirect GHG emissions). The assessment also included some of the optional GHG Scope 3 emissions. Another aspect of the report was to contact peers of the client and compare them to Peoples method and magnitude of GHG emissions. Finally, the project estimated the reduction of GHG that would be realized in current initiatives and also recommended other initiatives that Peoples could employ to obtain further reductions. A method to estimate GHG emissions from methane leaks was also developed.

Orange County Sanitation District (OCSD); P2-98 Air Permit to Construct; Huntington Beach, California, United States; 2018-2020

Air Quality Scientist - Black & Veatch. Responsible for preparing the air permit to construct application for the replacement of four primary clarifiers and the existing odor control scrubber complex with new primary clarifiers and a new odor control scrubber complex at the Huntington Beach wastewater treatment plant. Black & Veatch developed the emission calculations from facility data and determined the net emissions change to assess the applicability to South Coast Air Quality Management District (SCAQMD) Regulation XIII - New Source Review. Black & Veatch also prepared the screening Health Risk Assessment (HRA) in accordance with SCAQMD Rule 1401. The air permit application for the project includes the applicable SCAQMD forms, drawings, emission calculations, and the technical support document which was supplied to OCSD for submittal to SCAQMD.

U.S. Air Force Civil Engineer Center; Value Engineering

Initiative Support ; Multipl, United States; 2019

Air Quality Scientist - Black & Veatch. Black & Veatch was contracted with the United States Air Force Civil Engineering Center (AFCEC) to support their subcontractor for the Value Engineering (VE) initiative. The VE initiative mission is to maximize the effectiveness and minimize regulatory liabilities of the USAF air quality program through value engineering. Black & Veatch coordinated with the AFCEC's subcontractor for the VE initiative to conduct site visits to three USAF bases. The purpose of the site visits was to conduct an over-arching review of the base-wide air permitting program and identify potential improvement related to air regulatory and air compliance in order to reduce the risk of receiving violations from State and EPA inspections. In advance of each site visit Black & Veatch conducted a desktop technical review of the base's air permits, compliance related documents, and applicable state and federal regulations that were applicable to the base. During each VE site visit Black & Veatch attended meetings with the base's air program manager and contributed to the discussion related to the air permit requirements and related compliance documents in order to identify any compliance related risks. The site visit included conducting a walk-through of specific air emission processes (i.e, boilers, engines, painting and depainting operations, airplane maintenance operations, storage tanks), interviewing USAF personnel responsible for operation of specific emission units, reviewing air permit documents and air compliance documents, and providing a list of observation verbally to the air program manager prior to leaving the air base. Black & Veatch assisted the AFCEC VE team after the site visit in refining the list of observations and providing corrective action support as needed to assist the air base in resolving the final observations compiled during the site visit. The goal of the AFCEC VE team is to support the air program manager, as needed to reduce the risk of compliance violations from state and EPA inspections.

City of Oceanside San Luis Rey Water Reclamation Facility; Greenhouse Gas Assessment; Oceanside, California, United States; 2018-2019

Air Quality Scientist - Black & Veatch. Responsible for conducting a baseline greenhouse gas (GHG) emissions analysis for existing emissions sources at the wastewater treatment plant. The existing emission sources that emit GHG emissions include internal combustion engines, waste gas flares, plant owned vehicles, boilers, wastewater treatment process, electricity consumption by the facility, and natural gas combustion needed for facility buildings. The methodology outlined in the California Air Resources Board (CARB) publication titled "Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories, Version 1.1" was used to calculate Scope 1 and Scope 2 GHG emissions. The purpose of the project was to provide an estimate of the facility's baseline GHG emissions profile such that it can be compared to other GHG emission scenarios being considered for future modifications to the facility.

Confidential Client; BAAQMD Rule 11-18 Health Risk Assessment (HRA) Services; Bay Area, California, United States; 2017-2018

Air Quality Scientist - Black & Veatch. Responsible for preparing a baseline Health Risk Assessment (HRA) for a wastewater treatment plant in advance of a new rule in the Bay Area Air Quality Management District (BAAQMD) aimed at reducing toxic air contaminant (TAC) emissions from

existing facilities. The project collected data on each emission source that emitted TACs, developed representative emission rates, and used approved models, such as AERMOD and Hotspots Analysis and Reporting Program Version 2 (HARP 2), to estimate current health risk impacts associated with the facility's TAC emissions. The project included examining the emission sources and pollutants of concern to assist the client with planning ahead for the new rule and costs associated with reducing TAC emissions.

Kansas Army National Guard; Engine Applicability Assessment; Topeka and Wichita, Kansas, United States; 2016-2017

Air Quality Scientist - Black & Veatch. Responsible for preparing a report that assessed the applicability of regulations for Reciprocating Internal Combustion Engines (RICE) that are owned and operated by the Kansas Army National Guard (KSARNG). The report summarized the requirements individually for each emergency engine based on the National Emission Standards for Hazardous Air Pollutants(NESHAP) for Stationary Reciprocating Internal Combustion Engines (40 CFR Part 63, Subpart ZZZZ, New Source Performance Standards (NSPS) for Stationary Compression Standards for Stationary Spark Ignition Internal Combustion Engines (40 CFR Part 60, Subpart JJJJ), and NSPS for Stationary Compression Ignition Internal Combustion Engines (40 CFR Part 60, Subpart IIII). The project included site visits to each engine, interviews of maintenance staff, and review of documents that provided data on the engines. Ultimately the report provide the KSARNG a handbook to decode the complex requirements currently applicable to each engines and provided the requirements that would be applicable if the engine was re-categorized for non-emergency purposes.

City of San Diego; RMP Services for Alvarado Water Treatment Plant; San Diego, California, United States; 2015-2016

RMP Specialist - Black & Veatch. Responsible for assisting the WTP with the five-year update to the facility's RMP as required by the EPA's RMP, the California Governor's Office of Emergency Services (CalOES) CalARP, and the Occupational Safety and Health Administration (OSHA) PSM rules. The facility uses chlorine and aqueous ammonia for their water treatment process. The project included updating the RMP manuals, conducting compliance audits, conducting a hazard review, updating the off-site consequence analysis, and preparing the facility's online submittal to EPA via the CDX system.

Missile Defense Agency (MDA); Enivironmental Impact Assessment (EIS) for CONUS CIS; United States; 2014-2016

Air Quality Scientist - Black & Veatch. Responsible for preparing the air quality impact assessment for a proposed action that included installation of emergency reciprocating internal combustion engines (RICE) and boilers for heating purposes. The air quality impact analysis was conducted for various sites in the eastern United States. The project required calculating estimated emissions from construction sources (combustion source and fugitive emissions) and estimating emissions from operational sources (i.e., backup generators, boilers, worker vehicles, and on-road haul/delivery trucks). The air emission calculations during operation and construction were used to determine the impact to the local and regional air quality, as well as determine if a general conformity determination was required for the project.

Missile Defense Agency ; Environmental Assessment ; Anderson, Alaska, United States; 2015

Air Quality Scientist - Black & Veatch. Responsible for preparing the air quality impact assessment for a proposed action that included installation of emergency reciprocating internal combustion engines (RICE) and boilers for heating purposes. The project required calculating estimated emissions from construction sources (combustion source and fugitive emissions) and estimating emissions from operational sources (i.e., backup generators, boilers, worker vehicles, and on-road haul/delivery trucks). The ACAM model was utilized to estimate the estimate of air emissions during construction of the project. The air emission calculations during operation and construction were used to determine the impact to the local and regional air quality, as well as determine if a general conformity determination was required for the project.

Tri-State Generation and Transmission Association; RMP Services; Colorado, United States; 2014-2015

RMP Specialist - Black & Veatch. Performed as a scribe for the process hazard analysis (PHA) for a new process at the facility. The PHA sessions assisted Tri-State in identifying several changes to the design that will be implemented into the final design prior to construction of process system. The PHA sessions also identified the worst-case and alternative release scenarios, which were used in performing the Offsite Consequence Analysis (OCA) that is a requirement of EPA's Risk Management Plan regulation. Prepared draft standard operating procedures for the facility.

GNPower Kauswagan; Environmental Assessment; Lanao del Norte, Davao Region, Philippines; 2014

Air Quality Scientist - Black & Veatch. Responsible for preparing an air quality assessment report for a proposed power plant that would be located in the Philipines. The air quality assessment report provided an evaluation of the project's proposed emission rates compared to those listed in Philippine air standards and World Bank/International Finance Corporation (IFC) guidelines. The assessment also included a description of the preliminary air dispersion modeling conducted for the proposed project and an assessment of the air quality in the airshed where the project is located. Equator Principles were also applicable to the project, which includes a requirement for a greenhouse gas assessment. The air quality assessment report included a review of the greenhouse gas analysis provided in the proposed projects Environmental Impact Statement (EIS) and how the project intended to comply with this requirement.

Metropolitan St. Louis Sewer District; Lemay and Bissell Point WWTP; St. Louis, Missouri, United States; 2014

Air Quality Scientist - Black & Veatch. Responsible for assisting MSD with preparing a construction permit application for planned modifications to each of the plants. The planned modifications are required to comply with EPA's Sewage Sludge Incinerator Maximum Achievable Control Technology regulation (40 CFR 60, Subpart MMMM). As typical of construction permit applications, the project included estimating the baseline and actual air emissions, obtaining the necessary permit application forms, and conducting a regulatory review in support of the application preparation

Brownsville Board of Public Utilities ; Silas Ray Power Plant – Unit 9 Standard Permit Renewal; Brownsville, Texas, United

States; 2014

Air Quality Scientist - Black & Veatch. Responsible for assisting BPUB with preparing the 10 year renewal of its State of Texas New Source Review permit for the Unit 9 combined cycle combustion turbine located at the Silas Ray Power Plant. As typical of permit renewal applications, the project included gathering plant data, establishing the emissions inventory, obtaining the necessary permit application forms, and conducting a regulatory review in support of the application preparation. The renewal application was submitted to the TCEQ in October 2014 and was renewed by the agency within 12 weeks.

Miami-Dade County Water and Sewer Department; RMP Services; Miami, Florida, United States; 2014

RMP Specialist - Black & Veatch. Assisted in assisting the client with required activities that are part of the five-year RMP update required by EPA. The RMP activities that were conducted included conducting compliance audits, revalidation of the previous PHAs, updating the RMP submittal, and updating the RMP manual.

City of El Dorado; RMP Services; El Dorado, Kansas, United States; 2014

RMP Specialist - Black & Veatch. Conducted a compliance audit for the chlorine system as a component of the facility's RMP. As part of the compliance audit process, a walk-through inspection was conducted to understand and verify the system prior to reviewing the facility's documents that demonstrate compliance with EPA's RMP regulation.

Tampa Electric Company ; Risk Management Plan Services; Bradley, Florida, United States; 2011-2014

RMP Specialist - Black & Veatch. Performed as a scribe for the process hazard analysis (PHA) of the facility's anhydrous ammonia system for use in a selective catalytic reduction (SCR) system. TECO is in the process of converting several of their simple cycle combustion turbines to combined cycle. The initial PHA was conducted at 50% design (2013) and updated at 100% design (2014). The PHA sessions assisted TECO in identifying several changes to the design that will be implemented into the final design prior to construction of the ammonia process system. The PHA sessions also identified the worst-case and alternative release scenarios, which were used in performing the Offsite Consequence Analysis (OCA) that is a requirement of EPA's Risk Management Plan regulation.

Sacramento Municipal Utility District ; BioEnergy Assessment; Sacramento, California, United States; 2013

Air Quality Scientist - Black & Veatch. Assisted in preparing an assessment of air permit requirements for two different biomass gasification processes being considered. The assessment focused on the implications to air permitting requirements among eight different counties where the project could be sited. The majority of the assessment included discussion of the New Source Review (NSR) permitting requirements, Best Available Control Technology (BACT) and Lowest Achievable Emission Rate (LAER) thresholds and requirements, Emission Offset thresholds, and discussion of potential source-specific requirements (i.e., New Source Performance Standards and Maximum Available Control Technology (MACT) for the two types of biomass gasification technologies being considered.

W.R. Meadows; Air Permit Services; Boonville, Missouri, United States; 2013

Air Quality Scientist - Black & Veatch. Responsible for assisting W.R. Meadows in obtaining a renewed operating permit for an existing manufacturing facility in Booneville, Missouri. As part of the renewal process Black & Veatch assessed the applicability of the National Emission Standards for Hazardous Air Pollutants for Area Sources: Industrial, Commercial, and Institutional Boilers, commonly known as Area Source Boiler MACT, and incorporated these requirements into their renewed operating permit. The project also included assisting the facility with understanding the requirements of the Area Source Boiler MACT regulation and providing guidance to the facility on how to demonstrate initial compliance, as well as maintain ongoing compliance.

USTDA NEA; NG Tri-Generation Climate Greenhous Gas Impact Assessment; Tianjin, China; 2013

Air Quality Scientist - Black & Veatch. Responsible for performing a climate change impact assessment for implementation of a Tri-Generation Distributed Energy Combined Cooling, Heat and Power (CCHP) project at two locations in China. For each project an estimation of carbon dioxide (CO2) emissions was developed for a base case, which would be the emissions if the Tri-Generation CCHP distributed energy project was not developed, and a Tri-Generation case, which is based on the combustion sources proposed for the Tri-Generation CCHP distributed energy projects that would be used to offset existing CO2-intensive generation. The change in CO2 emissions between the base case and Tri-Generation case provided a quantification of the benefits from a carbon emissions perspective for the Tri-Generation CCHP distributed energy projects.

Orange County Sanitation District ; Project J-111 Plant Nos. 1 and 2 Central Power Generation Systems AQCS; Orange County, California, United States; 2012-2013

Air Quality Scientist - Black & Veatch. Assisted in preparing air permit application for the installation of post-combustion air quality control systems (AQCS) to digester gas-fired internal combustion engines at Orange County Sanitation District's Plant 1 and 2. The two plants are located within the South Coast Air Quality District (SCAQMD) and were applicable to the revised regulation 1110.2, Emissions from Gaseous and Liquid Fueled Engines, which required internal combustions engines to comply with more stringent emission limits for the pollutants NOx, VOC, and CO. The air permit application also contained a Health Risk Assessment (HRA) for the installation of the digester gas engines based on SCAQMD Rule 1401. The post-combustions AQCS that will be installed includes an Oxidation Catalysts, Selective Catalytic Reduction system, and Urea injection system. The project also includes installation of a digester gas cleaning system prior to combustion of digester gas in the engines.

Brownsville Board of Public Utilities; Reciprocating Internal Combustion Engine – Applicability ; Brownsville, Texas, United States; 2013

Air Quality Scientist - Black & Veatch. Responsible for assisting BPUB in assessing the applicability of requirements for the RICE National Emissions Standards for Hazardous Air Pollutants (NESHAPS) regulation, commonly referred to as RICE MACT, found in 40 CFR 63, Subpart ZZZZ, for existing RICE engines owned by the city of Brownsville. The assessment included determining the rule applicability and identifying any subsequent

requirements (including regulatory notification submittals) associated with the rule for 10 RICE engines that were located at various locations within the city of Brownsville.

Brownsville Board of Public Utilities; Silas Ray Power Plant – Unit 10 Standard Permit Renewal; Brownsville, Texas, United States; 2013

Air Quality Scientist - Black & Veatch. Responsible for assisting BPUB with preparing the 10 year renewal of its electric generation standard permit for the Unit 10 simple cycle combustion turbine located at the Silas Ray Power Plant. The project included preparing the application to meet the general and specific emission requirements of the “Air Quality Standard Permit for Electric Generating Units with an effective date of May 16, 2007”. As typical of permit renewal applications, the project included gathering plant data, establishing the emissions inventory, obtaining the necessary permit application forms, and conducting a regulatory review in support of the application preparation. The renewal application was submitted to the TCEQ in 2013 and was renewed by the agency within 10 weeks.

Brownsville Board of Public Utilities; Standard Permit Renewals; Brownsville, Texas, United States; 2012

Air Quality Scientist - Black & Veatch. Responsible for preparing the 10 year renewals of four electric generation standard permits for distributed generation engines located at various points around Brownsville. As typical of permit renewal applications, the project included gathering plant data, establishing the emissions inventory, obtaining the necessary permit application forms, and conducting a regulatory review in support of the application preparation. The renewals were submitted to the TCEQ in 2012 and were renewed by the agency within 6 weeks.

BioKyowa, Inc.; Construction Permit Application; Cape Girardeau, United States; 2012

Air Permitting Specialist - Black & Veatch. Prepared construction permit application and forms for planned modifications to an existing human and animal feed additives manufacturing plant. As part of the project, estimated emission increases were calculated as a result of the proposed modifications to the different process. The resulting potential emission increases were below de minimis emission rates and the project will require only a de minimis construction permit.

City of Winston-Salem; Annual Emissions Reports; Winston-Salem, North Carolina, United States; 2012

Air Quality Scientist - Black & Veatch. Developed emission estimates for two wastewater treatment facilities firing a mix of digester gas, natural gas, and fuel oil. Emissions were estimated for operation of combustion source boilers, internal combustion engines, and flares. Prepared the submittal of the emissions estimate to submit to the local compliance agency.

Confidential Client; Compliance Strategy Assessment; Multiple Oil Fired Facilities;; Hawaii, United States; 2011-2012

Air Quality Scientist - Black & Veatch. Responsible for performing air dispersion modeling (AERMOD) for multiple existing coal fired facilities in Hawaii. The project scope is to determine the facility's compliance with the newly promulgated 1 hour National Ambient Air Quality Standards (NAAQS) for nitrogen oxides (NOx) and sulfur dioxide (SO2), and the

particulate matter less than 2.5 microns in diameter (PM2.5) NAAQS. The NO2 modeling analysis incorporated the use of Tier 3 methodologies: specifically, the Ozone Limiting Method (OLM) and the Plume Volume Molar Ratio Method (PVMRM). The modeling ultimately determined the level of control that would be needed on a unit basis to bring the facility into compliance with NAAQS. Additionally, he was responsible for preparing reports demonstrating the meteorological representativeness of the meteorological data used in the modeling for the facilities. The location of the facilities is in a region that could not use the AERSURFACE program to derive surface characteristics for the area surrounding the facilities. Instead, he used accepted published methodology to calculate the surface characteristics manually for each facility, and used the calculated surface characteristics in AERMET to create the meteorological data for AERMOD.

Detroit Edison Company; Fermi 3 Combined Operating License (COL) Application Project; Enrico Fermi Nuclear Facility; Michigan, United States; 2007-2012

Meteorologist / Air Quality Scientist - Black & Veatch. Responsible for assisting in coordinating and preparing analysis for air quality and meteorological requirements. Such requirements include analyzing large meteorological and climatological datasets in order to provide a detailed statistical analysis of normal daily and extreme weather conditions for the Fermi 3 nuclear facility and surrounding region. Other requirements include calculating probable maximum annual frequency of meteorological events (i.e., dust storms, precipitation, tornadoes, and extreme temperatures); calculating estimated emissions from construction sources (combustion source and fugitive emissions); and estimating emissions from operational sources (i.e., cooling towers, backup generators, fire pumps, worker vehicles). Tracked the Nuclear Regulatory Commission (NRC) guidelines and developed the meteorology and air quality sections for the COLA and Final Safety and Analysis Report (FSAR) that are submitted to the NRC. Attended meetings and continues to support the project for air quality and meteorological-related activities.

Saudi Electricity Company; Stack Height Air Modeling; Riyadh, Saudi Arabia; 2011

Air Quality Scientist - Black & Veatch. Performed air quality modeling using ISCST3 Prime for 40 simple-cycle combustion turbines firing heavy crude fuel oil that will be converted into combined cycle combustion turbines with heat recovery steam generators (HRSGs). The project considered raising the stack height to assess the effect on air quality modeled ground-level impacts.

JEA; Title V Initial Permit Application, Simple Cycle Combustion Turbines; JEA Greenland Energy Center; Jacksonville, Florida, United States; 2011

Air Permit Specialist - Black & Veatch. Assisted in preparation of an initial Title V permit application for a newly constructed electric generating station in Jacksonville, Florida. The primary units at the facility are two simple cycle combustion turbines. Performed walkthrough of facility and inventoried combustion sources for the air permit application.

Grand River Dam Authority; PSD Construction Permit Application; Coal Fired Complex; Oklahoma, United States; 2011

Air Quality Scientist - Black & Veatch. Performed air dispersion modeling

(AERSCREEN) for an existing coal fired facility. Maximum modeled impacts were determined using surface characteristics derived from AERSURFACE and meteorological data from a local Oklahoma mesonet site. The resulting application document was major for carbon monoxide (CO) and minor for all other pollutants.

CST Storage; Class I Renewal Operating Permit Application;Manufacturing Plant; Parsons, Kansas, United States; 2011

Air Permit Specialist - Black & Veatch. Prepared air permit application for renewal of state of Kansas Class I Operating Permit. The facility has a potential to emit greater than 100 tons per year of VOCs. During the most recent renewal period, the facility's shot blast, machining, and welding activities became subject to 40 CFR 63 Subpart XXXXXX, National Emission Standards for Hazardous Air Pollutants: Area Source Standards for Nine Metal Fabrication and Finishing Source Categories.

PG&E; Construction Emissions Estimate, Transmission Line Reconductoring; San Francisco, California, United States; 2011

Air Quality Scientist - Black & Veatch. Developed emissions estimate for construction activities associated with the reconductoring of a segment of transmission lines located near San Francisco, California. Emissions were estimated for operation of combustion source non-road construction equipment, on-road vehicles, and helicopters. The project estimated emissions were compared to emissions thresholds applicable for construction projects in the Bay Area Air Quality Management District (BAAQMD).

Confidential Client; Various Projects; United States; 2010-2011

Air Quality Scientist - Black & Veatch. Prepared emissions inventory using plant-specific operational data from the Energy Velocity database. Prepared high-level analysis and developed risk of retirement for coal fired units in the central and southern United States based on capacity of unit and air permitting regulations.

Hastings; RMP Services; Anhydrous Ammonia System; Hastings, Nebraska, United States; 2010

RMP Specialist - Black & Veatch. Assisted in completing a hazard review of the facility's anhydrous ammonia system for use in a selective catalytic reduction (SCR) system and a coal fired power plant. Developed an RMP manual for the plant and assisted the client in preparing several other RMP elements necessary for submittal to the EPA.

BioKyowa; Title V Renewal; Cape Girardeau, Missouri, United States; 2010

Air Permitting Specialist - Black & Veatch. Prepared a renewal Title V permit application for an animal and human feed additive manufacturer. The primary emission units at the facility include natural gas fired steam boilers, wastewater treatment plant, chemical storage tanks, and vent filters for various processes of the production lines.

City of Wichita; RMP Compliance Audit; Water Treatment Plant; Wichita, Kansas, United States; 2009

RMP Specialist - Black & Veatch. Assisted in completing a compliance audit for the chlorine and ammonia system as a component of the RMP.

City of Bristol; RMP Compliance Audit and Process Hazard Analyses (PHAs); Water Treatment Plant; Bristol, Connecticut, United States; 2009

RMP Specialist - Black & Veatch. Assisted in completing a compliance audit and PHAs for the chlorine system as a component of the RMP.

City of Hannibal; RMP Compliance Audit and Hazard Review; Wastewater Treatment Plant; Hannibal, Missouri, United States; 2009

RMP Specialist - Black & Veatch. Assisted in completing a compliance audit and hazard review for the chlorine system as a component of the RMP.

Sun Energy LLC; Air Permit Application; Louisiana, United States; 2009

Air Quality Scientist - Black & Veatch. Provided air quality assessment services related to determining the amount of federal hazardous air pollutants, as well as state toxic air pollutants, potentially emitted from the operation for a first-of-its-kind municipal solid waste plasma arc gasification electric generation facility. The project consisted of a 2,500 ton per day gasification process resulting in the production of 115 MW of electricity to the grid for distribution. Additionally, assisted in the development of the air quality permit forms for a minor source permit application.

Los Angeles Department of Water & Power; Air Permit Application and Health Risk Assessment; Los Angeles, California, United States; 2008-2009

Air Quality Scientist - Black & Veatch. Provided air quality and health risk assessment services required for a minor source air permit application package for the construction of two new 22 MW LM 2500 combustion turbines fired on digester gas produced at the Hyperion Treatment Plant. The project included air dispersion modeling for both criteria pollutants and toxic air contaminants for various modes of operation, including normal operation, startup / shutdown, and commissioning. The toxic air contaminants modeling included performing a Tier 4 Health Risk Assessment.

Entergy Lousiana, LLC; River Bend Unit 3 COL Application Preparation, River Bend Nuclear Facility; St. Francisvile, Louisiana, United States; 2007-2009

Meteorologist / Air Quality Scientist - Black & Veatch. Assisted in coordinating and preparing analysis for air quality and meteorological requirements. Such requirements included analyzing large meteorological and climatological datasets in order to provide a detailed statistical analysis of normal daily and extreme weather conditions for the River Bend Unit 3 Nuclear Facility and surrounding region. Other requirements included calculating probable maximum annual frequency of meteorological events (i.e., dust storms, precipitation, tornadoes, and extreme temperatures); and calculating estimated emissions from the cooling tower. Tracked the NRC guidelines and aided in the development of the meteorology and air quality sections for the COLA and FSAR that are submitted to the NRC.

JEA Greenland Energy Center; Prevention of Significant Deterioration Air Permit Application; Greenland Energy Center;

Florida, United States; 2008

Air Quality Scientist - Black & Veatch. Provided air quality assessment services related to determining the potential impact of the conversion from a single cycle configuration to a 2 x 1 combined cycle configuration. Assisted in permit application services, including Class II air dispersion modeling and air permit application preparation.

City Water, Light, & Power; RMP Compliance Audit; Dallman Power Station; Springfield, Illinois, United States; 2008

RMP Specialist - Black & Veatch. Assisted in completing a compliance audit for the ammonia system as a component of the RMP.

City Water, Light, & Power; RMP Compliance Audit; Water Purification Plant; Springfield, Illinois, United States; 2008

RMP Specialist - Black & Veatch. Assisted in completing a compliance audit for the chlorine system as a component of the RMP.

Florida Municipal Power Agency; Title V Air Operating Permit Application; Treasure Coast Energy Center; Fort Pierce, Florida, United States; 2008

Air Quality Scientist - Black & Veatch. Provided air quality assessment services related to determining the impact from the operation of natural gas turbines at the combined cycle power plant. Assisted in permit application services, including Class II air dispersion modeling.

Topeka Water Treatment Plant; RMP Services; Water Treatment Plant; Topeka, Kansas, United States; 2007

Air Quality Scientist - Black & Veatch. Assisted client in development of the plant's RMP manual, updating drawings, conducting hazard review, and updating manual of standard operating procedures.

PRESENTATIONS & PUBLICATIONS

"Mesoscale Shear Eddies in the Upper Troposphere." Monthly Weather Review, Volume 128, Issue 12. December 2000.

"Climatological Study of the Relationship Between Clouds and Surface Temperature During Formation of Arctic Air Outbreaks in North America." Master's Thesis. October 2000.

Dave Friesen

David Friesen has 23 years of experience in Project Management, Site Acquisition, and Zoning. As a twenty plus year veteran of the industry in Michigan, Ohio, Kentucky, Illinois, Indiana, Wisconsin, Minnesota, Pennsylvania, Tennessee, and Florida. His experience has span and includes contract and lease negotiation, business development, financial management, and coordinating with clients, landowners, stakeholders, team members and vendors to meet project goals. He is adept at managing third party services such as environmental reports, engineering analysis, and construction drawings. David has been responsible for managing site acquisition teams and contractors, and now serves as Sr Land Services Manager for Black & Veatch's Telecommunications Division and overseeing site acquisition for AT&T's Ohio/Pennsylvania market.

PROJECT EXPERIENCE

AT&T; AT&T Turf, AT&T - BAU, GSM, LTE, BTS, Carrier Adds; Pittsburgh, Pennsylvania, United States; 2011-In-Progress

Sr Land Services Manager - Black & Veatch. Oversee AT&T projects in Pennsylvania and Ohio region from Startup to construction handoff. GSM, BAU, Carrier Add, BTS, WCS, First Net, overlay upgrades. 800+ sites. Duties included Day to Day operations, tracking deliverables, managing vendors / contracts, client reporting, information integrity, maintain good client relations, Scheduling, coordination with Engineering and Environmental teams. Jurisdictional interface for problem solving. negotiations with property owners, and counsel.

Oversee Sprint Nextel projects for Samsung OEM in Minnesota. Duties included Day to Day operations, tracking deliverables, managing vendors / contracts, client reporting, information integrity, maintain good client relations, Scheduling, coordination with Engineering and Environmental teams. Jurisdictional interface for problem solving. negotiations with property owners, and counsel.

AT&T; AT&T Overlay; Farmington Hills, Michigan, United States; 2008-2011

Site Acquisition Manager - Goodman Networks, Inc.. Oversee AT&T projects in Michigan region from Startup to construction handoff. Worked on New Site Builds, and overlay upgrades. 300+ fiber to cell sites completed. 150+ complex growth sites completed. 50+ sites implemented dual band. Duties included Day to Day operations, tracking deliverables, managing vendors / contracts, client reporting, information integrity, hiring personnel.

AT&T; AT&T; Indianapolis, Indiana, United States; 2006-2008

Site Acquisition Manager - Wireless Facilities, Inc.. Oversee Sprint-Nextel Synergy projects in Michigan region from scope to construction handoff. 150+ synergy sites. Duties included Day to Day operations, tracking deliverables, managing vendors / contracts, client reporting, information integrity, hiring personnel.

Oversee AT&T projects in Indianapolis from scope to construction handoff. 85+ overlay sites. Duties included Day to Day operations, tracking deliverables, managing vendors / contracts, client reporting, information integrity.

SITE ACQUISITION MANAGER

EXPERTISE:
Site Development, Land Use, Property Zoning, ROW, Utility procurement, Leasing, Negotiations, Communication, Leadership

EDUCATION
Bachelors, Business Administration, Negotiations, Oakland University, 1992, United States

TOTAL YEARS OF EXPERIENCE
23.5

BLACK & VEATCH YEARS OF EXPERIENCE
12.9

LANGUAGE CAPABILITIES

OFFICE LOCATION
Michigan, USA: United States

AT&T, Fiber Tower, Metro PCS, and Nextel Communications; AT&T, Fiber Tower, Metro PCS, and Nextel Communications; Harper Woods, Michigan, United States; 2003-2006

Acquisition/Zoning Manager - Axiom Consulting Group, LLC. Site Development consultant.
Provided Site Acquisition and Zoning services to Metro PCS in the Michigan market. Duties included Day to Day operations, Identifying potential raw land candidates and provide 'winning site selections' to the client for review. Negotiate leasing agreements, prepare zoning summaries to local and state jurisdictions for compliance. Prepare and attend Zoning meetings to gain approvals from local and state jurisdictions, tracking deliverables, coordinating third party services, client reporting, information integrity.

Provided Site Acquisition and Zoning services to Cingular Wireless (now AT&T) in the Michigan market. Duties included Day to Day operations, Identifying potential raw land candidates and provide 'winning site selections' to the client for review. Negotiate leasing agreements, prepare zoning summaries to local and state jurisdictions for compliance. Prepare and attend Zoning meetings to gain approvals from local and state jurisdictions, tracking deliverables, coordinating third party services, client reporting, information integrity.

Provided Site Acquisition and Zoning services to Fiber Tower in the Michigan market. Focus on downtown Detroit and small cell development. Duties included Day to Day operations, Identifying potential candidates and provide 'winning site selections' to the client for review. Negotiate leasing agreements, prepare zoning summaries to local and state jurisdictions for compliance. Prepare and attend Zoning meetings to gain approvals from local and state jurisdictions, tracking deliverables, coordinating third party services, client reporting, information integrity.

Provided Site Acquisition and Zoning services to Nextel in the Michigan market. Duties included Day to Day operations, Identifying raw land potential candidates and provide 'winning site selections' to the client for review. Negotiate leasing agreements, prepare zoning summaries to local and state jurisdictions for compliance. Prepare and attend Zoning meetings to gain approvals from local and state jurisdictions, tracking deliverables, coordinating third party services, client reporting, information integrity.

Nextel, US Cellular, Cingular Wireless (now AT&T); Nextel, US Cellular, Cingular Wireless (now AT&T); Chicago, Illinois, United States; 2003

Site Acquisition Specialist - Wireless Facilities, Inc. Provided Site Acquisition and Zoning services to US Cellular in the Illinois market. 15+ raw land sites. Duties included Day to Day operations, Identifying potential raw land candidates and provide 'winning site selections' to the client for review. Negotiate leasing agreements, prepare zoning summaries to local and state jurisdictions for compliance. Prepare and attend Zoning meetings to gain approvals from local and state jurisdictions, tracking deliverables, coordinating third party services, client reporting, information integrity.

Oversee/work on Cingular GSM overlay project in Illinois market. 122+ overlay projects. from Startup to construction handoff. Duties included Day to Day operations, tracking deliverables, managing vendors / contracts, client reporting, information integrity.

Oversee/work on Cingular GSM overlay project in Kentucky / Tennessee markets. 337+ overlay projects. from Startup to construction handoff. Duties included Day to Day operations, tracking deliverables, managing vendors / contracts, client reporting, information integrity.

Provided Site Acquisition and Zoning services to Nextel Communications in the Michigan market. Duties included Day to Day operations, Identifying potential raw land candidates and provide 'winning site selections' to the client for review. Negotiate leasing agreements, prepare zoning summaries to local and state jurisdictions for compliance. Prepare and attend Zoning meetings to gain approvals from local and state jurisdictions, tracking deliverables, coordinating third party services, client reporting, information integrity.

Drew Clark Ackerman, PE

Mr. Ackerman is an analytical, data-driven water resource manager with 29 years of consulting and research experience who has successfully navigated complex environmental and water quality compliance issues in consultative, research and project management engagements. He has specialized, multi-state experience characterizing and quantifying runoff impact and discharges on freshwater, brackish, and saline environments and demonstrated a record of developing innovating hydraulic, hydrologic, hydrodynamic and water quality models to enhance clarity of water management issues.

PROJECT EXPERIENCE

Johnson County TMDL Planning; Kansas City, Kansas; 2022-2023

Water Quality Lead - Black & Veatch. Reviewed past water quality analyses and directed additional water quality spatial/temporal analysis to identify potential TMDL compliance trends and areas of significant pollutant loading concern. Developed a range of follow up studies for client consideration to improve identification of pollutant sources and impacts of management approaches.

Central Arizona Project Water Quality Modeling; Phoenix, Arizona; 2022-2023

Technical Lead and Head Water Quality Modeler - Black & Veatch. Led the CEQUAL-W2 water quality modeling of the 336-mile canal and Lake Pleasant. The Canal modeling simulated nutrients, dissolved oxygen, attached and floating algae as well as other conservative constituents of concern. The Lake model simulated temperature with the infrastructure developed for additional follow-on water quality modeling. Client staff were trained on model use and analysis of results using a customized model interface under client defined shortage and introduced water conditions.

Charlotte Water Source Water Protection Planning; Charlotte, North Carolina; 2022-2023

Source Water Planning Lead - Black & Veatch. Led the analysis of the potential sources of pollutants of concern in the zone of concern upstream of the Charlotte Water drinking water intakes. Coordinated the analysis of regional regulations which impact receiving water quality. Directed the development of an ArcGIS dashboard and app for client use in identifying pollutants sources and updating the developed database. Conducted stakeholder meetings for input on source water protection concerns in the plan development and final plan. Identified potential funding sources and entities in the watershed with shared water quality concerns for potential teaming.

Tampa Bay Water Bypass Canal Water Source Water Protection Planning; Tampa Bay, Florida; 2022-2023

Source Water Planning Lead - Black & Veatch. Worked as a subconsultant to highlight past water quality studies in the Tampa Bypass Canal Watershed. Coordinated with other regional consultants to develop a consistent water

SENIOR WATER QUALITY ENGINEER

EXPERTISE:
Environmental Compliance; Eutrophication; Hydraulic modeling; Hydrodynamic modeling; Hydrology; Modeling; Project management; Sampling; Stormwater; Stormwater water quality; Water quality; Water quality management; Water quality modeling; Water resource management; Watershed management

EDUCATION
Master of Science, Oceanography, Physical Oceanography, Louisiana State University, 1995
Bachelor of Science, Civil Engineering, Environmental Engineering, Purdue University, 1993
Bachelor of Arts, Pre-Engineering, DePauw University, 1993

PROFESSIONAL REGISTRATION
License, Andrew Ackerman, Civil, #0051762, Colorado, 2016

TOTAL YEARS OF EXPERIENCE
29

BLACK & VEATCH YEARS OF EXPERIENCE
7

OFFICE LOCATION
Denver, Colorado

quality improvement planning approach. Identified hazards within the watershed, changes in land use and permitted dischargers and the associated water quality trends. Developed a list of sampling recommendations which would enhance the water quality dynamics understanding. Identified opportunities for improving water quality in the watershed through changing hydrologic operations, additional studies and potential teaming for water quality controls.

Hampton Borrow Pit Storage and Inundation Modeling; Lakeland, Florida; 2020-2022

Stormwater Lead Modeler - Black & Veatch. Developed a paired PCSWMM and 1D/2D HEC-RAS model of runoff into an existing large detention basin, the impact of a new overflow structure to meet revised state freeboard requirements and the inundation impacts downstream of the overflow basin on marsh water levels.

City of Clearwater; Clearwater Marshall Street WRF THMs Mixing Zone Evaluation; Clearwater, Florida; 2022-2023

Mixing Zone Modeler - Black & Veatch. Reviewed sampling results and the dilution of the WRF discharge in a small tidal creek. Developed a CEQUAL model to evaluate the range of potential mixing zone conditions. Used that information to propose a modification in effluent THM concentrations to the FDEP.

Zeeland Wastewater Treatment Plant Permit Limit Impact Evaluation; Zeeland, Michigan; 2022

Surface Water Quality Lead - Black & Veatch. Reviewed historic selenium and temperature data for potential discharge concentration modifications. Provided recommendations on potential permit limits and discussions with state agencies. Facilitated discussions between client and state agencies to understand background on thermal discharge requirements and potential site-specific standards.

Catawba Wateree Watershed Management Group; WATER QUALITY PHASE III Data Needs Assessment; North Carolina; 2019-2021

Technical Lead - Black & Veatch. Helped lead the technical advisory committee on the next phase of water quality data analysis for the Basin. Led the development of a basin-wide questionnaire on water quality data needs and spearheaded the development of a Power BI data platform. Summarized the results of two large stakeholder meetings to identify water quality data shortcomings for better water quality management.

Dusty L. Miller, ENV SP

Dusty L. Miller is an Environmental Scientist and Regulatory Specialist within Black & Veatch's Environmental business unit. Ms. Miller has a strong interest in environmental sustainability and prevention and minimization of project impacts on the environment and wildlife. She has been a credentialed Envision Sustainability Professional (ENV SP) in association with the Institute for Sustainable Infrastructure (ISI) Envision sustainable infrastructure rating system since early 2014 and is a member of Black & Veatch's Sustainability Catalyst group. She has over 18 years of environmental experience working on a wide variety of projects, particularly site selection and wind and solar projects, and is responsible for identifying and obtaining the permits and licenses required for the construction and operation of facilities of all types. She evaluates environmental resources that should be considered in the siting of energy generating facilities and prepares environmental reports to comply with the National Environmental Policy Act (NEPA) and comparable state statutes such as the California Environmental Quality Act (CEQA).

PROJECT EXPERIENCE

Valley Water; Anderson Dam Removal - Environmental Justice Evaluation; California, United States; 2023

Environmental Lead - Black & Veatch. Led the review and evaluation of environmental justice for a large dam removal project near a heavily populated urban area in California. Worked with the client, a regional water authority, to ensure that the environmental justice evaluation included all methodology requirements from FERC and the client. Coordinated with third parties working on other EIR sections to ensure consistency of information for the final EIR document submittal.

Confidential Client; Project Atlantis; Tennessee, United States; 2018

Environmental Scientist - Black & Veatch. Coordinated with multiple engineering disciplines with project scope and design still in progress to determine regulatory interpretations and permitting requirements for a proposed brownfield gas-based protein feed plant. Contacted multiple state and local agencies to pinpoint likely permit requirements specific to the project and associated activities (especially NPDES wastewater discharge and other water-related requirements from state and local authorities), which continued to change throughout the project timeframe. Provided information updates to others on the Black & Veatch team to help ensure that the team members all had current information. Project was suspended by the client in late 2018.

Newberry County Water & Sewer Authority; EA for FERC Request for Authorization for Water Withdrawal from the Saluda Hydroelectric Project ; Newberry County, South Carolina, United States; 2016

Environmental Scientist - Black & Veatch. In response to a FERC request, wrote an Environmental Assessment (EA) to evaluate environmental impacts to specific resources in support of Newberry County's application to withdraw an increased amount of water from the FERC-regulated Lake Murray upstream of Saluda Dam. Resources addressed included land use; surface water quality, use, and interbasin transfer; wetlands; fish and wildlife;

ENVIRONMENTAL SCIENTIST

EXPERTISE:
Environmental Compliance and Permitting; Environmental Impact Assessment; Environmental Justice; Environmental Regulatory Reviews; Equator Principles; Institute for Sustainable Infrastructure (ISI) Envision; NEPA Compliance; Site Selection; Sustainability; Due Diligence

EDUCATION
Bachelor of Science, Environmental Studies, University of Kansas, 1997, United States
Associate of Arts, General Studies, Johnson County Community College, 1995, United States

PROFESSIONAL REGISTRATION
Envision SP - Envision Sustainability Professional, Environmental, Multiple, United States

TOTAL YEARS OF EXPERIENCE
25.8

BLACK & VEATCH YEARS OF EXPERIENCE
25

LANGUAGE CAPABILITIES
English
Spanish

OFFICE LOCATION
Overland Park, Kansas, USA: United States

special status species; environmentally sensitive areas; recreation; cultural resources, and scenic/aesthetic resources.

PacifiCorp; Swift and Merwin Dam Fish Collection and Transport Facilities; Washington, United States; 2009-2010

Environmental Scientist / Regulatory Specialist - Black & Veatch. Researched the project areas for these dam improvements along the Lewis River and completed preliminary environmental portions of Joint Aquatic Resources Permit Applications and Washington State Environmental Policy Act checklists for both projects in mid-2009. In 2010, updated previous applications and determined requirements for local permits for the projects. Compiled information to support permit applications, which included summarizing Washington Department of Ecology guidance to assist the client in determining the ordinary high water mark of the Lewis River in the field.

Confidential Client; Hydrogen Hub - NEPA and Permitting Advisory Services; United States; 2023

Environmental Lead - Black & Veatch. Led the review and environmental evaluation of a multi-part, multi-state proposed hydrogen hub soliciting funding from the Department of Energy (DOE). Based on applicant information provided, completed DOE application documentation drafts including evaluation of baseline environmental conditions, environmental impacts, permits required, Justice40 considerations, and environmental overview of the proposed project for this preliminary DOE funding application.

Salisbury Rowan Utilities; Yadkin River Raw Water Intake Relocation - Environmental Assessment and Permitting; Salisbury, North Carolina, United States; 2021-2023

Environmental Lead - Black & Veatch. Black & Veatch's environmental team worked with our engineers and the client to write the Environmental Assessment (EA) for this FEMA-funded project. This work included preparation of informal consultation solicitations for agency input, field work including wetland delineation, protected species, tree identification and cultural resources surveys, and preparation of the EA. Additional work will also include Section 404 and Section 10 permitting for wetland impacts and the new intake installation through the U.S. Army Corps of Engineers.

Metropolitan Council; Fourth Incinerator Addition Environmental Justice Advising; Minnesota, United States; 2022

Environmental Scientist - Black & Veatch. Provided an overview environmental justice evaluation of the area where the Met Council plans to install a fourth waste incinerator at an existing incineration facility that serves the Twin Cities area. Provided advice and participated in discussions with members of the Met Council to ensure that environmental justice aspects of the project were thoroughly considered.

Confidential Client; SMR Feasibility Study - Environmental Reviews; Michigan, United States; 2022

Environmental Scientist/Technical Lead - Black & Veatch. Led the environmental review of one potential site location provided as a possibility for locating SMRs for a large Midwestern utility. Wrote and oversaw the

writing of feasibility study document sections, including site area, land use, topography, environmentally sensitive areas; terrestrial habitat and wildlife; aquatic habitat and wildlife; wetlands; threatened and endangered species; water resources; socioeconomics; historic and archaeological sites; and environmental justice. Coordinated with the client to review approaches to each of these subject areas and to incorporate their inputs. Served as overall reviewer of the feasibility study document.

Confidential Client; SMR Feasibility Study - Environmental Reviews; Virginia, United States; 2022

Environmental Scientist/Technical Lead - Black & Veatch. Led the environmental review of five potential site locations (existing power plant properties and one reclaimed coal extraction site) provided as possibilities for locating SMRs for a large Eastern utility. Participated in site visits to the locations to make environmental observations. Wrote and oversaw the writing of feasibility study document sections, including site area, land use, topography, environmentally sensitive areas; terrestrial habitat and wildlife; aquatic habitat and wildlife; wetlands; threatened and endangered species; water resources; socioeconomics; and historic and archaeological sites; and coordinated with the client to review approaches to each of these subject areas and to incorporate their environmental justice and other inputs. Served as overall reviewer of the feasibility study document.

USTDA; Bac Lieu Transmission Line Feasibility Study (ESIA, Regulatory Review); Bac Lieu, Viet Nam; 2022

Environmental Scientist/Technical Lead - Black & Veatch. Led the environmental effort for this transmission line project in Vietnam, which was proposed as a way to connect renewable generation sites and an LNG project on and near the coastal area of Bac Lieu province to substations further inland so that electric grid capacity in the area would be improved. Oversaw the creation of the regulatory review document, which explains the Vietnam regulations that would be applicable to the project activities, and authored portions of and oversaw the Environmental and Social Impact Statement, which describes existing conditions, the project, potential project impacts during construction, operation, and decommissioning of the project, and mitigation measures that may be implemented to avoid or minimize expected impacts. Participated in calls with the local subcontractor in Vietnam and the greater project team throughout the project.

Confidential Client; Equator Principles Advising; United States; 2022

Environmental Scientist/Technical Lead - Black & Veatch. Prepared a memo at the request of this power generation project developer client advising on the best potential ways to ensure that their projects can be found in compliance with all of the Equator Principles (including IFC Performance Standards at a high level) by proactively performing environmental and social reviews and ensuring that programs and plans are in place for each project that include documentation of the information needed to assess Equator Principles compliance and find projects in compliance from the perspective of an independent reviewer. Also included general information about the gaps between what is required in certain states and particular countries by their environmental regulations compared to requirements for full compliance with the Equator Principles. Explanatory information was also included about the concept of Free, Prior, and Informed Consent (FPIC)

and the process and documentation that would be needed in the event that any of the client's projects may involve impacts to indigenous peoples.

Eric Gates

Eric Gates is a highly skilled Project Manager in Black & Veatch's Government and Environmental business line with over 20 years of experience in managing environmental programs for large manufacturing facilities in the Construction, Mining, Chemical and Power industries. Eric's expertise lies in compliance management related to Air, Water and Waste regulations, with a strong focus on sustainability development, Permitting compliance and reporting. He has managed environmental compliance programs covering investigation, characterization, risk assessment, design audits, pollution prevention, and waste management of solid and hazardous wastes.

PROJECT EXPERIENCE

Environmental Due Diligence; Multiple Clients; 2022-In-Progress
Project Manager - Black & Veatch.
Serving as the Subject Matter Expert (SME) for the Phase I ESA program leading multiple Phase I Environmental Site Assessments (ESAs) for multiple clients located across the United States & Canada. Assessments include desktop reviews of site conditions and history, site visits, interviews, and preparation of technical documents to identify recognized environmental concerns. Assessments have included gas stations, wind farms, power plants, bulk storage facilities, parking garages/lots, and vacant fields for areas including Ontario CA, California, Florida, Kansas, Michigan, Maine, Massachusetts, Missouri, Idaho, Pennsylvania, Texas, Virginia and more.

Strata Green Energy; Permit Matrix Development; United States; 2023-In-Progress
Project Manager - Black & Veatch. PM - Developed permit matrix for 6 sites in multiple states for proposed hydrogen plants. This matrix assists in the strategics path of expansion of growth as well identifying all compliance needs for each site.

Georgia Pacific; Emissions Reporting Software Development; United States; 2023-In-Progress
Project Manager - Black & Veatch. Assisted client management and mills with software developers to create a reporting network for all facilities to upload and report all regulatory requirements with dashboard trends for compliance awareness and goals.

Siemens AG; HYDROGEN: Siemens Aldbrough Phase 2B FEED; England, United Kingdom; 2023-In-Progress
Environmental Lead - Black & Veatch. Ongoing Development of Environmental Management and plan and Systems for new Hydrogen Storage facility. Also providing permit support to the facilities environmental department.

PowerSouth; CCR Pond Closure; Alabama, United States; 2022-In-Progress
Project Manager - Black & Veatch. Led the design of CCR pond closure, design and post-closure activities. Responsible for assisting our client with state and federal reporting, compliance and negotiations related to the

PROJECT MANAGER

EXPERTISE:
Coal Combustion Residuals/By-product(CCR/CCB) Pond Closures (VA, AL) ; Environmental Compliance Management ; GHG; Groundwater; Landfill ; Mine Reclamation ; Permitting / Due Diligence Phase I ESAs ; Sustainability ; TRI; Water Monitoring; Mine (coal) Management (Surface / Underground)

EDUCATION
Bachelor of Engineering, Bachelor of Science in Civil Engineering; Associates of Mining Engineering, Bluefield State College, 2004, United States

TOTAL YEARS OF EXPERIENCE
21

PROFESSIONAL ASSOCIATIONS
Virginia Manufacturers Association - Member / Water and Air sub-committees
American Society of Civil Engineers - Member

OFFICE LOCATION
Bluefield, Virginia, USA

project. Additionally, oversaw all groundwater monitoring activities and prepare groundwater reports for submission to ADEM and EPA.

Arizona State University; DOE DAC Hubs Funding Support; Arizona, United States; 2022

Environmental Lead - Black & Veatch. Led a team of environmental professionals in completing the necessary application information for Environmental Health and safety Risks analysis associated with the regional direct air capture hubs. This grant was successfully awarded in August of 2023.

Sustainability Program Development; Virginia, United States; 2019-2021

Compliance Manger - Celanese Acetate. Developed site sustainability metrics program for facility and assist in corporate metric tracking software for reporting. This program included training key production engineers how to monitor and report metrics to the site compliance team.

Coal Ash Pond and Landfill Closures with solar design; Narrows, Virginia, United States; 2015-2020

Closure of Coal ash Pond A - Celanese Acetate. Project management of a successful closure of the first coal ash pond in Virginia under the Coal Combustion Byproduct (CCB) rule with added permitting as a high hazard dam permit under the Department of Conservation and Recreation (DCR) as well as Virginia solid waste landfill under the Virginia Department of Environmental Quality (VADEQ)

Closure of Ash Landfill / Solar post closure Design- Celanese Acetate. Project management of a successful landfill closure with the Virginia Department of Environmental Quality (VADEQ) with post closure design for brownfield solar expansion to supplement power to the natural gas power facility on site.

Landfill Leachate Pumping Station; Virginia, United States; 2016-2017

Environmental PM - Celanese Acetate. Managed consultant design, sampling, monitoring and state negotiations to construct a pumping station that can filter solids prior to entering the wastewater treatment leachate system. This station also captured a source of ammonia rich water to be treated before discharging to the environment.

Coal Stockpile Upgrade; Virginia, United States; 2012-2013

Mine Engineer - Massey Energy. Design, permit and budget the addition of a new raw and clean coal stockpile at the Knox Creek Coal Corporations' Preparation Plant. Role also included managing the contractor safety and environmental compliance.

Jhon Arbelaez-Novak

Jhon Arbelaez-Novak is an Environmental Analyst and Regulatory Specialist within Black & Veatch's Environmental & Land Services unit. Jhon has a strong interest in environmental sustainability, climate adaption and resilience, renewable energies, policy analysis, and environmental justice. He has 10 years of experience working on a wide variety of projects among many industries, including oil & gas, transportation, government, groundwater remediation, and coastal zone permitting. Jhon has worked with rural and BIPOC communities, and dealt with a variety of stakeholders. He has prepared and published environmental reports to comply with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), ranging from categorial exclusions/exemptions to Environmental Impact Reports/Environmental Impact Statements (EIR/EIS).

PROJECT EXPERIENCE

JEA; Gas Fired Combined Cycle Power Plant; Jacksonville, Florida, United States; 2023-In-Progress

Lead Regulatory Specialist - Black & Veatch. - Coordinate and co-author Site Certification Application.
- Coordinate with regulatory agencies, including the Florida Department of Environmental Protection, and other federal, State, and local agencies.

DG Fuels, LLC; Sustainable Aviation Fuel (SAF) Facility; Louisiana, United States; 2023-In-Progress

Lead NEPA Specialist - Black & Veatch. - Lead NEPA clearance process.
- Coordinate and author NEPA document, in conjunction with the US Department of Energy.
- Coordinate NEPA with regulatory agencies.

San Diego County Water Authority; San Vicente Energy Storage Facility; California, United States; 2023-In-Progress

CEQA/NEPA Consultant - Black & Veatch. - Ensure project compliance with CEQA/NEPA requirements.
- Provide assistance and information for permit acquisition.

Mekong Clean Energy Interconnection Company, Ltd.; Bac Lieu, Vietnam Environmental and Social Impact Assessment; Bac Lieu, Viet Nam; 2022-In-Progress

Environmental Specialist - Black & Veatch. -Co-author Environmental and Social Impact Assessment.

Coachella Valley Water District; WRP 7 Tertiary Treatment Improvements and MP 113.2 Pump Station Rehabilitation Project; California, United States; 2022-In-Progress

Lead CEQA Specialist - Black & Veatch. - Lead CEQA clearance process.
- Draft CEQA documents.
- Coordinate CEQA with regulatory agencies.

Dominion Energy; SMR Alternative Studies; United States; 2022-In-Progress

ENVIRONMENTAL PLANNING ANALYST

EXPERTISE:
Environmental Compliance; Environmental Justice; NEPA/CEQA; Regulatory Permitting; Stakeholder Engagement

EDUCATION
Master of Arts, International Environmental Policy, Middlebury Institute of International Studies, 2013, United States
Bachelor of Arts, Environmental Studies, Florida International University, 2005, United States

TOTAL YEARS OF EXPERIENCE
12

BLACK & VEATCH YEARS OF EXPERIENCE
1.5

LANGUAGE CAPABILITIES
English
Spanish

OFFICE LOCATION
Walnut Creek, California, USA: United States

Environmental Specialist - Black & Veatch. - Analyze environmental impacts for the feasibility of placing Small Modular Reactor units throughout various sites in Virginia and West Virginia.

Southern Nevada Water Authority; Horizon Lateral; Nevada, United States; 2022-In-Progress

Lead NEPA/Regulatory Specialist - Black & Veatch. - Manage all environmental tasks for the project.
- Oversee development of NEPA documents.
- Manage environmental subcontractors.
- Coordinate environmental. permitting and ROW access with various agencies, including BLM and BOR.

California Hydrogen Business Council; H2 Station Permitting; California, United States; 2022-In-Progress

Subcommittee Member - Black & Veatch. Assist in developing a hydrogen station permitting handbook handbook that provides essential information for improving the permitting process for hydrogen fueling stations in California.

EQT; Sub-Zero; United States; 2022-In-Progress

Regulatory Specialist - Black & Veatch. Develop environmental permit matrix, coordinate environmental permitting, NEPA requirements, and analyze environmental impacts for a multi-state LNG pipeline. Coordinate with multiple federal, state, regional, and local agencies.

Northern California Power Authority; CEQA Draft EIR Public Comments; Lodi, California, United States; 2023

Lead CEQA Specialist - Black & Veatch. - Coordinate and author public comments for a CEQA Draft EIR.

Programmatic Sitewide Environmental Impact Statement for Continued Operation at the Lawrence Livermore National Laboratory; Livermore, California, United States; 2019-2021

Environmental Planning Analyst - Lawrence Livermore National Laboratory. Coordinated data collection for all Program Area Directorates regarding upcoming projects up to the year 2035. Served as primary author and editor for various subjects analyzed in the EIS.

Supplemental Analysis (SA) of the Final Site-wide Environmental Impact Statement for Decontamination and Decommissioning (D&D) Projects; Livermore, California, United States; 2018-2019

Environmental Planning Analyst - Lawrence Livermore National Laboratory. Authored for the 2019 NEPA/CEQA SA for D&D projects, which analyzed demolition and disposal of hazardous and radioactive waste, as well as potential impacts from transportation and storage of such materials.

State Route 1 Lagunitas Creek Bridge Project"; Oakland, California, United States; 2017-2018

Coastal Program Analyst - California Department of Transportation. Served as reviewer for publication of "State Route 1 Lagunitas Creek Bridge Project" Final NEPA/CEQA EIS/EIR.

Republic of Ghana Forestry Commission; International Environmental Exchange Program; Accra, Greater Accra, Ghana; 2011

Environmental Fellow - U.S. State Department. In coordination with the Republic of Ghana Forestry Commission, developed sustainable solutions to deal with environmental degradation,
management of forests, and natural habitats.

Appendix B. Guidance to Reviewers

The SFWMD in conjunction with Black & Veatch realizes that expert reviews may sometimes include inappropriate, or out of scope comments. To prevent any potential out of scope comments or problems with this review, the SFWMD respectfully requests that the project's review be conducted in accordance with U.S. Army Corps of Engineers EC 1165-2-217, and specifically with the following:

- Focus on the technical aspects of the project and specifically the Charge Questions.
- Do not make comments with regard to:
  - USACE's or SFWMD's policies or changes in policies
  - Grammatical errors that do not affect the technical aspect of the document being reviewed. Clarification: If the error will result in an inappropriate design (for instance the text says "up to X inches of material" instead of "at least X inches of material") then it is an appropriate comment. However, if it is a typo, spelling error, etc., it should not be commented on.
  - Organization of the document, headings, subheadings, etc.
- Please review your comments prior to submittal to ensure that you are providing a rationale behind what you are stating in your comment.
- Use active voice and do not ask open ended questions unless needed.
- Comments should be clear, concise and reference specific document locations.
- Background information should be separated for the comment and should follow the specific comment.
- Should a reviewer have a lesson learned or something they want USACE to consider, start the entry with "Consider. "
- If you ask a question, please provide a rationale for why you ask it.
- If you feel that a comment should be discussed at the comment review conference or on a conference call – please identify it in your transmission of the comments to the Black & Veatch PM. If you state that you want to discuss this at the comment review conference or on the conference call or the Black & Veatch PM can leave the comment open so that it becomes flagged.
- All comments should be recorded in a professional tone. For example, often times comments are made directive in nature (e.g., "Change this to that"). What is more appropriate is to say "Recommend a change from this to that….". The reason for this suggestion is to reinforce a focus on the technical elements of the project instead of the personnel involved.
- If you either have duplicate comments of your own or see that there are duplicate comments by another expert reviewer – please do not consolidate comments. Duplicate comments may reinforce a particular design element to focus upon and will help facilitate the consolidation of comments into team consensus by the Black & Veatch PM. The Black & Veatch PM will make note that more than one reviewer made a particular comment when entering the "team" comment into the comment matrix. The Black & Veatch PM will attempt to resolve any contradictory comments with reviewers; if no resolution is reached the contradiction will stand. Duplicate comments will be consolidated by the Black & Veatch project manager prior to their placement into the comment matrix for review by SFWMD as outlined in the Task 4 of the SOW.

Appendix C. Table of Comments/Resolutions

Lake Okeechobee Section 203 Government Agency Review - Black & Veatch - December 11 through December 19

Comment No.	Black & Veatch Reviewer Name	Area(s) of Experience	Reviewer Agency	Report Section	Page #	Discipline	Comment	Significance of Concern	Basis of Concern	Suggested action to remedy/resolve concern	Response	Backcheck	Response2	Comment Closed
1	Todd Schellhase	Structural	Black & Veatch	Appendix A; A.10.3.6 and A.10.3.7	A.10-3	Structural	Lines 7 and 12 in paragraphs A.10.3.6 and A.10.3.7 contain factors identified as "Structure Importance factor". Please confirm if structure importance factors are applicable to wind loads.	Low	Reviewer did not find these factors in the applicable design standards.	Consider removing structure importance factors if not applicable.	Sections A.10.3.6 and A.10.3.7 have been revised to address this comment.	Concur		X
2	Todd Schellhase	Structural	Black & Veatch	Appendix A, A.10.4.4-8	A.10-5	Structural	The load factors on this page appear to be those from EM 1110-2-2104 (2003) rather than EM 1110-2-2104 (2016). The 2016 document is the version referenced on line 33 of page A.4-3 section A.4.4.5 Structural Design Criteria.	Low	Load factors do not appear to match those from the document identified as the applicable design criteria.	Consider revising load factors to be consistent with selected design criteria.	Section A.10.4 has been revised to address this comment.	Concur		X
3	Heriberto Torres	Construction	Black & Veatch	Appendix A, A3, A11	A.11-2	Construction	Appendix A Subsection A11.4 Utilities. No mention of coordination with utility (water or power) for relocations	Low	Consider including utility stakeholders (Florida Power & Light, Glades Electric Cooperative and Florida Gas Transmision Co.) early in the design to avoid schedule conflicts and delays.	Address early in PED.	Section A.11.4 has been updated to address this comment.	Concur		X
4	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, ANNEX B-1		Geotechnical	Appendix A, ANNEX B-1, Table 2A, Shallow and deep zone of PZ levels not discussed in the report.	Low	Not sure if they are trying to refer to artesian conditions at these shallow surfaces? the whole aquifer system after installing PZ should be discussed after borings	Provide more details in PED.	"Shallow" and "Deep" are defined by the installed depths shown in Table 2 (previous page)	Response Noted. The comment recommend not only stating the depths of the screens but also the reasons for installing them at these depths. Also, were the collected data enough to address these reasons. For example, was an artesian pressure anticipated and was it confirmed? Recommended to Provide more details in PED.	The referenced geotechnical data report by Ardaman is a final signed & sealed report, and there are no plans to edit at this time. There was no anticipated artisan pressure; the varied depths were installed to collect additional data. The screen intervals attempted to target areas with relatively higher hydraulic conductivity. Few data points were collected on the instruments. Boring logs which can provide profile information for the reader are provided in the report for each piezometer. Recommend continued reading of the isntruments and no further changes to the report.	X
5	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, ANNEX B-1		Geotechnical	Appendix A, ANNEX B-1, Permeability tests reports not provided, Triaxial tests were not discussed nor analyzed in P-Q space for determination of soil strength	Low	Consider the results in the report to better estimate the soil properties of the embankment rather based on judgment.	Provide more details in PED.	Perm data is provided in Appendix VII; Triax tests were performed with data provided to assist with future PED phases of design. Embankments with a 3:1 slope with sand consistent with the available borrow materials have been widely used in Florida for several years. For this Feasibility level study, the slope stability results are consistent with years of experience and judgement. Additional testing and analyses can be performed in a more detailed future phase of design.	Response Noted, Recommended to Provide more details in PED.	[illegible] discussing the method of obtaining the shear strength parameters. Recommend determining, the shear strength parameters from p-q and p'-q' spaces following the guidelines presented in the US Army Corps of Engineers "Slope Stability" Engineering Manual (USACE, 2003) at which the principal stresses shall be determined at the same point on the failure envelope for different samples (I.e., to ensure similar state of soil at failure). The corresponding strains at which the principal stresses were estimated	X
6	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.2.1, A.8.2.2	A.8-1	Geotechnical	Recommend adding dimensions details for all features mentioned including the 500 ft wide strip on the cross section in Figure A-8-2. Recommend referencing the figure within the text, you can use call out to increase scale for specific parts.	Low	To improve overall project understanding and visualization.	Provide more details in PED.	Comment should be evaluated in PED.	Concur		X
7	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.3.2	A.8-3	Geotechnical	North and south sections for west cell not mentioned, recommend commenting on them	Low	To improve overall project understanding and visualization.	Modify text.	A parenthetical notation that explains the existing topogrphic condition that each typical section represents has been added to the bulleted list of the typical sections. Since typical sections A, B and C capture the average, low, and high existing topogrphic condition along the perimeter dam, it is not necessary at this stage of the design to have additional typical sections of the perimeter dam for geotechnical analyses.	Concur		X
8	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.3.2	A.8-3	Geotechnical	Recommend explaining/discussing in more details the rapid-draw down method and boundary conditions, in this section or in A.8.7.2.	Low	To improve the understanding of the method and boundary conditions utilized.	Modify text.	Boundary Conditions and Rapid Drawdown are both discussed in A.8.7.2. Conditions used for the model (24-hour full drawdown) are extremely conservative, but given that those conditions show acceptable FOS, a slower drawdown will also be acceptable.	Concur		X
9	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.4.2	A.8-6 /**(A.8-7 in revised version)**	Geotechnical	Recommend changing FOS of Maximum surcharge pool 1.4 not 1.3 as per EM 1110-2-1902	Low	Recommend revising this table to be in compliance with EM 1110-2-1902 guidance.	Modify text.	Updated as recommended. "Steady State Seepage with PMF/PMP Pool" now shows FOS = 1.4 per Table 3-1 of EM 1110-2-1902.	Concur		X
10	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.4.2	A.8-6 /**(A.8-7 in revised version)**	Geotechnical	Suggest adding the recommended factor of safety against uplift/piping	Low	Comparison to the FOS for uplift used referenced later in the text	Include discussion in text.	Updated in A.8.4.2 list, as suggested.	Concur		X
11	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.4.3	A.8-6 / **(A.8-7 in revised version)**	Geotechnical	Referring to Section A.5.2, the water levels are not clear in the referred section. Recommend adding a summary table that include low, high, and mean water levels as standalone table and/or to Table A-8.3. Would the downstream water level at dry season affect the analysis?	Low	for better understanding the boundary conditions and assure the worst case seniors are addressed	Provide more details in PED.	Water elevations at perimeter canal considered for the seepage analysis are described in Paragraph A.8.7.2 for each Cross Section. In addition, Table A.8-3 was updated to include the water elevations for each scenario. Downstream water level at dry season was included for Sections A and C where the control elevation changed and estimated seepage results are also included in Table A.8-3.	Concur		X
12	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.4.4	A.8-7 **(A.8-8 in revised version)**	Geotechnical	Recommend replacing "SPT" by "field investigation" to provide flexibility in the methods used for evaluation	Low	More accurate statement.	Modify text.	Text updated	Concur		X
13	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.6	A.8-8	Geotechnical	Recommend discussing in detail the basis and parameters used to develop the unsaturated permeability. Figures and references may be attached as an appendix.	Low	Not clear to approve.	Provide more details in PER.	Defining a saturated/unsaturated model allows to simulate the movement of water across the soil types considered for the seepage analysis. This parameter or subtle changes in permeability properties have more influence in transient conditions where is of particular interest the water transfer and storage within the soil porous media. Defining the models as such allows for further time-dependent advanced analyses in the future, if considered necessary.	Concur, Recommended to Provide more details in PED.		X
14	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.6	A.8-8 **(A.8-9 in revised version)**	Geotechnical	Table A.8-1, recommend reviewing the calculations for obtaining the friction angle for Unit A as it has low unit weight, likely the angle of friction may be less for this layer.	Low	May affect Factor of safety	Check correlations and adjust if needed.	More detailed review and analysis of materials properties may be performed during PED. Material properties used are consistent with literature for similar sands.	Concur		X
15	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.6	A.8-8 **(A.8-9 in revised version)**	Geotechnical	Table A.8-1, recommend reviewing the anisotropy ratios for stratified soils as per USBR 2014, the ratio should not be less than 10	Low	Please refer to United States Bureau of Reclamation (USBR) (2014), Design Standards No 13: Embankment Dams. By Engomoen, B., Witter, D. T., Knight, K., & Luebke, T. A.	Address in PED.	Don't disagree. However, the 2D seepage analyzed in the feasibility-level study is more conservative assuming a lower anisotropy ratio (i.e. lower ratio = higher vertical conductivity = more seepage around the cutoff wall versus through). Additionally, a ration of 5 is not unreasonable for sands, albeit the stratified nature of the sands on this site is acknowledged. A ration of 10+ was used in the sensitivity analysis presented in A.8.10, and both stability and seepage factors of safety were improved as a result.	Concur		X
16	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.7.2	A.8-9/**(A.8-10 in revised version)**	Geotechnical	Recommended for all sections, to provide table to summarize, low, high and long-term water levels upstream and downstream and maximum height of embankment.	Low	Better understanding the most critical conditions for analysis.	Provide more details in PED.	Table A.8-3 was updated and presents a summary of water elevations used upstream and downstream for each cross section used in the analyses.	Concur		X
17	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.7.2	A.8-9/**(A.8-10 in revised version)**	Geotechnical	Recommend mentioning the factor of safety of 3.0 is for ...?(i.e., piping and uplift)	Low	Not clear	Add text.	Addressed as suggested (A.8.7.2) and as discussed in previous comment (A.8.4.2)	Concur		X

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18	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.7.2	A.8-10/ **(A.8-11 in revised version)**	Geotechnical	" Results show water pressures in the embankment soils will dissipate within 24 hours of such an event" Recommend explaining whether the dissipation in water pressure is due to assigned boundary conditions or not?	Low	Provides a better understanding of the analysis.	Add text.	Text modified to clarify that the dissipation mentioned was the modeled drawdown conditions.	Concur		X
19	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.7.2	A.8-10/ **(A.8-11 in revised version)**	Geotechnical	Table A.8-2, recommend checking the critical gradient equation, also the values are not correct based on the unit weight provided in Table A.8-1	Low	Inaccurate exit gradient information on table.	Check and modify table as needed.	Critical gradient equation was updated. Exit gradients were estimated from the SEEP/W models at the critical exit point in the perimeter canal. Table was revised and updated accordingly.	Concur		X
20	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.7.2	A.8-10/ **(A.8-11/12 in revised version)**	Geotechnical	Table A.8-3, Recommend explaining (1) and (2) in the footnote of the table as well as , add water level up/downstream	Low	Provides a better understanding of the analysis.	Modify table.	It appears the review was performed on a older draft of the report. Footnotes (1) and (2) were removed in the latest draft.	Concur		X
21	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.7.2	**(A.8-10 in revised version)**	Geotechnical	It is recommended to remove the added comment about boundary conditions	Low	Recommend adding boundary conditions, it should not affect the results if added correctly. A comparison between adding and removing the boundary conditions preferably investigated	Check and modify; address in PED.	[For Eduardo to verify] Different boundary conditions were tested during development of the model with negligible change to the results or flow in/out of the model. Further evaluation may be considered during PED.	Concur		X
22	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.7.2	**(A.8-10 in revised version)**	Geotechnical	It is recommended to remove the added comment about exit gradient. and mention the location at which the exit gradient were estimated	Low	There are many factors can affect the exit gradients other than the mentioned reason. The sections have different water level, dimensions and configurations, which likely having larger affect on the exit gradient compared to the mentioned one	Check and modify, and Address in PED.	Acknowledged that there are many factors that contribute to changes, and that other factors likely contributed to some amount of change. The mentioned condition was evaluated in detail by several geotechnical engineers with modeling experience. Modifications were made to the model to test and verify the stated condition was the reason for the somewhat unexpected results. We are confident that the condition mentioned is accurate and the effort made to specifically explain the result was warranted.	Concur		X
23	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.8.3	A.8-11/ **(A.8-13 in revised version)**	Geotechnical	Table A.8-4, change FOS from 1.3 to 1.4 for Steady State Seepage with PMF/PMP Pool	Low	Recommend revising this table to be in compliance with EM 1110-2-1902 guidance.	Modify text.	Modified	Concur		X
24	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.8.3	A.8-12 / **(A.8-14/15 in revised version)**	Geotechnical	Table A.8-5 to A.8-7, the PMP pool were not included in the sensitivity analysis. Recommended either adding or explaining why not being investigated	Low	Clarify why the identified condition is not addressed.	Modify text.	The purpose of the sensitivity analysis in tables Tables A.8-5 to -7 is not to evaluate the PMP condition. It was to show (a) the effect of changing the pool elevation in the model and (b) the effect of changing the reservoir embankment elevation. PMP was already evaluated in the normal, non-sesitivity analyses. Aditionally, to satisfy the comment, results provided for "Pool Elevation" at Normal Elevation +4 is close to PMP.	Concur		X
25	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.12	A.8-13 / **(A.8-17 in revised version)**	Geotechnical	Recommend add statement that organic layers should be removed to prevent excessive settlement and internal erosion.	Low	Accounting for the settlement of the organic layer does not exclude internal erosion nor slope failure concerns	Modify text.	Added statement for "removal of organics"	Concur		X
26	Amr Ewais	Geotechnical	Black & Veatch	Appendix A,		Geotechnical	Figure A.8-7, Recommend changing the color of one of the boundary conditions.	Low	The current format is unclear.	Modify figure.	Acknowledged. Color change to be considered for next set of analyses during PED phase of design.	Concur		X
27	Joe Santogatta	Electrical	Black & Veatch	Appendix A	A.13-3	Electrical	Add sizing and location details to 4160V MCC similar to the 480V switchboard and panel.	Low	Provide clarification of design data.	Modify text.	Concur. Added sizing and location to the 4,160V MCC to match switchgear and panel in Figure A.13-1. Used assumptions due to no building layout and electrical motor data sheets being provided yet due to this project design stage being a feasibilty study report.	Concur		X
28	Joe Santogatta	Electrical	Black & Veatch	Appendix A	A.13-6	Electrical	Add sizing and location details to 4160V MCC similar to the 480V switchboard and panel.	Low	Provide clarification of design data.	Modify text.	Concur. Added sizing and location to the MCCs to match switchgear and panels in Figure A.13-2. Used assumptions due to no building layout and electrical motor data sheets being provided yet due to this project design stage being a feasibilty study report.	Concur		X
29	Joe Santogatta	Electrical	Black & Veatch	Appendix A	A.13-6	Electrical	Add main breaker to 480V switchgear or remove 'yes' from description	Low	Provide clarification of design data.	Modify text.	Concur. Replaced "Yes" with "No" in the description in Figure A.13-2.	Concur		X
30	Joe Santogatta	Electrical	Black & Veatch	Appendix A	A.13-6	Electrical	Add generator sizing data.	Low	Provide clarification of design data.	Address in PED.	Non-Concur. This is a feasibility study report, so Mechanical team did not provide any electrical motor data sheets for the main pumps and any electrical information on the ancillary equipment. When the project proceeds to the PED phase, and specific electrical information is provided, generator calculations will be completed and results will be incorporated into the design.	Noted		X
31	Joe Santogatta	Electrical	Black & Veatch	Appendix A	A.13-8 - A13-9	Electrical	Consider Aluminum conduit instead of RGS for any caustic areas or exposure to coastal conditions	Low	Suggested Alternative to standard.	Address in PED.	For Information Only. The District Standard is RGS conduit for exposed conduit and this project is located away from the coast. Design team will consider use of aluminum conduit or other more chemical resistant conduit like PVC coated RGS depending on District Field Station input if the design contains caustic areas. At this time, the design does not contain any caustic areas.	Concur		X
32	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Annex A §7.3	22	Environmental	Preferred range of Lake O water levels stated as "12.5 to 15.5 feet", yet in Section 7.1 it is described as "11.5 to 15.5 feet."	Low	Clarify inconsistency of referenced data.	Modify text.	This text is part of the completed Biological Assessment prepared by USACE for the U.S. Fish and Wildlife Service and is not subject to any further modifications.	Response noted.		X
33	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Annex A §7.3.2.1	23	Environmental	Provide justification to support the statement of unlikely presence within the project area.	Low	Supporting information	Modify text.	This text is part of the completed Biological Assessment prepared by USACE for the U.S. Fish and Wildlife Service and is not subject to any further modifications.	Response noted.		X
34	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Annex A §7.3.4.1	24	Environmental	"Nesting occurs exclusively in cabbage palms" is incorrect.	Low	Accuracy of information and potential for mortalities **could exists** if other sites are not surveyed, prior to clearing.	Suggest "primarily" be used rather than "exclusively" and extend surveys and timing of clearing activities to include all trees.	This text is part of the completed Biological Assessment prepared by USACE for the U.S. Fish and Wildlife Service and is not subject to any further modifications.	Response noted.		X
35	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Annex A §7.3.10.2	30	Environmental	Description of proposed vegetation benefits within Lake O seem to be questioned in this section.	Low	Consistency and clarity	Modify text.	This text is part of the completed Biological Assessment prepared by USACE for the U.S. Fish and Wildlife Service and is not subject to any further modifications.	Response noted.		X
36	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Annex A §7.3.12	31	Environmental	Statement "...particularly by reducing the frequency of extreme low lake stages." contradicts Table 5 showing an increase in the frequency.	Low	Ensure the accuracy of information being stated.	Modify text.	This text is part of the completed Biological Assessment prepared by USACE for the U.S. Fish and Wildlife Service and is not subject to any further modifications.	Response noted.		X
37	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Annex A §7.3.14.2	34	Environmental	Geographic connection between CFA loss and compensation is not clearly described.	Low	Clarity	Add a description of the two CFAs proximity to the Lake O improvements.	This text is part of the completed Biological Assessment prepared by USACE for the U.S. Fish and Wildlife Service and is not subject to any further modifications.	Response noted.		X
38	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Annex A §9 (1.)	47	Environmental	Avoidance buffers are suggested to reduce impacts to bonneted bat roosts. It is not clear how this would be accomplished.	Low	Clarity	Modify text.	This text is part of the completed Biological Assessment prepared by USACE for the U.S. Fish and Wildlife Service and is not subject to any further modifications.	Response noted.		X
39	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Annex A Appendix B	Page following the Appendix B Tab sheet.	Environmental	Worksheet is incorrectly described as "Wood Stork Biomass Assessment" rather than "Wood Stork Prey Biomass Assessment"	Low	Clarity and accuracy	Worksheet should be described as "Wood Stork Prey Biomass Assessment" not "Wood Stork Biomass Assessment"	This text is part of the completed Biological Assessment prepared by USACE for the U.S. Fish and Wildlife Service and is not subject to any further modifications.	Response noted.		X
40	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Annex A Appendix B	Page following the Appendix B Tab sheet.	Environmental	Unused rows in the table may be confused for missing or incomplete data.	Low	Clarity	Remove or hide unused rows	This text is part of the completed Biological Assessment prepared by USACE for the U.S. Fish and Wildlife Service and is not subject to any further modifications.	Response noted.		X
41	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Appendix C.3 §C.3.2.2	C.3-6	Environmental	Consider describing how the project complies with the EO.	Low	Clarity	Modify text.	Text added to Section C.3.2.2.	Concur		X
42	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Appendix C.3 §C.3.2.7	C.3-7	Environmental	This section appears incomplete or mixed between EO directives.	Low	Clarity	Modify text.	Text has been modified in Section C.3.2.7 and Table 7-1.	Concur		X
43	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Appendix C.3 §C.3.2.11	C.3-8	Environmental	Consider describing how the project complies with the EO.	Low	Clarity	Modify text.	Text added to Section C.3.2.11.	Concur		X
44	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Appendix C.3 §C.3.4	C.3-9 line 39	Environmental	Word "insufficient" should probably be "in sufficient"	Low	Two different meanings	Modify text.	Text updated	Concur		X
45	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Appendix C.3 General		Environmental	Acronym definitions are suggested throughout the document.	Low	Clarity	Modify text.	CFR, USFWS, PED, LOW, NEPA, NOI, SHPO, ROD, SFWMD, DoD, FAC, and CWA abbreviations have been defined.	Concur		X
46	Drew Ackerman	Surface water quality and water quality modeling	Black & Veatch	Annex I	I-2	Water Quality	Is there a reason that average values were presented as the only model output? The model provides daily output (which was aggregated to annual). More insight could be provided with more detailed analysis and data presentation (e.g. box and whisker plots of loads).	Low	Clarity and accuracy	Additional analysis and presentation of annual loads is needed	The PLSM was used to achieve a conservative and simplified estimate of potential P loads changes to Lake O under the FWO and LOCAR alternative conditions. It uses the daily output data from the much larger and more complex RSM-BN model, but the outputs of PLSM itself are annual. Due to the conservative nature of the model, The PLSM is set up to compare long-term P loading differences between different scenarios (e.g. Alt 1,2,3) rather than compare the interannual variability within a particular scenario, which would require a more complex model.	Concur. Be sure to pay attention to the inter-annual variability with subsequent more detailed assessments.		X
47	Drew Ackerman	Surface water quality and water quality modeling	Black & Veatch	Annex I	I-2	Water Quality	The concentrations applied to the loads into the reservoirs are unclear. It seems like these are the concentrations: Lake 40ug/L (from TMDL) to 100 ug/L (from Upper Kissimmee) Rainfall 10 ug/L Dry deposition 18 mg/m2/yr. A clearer description (or a figure) of the concentration data an inputs would be helpful. Section I.1.1 is worded awkwardly. How the sensitivity concentrations were applied is not readily clear in Section I.2	Low	Clarity	More detail in section I.1.1 and better organization of section I.2	A single baseline P concentration has not been determined for the FWO condition, and therefore a range of baseline concentrations was used to assess the alternative reservoir options. Rather than just choosing arbitrary numbers, the minimum value was set as the TMDL (40ul), the max as the concentration in the Upper Kissimmee for the POR (100ul), and 60ul and 80ul to complete the range.	Concur. Be sure to pay attention to the impacts of varying concentrations in subsequent detailed assessments.		X
48	Drew Ackerman	Surface water quality and water quality modeling	Black & Veatch	Annex I	I-4	Water Quality	The atmospheric deposition of phosphorus doesn't track with the reservoir area like rainfall does.	Low	Accuracy	Check atmospheric deposition calculations.	The minor discrepancy between the alternatives is due to the rounding of small numbers. However, Alt2 has the highest surface area and the highest atmospheric deposition and rainfall, while Alt1 has the lowest.	Concur.		X

Comment No.	Black & Veatch Reviewer Name	Area(s) of Experience	Reviewer Agency	Report Section	Page #	Discipline	Comment	Significance of Concern	Basis of Concern	Suggested action to remedy/resolve concern	Response	Backcheck	Response2	Comment Closed
49	Drew Ackerman	Surface water quality and water quality modeling	Black & Veatch	Annex I	I-3	Water Quality	Figure I-1 in the Alt 2 East West and Alt 3 South, it appears that there is a fourth source of water with a value of zero. I'm unclear on what that may be.	Low	Clarity and accuracy	Adding a table of water loading into each reservoir would be helpful	The focus of the PLSM was the contribution of flows and loads to Lake Okeechobee, not the reservoir. If additional modeling regarding flows and loads to the reservoir is required, a different model will need to be used	Concur. The response doesn't address the comment. A table of the data would be helpful to present that information but likely isn't critical at this time		X
50	Drew Ackerman	Surface water quality and water quality modeling	Black & Veatch	Annex I	I-3	Water Quality	Does Figure I-5 show loads into Lake Okeechobee? It's unclear on what that is showing	Low	Clarity	Revise Figure I-1 and the last paragraphs on page I-3	The graph is simply to show that the reservoir is predicted to have the same percentage impact on total P loads to Lake O, regardless of the baseline P concentration.	Concur		X
51	Jeff Beriswill	Dams/ Geotechnical	Black & Veatch	Main Text, ES.6	ES-4	Geotechnical	The perimeter dam and an interior divider average heights are listed as approximately 32 ft and 33 ft above the ground, respectively. The perimeter dam is currently 6 feet higher than the interior divider without the wave wall.	Low	Current geometry needs to be reflected in report (typical for all sections of report)	Revise text.	Section ES.6 has been revised to state the correct average height of the perimeter dam (39'), based on the revised design of the Recommended Plan. This same correction was made to Section 6.1.1.	Concur		X
52	Jeff Beriswill	Dams/ Geotechnical	Black & Veatch	Main Text, ES.6.5, Table ES.6	ES-10	Geotechnical	Future Without Project cutback total is less rather than more than the reservoir (600 ac-ft vs. 755 ac-ft). It is unclear how this is consistent with the statement in ES.14 on page ES-16: "... the Recommended Plan reduces the severity and frequency of water shortages and reduces the volume of water shortage cutbacks when compared to the Future Without Project (when simulated with LOSOM).."	Low	Result is counter to being an expected benefit over no reservoir.	Clarify how project is a benefit in Section ES.6.5.	The statement on ES-16 references to modeled runs with LOSOM rather than LORS08. The statement will be updated to make it clear that the Recommended Plan modeled with LOSOM operations produces these results.	Concur		X
53	Jeff Beriswill	Dams/ Geotechnical	Black & Veatch	Appendix A, A.3.2	A.3-1	Geotechnical	Several of the 7 proposed major construction contracts are dependent/interconnected with other activities (ex. Reservoir Dam Foundation and Reservoir Earthwork).	Moderate	Increases risks of claims from contractors.	Consider re-evaluating the division of the project work activities as the design progresses from an interference and risk perspective.	The first paragraph of Section A.3.2 has been revised to address this comment.	Concur		X
54	Jeff Beriswill	Dams/ Geotechnical	Black & Veatch	Appendix A, A.4.2	A.4-1	Geotechnical	The project design life is listed as 50 years.	Moderate	Functionally, a major project such as LOCAR is expected to last essentially indefinitely.	In PED consider longer design life of features that cannot be readily accessed post-construction (ex. perimeter dam components/control structures).	Section A.4.2 has been revised to address this comment.	Concur		X
55	Jeff Beriswill	Dams/ Geotechnical	Black & Veatch	Appendix A, Annex B-2	Fig. A.8-2.A	Geotechnical	Provide site plan with locations of design sections.	Low	Difficult to orient applicable locations for individual design sections.	Add site location plan to annex.	Section locations are shown in Figure A.8-1	Concur		X
56	Jeff Beriswill	Dams/ Geotechnical	Black & Veatch	Appendix A, Annex B-2	Fig. A.8.7.1	Geotechnical	No hydraulic conductivity (k) values provided on drawing for site soils.	Low	Difficult to evaluate seepage results without k.	Add k to properties table for all seepage results figures.	Acknowledged that figures do not include conductivity and it would help with review of each individual figure. Noted for next phase of design. In lieu of reprinting each of dozens of figures, please reference Table A.8-1 for all seepage and stability parameters.	Concur		X
57	Jeff Beriswill	Dams/ Geotechnical	Black & Veatch	Appendix A, Annex B-2	Fig. A.8.7.1	Geotechnical	Soil strata colors in table key cannot be seen on cross section due to elevation head color contours.	Low	Foundation soil strata are difficult to follow.	Revise figure so soil strata can be seen on the cross section.	[Eduardo, please address the comment and modify figure numbers and text to reference the new figure. Seems like one figure that includes labels on each strata and shows the strata colors would handle the figure portion]	Concur		X
58	Jeff Beriswill	Dams/ Geotechnical	Black & Veatch	Appendix A, A.7.2	A.7-2	Geotechnical	The section discusses only Phase 1 of the JTech investiagation, while Annex B-1 provides the summary report for both investigation phases.	Moderate	Implies that results of the Phase 2 investigation are not addressed and may influence the geotechnical evaluations.	Update the section (and Table A.7.2) to clarify that both investigation phases are shown in the report and included in the design strata locations and engineering properties.	A.7-2 text updated	Concur		X
59	Jeff Beriswill	Dams/ Geotechnical	Black & Veatch	Appendix A, A.7.3	A.7-5	Geotechnical	The generalized soil profile does not address the 5' to 15' thick layer of very loose silty to clayey sand/ very soft sandy clay to clay in the depth range of 27' to 47' noted in the geotechnical report in Annex B-1.	High	A consistent very loose/very soft clayey soil may influence the embankment stability and seepage performance.	Note the presence of the layer and consider it in design analyses.	Comment acknowledged and a paragraph for "Settlement and Waiting Periods" was added to the recommendations section to address the need for further evaluation during PED. Of note, a large majority of the Loose "SC" material in the upper 40' was lower fines (12-30%) material which is expected to experience most settlement during construction. Only thin (< 5') layers of CH were present to those depths. Higher clay content (30-90%) and thicker CH layers were more frequent below 40-feet.	Concur		X
60	Renee Murch	H&H, Groundwater	Black & Veatch	A.05, Hydrologic Design	A.5-2	Hydraulic	The original Design Case 2 used DCM-2 rainfall and it was changed to NOAA Atlas 14 in the latest revision. Altas 14 rainfall is a lower rainfall total and therefore less conservative. The same design case uses DCM-2 overwater wind speed. It is not clear why Atlas 14 rainfall was selected for use instead of DCM-2. Please consider clarification.	Moderate	The change in the design to a lower design rainfall results in a less conservative design.	Please clarify in the text why NOAA Altas 14 rainfall was selected for use over DCM-2. Please cite any guidance used to make this decision.	The 100-yr design storm rainfall depth for design case 2 was changed from the DCM-2 depth of 12" to the more up-to-date NOAA atlas 14 depth of 10.9" because USACE directed us to make this change when they were conducting their risk assessment of the project. USACE does not want us to be unnecessarily over conservative, by using the DCM-2 rainfall depth, since it is based on less recent historical rainfall data than the NOAA Atlas 14 rainfall depths. Section A.5.2.2 of Appendix A has been revised to explain why the NOAA Atlas 14 rainfall was used instead of the DCM-2 rainfall.	The addition of text as noted should sufficiently address the comment.		X
61	Renee Murch	H&H, Groundwater	Black & Veatch	A.05, Hydrologic Design	A.5-8	Hydraulic	Tables A.5-3 and A.5-4. Although not essential, it would be helpful to see fetch length added (new column) to the table to help make the calculations reproducable.	Low	Validation of Zeider Zee equation calculations.	Please consider adding fetch length to the tables.	Footnote No. 2 for Tables A.5-3 and A.5-4 has been revised to include the maximum fetch length used to calculate the maximum wind setup.	The noted footnote addresses the comment.		X
62	Jeff Beriswill	Dams/ Geotechnical	Black & Veatch	Appendix A, A.11, Table A.11-1	A.11-1	Civil	The Interior Top of Bank of Elevation of Perimeter Dam Crest is listed as 66' rather than 72'.	Low	Embankment crest elevation is not consistent with current design.	Correct table label and storage volume calculation.	Table A.11-1 has been updated to be consistent with the current design.	Concur		X
63	Renee Murch	H&H, Groundwater	Black & Veatch	Appendix A, Annex A-2.2, Section 1.2.3	Page 6 of 24	H&H	It may be helpful to show the radials for the west cell as well as the east cell on Figure 1-5 (for completeness)	Low	Provides detail on how fetch length for the west cell was determined.	Revise Figure 1-5	Figure 1-5 has been revised by adding the fetch length radials to the West Cell.	The noted figure modifications address the comment.		X
64	Renee Murch	H&H, Groundwater	Black & Veatch	Appendix A, Annex A-2.2, Section 2.2	Page 8 of 24	H&H	Consider explaining why Atlas 14 rainfall was used instead of DCM-2	Moderate	Altas 14 rainfall is less conservative than DCM-2 (10.9" versus 12")	Add text in the section to provide additional clarity.	Section 2.2 of Annex A-2.2 has been revised to include the same explanation added to Section A.5.2.2 of Appendix A (see response to comment on row 62).	The revisions address the comment.		X
65	Renee Murch	H&H, Groundwater	Black & Veatch	Appendix A, Annex A-2.7, Section 4.1	Page 9 of 46	H&H	The polygon(s) in Figure 6 that show the HEC-RAS model domain need more explaination to indicate why the domain consists of 2 polygons. The 2-D flow areas are later discussed in Section 4.3, but please consider discussing them when the figure is introduced in order to minimize confusion.	Moderate	Clarification of HEC-RAS model domain and domain features	Revise Figure 6 or modify the text.	Text was added to explain the two polygons when Figure 6 is introduced. Based on the comment, no changes are warranted for Figure 6.	The addition of text as noted should sufficiently address the comment.		X
66	Renee Murch	H&H, Groundwater	Black & Veatch	Appendix A, Annex A-2.7, Section 4.3	Page 12 of 46	H&H	Please consider noting if model sensitivity to the weir coefficient was evaluated. If sensitivity was evaluated, were the inundation mapping results sensitive to the weir coefficient? If sensitivity was not evaluated, will it be evaluated?	Moderate	Sensitivity of overall inundation results to model parameterization	Add text to this section or add a section to discuss model sensitivity to various parameters.	The model sensitivity to the weir coefficient was not evaluated as it was not part of the objectives of the study.	No changes were made. The lack of sensitivity evaluation should be noted in the documentation.	Text was added to the dam breach memo to address this backcheck comment.	x
67	Renee Murch	H&H, Groundwater	Black & Veatch	Appendix A, Annex A-2.7, Section 5	Page 19 of 46	H&H	Consider presenting time series graphs, particularly for C-41A flow and stage at selected locations to examine conveyance.	Moderate	Model results should generally be examined temporally and spatially.	Add time series plots and discussion in Section 5	Evaluating conveyance of C-41A was outside the scope of this effort and can be evaluated as part of PED.	No changes were made. The lack of examination of C-41A flow time series should be noted as necessary for inclusion in the PED.	Text was added to the dam breach memo to address this backcheck comment.	x
68	Renee Murch	H&H, Groundwater+B70	Black & Veatch	Appendix A, Annex A-2.7, General	N/A	H&H	Please consider adding a section to discuss model sensitivity to parameterization (weir coefficient) and the location of the 2-D flow areas.	Moderate	Sensitivity of model results to model conceptualization and parameterization can introduce additional uncertainty in results.	Add text discussion.	Sensitivity of parameterization and location of 2-D flow areas was not evaluated as it was not part of the objectives of the study.	No changes were made. Text similar to the response should be noted in the documentation.	Text was added to the dam breach memo to address this backcheck comment.	x
69	Renee Murch	H&H, Groundwater	Black & Veatch	Annex C	C-21	H&H	Please clarify the position of the divider dam structure (DDS-1) during each filling operation. Item 9 on page C-22 specifies the operations of DDS-1 for normal operations and dewatering and maintenance, but the position of DDS-1 during filling is not specified.	Moderate	Additional operational detail for reservoir filling needed.	Add text discussion in this section.	Part 9, under Section C.7.1.1 has been revised to address this comment.	Additional text should be sufficient to address comment.		X
70	Renee Murch	H&H, Groundwater	Black & Veatch	Appendix A, Annex A.09	A.9-3	Groundwater	Please discuss how the hydrogeological parameters compare to the studies or models of others in the region to add defensibility.	Moderate	The model is uncalibrated and highly unconstrained. Adding discussion will strengthen defensibility.	Add text discussion.	Text comparing other studies was added to Section A.9.2.2.	Additional text should be sufficient to address this comment.		X
71	Renee Murch	H&H, Groundwater	Black & Veatch	Appendix A, Annex A.09	A.9-4	Groundwater	Consider adding the min and max Kh and min and max thickness to Table A.9-1 to bracket the uncertainty in Kh and layer thickness	High	If Kh values have a large range, this can lead to a high degree of uncertainty in model parameterization and therefore seepage estimates.	Modify table.	Max/min information was added to Table A.9-1.	Additional table columns should be sufficient to address this comment.		X
72	Renee Murch	H&H, Groundwater	Black & Veatch	Appendix A, Annex A.09	A.9-4	Groundwater	Consider noting how Kh/Kv was determined or assumed.	High	Uncertainty in model parameterization can produce uncertainty in seepage estimates.	Add discussion.	The anisotropy ratios were determined by the geotechinical engineering material analysis, please refer to Sections A.7 and A.8. Text was added to Section A.9.2.2 referencing these sections.	Additional text should be sufficient to address this comment.		X

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73	Renee Murch	H&H, Groundwater	Black & Veatch	Appendix A, Annex A.09	A.9-10	Groundwater	The Lower Kissimmee Basin GW Model is mentioned as another GW model in the area. How does the parameterization of the surficial in that model compare to this model parameterization? Although this effort involves several layers and the Kissimmee Basin GW model simulated the surficial as a single layer, a composite Kh can be calculated for this effort to compare to the previous study.	Moderate	Uncertainty in model parameterization can produce uncertainty in seepage estimates.	Add discussion.	The horizontal conductivities that were calibrated for the surficial aquifer in the LKBGWM (Butler et al., 2014) range from 1.8 to 115 ft/day within the LOCAR groundwater model area. Thus, the LOCAR horizontal conductivities are mostly within the range calibrated for the 2014 study, except for Unit D, which falls just below the low range (1.4 ft/d). Text was added to Section A.9.2.2 to include this information.	Added text should be sufficient.		X
74	Renee Murch	H&H, Groundwater	Black & Veatch	Appendix A, Annex A.09	A.9-12, 13	Groundwater	There should be a model ET zone within the LOCAR footprint to represent open water. How was the ET package of the MODFLOW model parameterized to reflect the open water surface of the LOCAR West and East Cells? Figure A.9-10 shows that the ET zone for the LOCAR footprint is low drainage pastures with a small amount of undeveloped wetlands.	High	The model should be conceptualized to represent the ET from the LOCAR footprint at open water rates, which exceed reference ET.	Add discussion and change MODFLOW ET package. If the ET package is not changed, discuss model sensitivity to ET package.	The reservoir in the model is a fixed head boundary. Thus, the stages are assumed to be constant and will not be impacted by ET or seepage. This is a conservative assumption to maximize the head differential between the reservoir and surrounding land.	The Response text or something similar could be noted in the text. This tends to be the "worst case" scenario and also highlights the uncertainty in the seepage estimates.	Text was added to the A9 document to address this backcheck comment.	X
75	Renee Murch	H&H, Groundwater	Black & Veatch	Appendix A, Annex A.09, A.9.3.4	A.9-12, 13	Groundwater	The flux entering the drain boundary conditions (representing farm canals) should be evaluated for the various scenarios. The current sensitivity analysis looks at the wet season. During the dry season, the head gradient between the aquifer and the canals may be significantly different than the wet season gradient. Please consider adding this evaluation in future efforts.	High	Model sensitivity to drain parameterization can result in a high degree of uncertainty of results.	Add farm canal property sensitivity analysis for dry season model.	Text was added to Section A.9.3.4, to indicate that a sensitivity analysis with the dry season model should be conducted during the PED phase.	Added text should be sufficient.		X
76	Renee Murch	H&H, Groundwater	Black & Veatch	Main Report	3-6	H&H	Will Alternative 1 in the main report be modified to reflect the updated design with the ecologically sensitive area removed? The text cites the original NFSL and average storage depths, which are not consistent with the current design. This may add confusion if a reader skims the main report and no annex documents. A reference to Section 6.1.1 of the report is recommended to be added with text describing the refinement of the footprint and design.	Low	Reservoir footprint, NFSL, and other design elements have been modified from this original design.	Revise this section and other sections in the main text. Add reference to Section 6.1.1	Reference to section 6.1.1 and text describing the refinement of the footprint and design has been added to section 3.2.1. and section E.5.1	Added text should be sufficient.		X
77	Renee Murch	H&H, Groundwater	Black & Veatch	Main Report	4-7	H&H	According to Table 4-5, the FWOL simulation reduces the cutback total the most and also results in the lowest frequency of cutback, severity score, and number of water years with at least 1 cutback. Although the ECB is used as a baseline for comparison to the alternatives, text should be added to discuss why the FWOL is less preferable than one of the alternatives since its performance is superior for water supply in LOSA compared to the alternatives.	Moderate	Establishment of increase in availability of water supply to existing legal users of LOSA	Add text as needed.	The requested detail is already included in the Section 4.1.1.3 txt: "The simulated Future Without Project condition (FWOL) assumes a LOR508-based schedule consistent with the current draft Project Operating Manual for the EAA Reservoir. However, recent project planning efforts have identified the LOSOM schedule as the successor to LOR508, and it is expected that future implementations of Lake Okeechobee regulation schedules will not return to LOR508-like protocols, but rather would continue to evolve the LOSOM-like operational mindset." As such, the required savings clause comparison to ECB and the consistent Alternative comparisons to the LOSOM-based FWOLL show that the LOCAR feature improves water supply and while some FWOL performance may indeed be preferable, the use of LOSOM-based protocols is warranted for LOCAR.	This text is sufficient.		X
78	Heriberto Torres	Construction	Black & Veatch	Annex C, C21	C-29	Construction	There are no interim operations during construction.	Moderate	In this section there should be comments on all the activities such as detour (MOTs) to be developed and implemented during activities that will be impacting the general public such as bridge replacements and utility relocations.	Add text as needed.	Section C.21 will be revised to address this comment and include content about operations during construction per CGM #5.	Concur		X
79	Renee Murch	H&H, Groundwater	Black & Veatch	Appendix A, Annex A-2.2, Section 4.2	18	H&H	Section 4.2 states that DCM-2 recommends the use of ACES for wave runup and overtopping, yet EurOtop was used. It would be nice to see how the ACES methodology compares to the EurOtop results (similar to what was done in Section 3.5). Was this considered?	Low-Moderate	12/18/023	Add text and analysis as needed.	We did not consider calculating overtopping rates using previous methodologies as the methods in EurOtop (2018) are the result of years of advancements that were built upon the previous 1976/1977 equations. We don't feel that comparing these methods is necessary to validate these equations. No edits were made.	ACES is not recommended to validate the EurOtop but rather to provide a weight of evidence approach as has been done on other District design projects follow the guidelines outlined in DCM-2, which specifies the use of ACES. If it is not used, literature should be cited to describe why it is not used and provide more context on the use of EurOtop.	The method used in ACES is based on a methodology proposed by John Ahrens (Prediction of Irregular Wave Overtopping. John Ahrens. Coastal Engineering Technical Aid No. 77-7. December 1977). The method is based on monochromatic wave overtopping tests and is essentially a summation of single wave overtopping volumes, which does not really represent the dynamics of wave overtopping from irregular waves. Ahrens (1977) indicates that at the time of publication, no guidance for predicting overtopping for irregular wave conditions was available and the proposed method was provided as interim guidance until results of laboratory study of runup and overtopping by irregular waves was available. A lot has been learned about runup and overtopping in the almost 50 years since this methodology was proposed and we don't feel that including	x
80	Heriberto Torres	Construction	Black & Veatch	Appendix A Annex B-1	25	Construction	Need to include geotechnical borings at all bridge locations.	Medium	If concrete piles are to be driven for new bridges a complete boring log will be necesary to avoid delays and minimize the posibility of future claims.	Address in PED	During the PED phase, geotechnical borings will be performed at all locations of proposed bridges. Currently the project only includes the construction of one bridge (Bridge BR-1 over CNL-2). A sentence has been added to Appendix A, Section A.16 concerning the requirement for borings to be performed at the final location determined for all dam structures and water mgmt. structures to be built outside of the reservoir dam.	Concur		X
81	Terry Hull	H&H, Coastal	Black & Veatch	Appendix A.5.2.1	A.5.1	H&H	Rows 23-29 are difficult to follow.	Low	Clarification	Provide a storm hyetograph.	Section A.5.2.1 has been revised to more clearly describe the DCM-2 PMP Scenario 1 routing analysis that was used to determine the MWSL for the reservoir. A reference to the Scenario 1 hyetograph and reservoir discharge hydrograph figure in Annex A-2.1 was added to Section A.5.2.1.	Concur		X
82	Terry Hull	H&H, Coastal	Black & Veatch	Appendix A Annex A-2.5	11	H&H	Was the cumulative vol in Table 3 determined by integrating under the curves in Fig 3?	Low	Clarification	Modify text.	Both Table 3 and Figure 3 present results of the calculations described at the bottom of page 9. Cumulative overtopping volumes are representative of the integration of the curve but on a relatively rough (1 hour) time step. No changes are recommended.	Concur		X
83	Terry Hull	H&H, Coastal	Black & Veatch	Annex A-2.2	22	H&H	Table 4-4: How is probability determined?	Low	Clarification	Modify text.	EurOtop (2018) presents equations for calculating the probability of overtopping, which is equal to the percentage of waves that overtop the embankment. Text was edited to indicate that this was calculated based on equations in EurOtop (2018).	Concur		X
84	Terry Hull	H&H, Coastal	Black & Veatch	Annex A-2.2	22	H&H	Table 4-4: Was the cumulative overtopping volume estimated from the single wave volume, period, and storm duration?	Low	Clarification	Modify text.	Yes. The single wave volume calculated as per EurOtop (2018) is a function of the number of overtopping waves, which was calculated from the storm duration, the mean wave period, and the percentage of overtopping waves. Text has been edited to reflect this.	Concur		X
85	Terry Hull	H&H, Coastal	Black & Veatch	Appendix A	A.12-25 line 20	H&H	Elevation should be NAVD88	Low	Clarification	Modify text.	Text updated.	concur		X
86	Terry Hull	H&H, Coastal	Black & Veatch	Appendix A	A.16-1	H&H	Table A.16-1: It is unclear if the elevations are NAVD88.	Low	Clarification	Modify text.	The only elevations shown in Table A.16-1 are 34 and 27. The header for the row that these elevations appear in clearly states that the elevations are in NAVD88.	Concur; the reference to sea level is confusing.		X
87	Jhon Arbelaez-Novak	Enviornmental	Black & Veatch	Appendix C1	General	Environmental	Convert NGVD29 datums to NAVD88 to maintain consistency throughout the document.	Low	Clarification	Modify text.	NGVD29 has been converted to NAVD88 throughout the document.	Concur		X

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88	Jhon Arbelaez-Novak	Environmental	Black & Veatch	Appendix C1	86	Socioeconomics	Provide reasoning why a 2-mile study radius was used	High	Different federal guidelines require varying study radiuses. An explanation as to why this radius was chosen would help prevent future questions/comments from the Corps which may delay schedules.	Modify text.	The two-mile radius was used in the original report prepared a few years ago, so that radius was kept for consistency. Per that report, a two-mile radius was chosen as an initial estimate of project siting and potential effects to facilitate the EJ analysis. Those in that immediate project area have the potential to be the most impacted by the project. The analysis goes on to look at the larger study area that includes the counties and tribal land, and therefore looks at both smaller and larger scale geographies.	Concur		X
89	Jhon Arbelaez-Novak	Environmental	Black & Veatch	Appendix C1	102	Socioeconomics	Define "low income."	Low	Clarification	Modify text.	Low-income is the proportion of people whose income is below the poverty level.	Understood. It would be helpful to include that criteria in the document for clarity.	The first reference to low income on PDF page 102, page C.1-98, was updated to include "populations whose income is below the poverty level."	X
90	Jhon Arbelaez-Novak	Environmental	Black & Veatch	Appendix C1	105	Tribal Resources	Were tribal consultations performed?	Critical	Because the area is known to contain tribal resources, consultations with the tribes is necessary for the analysis.	If not done, need to address in PED	Yes, tribal consultation has been on-going. The ACOEis responsible for government to government consultation. Correspondence is included in the LOCAR EIS.	Concur		X
91	Eric Gates	Environmental	Black & Veatch	Annex G	G 97-100	Environmental	Include the completed or planned Phase I and Phase II recommedations.	Moderate	Mitigate environmental risks, ensure compliance and reduce liabilities.	Include in PED.	A DEP OCULUS desktop search was conducted to determine if there were identified environmental concerns for the planning area. The findings of this historical search are included in Annex G. Upon congressional authorization and prior to entering the PED, a complete Phase I/II will be conducted for the project footprint.	Concur		X
92	Terry Hull	H&H, Coastal	Black & Veatch	General		H&H	Consider Florida Flood Hub latest SLR projections.	Low	Clarification	Include in PED.	Annex H was originally developed for and discusses the climate change assessment conducted by the Corps for LOWRP. It is not subject to any further modifications.	Concur		X
93	Terry Hull	H&H, Coastal	Black & Veatch	Annex A-2.7		H&H	Are canal gates that impede breach flow designed to withstand breach conditions?	Medium	If structures that impede breach flow fail, results could be worse.	Modify text. Include in PED if needed.	For the water control structures included in the model, structure book pages were used to obtain information on the discharge characteristics, hydraulic description, and Maximum Allowable Gate Opening curves. The model assumed that these structures would not be blown out by a breach. Previous model iterations did not include the structures and the extent of inundation was greater.	I assume this means the structures are designed to withstand the hydraulic/erosive forces of a breach. As you note, flooding is worse if they fail. Concur		X
94	Terry Hull	H&H, Coastal	Black & Veatch	General		H&H	Will wave loads, including overtopping waves, on infrastructure be conidered in the design?	Medium	Important loading conditions to be considered.	Include in PED.	Pages 23 through 28 of the Civil Plates (Annex C-1) show the planning level design cross-section of each structure that will penetrate the reservoir perimeter dam and divider dam. Wave loads on these structures (including loads from overtopping waves) will be calculated during the PED phase in order to finalize the structural design of each of these structures. A statement has been added to Appendix A, Section A.5.4.5 to that effect, which references the flood/wave load design requirement in Section A.10.3.8. Also, in the Civil Plates, the callout of the wave wall shown in front of the control bldg. on top of the dam crest for the dam structure cross-sections, has been edited to include a statement that the proposed wave wall in front of the control bldg. is for wave energy dissipation adjacent to the control bldg.	Concur		X
95	Bryce Weinand	Climate Change	Black & Veatch	Annex H	H-8 and H-9	Climate Change	Consider adding a marker on the plot on Figures H-4 and H-5 that corresponds to the tailwater level that exceeds the level at which S-79 and S-80 discharge.	Low	Clarification	Modify figure.	Annex H was originally developed for and discusses the climate change assessment conducted by the Corps for LOWRP. It is not subject to any further modifications.	Concur		X
96	Bryce Weinand	Climate Change	Black & Veatch	Annex H	H-10	Climate Change	Line 3 of the text and Figure H-6 indicates Daytona Beach Shores, FL (ID 8721120) was chosen for the east shore of Florida. It seems that other NOAA Stations are closer to the St. Lucie River inlet that may have SLR projections for climate change.	Medium	Choosing a closer SLR recording station may produce different results that are more representative for the inlet to S-80.	Include in PED.	Annex H was originally developed for and discusses the climate change assessment conducted by the Corps for LOWRP. It is not subject to any further modifications.	Concur		X
97	Bryce Weinand	Climate Change	Black & Veatch	Annex H	H-22	Climate Change	Figure H-14 is difficult to interpret the annual and seasonal % change values for Florida and the project location.	Low	Clarification	Consider providing images in the figure zoomed into the Southeast US.	Annex H was originally developed for and discusses the climate change assessment conducted by the Corps for LOWRP. It is not subject to any further modifications.	Concur		X
98	Bryce Weinand	Climate Change	Black & Veatch	Annex H	H-26	Climate Change	Figure H-16 is difficult to interpret the seasonal projected change values for precipitation for Florida and the project location.	Low	Clarification	Consider providing images in the figure zoomed into the Southeast US.	Annex H was originally developed for and discusses the climate change assessment conducted by the Corps for LOWRP. It is not subject to any further modifications.	Concur		X
99	Bryce Weinand	Climate Change	Black & Veatch	Annex H	Throughout Appendix H	Climate Change	The discussion on precipitation and temperature use the USGCRP Fourth Assessment from USGCRP. Recently the NCA5 was released.	Low	Should the discussion of precipitation and temperature be updated with the NCA5 information?	Include in PED.	Annex H was originally developed for and discusses the climate change assessment conducted by the Corps for LOWRP. It is not subject to any further modifications.	Concur		X
100	Kevin Shelton	Ecology	Black & Veatch	Annex B.2	B.3-19-21	Environmental	Table B.3-6: Several columns are shifted.	Low	Clarity	Suggest correcting column corrections for clarity.	Table updated.	Concur		X
101	Kevin Shelton	Ecology	Black & Veatch	Appendix G	G-26-27	Environmental	Tables G.10 and G.11 represent the same data for SLE and CRE but in different formats	Low	Clarity	Suggest using the same table format for Tables G.10 and G.11 for clarity	Table G.10 format updated.	Concur		X
102	Kevin Shelton	Ecology	Black & Veatch	Appendix G	G-29	Environmental	Table G-13 Title "Total Storage HUs..." appears to be incorrect.	Low	Clarity	Remove "Storage"	Table title updated.	Concur		X
103	Kevin Shelton	Ecology	Black & Veatch	Appendix G	G-28	Environmental	The FWO for the SLE appears to be the best option.	Low	Clarity	Suggest discussion of model results to include explanation regarding apparent best-case future performace without intervention over planned Alternatives. Alternatively correct the model and resultant calculations.	The modeling document report (LOCAR MDR) is a part of the feasibility study in Appendix A, Annex A2.4. All of the modeled operations are documented (and/or cited) in the LOCAR MDR. In particular, Section 3.1 of the MDR described the as-authorized LORS-based EAA reservoir FWO, Section 3.2 describes the LOCAR LOSOM-based proposed operations and the MDR Appendix B describes a LOSOM-based version of the EAA reservoir FWO which is the cleanest way of showing the LOCAR storage benefits independent of Lake regulation schedule changes.	The explanation for the modeling is good and the hydrologic and habitat benefits of each LOCAR Alternative are well documented. A discussion of the FWO vs LOCAR Alternatives for the SLE would still be beneficial as the model shows a decrease in Habitat Units for all LOCAR Alternatives vs HUs without the project entirely. Section G.4.2 discusses the total Northern Estuary Alternative Performance and the overall increase in HUs for the project is considerable, but the SLE does appear to suffer.	Section 5.3.3.1 discusses the sensitivity run of LOSOM-like operations that includes the LOSOM FWO modeled results. A statement was added to the end of section G.4.1.5 that states "Section 5.3.3 of the main repot discusses the performance of alternatives, including the sensitivity analysis conducted to compare a FWO scenario with different Lake Okeechobee operations. The FWO results presented here are based on currently authorized operations."	X
104	Jhon Arbelaez-Novak	Environmental	Black & Veatch	Appendix C2	Sections 2.4, 2.5, 2.6, 2.7, and other sections where impacts may occur	Environmental	List mitigation techniques that may be implemented if impacts are anticipated.	Moderate	Although BMP's and other actions are listed to minimize impacts, no mitigation strategies are provided were impacts are likely to occur.	Modify text.	Additional language has been added to Section C.3.4 (Wetlands). Any impacts to wetlands resulting from implementation of the project component will be avoided, minimized, and mitigated, as appropriate.	Concur		X
105	Jhon Arbelaez-Novak	Environmental	Black & Veatch	Appendix C2	183	Environmental	Include long-term positive impacts.	Medium	Although short-term impacts are anticipated, the long-term impacts would provide a much greater benefit, such as an overall more stable water supply. See Section C2.17 for example on positive impacts on overall aesthetic value created by the project.	Modify text.	A statement was added to Section C.2.13 regarding the long-term benefits to water supply. Text was also radded to Table C.2-16 to clarify the model runs and their benefits for water supply.	Concur		X
106	Jhon Arbelaez-Novak	Environmental	Black & Veatch	Appendix C2	192	Cultural Resources	Provide expected completion date for cultural resource survey, and if available, preliminary findings.	Medium	This information would avoid future comments for the Corps, which may affect schedule.	Modify text.	30-day review period under the on-going consultation with the Tribes expired December 11th. Provided no comments are received, the consultant is currently finalizing the report. Under the current project alternative footprint, all known CRs sites have been avoided.	Concur		X
107	Jhon Arbelaez-Novak	Environmental	Black & Veatch	Appendix C2		Tribal Resources	No information is provided on tribal consultations.	Critical	Tribal consultation is required. As highlighted in Appendix C1, the area is well known to have been inhabited by native populations in the past.	Address if tribal consultations have occurred, or when they will occur.	Yes, tribal consultations have been on-going. The ACOE is responsible for government to government consultation. The ACOE Correspondence is included in the LOCAR EIS.	Concur		X

Comment No.	Black & Veatch Reviewer Name	Area(s) of Experience	Reviewer Agency	Report Section	Page #	Discipline	Comment	Significance of Concern	Basis of Concern	Suggested action to remedy/resolve concern	Response	Backcheck	Response2	Comment Closed
108	Dusty Miller	Environmental	Black & Veatch	Recreation (App F)	F-8	Recreation	Page F-8, Line 3 – Environmental point value considered was based only on aesthetic considerations.	Low	A more comprehensive set of environmental considerations, including potential for adverse impacts to water quality from recreational activities, should be include in the evaluation.	Address other environmental considerations.	Environmental point values for UDV were developed following USACE Economic Guidance Memorandum (EGM) 23-03. Adverse impacts to water quality can be considered for the environmental point value under the environmental point value, but these adverse impacts were deemed to likely be negligible.	Concur		X
109	Dusty Miller	Environmental	Black & Veatch	Recreation (App F)		Recreation	Subsection F.3.5 may benefit from clearer wording and/or more detailed explanation of how visitation was estimated and why the method used is appropriate. Were established methods such as those at these links considered? https://www.fs.usda.gov/pnw/pubs/pnw_gtr957.pdf, https://www.frpa.org/frpamainsite/calculator (specifically for FL), or direct comparison to a similar single park or other attraction in Florida that may have recreation use numbers available?	Medium	More accurate comparison of recreation area projected use.	Modify text.	The second half of section F.3.5 provides step-by-step details on how visitation was estimated, and we relied heavily on the FDEP SCORP to build to our estimates. No other suitable data sources could be found, and data from the SCORP was deemed the best available. Our methodology follows an approach used in previous SFWMD and USACE studies. Unfortunately the sources recommended in the comment do not provide clear guidance on estimating visitation.	Concur		X
110	Dusty Miller	Environmental	Black & Veatch	Recreation (App F)		Recreation	Table F-10 - Benefit to Cost Summary - does not appear to account for the costs of the potential water pollution caused by recreational activities. It is unclear whether this is included in the "Land and Damages" item in the table and, if so, what method was used to estimate the amount.	Low	Clarify that the costs of the potential water pollution caused by recreational activities were determined.	Modify text.	Potential water pollution from recreational activities likely to be negligible. These kind of costs are not typically included in this kind of cost-benefit analysis.	Concur		X
111	Bryce Weinand	Climate Change	Black & Veatch	Annex H	H-33	Climate Change	Last sentence on the page, I believe "project" should be changed to "projected". Additionaly, consider adding a statement to the paragraph on page H-33 that ties the NCA analysis for annual and averages and extremes to Figure H-23 and Figure H-24.	Low	Clarity	Modify text.	Annex H was originally developed for and discusses the climate change assessment conducted by the Corps for LOWRP. It is not subject to any further modifications.	Concur		X
112	Todd Bednar	Cost Estimator	Black & Veatch	Appendix B, Cost	172	Cost Estimate	The unit price for Sheet Piling appears to be consistently low throughout the budget. Unit prices on the order of $70-$90/sf are likely more accurate.	Medium	Budget increase	Re-visit the unit price.	Majority of sheetpiling in estimate is temporary sheet piles that would be driven and extracted. Unit price for that is much less as material can be salvaged and reused. For permanent sheet pile items, current unit prices is around $75/sf.	Concur		X
113	Todd Bednar	Cost Estimator	Black & Veatch	Appendix B, Cost	173, 174	Cost Estimate	The quantity of concrete shown in the detail level does not match the element level quantity shown in bold.	Medium	Clarification	Provide explanation for the difference in quantities	Detailed line items for concrete typically include a 10% quantity increase to account for waste/loss of concrete placement.	Concur		X
114	Dave Friesen	Real Estate	Black & Veatch	Appendix D.4.1	D5	Real Estate	Although SFWMD is responsible for providing lands, it is unclear what other parcels might be impacted and if the amount set aside for costs would be sufficient.	Medium	Project Costs, Parcel availability, and timeline	Provide additonal details regarding impacts on adjacent parcels.	SFWMD is responsible for certifying the lands, and all anticipated lands needed have been identified. No offsite impacts to adjacent lands are anticipated. Please see Real Estate Appendix for details.	Concur		X
115	Todd Bednar	Cost Estimator	Black & Veatch	Appendix B, Cost	Multiple	Cost Estimate	The unit price concrete appears to be consistently at the low end of the current cost range. More likely unit prices include: Fdns-$600-$800/cy, Walls-$800-$1000/cy, Elevated Beams-$1000-$1300/cy, SOG-$600-$800/cy.	Medium	Budget increase	Re-visit the unit prices.	The estimate does not account for reinforcing steel within each of the specific features' folder. So unit prices are low. Once factoring in reinforcing to the unit price of concrete, the average unit price is around $1,100/cy, which is in line with prices listed in comment.	Concur		X
116	Bryce Weinand	Climate Change	Black & Veatch	Annex H	H-36, Section H.5.2.4.1	Climate Change	The last sentence indicates that Figure H-26 provides change in frequency of river flooiding for sites. Please provide additional analsyis here and explain how this relates to the project location.	Low	Further clarification of what the Figure is showing is needed.	Modify text.	Annex H was originally developed for and discusses the climate change assessment conducted by the Corps for LOWRP. It is not subject to any further modifications.	Concur		X
117	Todd Bednar	Cost Estimator	Black & Veatch	Appendix B, Cost	176	Cost Estimate	The unit price for the ovhd bridge crane may be low. A recent vendor quote for a project in Miami indicates a more likely unit price to $10,000-$15,000/ton.	Low	Budget increase	Re-visit the unit prices.	Overhead bridge crane unit prices is approximately $190k. There is no design currently for crane, and estimate uses relevant cost book item for now. Cost can be reviewed in subsequent phases of project, once more design details become available.	Concur		X
118	Todd Bednar	Cost Estimator	Black & Veatch	Appendix B, Cost	196	Cost Estimate	The unit price for the fire equipment seems high. More likely unit prices are $400-$600/ea.	Low	Budget decrease	Re-visit the unit prices.	No design details are available for fire equipment, and estimate is based on relevant cost book line item. Cost item can be reviewed in subsequent phases of project, once more design details become available.	Concur		X
119	Dave Friesen	Real Estate	Black & Veatch	Appendix D.4.1	D5	Real Estate	Although SFWMD is responsible for providing lands, it is unclear what other parcels might be impacted and if the amount set aside for costs will be sufficient.	Medium	Budget increase	More information regarding SOW and impact to surrounding parcels	SFWMD is responsible for certifying the lands, and all anticipated lands needed for the project have been identified. Please see Real Estate Appendix for details.	Concur		X
120	Todd Bednar	Cost Estimator	Black & Veatch	Appendix B, Cost	210	Cost Estimate	The unit price for clearing and grubbing appears to be low. A more likely unit price is $6,000-$9,000/AC	Low	Budget increase	Re-visit the unit prices.	The land is majority existing pasture-land, and little amount of old citrus groves. Grubbing will be limited, and current unit price is in line with other on-going projects in the area.	Concur		X
121	Todd Bednar	Cost Estimator	Black & Veatch	Appendix B, Cost	210	Cost Estimate	The unit price for silt fence seems low. Consider a unit price of $3-$4/lf	Low	Budget increase	Re-visit the unit prices.	Material cost will be adjusted to increase unit price for silt fencing.	Concur		X
122	Todd Bednar	Cost Estimator	Black & Veatch	Appendix B, Cost	211	Cost Estimate	The unit price for the soil-bentonite cutoff walls is at the low end of the current cost range. A unit price to $20-$25/VSF is considered more likely based on recent projects in Central Florida.	Medium	Budget increase	Re-visit the unit prices.	Current unit price is based on recent contracted price for C-43 project, and totals to $19.21/sf. Adjustments to crews and labor rates are on going, and new unit price will be within the $20-25/sf range.	Concur		X
123	Dave Friesen	Real Estate	Black & Veatch	Appendix D.4.2	D5	Real Estate	All necessary access easements have not yet been identified and/or acquired, which provides significant uncertainty to costs and availability for acquisition.	Medium	Uncertain access easement costs	Access easments need to be addressed to accurately determine cost impacts.	Land acquisition and easements will be acquired after the project receives Congressional Authorization.	Concur		X
124	Todd Bednar	Cost Estimator	Black & Veatch	Appendix B, Cost	211	Cost Estimate	The Unit of Measure (UOM) for the soil-bentonite cutoff wall should be listed as vertical square feet (VSF).	Low	UOM is unclear	Change the UOM for the soil-bentonite cutoff walls from SF to VSF	MCACES software does not have the "vsf" unit of measure, therefore SF will remain in use.	Concur		X
125	Dave Friesen	Real Estate	Back & Veatch	Appendix D.13	D6	Real Estate	Affect on Cultural Resources cannot yet be assessed. Avoidance, mitigation, and minimization costs could be significant, as well as, potential adversarial positions by affected environmental, tribal, or other possible groups.	Low	Unavailability of impact and response	Provide details relating to impacts and response in text.	Agree. Environmentally sensitive areas will be avoided if possible.	Concur		X
126	Todd Bednar	Cost Estimator	Black & Veatch	Appendix B, Cost	165	Cost Estimate	The Sales Tax rate shown is 6%. The current tax rate for the project location is 7.5%.	Medium	Budget increase	Verify appropriate sales tax rate.	Tax rate has been updated to 7.5%.	Concur		X
127	Dave Friesen	Real Estate	Black & Veatch	Appendix D.12	D6	Real Estate	Additional Real Estate may be required for induced flooding.	Medium	If any such lands are required, acquisition may result in significant costs or adverse positions.	Address potential need for additional land acquisition.	According to the Savings Clause Analysis, the project cannot impact offsite adjacent landowners, and the analysis indicates that there are no offsite impacts. In addition, there are dam safety features for flooding such as a seepage canal. No additional lands for flooding are required.	Concur		X
128	Todd Bednar	Cost Estimator	Black & Veatch	Risk Register, Cost and Schedule, ES1		Cost Estimate	This is a large project that will last multiple years. Can the local market can supply the required labor for the project?	Medium	Schedule & budget concerns	Labor market analysis	This is a risk discussed in the CSRA. Also labor rates have been increased to include additional wages to entice workers in the region. Subsequent phases of the project will look at this in more detail, but this risk is accounted for in the estimate and contingency development.	Concur		X
129	Dave Friesen	Real Estate	Black & Veatch	Appendix D.19	D8	Real Estate	Acquisition of real estate is scheduled for 18-24 months. Depending on what is necessary, this may or may not be reasonable. Unknown requirements at this point.	Medium	Schedule and timeline concerns	This potential schedule impact should be refined and tracked in the PED.	Lands and Damages were evaluated in the Risk Register. Land ownership does have a high risk of impacting the schedule. Discussions with the landowner have been initiated. Land acquisition will occur after the project is Congressionally Authorized.	Concur		X
130	Dave Friesen	Real Estate	Black & Veatch	Appendix D.18	D8	Real Estate	Section states No Zoning Ordinances are proposed, but not whether it was determined unnecessary.	Medium	Zoning may be necessary	Establish SFWMD status for zoning reviews	Acknowledged.	Concur		X
131	Todd Bednar	Cost Estimator	Black & Veatch	Risk Register, Cost and Schedule, ES3		Cost Estimate	Equipment fabrication & supply chain issues	Medium	schedule & budget concerns	To reduce equipment delivery issues, consider pre-purchasing the large equipment - generators, pumps, valves, MCC's, transformers, gates.	Acknowledged. This is accounted for in the CSRA risk register.	Concur		X
132	Dave Friesen	Real Estate	Black & Veatch	Appendix D.20	D8	Real Estate	No Utility relocations Expected, however, if required, they are subject to approval of Final Attorney's Opinions or Compensability for each impacted utility needs / facilities.	Low	Timeline / Schedule concerns	Identify any potential utility relocations early in the PED.	Acknowledged.	Concur		X
133	Dave Friesen	Real Estate	Black & Veatch	Appendix D.21	D8	Real Estate	Environmental assessments not yet completed. SFWMD is responsible for any remediation & costs.	Low	Schedule delays		Acknowledged. If HTRW is identified, SFWMD will be responsible for the assessment, remediation and cost associated with these activities.	Concur		X
134	Todd Bednar	Cost Estimator	Black & Veatch	Project Schedue		Cost Estimate	The schedule shows the construction of PS-1 to take approximate 3.5 years & PS-2 to take approximately 6 years.	Low	The construction schedule seems to be longer than necessary given the projected level of effort.	Consider if the construction schedule can be shortened.	Subsequent phases of project will revise schedule. Currently, a conservative schedule has been developed and coordinated with local sponsors and USACE. No change at this time.	Concur		X
135	Dave Friesen	Real Estate	Black & Veatch	Appendix D.22	D9	Real Estate	The Majority Landowner for the project area does not want to sell at market value. Condemnation may be required.	High	This may be costly and create delays.	This potential cost/schedule impact should be refined and tracked in the PED.	Discussions with the landowner have been initiated.	Concur		X
136	Todd Bednar	Cost Estimator	Black & Veatch	Project Schedule		Cost Estimate	The schedule shows the construction of perimeter canal outfall structure PCOS-1 will take 3.5 years.	Medium	The construction schedule seems to be longer than necessary given the projected level of effort.	Consider if the construction schedule can be shortened.	Subsequent phases of project will revise schedule. Currently, a conservative schedule has been developed and coordinated with local sponsors and USACE. No change at this time.	Concur		X
137	Todd Bednar	Cost Estimator	Black & Veatch	Project Schedule		Cost Estimate	The schedule shows the construction of the culverts CU-2 & CU-1A will take 2.5 years.	Medium	The construction schedule seems to be longer than necessary given the projected level of effort.	Consider if the construction schedule can be shortened.	Subsequent phases of project will revise schedule. Currently, a conservative schedule has been developed and coordinated with local sponsors and USACE. No change at this time.	Concur		X

Comment No.	Black & Veatch Reviewer Name	Area(s) of Experience	Reviewer Agency	Report Section	Page #	Discipline	Comment	Significance of Concern	Basis of Concern	Suggested action to remedy/resolve concern	Response	Backcheck	Response2	Comment Closed
138	Kevin Shelton	Ecology	Black & Veatch	Annex D, Table D-2	D.1-13	Environmental	The Trigger for Management Action for Uncertainty Tracking ID#26 of 50% reduction in annual abundance seems to be looking for short-term extremes only.	Low	long term success	Suggest adding longer term triggers as well. Also consider adding more explanation for the chosen criteria in the narrative.	We agree, and there's a distinction made between the time a response can be expected vs the time a response might be detected due to project vs climate variability. We feel the 3rd to last paragraph on p. D.1-15 explains that this is not a short-term extreme monitoring time-frame, but should be expected to cover 5-10 years to account for climate variability, etc. In other words, it's a response that could be seen in the short-term, but would be evaluated over a longer time period to assess real trends and causal factors.	The explanation of the monitoring period is noted and acceptable. The 50% reduction criteria proposed for the monitoring of "SAV and EAV, cyanobacteria, phytoplankton and sportfish" will be evaluated in the nearshore areas where changes in "lake stages have the most immediate impact" and are subject to high variability is appropriate. Snail kite reductions below the 3-year moving average will detect fairly small changes before significant losses occur. The criteria for a large reduction in wading bird abundance is still a concern. A 50% reduction in wading bird population "throughout the marsh" would be alarming.	We concur that such a large reduction in wading bird abundance sounds concerning, however, both nest numbers and foraging numbers within and between seasons can be highly variable on the Lake. It's not uncommon for us to see >50% declines in nesting numbers from one year to the next, or a 3-fold increase, for example. Most of that is tied to climate variability and water management decisions, though conditions outside the lake can also affect wading bird activity within the levee (they can forage in the watershed and nest in the lake). Due to the high variability in our monitoring data, we would need to see significant reductions relative to historical variation, and see that across several years and climatic conditions. While a decline of half sounds concerning, the highly variable use of the lake by these indicators makes it hard for us to detect changes at higher levels of sensitivity.	X
139	Kevin Shelton	Ecology	Black & Veatch	4.3.3	4-20	Environmental	The effect on T&E species in this section only mentions the Floida grasshopper sparrow. Annex A lists several other species that were determined to be potentially affected, several of which have a "May Affect" determination, which is a higher potential than the sparrow.	Low	Completeness of presented data	Suggest more complete data is presented. The list is expanded in Section 5.4 but not here.	Table updated.	Concur		X
140	Kevin Shelton	Ecology	Black & Veatch	Table 4-25	4-29	Environmental	"The Corps would coordinate with the Rid and Florida Fish and Wildlife Conservation Commission". "Rid" is likely a typo but it makes the reference unclear.	Low	Clarity	Modify text.	Text updated.	Concur		X
141	Renee Murch	H&H, Groundwater	Black & Veatch	Annex B	B.1-9	H&H	Changes to model boundary conditions for the RSM-BN model and assumptions for the 3 scenarios (ECB, FWO, and Alternative 1) should be summarized for clarity.	Low	Clairification of differences between model simulations.	Add text discussion.	A reference will be added to direct readers to the Modeling Documentation Report.	An added reference should be sufficient.		X
142	Jhon Arbelaez-Novak	Environmental	Black & Veatch	Appendix C1, Figures C.1-18 and C.1-19	C.1-49/50	Environmental	The Lake Okeechobee regulation schedules are dated 2008.	Low	Changes in the regulation schedules	Provide more recent figures/maps if changes have been made.	No changes were made. The name of current operations is LORS08 which is the abbrieviated 2008 Lake Okeechobee Regulation Schedule.	Response noted.		X
143	Dusty Miller	Environmental	Black & Veatch	Recreation (App F)	F-2	Recreation	Page F-2, lines 7 through 9 – This paragraph notes that recreation will be available at the East and West Cells includes fishing, hunting, and boating. Fishing may exacerbate invasive species/native species displacement issues if there is public demand for stocked areas for fishing (bass is mentioned), and fishing line and other pollutants may be left as litter in the project area, with attendant adverse effects on aquatic species. Similarly, for hunting, the use of lead ammunition and use of gasoline and oil in boats and jet skis, etc., may worsen water pollution problems in waters ultimately draining into Lake Okeechobee. Without restrictions to limit the potential adverse effects of these recreational activities, this may be inconsistent with the overall project purpose of reducing pollutant load into Lake Okeechobee. (This concern is somewhat acknowledged in the following paragraph.) Plans for a long walking trail loop with a parking lot may bring pollutants from animal waste with dog walking and potential runoff from the restroom facilities and parking area.	Medium	Recreation activities may impact overall project goal of reducing adverse water quality impacts.	Address potential adverse water impacts for recreation features.	The public would fish for whatever naturally recruited within the reservoir, which would likely be both native and invasive exotic species; there would be no stocking of game fish species. Littering can be managed with enforceable rules, information, garbage cans, regular pick-up service, and law enforcement; although illegal dumping will always be an issue in remote areas. Lead ammo is prohibited for use in waterfowl and alligator hunting over water. As of now, the only boats that would likely be permitted for use in the Reservoir would be canoes/kayaks/electric trolling motors (possibly small outboards <25 h.p.?) as in the A-1 FEB in Palm Beach County, where a limited number of quota hunting permits are issued Fri-Sun during the hunting season only. Either way, the numbers of users will be limited using the District's Special Use Licensing system, FWC hunting quotas, and hours of operation to minimize the impacts of public use. Dogs will be prohibited except for retrievers during hunting season, which will have minimal impact on nutrient input into this 11,000 acre reservoir. Restroom waste is self-contained in underground vaults. The parking area will be relatively small with approximately 40 parking spaces total. All District lands and CERP projects are open for public use. Recreation activities at planned large reservoirs will be adjusted accordingly for safe use. The recreation features are designed for passive use and not to negatively impact the planned feature or have impacts to water quality.	Thank you for the additional information and the detail on measures to prevent significant impacts from recreation.		X
144	Todd Bednar	Cost Estimator	Black & Veatch	Appendix B, Cost	178	Cost Estimate	The generator cost is low in compared to recent quotes. Currently, all electrical equipment is experiencing long lead times, supply chain issues, and high demand. A more likely unit cost/kW is $750-$1000 minimum.	Medium	Budget increase	Re-visit the unit prices.	No design information is available for generators, as such a cost book item was used. A more expensive cost book item will be used to increase cost for generators.	Concur		X
145	Todd Bednar	Cost Estimator	Black & Veatch	Appendix B, Cost	195	Cost Estimate	The floor grating cost is low. Is the grating steel, FRP, or SST? When the perimeter support angles, galvanizing costs are included, the unit price is not sufficient. The expected price is about $70-$90/sf.	Medium	Budget increase	Re-visit the unit prices.	Steel grating cost will be increased.	Concur		X
146	Dave Friesen	Real Estate	Black & Veatch	Appendix D.17	D7	Real Estate	If SFWMD has issues acquiring necessary land rights, it can request the Corps do so pursuant to its Master Agreement. However, the quoted portion of the 'MA' does not require provision of lands (only that a request be submitted), and that SFWMD is responsible for costs, including any clean-up and response. Even if Corps is able to annex land from private owners, this is a process that could likely result in unexpected costs and delays.	High	Negotiation breakdown / costs	The potential cost and schedule impacts should be refined and tracked in the PED.	Upon Congressional Authorization of the project, under CERP it is the responsibility of the non-federal sponsor to provide the lands needed for the project.	Concur		X
147	Dave Friesen	Real Estate	Black & Veatch	Appendix D.23	D9	Real Estate	There are a great deal of project specifics are still unknown. Estimate accuracy of any such costs would likely be highly questionable.	High	Costs and timeline	The potential cost/schedule impacts of such items should be refined and tracked in the PED.	Agree. Lands and Damages were evaluated in the Risk Register that inform the cost estimate. A 54% contingency has been added to the project cost to account for unknowns and risk.	Concur		X
148	Terry Hull	Coastal, H&H	Black & Veatch	Annex A-2.2	general		I didn't see wave setup discussed. Was it included in the total water surface elevation? If not, it may be because it's not in the DCM. However, as I recall the DCM was based on flat topo and constant water depth like in STAs typically. In these cases, wave setup would be neglible. LOCAR has unique bathymetry similar to beach conditions with the northern portion being nearshore and southern portion being offshore. The large waves would break propagating north to the shallow portion and create wave setup.		Possible underestimated overtopping; a quick calculation produces about 2-3 ft of wave setup to add to wind setup before calculating runup.	Add wave setup through calculations or coupling your STWAVE model with ADCIRC to get the total water level including wind and wave setup.	Wave setup was not included in the overtopping assessment. This is not typically done since wave setup is a highly localized affect and to a large extent is implicit to the wave overtopping equations in EurOtop, which are based on physical model tests which reproduce wave setup for the given water level and wave conditions. The EurOtop manual indicates "there is, in general, no requirement to add on an additional water level increase for wave set-up when calculating overtopping discharges using the methods reported in this document unless the foreshore is very long and very gently (sic). In that case numerical models should give the wave set-up one or two wave lengths in front of the toe of the structure." We will check the potential influence wave setup could have at LOCAR the week of January 8 when our modeler returns from PTO and provide an updated response.	Concur; I think the foreshore physiography may meet the conditions requiring modeling or other consideration, but I just wanted to bring it to your attention.		X
149	Zan Kugler	Pump Station Design	Black & Veatch	A.12.2.6 System Analysis of Pump Stations Model Studies	177	Mech	"The HI standard ANSI/HI 9.8 - 2009 recommends intakes of pump stations with an individual pump capacity exceeding 40,000 gpm, or non-uniform flow to the pump sump be modelled. However, the designer must decide the necessity of a model study on a case-by-case basis."	Low	The SFWMD requires a physical model study be performed as per HI recommendation. A CFD model study most likely also be required of the approach channel.	Revise text to indicate SFWMD requires physical model study.	The text in Section A.12.2.6, Model Studies, has been revised to address this comment by requiring that a physical model study be completed during the PED phase.	No additional comments, Concur.		X

Comment No.	Black & Veatch Reviewer Name	Area(s) of Experience	Reviewer Agency	Report Section	Page #	Discipline	Comment	Significance of Concern	Basis of Concern	Suggested action to remedy/resolve concern	Response	Backcheck	Response2	Comment Closed
150	Zan Kugler	Pump Station Design	Black & Veatch	A.12.2.6 System Analysis of Pump Stations System Design Requirements	174	Mech	Have the intake losses produced by the trash rack been considered in the determination of the total static head? Typically a 0.5 ft. loss is considered for a partially blocked rack to establish the low water shut off in the intake bay.	Moderate	The total static head calculations should include intakes losses.	Revise total static head calculations.	Calculations have been revised to include 0.5 feet headloss through the trash rack.	Concur with revisions. Designer to confirm the maximum static head is minimum water level in the intake to the high point of the flow stream. I can't find any mention of the pump intake low water shut-off stage in the static head calculations.		X
151	Zan Kugler	Pump Station Design	Black & Veatch	A.12.2.6 System Analysis of Pump Stations System Design Requirements	175	Mech	"The maximum static head at PS-2 is based on the minimum Inflow-Outflow Canal stage of 22 ft NAVD88, the reservoir NFSL or pump shut-off elevation of 51.70 ft NAVD88 and a siphon in the pump discharge. Maximum static head over the hump is based on water elevation in the discharge pipe when 2/3 full. The minimum static head is surface-to-surface between the canal and the reservoir in empty conditions and with a siphon established." What is the maximum siphon recovery for PS-2 and SPS-1?	High	With a siphon assist system, it is required that the siphon recovery is not greater than 28 feet. The value of 28 feet is used to prevent possible water vaporization and siphon priming problems.	Revise concept design if siphon recovery is over 28 ft.	Design concept was modified to reduce the siphon recovery to less than 28 feet by raising the saxophone dissipator in the reservoir. The siphon recovery limit was identified as an item to be addressed in the PED phase.	No additional comments, Concur.		X
152	Zan Kugler	Pump Station Design	Black & Veatch	A.12.2.6 System Analysis of Pump Stations System Design	175	Mech	"Maximum static over the hump is based on water elevation in the discharge pipe when 2/3 full."	Low	It would be beneficial if the calculation of the critical depth for the discharge pipe be provided.	Provide calculation.	Critical depth was added for the discharge pipe.	No additional comments, Concur.		X
153	Zan Kugler	Pump Station Design	Black & Veatch	A.12.2.2 Equipment	160	Mech	Add the intake low water shut-off stage and motor Hp to the tables.	Low	The additional of the intake low water shut-off stage and motor Hp to the tables would be beneficial.	Revise tables.	Table was revised to include pump low water shut off and Hp.	Concur. Assume low water shut-off within the intake was based on the canal design low water stage minus the trash rack loss?		X
154	Zan Kugler	Pump Station Design	Black & Veatch	A.1.2 Proposed Improvements at S-84 Site	15	Mech	A gated spillway (S-84+), with a maximum design flow capacity of 9,000 cfs, is proposed to replace S-84 and S-84X. Will the new structure have similar hydraulic design criteria as the existing S84 and S84X spillways? Do the existing S84 and S84X spillways have ogee weirs. If not then why was this weir type selected?	Low	The basis for the 9000 cfs flow capacity is not evident.	Add narative to support proposed design criteria.	The design capacity for S-84+ of 9,000 cfs (which is the 100% SPF peak discharge rate to C-41A upstream of S-84+) is explained in Section A.5.3.3, as the flow capacity needed at S-84+ to allow for a peak discharge rate from the reervoir of 1,500 cfs during the PMP and storms with less precipitation. A sentence has been added at the end of Section A.1.2 to point the reader to Section A.5.3.3 for more information concerning the design capacity of S-84+. S-84+ has been designed to be gated spillway that is siilar to the design of S-84 and S-84X. The S-84 and S-84X bays each have an ogee weir as shown on the record drawings for these structures.	No additional comments, Concur.		X
155	Zan Kugler	Pump Station Design	Black & Veatch	2.0 Pump Station Hydraulic Calculations	228	Mech	The pump drawings indicate a bell inlet. Does the pump curves and calculations include the suction losses for the FSI inlet?	Low	FSI suction losses not included in curves.	Add note to indicate that the curves will be revised at a later design phase.	Note was added to include the FSI losses in the PED Phase.	No additional comments, Concur.		X
156	Zan Kugler	Pump Station Design	Black & Veatch	A.13.1 Design Criteria Utility Power	189	Mech/Elec	The anticipated power demands should be defined. Is there a concern the existing utility service is inadequate? And if so, were additional costs added to the project estimate for utility improvements required for service to the proposed facilities?	Moderate	The SFWMD has had service issues in the past with Glades Electric. This project will require a significant power demand that may not currently be available in this area .Any extension of existing power transmission facilities required to make this energy available at the pump station site is the responsibility of the Government.	Add narative that followup with utilities to confirm availability of service will be made in the future design phase.	A sentence has been added to the end of Sections A.13.1.1 through A.13.1.4 to address this comment.	No additional comments, Concur.		X
157	Zan Kugler	Pump Station Design	Black & Veatch	A.12.2.10 Requirements for Mechanically Cleaned Trash Racks	186	Mech	"The screening system consists of heavy-duty bars with a 3-inch clear spacing set on a 70" angle from horizontal."	Moderate	The SFWMD standard is a 60 degree inclination. It is assumed the 3" bar clearance was specified by Flygt.	Confirm the 70 degree inclination is acceptable to SFWMD.	Trash screening angle varies by manufacturer, i.e. hydro components uses 70 degress, duperon uses 60 degress. Text was modified to indicate that the trash rack angle may vary based on raker type selected during the PED phase.	Concur with text change response however the review of the text modification indicated: "The screening system consists of heavy-duty bars with a 3-inch clear spacing set on an 60" angle" Also note: If there is a possibility for the presence of manatees, the maximum inclination shall be determined to conform with the permit requirements of the FWC/FDEP and confirmed with the rake MANUFACTURER.		X
158	Zan Kugler	Pump Station Design	Black & Veatch	A.12.2.8 Requirements for Electric Motor Drivers	183	Mech	"When used for driving vertical, axial/mixed flow wet pit pumps, the electric motor couples to a right-angle gearbox (drive) through a short horizontal drive shaft with universal joints on each end." This is a confusing and contradictory statement given the station section illustrations provided and other narrative such as: "Pump manufacturers should provide pump and motor as a single unit. The pump column and base plate will support the motor." and "Pump manufacturers will provide the coupling between the motor and the pump." These comments indicate a direct drive slow speed motor. Also the Flygt pumps shown in A.12.2.8 Requirements for Electric Motor Drivers are direct drive pumps.	Moderate	The narative is a confusing and contradictory to the concept design presented in the majority of the text and illustrations.	Revise text to be consistent.	Text has been revised to reflect direct coupled electric motors.	No additional comments, Concur.		X
159	Zan Kugler	Pump Station Design	Black & Veatch	A.12.3.2 Gate Hoist	188	Mech	"Gate hoists consist of drums, drive shafts, couplings, worm gear reducer, drive motor, brake, sheaves, wire rope fittings, welded rigid steel base frame, anchor bolts, electrical equipment, hoist cover, gate position indicator, slack cable limit switch and all accessories."	Low	Somewhat confusing text.	Suggest adding the hoist name to the component description, "Drum and Cable".	Concur, text was revised to clarify.	No additional comments, Concur.		X
160	Zan Kugler	Pump Station Design	Black & Veatch	A.12.2.7 Requirements for Axial Flow Pumps "	181	Mech	"The FSI will be designed in accordance with the ACE standard for the Type 10 FSI (ETL No. 110-2-327.)"	High	This FSI minimizes the submergence which can create approach flow problems. It typically requires significantly less submergence than the HI standard.	Indicate this FSI type will require a physical model study to ensure there is adequate submergence and no vortex formations.	A requirement for a physical model study was added.	No additional comments, Concur.		X
161	Zan Kugler	Pump Station Design	Black & Veatch	A.12.2.8 Requirements 1 for Electric Motor Drivers	183	Mech	"Based on the site of the location of the LOCAR Pump Station, there is sufficient available electrical capacity to use electric motors on the larger pumps."	Low	This statement is confusing given the discussion in Electrical section A.13.1 Design Criteria which indicated the utility companies did not respond to the communication of the anticipated power demands.	Revise text to indicate the availability of service will be confirmed with utility companies and if servive improvements are required agreements with the companies will be made to provide service.	The extension of electrical service to PS-2 is already discussed in Section A.13.1.2 and shown in Annex E-1; therefore, this sentence has been deleted from A.12.2.8. See response to Comment No. 156.	No additional comments, Concur.		X
162	Zan Kugler	Pump Station Design	Black & Veatch	A.4.4.1 General	27	General	It may be of benefit to add the SFWMD and Jacksonville District reached agreement on several design memoranda to help standardize projects under the Comprehensive Everglades Restoration Plan. Design Criteria Memorandum DCM-5 officially requires the use of the MPSEG on major pumping stations in the SFWMD's area. Major pumping stations are defined in the guidelines as stations having axial or mixed flow pump machinery with a minimum total station capacity of 1,500 cfs excluding seepage and low flow capacity.	Low	Ensure there is clarity as to the design criteria that is to be followed.	Add text as indicated.	Section A.4.4.1 has been revised to address this comment.	No additional comments, Concur.		X
163	Zan Kugler	Pump Station Design	Black & Veatch	A.12.2.7 Requirement for Axial Flow Pumps Bearings	182	Mech	The mechanical section had an appreciable amount of rewritten technical specifications that tend to cloud various important design criteria, i.e. providing detailed specifications for the sleeve bearings but not stating the pumps are to be water (product) lubricated.	Low	Some basic design criteria is lost in the detailed descriptive text.	Add text to indicate the pumps are to be water lubricated. Check to see if other basic design criteria has be overlooked as a result of the enclusion of the rewritten technical specifications.	Text was added to reflect water lubricated bearings.	No additional comments, Concur.		X

Appendix D. Significant Correspondences

Submittal of Reviewer Qualifications

Beriswill, Jeffrey

From: Beriswill, Jeffrey
Sent: Thursday, December 14, 2023 8:21 PM
To: Caneja, Elizabeth
Cc: Dinges, Jon; Mickel, Zach
Subject: LOCAR Feasibility Study ATR Reviewer Qualifications
Attachments: LOCAR Feasibility Study ATR Reviewer Qualifications 12.14.23.pdf

Liz,

Attached is the LOCAR Feasibility Study ATR Reviewer Qualifications in accordance with Task 2 of the associated Work Order.

Let me know if you have any questions, or if you require further information.

Regards,

Jeff Beriswill, M.E., P.E.*
Southeast Dams Practice Leader
**Licensed in FL, GA, NC*
Black & Veatch
1715 N. Westshore Boulevard, Suite 725, Tampa, FL 33607 (note new address)
M +1 863-640-4793

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Acceptance of Reviewer Qualifications

Beriswill, Jeffrey

From: Caneja, Elizabeth <ecaneja@sfwmd.gov>
Sent: Monday, January 8, 2024 10:55 AM
To: Beriswill, Jeffrey
Cc: Leeds, Jennifer
Subject: RE: LOCAR FS Updates

Hi Jeff,

No, we were good with the list of reviewers provided. We also provided the quals to USACE Eng HQs for their approval.

Thanks,

ELIZABETH CANEJA
LEAD PROJECT MANAGER
Ecosystem Restoration and Capital Projects Division
South Florida Water Management District
3301 Gun Club Road, MS 8410 • West Palm Beach, Florida 33406
Work from Home • 561-809-2347 (cell) or Office • 561-682-2586

From: Beriswill, Jeffrey <BeriswillJ@bv.com>
Sent: Monday, January 8, 2024 9:47 AM
To: Caneja, Elizabeth <ecaneja@sfwmd.gov>
Cc: Leeds, Jennifer <jleeds@sfwmd.gov>
Subject: RE: LOCAR FS Updates

[Please remember, this is an external email]

Liz,

Also, do you have edits to the Draft ATR Reviewer Qualifications sent on 12/14? It will need to be modified for a couple changes in reviewers. It will also be incorporated into the ATR Report.

Regards,

Jeff Beriswill, M.E., P.E.*
Southeast Dams Practice Leader
**Licensed in FL, GA, NC*
Black & Veatch
1715 N. Westshore Boulevard, Suite 725, Tampa, FL 33607 (note new address)
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Submittal of Work Plan

Beriswill, Jeffrey

From: Beriswill, Jeffrey
Sent: Friday, December 15, 2023 2:45 PM
To: Caneja, Elizabeth
Cc: Dinges, Jon; Mickel, Zach
Subject: LOCAR Feasibility Study ATR Draft Work Plan
Attachments: LOCAR Feasibility Study ATR.pdf

Liz,

Attached is the Draft LOCAR Feasibility Study ATR Work Plan in accordance with Task 1 of the associated Work Order.

Let me know if you have any questions, or if you require further information.

Regards,

Jeff Beriswill, M.E., P.E.*
Southeast Dams Practice Leader
**Licensed in FL, GA, NC*
Black & Veatch
1715 N. Westshore Boulevard, Suite 725, Tampa, FL 33607 (note new address)
M +1 863-640-4793

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Acceptance of Work Plan

Beriswill, Jeffrey

From: Caneja, Elizabeth <ecaneja@sfwmd.gov>
Sent: Monday, January 8, 2024 9:46 AM
To: Beriswill, Jeffrey
Cc: Leeds, Jennifer
Subject: RE: LOCAR FS Updates

Good Morning Jeff,

Thanks for the update, and we will take a look at the new comments.

No revisions needed on the Draft Work Plan.

Thanks, Liz

From: Beriswill, Jeffrey <BeriswillJ@bv.com>
Sent: Monday, January 8, 2024 9:37 AM
To: Caneja, Elizabeth <ecaneja@sfwmd.gov>
Cc: Leeds, Jennifer <jleeds@sfwmd.gov>
Subject: RE: LOCAR FS Updates

[Please remember, this is an external email]

Liz,

As of this morning, we have added backcheck comments and closed most of the comments. We need to provide the cost estimate backcheck response, which I anticipate providing today.

Also, we received 15 pump station comments from Zan Kugler this morning, and are going through our internal review of the comments. They should also be ready by EOD.

We are currently working on the draft ATR Report. Do you have any edits to our draft Work Plan that we provided on 12/15? It will be incorporated into our summary report.

Regards,

Jeff Beriswill, M.E., P.E.*
Southeast Dams Practice Leader
**Licensed in FL, GA, NC*
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Orientation Briefing Memorandum

MEMORANDUM

January 17, 2024

South Florida Water Management District (SFWMD)

B&V Project 418143
B&V File 14.4200
SFWMD Work Order No. 4600003988-WO10

Subject: SFWMD Lake Okeechobee Component A Reservoir (LOCAR) Feasibility Study
Agency Technical Review (ATR) Orientation Briefing

To:: Elizabeth Caneja, SFWMD

From: Jeff Beriswill, Black & Veatch (B&V)

Meeting Purpose

In accordance with Work Order No. 4600003988-WO10, the Agency Technical Review team conducted a project orientation briefing on the LOCAR Feasibility Study with the Project Development Team on December 11, 2023.

Attended by:

B&V	Jon Dinges	Jeff Beriswill	Terry Hull
	Todd Bednar	John Bianco	Zach Mickel
	Renee Murch	Todd Schellhase	Kevin Shelton
	Heriberto Torres	Lisa Walker	Joe Santogatta
SFWMD	Elizabeth Caneja	Jennifer Leeds	
JTech	Jamie Childers	Georgia Vince	Shawn Waldeck
	Raymond Sciortino		

Overview

Meeting notes:

1. Attendees were all introduced.
2. SFWMD provided a brief project overview for the LOCAR Feasibility Study, including alternatives, conceptual configuration, project objectives (water supply and flood control), and project benefits in both estuaries and to Lake Okeechobee.
3. JTech provided a brief overview of the preliminary design elements and information, including location, topography, geology, embankment design components, and ancillary components.
4. Black & Veatch provided an overview of the purpose and intent of the Agency Technical Review (ATR). It is not to make project decisions, but to perform an independent review.
5. Black & Veatch provided an overview of the deliverables for the ATR:
   a. Review comments

   b. Selection of ATR team. SFWMD will pass resumes along to USACE for review.
   c. Orientation briefing memorandum.
   d. ATR Report. DrChecks is not being used for this ATR. ATR comments are entered into a spreadsheet log. Once SFWMD receives the comments, responses will be in the log and backchecked. Using a spreadsheet will help expedite managing the comments. Once comments are entered, BV will upload the comments to SFWMD SharePoint and add comments as needed to create a collaborative comment log.
6. Black & Veatch reviewed the ATR schedule.
7. Feasibility Study Appendix A is being revised and should be in by Wednesday, December 13.
8. The Feasibility Study Cost Appendix is being updated also (Appendix B).
9. The October 23, 2023, version of the Feasibility Study is the working version, other than the two appendices mentioned above. Probable Maximum Precipitation and dam breach updates will be in the version to be released on 12/13/2023. JTech will provide a track changes version in PDF format for the ATR team.
10. The seepage analysis had to be updated for increased dam height.
11. Editorial comments are not necessary; the ATR should focus on technical comments.
12. JTech will provide an outline of the significant changes in Appendix A.
13. SFWMD will provide access to SharePoint to those on the ATR orientation call (email addresses in the invitation).

Appendix E. Statement of Technical Review

COMPLETION OF AGENCY TECHNICAL REVIEW

This Statement of Technical Review has been completed by the ATR Team for the 200,000-acre-foot Reservoir Feasibility Study for Lake Okeechobee Component A Storage Reservoir (LOCAR), North of Lake Okeechobee, Florida, see the ATR Report, which includes a brief summary of the review including any significant and unresolved issues, future commitments, the Charge questions, a brief resume of ATR reviewers, a printout of all review comments with resolution, and any significant correspondence between the PDT, RMO, and ATR Team. The ATR was conducted as defined in the project's RP to comply with the requirements of ER 1165-2-217. 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 USACE policy. All comments resulting from the ATR have been resolved and are attached.

SIGNATURE

1/24/2024

Jeff Beriswill, P.E.
ATR Team Lead
Black & Veatch

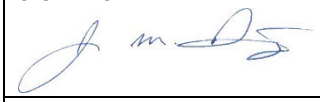
Date

SIGNATURE

Elizabeth Caneja
Lead Project Manager
South Florida Water Management District

Date

SIGNATURE



1/24/2024

Jon Dinges, P.E.
Engineer Project Manager
Black & Veatch

Date

1 of 1

ER 1165-2-217 • 1 May 2021

Appendix F. ATR Certification

CERTIFICATION OF AGENCY TECHNICAL REVIEW

SUBJECT: Agency Technical Review (ATR) of the Feasibility Study for the 200,000-acre-feet Reservoir for Lake Okeechobee Component A Storage Reservoir (LOCAR), North of Lake Okeechobee, Florida.

Significant concerns and the explanation of the resolution are as follows: There are no significant concerns or any unresolved comments.

As noted above, all concerns resulting from the ATR of the project have been fully resolved or have been elevated and documented with this certification.

SIGNATURE

Jennifer Leeds
Bureau Chief, Ecosystem Restoration Planning
South Florida Water Management District

Date

SIGNATURE

Sean Williams
Bureau Chief, Construction and Engineering
South Florida Water Management District

Date

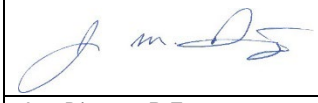
SIGNATURE

Jeff Beriswill, P.E.
ATR Team Lead
Black & Veatch

1/24/2024

Date

SIGNATURE



Jon Dinges, P.E.
Engineer Project Manager
Black & Veatch

1/24/2024

Date

1 of 1

Lake Okeechobee Section 203 Government Agency Review - Black & Veatch - December 11 through December 19

Comment No.	Black & Veatch Reviewer Name	Area(s) of Experience	Reviewer Agency	Report Section	Page #	Discipline	Comment	Significance of Concern	Basis of Concern	Suggested action to remedy/resolve concern
1	Todd Schellhase	Structural	Black & Veatch	Appendix A; A.10.3.6 and A.10.3.7	A.10-3	Structural	Lines 7 and 12 in paragraphs A.10.3.6 and A.10.3.7 contain factors identified as "Structure Importance factor". Please confirm if structure importance factors are applicable to wind loads.	Low	Reviewer did not find these factors in the applicable design standards.	Consider removing structure importance factors if not applicable.
2	Todd Schellhase	Structural	Black & Veatch	Appendix A, A.10.4.4-8	A.10-5	Structural	The load factors on this page appear to be those from EM 1110-2-2104 (2003) rather than EM 1110-2-2104 (2016). The 2016 document is the version referenced on line 33 of page A.4-3 section A.4.4.5 Structural Design Criteria.	Low	Load factors do not appear to match those from the document identified as the applicable design criteria.	Consider revising load factors to be consistent with selected design criteria.
3	Heriberto Torres	Construction	Black & Veatch	Appendix A, A3, A11	A.11-2	Construction	Appendix A Subsection A11.4 Utilities. No mention of coordination with utility (water or power) for relocations	Low	Consider including utility stakeholders (Florida Power & Light, Glades Electric Cooperative and Florida Gas Transmision Co.) early in the design to avoid schedule conflicts and delays.	Address early in PED.
4	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, ANNEX B-1		Geotechnical	Appendix A, ANNEX B-1, Table 2A, Shallow and deep zone of PZ levels not discussed in the report.	Low	Not sure if they are trying to refer to artesian conditions at these shallow surfaces? the whole aquifer system after installing PZ should be discussed after borings	Provide more details in PED.
5	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, ANNEX B-1		Geotechnical	Appendix A, ANNEX B-1, Permeability tests reports not provided, Triaxial tests were not discussed nor analyzed in P-Q space for determination of soil strength	Low	Consider the results in the report to better estimate the soil properties of the embankment rather based on judgment.	Provide more details in PED.
6	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.2.1, A.8.2.2	A.8-1	Geotechnical	Recommend adding dimensions details for all features mentioned including the 500 ft wide strip on the cross section in Figure A-8-2. Recommend referencing the figure within the text, you can use call out to increase scale for specific parts.	Low	To improve overall project understanding and visualization.	Provide more details in PED.
7	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.3.2	A.8-3	Geotechnical	North and south sections for west cells not mentioned, recommend commenting on them	Low	To improve overall project understanding and visualization.	Modify text.
8	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.3.2	A.8-3	Geotechnical	Recommend explaining/discussing in more details the rapid-draw down method and boundary conditions, in this section or in A.8.7.2.	Low	To improve the understanding of the method and boundary conditions utilized.	Modify text.
9	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.4.2	A.8-6 /(**A.8-7 in revised version)**	Geotechnical	Recommend changing FOS of Maximum surcharge pool 1.4 not 1.3 as per EM 1110-2-1902	Low	Recommend revising this table to be in compliance with EM 1110-2-1902 guidance.	Modify text.
10	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.4.2	A.8-6 /**(A.8-7 in revised version)**	Geotechnical	Suggest adding the recommended factor of safety against uplift/piping	Low	Comparison to the FOS for uplift used referenced later in the text	Include discussion in text.

Lake Okeechobee Section 203 Government Agency Review - Black & Veatch - December 11 through December 19

Comment No.	Black & Veatch Reviewer Name	Area(s) of Experience	Reviewer Agency	Report Section	Page #	Discipline	Comment	Significance of Concern	Basis of Concern	Suggested action to remedy/resolve concern
11	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.4.3	A.8-6 / **(A.8-7 in revised version)**	Geotechnical	Referring to Section A.5.2, the water levels are not clear in the referred section. Recommend adding a summary table that include low, high, and mean water levels as standalone table and/or to Table A-8.3. Would the downstream water level at dry season affect the analysis?	Low	for better understanding the boundary conditions and assure the worst case seniors are addressed	Provide more details in PED.
12	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.4.4	A.8-7 **(A.8-8 in revised version)**	Geotechnical	Recommend replacing "SPT" by "field investigation" to provide flexibility in the methods used for evaluation	Low	More accurate statement.	Modify text.
13	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.6	A.8-8	Geotechnical	Recommend discussing in detail the basis and parameters used to develop the unsaturated permeability. Figures and references may be attached as an appendix.	Low	Not clear to approve.	Provide more details in PER.
14	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.6	A.8-8 **(A.8-9 in revised version)**	Geotechnical	Table A.8-1, recommend reviewing the calculations for obtaining the friction angle for Unit A as it has low unit weight, likely the angle of friction may be less for this layer.	Low	May affect Factor of safety	Check correlations and adjust if needed.
15	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.6	A.8-8 **(A.8-9 in revised version)**	Geotechnical	Table A.8-1, recommend reviewing the ansitropy ratios for stratified soils as per USBR 2014, the ratio should not be less than 10	Low	Please refer to United States Bureau of Reclamation (USBR) (2014), Design Standards No 13: Embankment Dams. By Engomoen, B., Witter, D. T., Knight, K., & Luebke, T. A.	Address in PED.
16	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.7.2	A.8-9/**(A.8-10 in revised version)**	Geotechnical	Recommended for all sections, to provide table to summarize, low, high and long-term water levels upstream and downstream and maximum height of embankment.	Low	Better understanding the most critical conditions for analysis.	Provide more details in PED.
17	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.7.2	A.8-9/**(A.8-10 in revised version)**	Geotechnical	Recommend mentioning the factor of safety of 3.0 is for ...?(i.e., piping and uplift)	Low	Not clear	Add text.
18	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.7.2	A.8-10/ **(A.8-11 in revised version)**	Geotechnical	" Results show water pressures in the embankment soils will dissipate within 24 hours of such an event" Recommend explaining whether the dissipation in water pressure is due to assigned boundary conditions or not?	Low	Provides a better understanding of the analysis.	Add text.
19	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.7.2	A.8-10/ **(A.8-11 in revised version)**	Geotechnical	Table A.8-2, recommend checking the critical gradient equation, also the values are not correct based on the unit weight provided in Table A.8-1	Low	Inaccurate exit gradient information on table.	Check and modify table as needed.
20	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.7.2	A.8-10/ **(A.8-11/12 in revised version)**	Geotechnical	Table A.8-3, Recommend explaining (1) and (2) in the footnote of the table as well as , add water level up/downstream	Low	Provides a better understanding of the analysis.	Modify table.
21	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.7.2	**(A.8-10 in revised version)**	Geotechnical	It is recommended to remove the added comment about boundary conditions	Low	Recommend adding boundary conditions, it should not affect the results if added correctly. A comparison betwen adding and removing the boundary conditions preferably investigated	Check and modify; address in PED.
22	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.7.2	**(A.8-10 in revised version)**	Geotechnical	It is recommended to remove the added comment about exit gradient. and mention the location at which the exit gradiend were estimated	Low	There are many factors can affect the exit gradients other than the mentioned reason. The sections have different waterlevel, dimenrions and configurations, which likely haveing larger affect on the the exit gradient compared to the mentiond one	Check and modify, and Address in PED.

Lake Okeechobee Section 203 Government Agency Review - Black & Veatch - December 11 through December 19

Comment No.	Black & Veatch Reviewer Name	Area(s) of Experience	Reviewer Agency	Report Section	Page #	Discipline	Comment	Significance of Concern	Basis of Concern	Suggested action to remedy/resolve concern
23	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.8.3	A.8-11/ **(A.8-13 in revised version)**	Geotechnical	Table A.8-4, change FOS from 1.3 to 1.4 for Steady State Seepage with PMF/PMP Pool	Low	Recommend revising this table to be in compliance with EM 1110-2-1902 guidance.	Modify text.
24	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.8.3	A.8-12 / **(A.8-14/15 in revised version)**	Geotechnical	Table A.8-5 to A.8-7, the PMP pool were not included in the sensitivity analysis. Recommended either adding or explaining why not being investigated	Low	Clarify why the identified condition is not addressed.	Modify text.
25	Amr Ewais	Geotechnical	Black & Veatch	Appendix A, A.8.12	A.8-13 / (**A.8-17 in revised version)**	Geotechnical	Recommend add statement that organic layers should be removed to prevent excessive settlement and internal erosion.	Low	Accounting for the settlement of the organic layer does not exclude internal erosion nor slope failure concerns	Modify text.
26	Amr Ewais	Geotechnical	Black & Veatch	Appendix A,		Geotechnical	Figure A.8-7, Recommend changing the color of one of the boundary conditions.	Low	The current format is unclear.	Modify figure.
27	Joe Santogatta	Electrical	Black & Veatch	Appendix A	A.13-3	Electrical	Add sizing and location details to 4160V MCC similar to the 480V switchboard and panel.	Low	Provide clarification of design data.	Modify text.
28	Joe Santogatta	Electrical	Black & Veatch	Appendix A	A.13-6	Electrical	Add sizing and location details to 4160V MCC similar to the 480V switchboard and panel.	Low	Provide clarification of design data.	Modify text.
29	Joe Santogatta	Electrical	Black & Veatch	Appendix A	A.13-6	Electrical	Add main breaker to 480V switchgear or remove 'yes' from description	Low	Provide clarification of design data.	Modify text.
30	Joe Santogatta	Electrical	Black & Veatch	Appendix A	A.13-6	Electrical	Add generator sizing data.	Low	Provide clarification of design data.	Address in PED.
31	Joe Santogatta	Electrical	Black & Veatch	Appendix A	A.13-8 - A13-9	Electrical	Consider Aluminum conduit instead of RGS for any caustic areas or exposure to coastal conditions	Low	Suggested Alternative to standard.	Address in PED.
32	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Annex A §7.3	22	Environmental	Preferred range of Lake O water levels stated as "12.5 to 15.5 feet", yet in Section 7.1 it is described as "11.5 to 15.5 feet."	Low	Clarify inconsistency of referenced data.	Modify text.
33	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Annex A §7.3.2.1	23	Environmental	Provide justification to support the statement of unlikely presence within the project area.	Low	Supporting information	Modify text.
34	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Annex A §7.3.4.1	24	Environmental	"Nesting occurs exclusively in cabbage palms" is incorrect.	Low	Accuracy of information and potential for mortalities **could exists** if other sites are not surveyed, prior to clearing.	Suggest "primarily" be used rather than "exclusively" and extend surveys and timing of clearing activities to include all trees.
35	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Annex A §7.3.10.2	30	Environmental	Description of proposed vegetation benefits within Lake O seem to be questioned in this section.	Low	Consistency and clarity	Modify text.
36	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Annex A §7.3.12	31	Environmental	Statement "...particularly by reducing the frequency of extreme low lake stages." contradicts Table 5 showing an increase in the frequency.	Low	Ensure the accuracy of information being stated.	Modify text.
37	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Annex A §7.3.14.2	34	Environmental	Geographic connection between CFA loss and compensation is not clearly described.	Low	Clarity	Add a description of the two CFAs proximity to the Lake O improvements.
38	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Annex A §9 (1.)	47	Environmental	Avoidance buffers are suggested to reduce impacts to bonneted bat roosts. It is not clear how this would be accomplished.	Low	Clarity	Modify text.

Lake Okeechobee Section 203 Government Agency Review - Black & Veatch - December 11 through December 19

Comment No.	Black & Veatch Reviewer Name	Area(s) of Experience	Reviewer Agency	Report Section	Page #	Discipline	Comment	Significance of Concern	Basis of Concern	Suggested action to remedy/resolve concern
39	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Annex A Appendix B	Page following the Appendix B Tab sheet.	Environmental	Worksheet is incorrectly described as "Wood Stork Biomass Assessment" rather than "Wood Stork Prey Biomass Assessment"	Low	Clarity and accuracy	Worksheet should be described as "Wood Stork Prey Biomass Assessment" not "Wood Stork Biomass Assessment"
40	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Annex A Appendix B	Page following the Appendix B Tab sheet.	Environmental	Unused rows in the table may be confused for missing or incomplete data.	Low	Clarity	Remove or hide unused rows
41	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Appendix C.3 §C.3.2.2	C.3-6	Environmental	Consider describing how the project complies with the EO.	Low	Clarity	Modify text.
42	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Appendix C.3 §C.3.2.7	C.3-7	Environmental	This section appears incomplete or mixed between EO directives.	Low	Clarity	Modify text.
43	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Appendix C.3 §C.3.2.11	C.3-8	Environmental	Consider describing how the project complies with the EO.	Low	Clarity	Modify text.
44	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Appendix C.3 §C.3.4	C.3-9 line 39	Environmental	Word "insufficient" should probably be "in sufficient"	Low	Two different meanings	Modify text.
45	Kevin Shelton	Environmental/ Ecological	Black & Veatch	Appendix C.3 General		Environmental	Acronym definitions are suggested throughout the document.	Low	Clarity	Modify text.
46	Drew Ackerman	Surface water quality and water quality modeling	Black & Veatch	Annex I	I-2	Water Quality	Is there a reason that average values were presented as the only model output? The model provides daily output (which was aggregated to annual). More insight could be provided with more detailed analysis and data presentation (e.g. box and whisker plots of loads).	Low	Clarity and accuracy	Additional analysis and presentation of annual loads is needed
47	Drew Ackerman	Surface water quality and water quality modeling	Black & Veatch	Annex I	I-2	Water Quality	The concentrations applied to the loads into the reservoirs are unclear. It seems like these are the concentrations: Lake 40ug/L (from TMDL) to 100 ug/L (from Upper Kissimmee) Rainfall 10 ug/L Dry deposition 18 mg/m2/yr A clearer description (or a figure) of the concentration data an inputs would be helpful. Section I.1.1 is worded awkwardly. How the sensitivity concentrations were applied is not readily clear in Section I.2	Low	Clarity	More detail in section I.1.1 and better organization of section I.2
48	Drew Ackerman	Surface water quality and water quality modeling	Black & Veatch	Annex I	I-4	Water Quality	The atmospheric deposition of phosphorus doesn't track with the reservior area like rainfall does.	Low	Accuracy	Check atmospheric deposition calculations.
49	Drew Ackerman	Surface water quality and water quality modeling	Black & Veatch	Annex I	I-3	Water Quality	Figure I-1 in the Alt 2 East West and Alt 3 South, it appears that thre is a fourth source of water with a value of zero. I'm unclear on what that may be.	Low	Clarity and accuracy	Adding a table of water loading into each reservoir would be helpful
50	Drew Ackerman	Surface water quality and water quality modeling	Black & Veatch	Annex I	I-3	Water Quality	Does Figure I-5 show loads into Lake Okeechobee? It's unclear on what that is showing	Low	Clarity	Revise Figure I-1 and the last paragraphs on page I-3
51	Jeff Beriswill	Dams/ Geotechnical	Black & Veatch	Main Text, ES.6	ES-4	Geotechnical	The perimeter dam and an interior divider average heights are listed as approximately 32 ft and 33 ft above the ground, respectively. The perimeter dam is currently 6 feet higher than the interior divider without the wave wall.	Low	Current geometry needs to be reflected in report (typical for all sections of report)	Revise text.
52	Jeff Beriswill	Dams/ Geotechnical	Black & Veatch	Main Text, ES.6.5, Table ES.6	ES-10	Geotechnical	Future Without Project cutback total is less rather than more than the reservoir (600 ac-ft vs. 755 ac-ft). It is unclear how this is consistent with the statement in ES.14 on page ES-16: "... the Recommended Plan reduces the severity and frequency of water shortages and reduces the volume of water shortage cutbacks when compared to the Future Without Project (when simulated with LOSOM).."	Low	Result is counter to being an expected benefit over no reservoir.	Clarify how project is a benefit in Section ES.6.5.
53	Jeff Beriswill	Dams/ Geotechnical	Black & Veatch	Appendix A, A.3.2	A.3-1	Geotechnical	Several of the 7 proposed major construction contracts are dependent/interconnected with other activities (ex. Reservoir Dam Foundation and Reservoir Earthwork).	Moderate	Increases risks of claims from contractors.	Consider re-evaluating the division of the project work activities as the design progresses from an interference and risk perspective.

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Comment No.	Black & Veatch Reviewer Name	Area(s) of Experience	Reviewer Agency	Report Section	Page #	Discipline	Comment	Significance of Concern	Basis of Concern	Suggested action to remedy/resolve concern
54	Jeff Beriswill	Dams/ Geotechnical	Black & Veatch	Appendix A, A.4.2	A.4-1	Geotechnical	The project design life is listed as 50 years.	Moderate	Functionally, a major project such as LOCAR is expected to last essentially indefinitely.	In PED consider longer design life of features that cannot be readily accessed post-construction (ex. perimeter dam components/control structures).
55	Jeff Beriswill	Dams/ Geotechnical	Black & Veatch	Appendix A, Annex B-2	Fig. A.8-2.A	Geotechnical	Provide site plan with locations of design sections.	Low	Difficult to orient applicable locations for individual design sections.	Add site location plan to annex.
56	Jeff Beriswill	Dams/ Geotechnical	Black & Veatch	Appendix A, Annex B-2	Fig. A.8.7.1	Geotechnical	No hydraulic conductivity (k) values provided on drawing for site soils.	Low	Difficult to evaluate seepage results without k.	Add k to properties table for all seepage results figures.
57	Jeff Beriswill	Dams/ Geotechnical	Black & Veatch	Appendix A, Annex B-2	Fig. A.8.7.1	Geotechnical	Soil strata colors in table key cannot be seen on cross section due to elevation head color contours.	Low	Foundation soil strata are difficult to follow.	Revise figure so soil strata can be seen on the cross section.
58	Jeff Beriswill	Dams/ Geotechnical	Black & Veatch	Appendix A, A.7.2	A.7-2	Geotechnical	The section discusses only Phase 1 of the JTech investiagation, while Annex B-1 provides the summary report for both investigation phases.	Moderate	Implies that results of the Phase 2 investigation are not addressed and may influence the geotechnical evaluations.	Update the section (and Table A.7.2) to clarify that both investigation phases are shown in the report and included in the design strata locations and engineering properties.
59	Jeff Beriswill	Dams/ Geotechnical	Black & Veatch	Appendix A, A.7.3	A.7-5	Geotechnical	The generalized soil profile does not address the 5' to 15' thick layer of very loose silty to clayey sand/ very soft sandy clay to clay in the depth range of 27' to 47' noted in the geotechnical report in Annex B-1.	High	A consistent very loose/very soft clayey soil may influence the embankment stability and seepage performance.	Note the presence of the layer and consider it in design analyses.
60	Renee Murch	H&H, Groundwater	Black & Veatch	A.05, Hydrologic Design	A.5-2	Hydraulic	The original Design Case 2 used DCM-2 rainfall and it was changed to NOAA Atlas 14 in the latest revision. Altas 14 rainfall is a lower rainfall total and therefore less conservative. The same design case uses DCM-2 overwater wind speed. It is not clear why Atlas 14 rainfall was selected for use instead of DCM-2. Please consider clarification.	Low-moderate	The change in the design to a lower design rainfall results in a less conservative design.	Please clarify in the text why NOAA Altas 14 rainfall was selected for use over DCM-2. Please cite any guidance used to make this decision.
61	Renee Murch	H&H, Groundwater	Black & Veatch	A.05, Hydrologic Design	A.5-8	Hydraulic	Tables A.5-3 and A.5-4. Although not essential, it would be helpful to see fetch length added (new column) to the table to help make the calculations reproducable.	Low	Validation of Zeider Zee equation calculations.	Please consider adding fetch length to the tables.
62	Jeff Beriswill	Dams/ Geotechnical	Black & Veatch	Appendix A, A.11, Table A.11-1	A.11-1	Civil	The Interior Top of Bank of Elevation of Perimeter Dam Crest is listed as 66' rather than 72'.	Low	Embankment crest elevation is not consistent with current design.	Correct table label and storage volume calculation.
63	Renee Murch	H&H, Groundwater	Black & Veatch	Appendix A, Annex A-2.2, Section 1.2.3	Page 6 of 24	H&H	It may be helpful to show the radials for the west cell as well as the east cell on Figure 1-5 (for completeness)	Low	Provides detail on how fetch length for the west cell was determined.	Revise Figure 1-5
64	Renee Murch	H&H, Groundwater	Black & Veatch	Appendix A, Annex A-2.2, Section 2.2	Page 8 of 24	H&H	Consider explaining why Atlas 14 rainfall was used instead of DCM-2	Low-moderate	Altas 14 rainfall is less conservative than DCM-2 (10.9" versus 12")	Add text in the section to provide additional clarity.
65	Renee Murch	H&H, Groundwater	Black & Veatch	Appendix A, Annex A-2.7, Section 4.1	Page 9 of 46	H&H	The polygon(s) in Figure 6 that show the HEC-RAS model domain need more explaination to indicate why the domain consists of 2 polygons. The 2-D flow areas are later discussed in Section 4.3, but please consider discussing them when the figure is introduced in order to minimize confusion.	Moderate	Clarification of HEC-RAS model domain and domain features	Revise Figure 6 or modify the text.

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Comment No.	Black & Veatch Reviewer Name	Area(s) of Experience	Reviewer Agency	Report Section	Page #	Discipline	Comment	Significance of Concern	Basis of Concern	Suggested action to remedy/resolve concern
66	Renee Murch	H&H, Groundwater	Black & Veatch	Appendix A, Annex A-2.7, Section 4.3	Page 12 of 46	H&H	Please consider noting if model sensitivity to the weir coefficient was evaluated. If sensitivity was evaluated, were the inundation mapping results sensitive to the weir coefficient? If sensitivity was not evaluated, will it be evaluated?	Moderate	Sensitivity of overall inundation results to model parameterization	Add text to this section or add a section to discuss model sensitivity to various parameters.
67	Renee Murch	H&H, Groundwater	Black & Veatch	Appendix A, Annex A-2.7, Section 5	Page 19 of 46	H&H	Consider presenting time series graphs, particularly for C-41A flow and stage at selected locations to examine conveyance.	Moderate	Model results should generally be examined temporally and spatially.	Add time series plots and discussion in Section 5
68	Renee Murch	H&H, Groundwater+B7	Black & Veatch	Appendix A, Annex A-2.7, General	N/A	H&H	Please consider adding a section to discuss model sensitivity to parameterization (weir coefficient) and the location of the 2-D flow areas.	Low-moderate	Sensitivity of model results to model conceptualization and parameterization can introduce additional uncertainty in results.	Add text discussion.
69	Renee Murch	H&H, Groundwater	Black & Veatch	Annex C	C-21	H&H	Please clarify the position of the divider dam structure (DDS-1) during each filling operation. Item 9 on page C-22 specifies the operations of DDS-1 for normal operations and dewatering and maintenance, but the position of DDS-1 during filling is not specified.	Moderate	Additional operational detail for reservoir filling needed.	Add text discussion in this section.
70	Renee Murch	H&H, Groundwater	Black & Veatch	Appendix A, Annex A.09	A.9-3	Groundwater	Please discuss how the hydrogeological parameters compare to the studies or models of others in the region to add defensibility.	Low-moderate	The model is uncalibrated and highly unconstrained. Adding discussion will strengthen defensibility.	Add text discussion.
71	Renee Murch	H&H, Groundwater	Black & Veatch	Appendix A, Annex A.09	A.9-4	Groundwater	Consider adding the min and max Kh and min and max thickness to Table A.9-1 to bracket the uncertainty in Kh and layer thickness	Moderate-high	If Kh values have a large range, this can lead to a high degree of uncertainty in model parameterization and therefore seepage estimates.	Modify table.
72	Renee Murch	H&H, Groundwater	Black & Veatch	Appendix A, Annex A.09	A.9-4	Groundwater	Consider noting how Kh/Kv was determined or assumed.	Moderate-high	Uncertainty in model parameterization can produce uncertainty in seepage estimates.	Add discussion.
73	Renee Murch	H&H, Groundwater	Black & Veatch	Appendix A, Annex A.09	A.9-10	Groundwater	The Lower Kissimmee Basin GW Model is mentioned as another GW model in the area. How does the parameterization of the surficial in that model compare to this model parameterization? Although this effort involves several layers and the Kissimmee Basin GW model simulated the surficial as a single layer, a composite Kh can be calculated for this effort to compare to the previous study.	Moderate	Uncertainty in model parameterization can produce uncertainty in seepage estimates.	Add discussion.
74	Renee Murch	H&H, Groundwater	Black & Veatch	Appendix A, Annex A.09	A.9-12, 13	Groundwater	There should be a model ET zone within the LOCAR footprint to represent open water. How was the ET package of the MODFLOW model parameterized to reflect the open water surface of the LOCAR West and East Cells? Figure A.9-10 shows that the ET zone for the LOCAR footprint is low drainage pastures with a small amount of undeveloped wetlands.	Moderate-high	The model should be conceptualized to represent the ET from the LOCAR footprint at open water rates, which exceed reference ET.	Add discussion and change MODFLOW ET package. If the ET package is not changed, discuss model sensitivity to ET package.
75	Renee Murch	H&H, Groundwater	Black & Veatch	Appendix A, Annex A.09, A.9.3.4	A.9-12, 13	Groundwater	The flux entering the drain boundary conditions (representing farm canals) should be evaluated for the various scenarios. The current sensitivity analysis looks at the wet season. During the dry season, the head gradient between the aquifer and the canals may be significantly different than the wet season gradient. Please consider adding this evaluation in future efforts.	moderate-high	Model sensitivity to drain parameterization can result in a high degree of uncertainty of results.	Add farm canal property sensitivity analysis for dry season model.
76	Renee Murch	H&H, Groundwater	Black & Veatch	Main Report	3-6	H&H	Will Alternative 1 in the main report be modified to reflect the updated design with the ecologically sensitive area removed? The text cites the original NFSL and average storage depths, which are not consistent with the current design. This may add confusion if a reader skims the main report and no annex documents. A reference to Section 6.1.1 of the report is recommended to be added with text describing the refinement of the footprint and design.	Low	Reservoir footprint, NFSL, and other design elements have been modified from this original design.	Revise this section and other sections in the main text. Add reference to Section 6.1.1

Comment No.	Black & Veatch Reviewer Name	Area(s) of Experience	Reviewer Agency	Report Section	Page #	Discipline	Comment	Significance of Concern	Basis of Concern	Suggested action to remedy/resolve concern
77	Renee Murch	H&H, Groundwater	Black & Veatch	Main Report	4-7	H&H	According to Table 4-5, the FWOL simulation reduces the cutback total the most and also results in the lowest frequency of cutback, severity score, and number of water years with at least 1 cutback. Although the ECB is used as a baseline for comparison to the alternatives, text should be added to discuss why the FWOL is less preferable than one of the alternatives since its performance is superior for water supply in LOSA compared to the alternatives.	Moderate	Establishment of increase in availability of water supply to existing legal users of LOSA	Add text as needed.
78	Heriberto Torres	Construction	Black & Veatch	Annex C, C21	C-29	Construction	There are no interim operations during construction.	Moderate	In this section there should be comments on all the activities such as detour (MOTs) to be developed and implemented during activities that will be impacting the general public such as bridge replacements and utility relocations.	Add text as needed.
79	Renee Murch	H&H, Groundwater	Black & Veatch	Appendix A, Annex A-2.2, Section 4.2	18	H&H	Section 4.2 states that DCM-2 recommends the use of ACES for wave runup and overtopping, yet EurOtop was used. It would be nice to see how the ACES methodology compares to the EurOtop results (similar to what was done in Section 3.5). Was this considered?	Low-Moderate	12/18/023	Add text and analysis as needed.
80	Heriberto Torres	Construction	Black & Veatch	Appendix A Annex B-1	25	Construction	Need to include geotechnical borings at all bridge locations.	Medium	If concrete piles are to be driven for new bridges a complete boring log will be necesary to avoid delays and minimize the posibility of future claims.	Address in PED
81	Terry Hull	H&H, Coastal	Black & Veatch	Appendix A.5.2.1	A.5.1	H&H	Rows 23-29 are difficult to follow.	Low	Clarification	Provide a storm hyetograph.

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82	Terry Hull	H&H, Coastal	Black & Veatch	Appendix A Annex A-2.5	11	H&H	Was the cumulative vol in Table 3 determined by integrating under the curves in Fig 3?	Low	Clarification	Modify text.
83	Terry Hull	H&H, Coastal	Black & Veatch	Annex A-2.2	22	H&H	Table 4-4: How is probability determined?	Low	Clarification	Modify text.
84	Terry Hull	H&H, Coastal	Black & Veatch	Annex A-2.2	22	H&H	Table 4-4: Was the cumulative overtopping volume estimated from the single wave volume, period, and storm duration?	Low	Clarification	Modify text.
85	Terry Hull	H&H, Coastal	Black & Veatch	Appendix A	A.12-25 line 20	H&H	Elevation should be NAVD88	Low	Clarification	Modify text.
86	Terry Hull	H&H, Coastal	Black & Veatch	Appendix A	A.16-1	H&H	Table A.16-1: It is unclear if the elevations are NAVD88.	Low	Clarification	Modify text.
87	Jhon Arbelaez-Novak	Envionmental	Black & Veatch	Appendix C1	General	Environmental	Convert NGVD29 datums to NAVD88 to maintain consistency throughout the document.	Low	Clarification	Modify text.
88	Jhon Arbelaez-Novak	Environmental	Black & Veatch	Appendix C1	86	Socioeconomics	Provide reasoning why a 2-mile study radius was used	High	Different federal guidelines require varying study radiuses. An explanation as to why this radius was chosen would help prevent future questions/comments from the Corps which may delay schedules.	Modify text.
89	Jhon Arbelaez-Novak	Environmental	Black & Veatch	Appendix C1	102	Socioeconomics	Define "low income."	Low	Clarification	Modify text.
90	Jhon Arbelaez-Novak	Environmental	Black & Veatch	Appendix C1	105	Tribal Resources	Were tribal consultations performed?	Critical	Because the area is known to contain tribal resources, consultations with the tribes is necessary for the analysis.	If not done, need to address in PED
91	Eric Gates	Environmental	Black & Veatch	Annex G	G 97-100	Environmental	Include the completed or planned Phase I and Phase II recommedations.	Moderate	Mitigate environmental risks, ensure compliance and reduce liabilities.	Include in PED.
92	Terry Hull	H&H, Coastal	Black & Veatch	General		H&H	Consider Florida Flood Hub latest SLR projections.	Low	Clarification	Include in PED.
93	Terry Hull	H&H, Coastal	Black & Veatch	Annex A-2.7		H&H	Are canal gates that impede breach flow designed to withstand breach conditions?	Medium	If structures that impede breach flow fail, results could be worse.	Modify text. Include in PED if needed.
94	Terry Hull	H&H, Coastal	Black & Veatch	General		H&H	Will wave loads, including overtopping waves, on infrastructure be condidered in the design?	Medium	Important loading conditions to be considered.	Include in PED.

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Comment No.	Black & Veatch Reviewer Name	Area(s) of Experience	Reviewer Agency	Report Section	Page #	Discipline	Comment	Significance of Concern	Basis of Concern	Suggested action to remedy/resolve concern
95	Bryce Weinand	Climate Change	Black & Veatch	Annex H	H-8 and H-9	Climate Change	Consider adding a marker on the plot on Figures H-4 and H-5 that corresponds to the tailwater level that exceeds the level at which S-79 and S-80 discharge.	Low	Clarification	Modify figure.
96	Bryce Weinand	Climate Change	Black & Veatch	Annex H	H-10	Climate Change	Line 3 of the text and Figure H-6 indicates Daytona Beach Shores, FL (ID 8721120) was chosen for the east shore of Florida. It seems that other NOAA Stations are closer to the St. Lucie River inlet that may have SLR projections for climate change.	Medium	Choosing a closer SLR recording station may produce different results that are more representative for the inlet to S-80.	Include in PED.
97	Bryce Weinand	Climate Change	Black & Veatch	Annex H	H-22	Climate Change	Figure H-14 is difficult to interpret the annual and seasonal % change values for Florida and the project location.	Low	Clarification	Consider providing images in the figure zoomed into the Southeast US.
98	Bryce Weinand	Climate Change	Black & Veatch	Annex H	H-26	Climate Change	Figure H-16 is difficult to interpret the seasonal projected change values for precipitation for Florida and the project location.	Low	Clarification	Consider providing images in the figure zoomed into the Southeast US.
99	Bryce Weinand	Climate Change	Black & Veatch	Annex H	Throughout Appendix H	Climate Change	The discussion on precipitation and temperature use the USGCRP Fourth Assessment from USGCRP. Recently the NCA5 was released.	Low	Should the discussion of precipitation and temperature be updated with the NCA5 information?	Include in PED.
100	Kevin Shelton	Ecology	Black & Veatch	Annex B.2	B.3-19-21	Environmental	Table B.3-6: Several columns are shifted.	Low	Clarity	Suggest correcting column corrections for clarity.
101	Kevin Shelton	Ecology	Black & Veatch	Appendix G	G-26-27	Environmental	Tables G.10 and G.11 reperesent the same data for SLE and CRE but in different formats	Low	Clarity	Suggest using the same table format for Tables G.10 and G.11 for clarity
102	Kevin Shelton	Ecology	Black & Veatch	Appendix G	G-29	Environmental	Table G-13 Title "Total Storage HUs…" appears to be incorrect.	Low	Clarity	Remove "Storage"
103	Kevin Shelton	Ecology	Black & Veatch	Appendix G	G-28	Environmental	The FWO for the SLE appears to be the best option.	Low	Clarity	Suggest discussion of model results to include explanation regarding apparent best-case future performace without intervention over planned Alternatives. Alternatively correct the model and resultant calculations.
104	Jhon Arbelaez-Novak	Environmental	Black & Veatch	Appendix C2	Sections 2.4, 2.5, 2.6, 2.7, and other sections where impacts may occur	Environmental	List mitigation techniques that may be implemented if impacts are anticipated.	Moderate	Although BMP's and other actions are listed to minimize impacts, no mitigation strategies are provided were impacts are likely to occur.	Modify text.
105	Jhon Arbelaez-Novak	Environmental	Black & Veatch	Appendix C2	183	Environmental	Include long-term positive impacts.	Medium	Although short-term impacts are anticipated, the long-term impacts would provide a much greater benefit, such as an overall more stable water supply. See Section C2.17 for example on positive imapcts on overall aesthetic value created by the project.	Modify text.
106	Jhon Arbelaez-Novak	Environmental	Black & Veatch	Appendix C2	192	Cultural Resources	Provide expected completion date for cultural resource survey, and if available, preliminary findings.	Medium	This information would avoid future comments for the Corps, which may affect schedule.	Modify text.
107	Jhon Arbelaez-Novak	Environmental	Black & Veatch	Appendix C2		Tribal Resources	No information is provided on tribal consultations.	Critical	Tribal consultation is required. As highlighted in Appendix C1, the area is well known to have been inhabited by native populations in the past.	Address if tribal consultations have occurred, or when they will occur.

Comment No.	Black & Veatch Reviewer Name	Area(s) of Experience	Reviewer Agency	Report Section	Page #	Discipline	Comment	Significance of Concern	Basis of Concern	Suggested action to remedy/resolve concern
108	Dusty Miller	Environmental	Black & Veatch	Recreation (App F)	F-8	Recreation	Page F-8, Line 3 – Environmental point value considered was based only on aesthetic considerations.	Low	A more comprehensive set of environmental considerations, including potential for adverse impacts to water quality from recreational activities, should be include in the evaluation.	Address other environmental considerations.
109	Dusty Miller	Environmental	Black & Veatch	Recreation (App F)		Recreation	Subsection F.3.5 may benefit from clearer wording and/or more detailed explanation of how visitation was estimated and why the method used is appropriate. Were established methods such as those at these links considered? https://www.fs.usda.gov/pnw/pubs/pnw_gtr957.pdf, https://www.frpa.org/frpamainsite/calculator (specifically for FL), or direct comparison to a similar single park or other attraction in Florida that may have recreation use numbers available?	Medium	More accurate comparison of recreation area projected use.	Modify text.
110	Dusty Miller	Environmental	Black & Veatch	Recreation (App F)		Recreation	Table F-10 - Benefit to Cost Summary - does not appear to account for the costs of the potential water pollution caused by recreational activities. It is unclear whether this is included in the “Land and Damages” item in the table and, if so, what method was used to estimate the amount.	Low	Clarify that the costs of the potential water pollution caused by recreational activities were determined.	Modify text.
111	Bryce Weinand	Climate Change	Black & Veatch	Annex H	H-33	Climate Change	Last sentence on the page, I believe "project" should be changed to "projected". Additionaly, consider adding a statement to the paragraph on page H-33 that ties the NCA analysis for annual and averages and extremes to Figure H-23 and Figure H-24.	Low	Clarity	Modify text.
112	Todd Bednar	Cost Estimator	Black & Veatch	Appendix B, Cost	172	Cost Estimate	The unit price for Sheet Piling appears to be consistently low throughout the budget. Unit prices on the order of $70-$90/sf are likely more accurate.	Medium	Budget increase	Re-visit the unit price.
113	Todd Bednar	Cost Estimator	Black & Veatch	Appendix B, Cost	173, 174	Cost Estimate	The quantity of concrete shown in the detail level does not match the element level quantity shown in bold.	Medium	Clarification	Provide explanation for the difference in quantities
114	Dave Friesen	Real Estate	Black & Veatch	Appendix D.4.1	D5	Real Estate	Although SFWMD is responsisble for providing lands, it is unclear what other parcels might be impacted and if the amount set aside for costs would be sufficient.	Medium	Project Costs, Parcel availability, and timeline	Provide additonal details regarding impacts on adjacent parcels.
115	Todd Bednar	Cost Estimator	Black & Veatch	Appendix B, Cost	Multiple	Cost Estimate	The unit price concrete appears to be consistently at the low end of the current cost range. More likely unit prices include: Fdns-$600-$800/cy, Walls-$800-$1000/cy, Elevated Beams-$1000-$1300/cy, SOG-$600-$800/cy.	Medium	Budget increase	Re-visit the unit prices.
116	Bryce Weinand	Climate Change	Black & Veatch	Annex H	H-36, Section H.5.2.4.1	Climate Change	The last sentence indicates that Figure H-26 provides change in frequency of river flooiding for sites. Please provide additional analsyis here and explain how this relates to the project location.	Low	Further clarification of what the Figure is showing is needed.	Modify text.
117	Todd Bednar	Cost Estimator	Black & Veatch	Appendix B, Cost	176	Cost Estimate	The unit price for the ovhd bridge crane may be low. A recent vendor quote for a project in Miami indicates a more likely unit price to $10,000-$15,000/ton.	Low	Budget increase	Re-visit the unit prices.
118	Todd Bednar	Cost Estimator	Black & Veatch	Appendix B, Cost	196	Cost Estimate	The unit price for the fire equipment seems high. More likely unit prices are $400-$600/ea.	Low	Budget decrease	Re-visit the unit prices.
119	Dave Friesen	Real Estate	Black & Veatch	Appendix D.4.1	D5	Real Estate	Although SFWMD is responsible for providing lands, it is unclear what other parcels might be impacted and if the amount set aside for costs will be sufficient.	Medium	Budget increase	More information regarding SOW and impact to surrounding parcels
120	Todd Bednar	Cost Estimator	Black & Veatch	Appendix B, Cost	210	Cost Estimate	The unit price for clearing and grubbing appears to be low. A more likely unit price is $6,000-$9,000/AC	Low	Budget increase	Re-visit the unit prices.
121	Todd Bednar	Cost Estimator	Black & Veatch	Appendix B, Cost	210	Cost Estimate	The unit price for silt fence seems low. Consider a unit price of $3-$4/lf	Low	Budget increase	Re-visit the unit prices.

Lake Okeechobee Section 203 Government Agency Review - Black & Veatch - December 11 through December 19

Comment No.	Black & Veatch Reviewer Name	Area(s) of Experience	Reviewer Agency	Report Section	Page #	Discipline	Comment	Significance of Concern	Basis of Concern	Suggested action to remedy/resolve concern
122	Todd Bednar	Cost Estimator	Black & Veatch	Appendix B, Cost	211	Cost Estimate	The unit price for the soil-bentonite cutoff walls is at the low end of the current cost range. A unit price to $20-$25/VSF is considered more likely based on recent projects in Central Florida.	Medium	Budget increase	Re-visit the unit prices.
123	Dave Friesen	Real Estate	Black & Veatch	Appendix D.4.2	D5	Real Estate	All necessary access easements have not yet been identified and/or acquired, which provides significant uncertainty to costs and availability for acquisition.	Medium	Uncertain access easement costs	Access easments need to be addressed to accurately determine cost impacts.
124	Todd Bednar	Cost Estimator	Black & Veatch	Appendix B, Cost	211	Cost Estimate	The Unit of Measure (UOM) for the soil-bentonite cutoff wall should be listed as vertical square feet (VSF).	Low	UOM is unclear	Change the UOM for the soil-bentonite cutoff walls from SF to VSF
125	Dave Friesen	Real Estate	Back & Veatch	Appendix D.13	D6	Real Estate	Affect on Cultural Resources cannot yet be assessed. Avoidance, mitigation, and minimization costs could be significant, as well as, potential adversarial positions by affected environmental, tribal, or other possible groups.	Low	Unavailability of impact and response	Provide details relating to impacts and response in text.
126	Todd Bednar	Cost Estimator	Black & Veatch	Appendix B, Cost	165	Cost Estimate	The Sales Tax rate shown is 6%. The current tax rate for the project location is 7.5%.	Medium	Budget increase	Verify appropriate sales tax rate.
127	Dave Friesen	Real Estate	Black & Veatch	Appendix D.12	D6	Real Estate	Additional Real Estate may be required for induced flooding.	Medium	If any such lands are required, acquisition may result in significant costs or adverse positions.	Address potential need for additional land acquisition.
128	Todd Bednar	Cost Estimator	Black & Veatch	Risk Register, Cost and Schedule, ES1		Cost Estimate	This is a large project that will last multiple years. Can the local market can supply the required labor for the project?	Medium	Schedule & budget concerns	Labor market analysis
129	Dave Friesen	Real Estate	Black & Veatch	Appendix D.19	D8	Real Estate	Acquisition of real estate is scheduled for 18-24 months. Depending on what is necessary, this may or may not be reasonable. Unknown requirements at this point.	Medium	Schedule and timeline concerns	This potential schedule impact should be refined and tracked in the PED.
130	Dave Friesen	Real Estate	Black & Veatch	Appendix D.18	D8	Real Estate	Section states No Zoning Ordinances are proposed, but not whether it was determined unnecessary.	Medium	Zoning may be necessary	Establish SFWMD status for zoning reviews
131	Todd Bednar	Cost Estimator	Black & Veatch	Risk Register, Cost and Schedule, ES3		Cost Estimate	Equipment fabrication & supply chain issues	Medium	schedule & budget concerns	To reduce equipment delivery issues, consider pre-purchasing the large equipment - generators, pumps, valves, MCC's, transformers, gates.
132	Dave Friesen	Real Estate	Black & Veatch	Appendix D.20	D8	Real Estate	No Utility relocations Expected, however, if required, they are subject to approval of Final Attorney's Opinions or Compensability for each impacted utility needs / facilities.	Low	Timeline / Schedule concerns	Identify any potential utility relocations early in the PED.
133	Dave Friesen	Real Estate	Black & Veatch	Appendix D.21	D8	Real Estate	Environmental assessments not yet completed. SFWMD is responsible for any remediation & costs.	Low	Schedule delays	
134	Todd Bednar	Cost Estimator	Black & Veatch	Project Schedue		Cost Estimate	The schedule shows the construction of PS-1 to take approximate 3.5 years & PS-2 to take approximately 6 years.	Low	The construction schedule seems to be longer than necessary given the projected level of effort.	Consider if the construction schedule can be shortened.
135	Dave Friesen	Real Estate	Black & Veatch	Appendix D.22	D9	Real Estate	The Majority Landowner for the project area does not want to sell at market value. Condemnation may be required.	High	This may be costly and create delays.	This potential cost/schedule impact should be refined and tracked in the PED.
136	Todd Bednar	Cost Estimator	Black & Veatch	Project Schedule		Cost Estimate	The schedule shows the construction of perimeter canal outfall structure PCOS-1 will take 3.5 years.	Medium	The construction schedule seems to be longer than necessary given the projected level of effort.	Consider if the construction schedule can be shortened.
137	Todd Bednar	Cost Estimator	Black & Veatch	Project Schedule		Cost Estimate	The schedule shows the construction of the culverts CU-2 & CU-1A will take 2.5 years.	Medium	The construction schedule seems to be longer than necessary given the projected level of effort.	Consider if the construction schedule can be shortened.

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Comment No.	Black & Veatch Reviewer Name	Area(s) of Experience	Reviewer Agency	Report Section	Page #	Discipline	Comment	Significance of Concern	Basis of Concern	Suggested action to remedy/resolve concern
138	Kevin Shelton	Ecology	Black & Veatch	Annex D, Table D-2	D.1-13	Environmental	The Trigger for Management Action for Uncertainty Tracking ID#26 of 50% reduction in annual abundance seems to be looking for short-term extremes only.	Low	long term success	Suggest adding longer term triggers as well. Also consider adding more explanation for the chosen criteria in the narrative.
139	Kevin Shelton	Ecology	Black & Veatch	4.3.3	4-20	Environmental	The effect on T&E species in this section only mentions the Floida grasshopper sparrow. Annex A lists several other species that were determined to be potentially affected, several of which have a "May Affect" determination, which is a higher potential than the sparrow.	Low	Completeness of presented data	Suggest more complete data is presented. The list is expanded in Section 5.4 but not here.
140	Kevin Shelton	Ecology	Black & Veatch	Table 4-25	4-29	Environmental	"The Corps would coordinate with the Rid and Florida Fish and Wildlife Conservation Commission". "Rid" is likely a typo but it makes the reference unclear.	Low	Clarity	Modify text.
141	Renee Murch	H&H, Groundwater	Black & Veatch	Annex B	B.1-9	H&H	Changes to model boundary conditions for the RSM-BN model and assumptions for the 3 scenarios (ECB, FWO, and Alternative 1) should be summarized for clarity.	Low	Clairification of differences between model simulations.	Add text discussion.
142	Jhon Arbelaez-Novak	Environmental	Black & Veatch	Appendix C1, Figures C.1-18 and C.1-19	C.1-49/50	Environmental	The Lake Okeechobee regulation schedules are dated 2008.	Low	Changes in the regulation schedules	Provide more recent figures/maps if changes have been made.
143	Dusty Miller	Environmental	Black & Veatch	Recreation (App F)	F-2	Recreation	Page F-2, lines 7 through 9 – This paragraph notes that recreation will be available at the East and West Cells includes fishing, hunting, and boating. Fishing may exacerbate invasive species/native species displacement issues if there is public demand for stocked areas for fishing (bass is mentioned), and fishing line and other pollutants may be left as litter in the project area, with attendant adverse effects on aquatic species. Similarly, for hunting, the use of lead ammunition and use of gasoline and oil in boats and jet skis, etc., may worsen water pollution problems in waters ultimately draining into Lake Okeechobee. Without restrictions to limit the potential adverse effects of these recreational activities, this may be inconsistent with the overall project purpose of reducing pollutant load into Lake Okeechobee. (This concern is somewhat acknowledged in the following paragraph.) Plans for a long walking trail loop with a parking lot may bring pollutants from animal waste with dog walking and potential runoff from the restroom facilities and parking area.	Medium	Recreation activities may impact overall project goal of reducing adverse water quality impacts.	Address potential adverse water impacts for recreation features.
144	Todd Bednar	Cost Estimator	Black & Veatch	Appendix B, Cost	178	Cost Estimate	The generator cost is low in compared to recent quotes. Currently, all electrical equipment is experiencing long lead times, supply chain issues, and high demand. A more likely unit cost/kW is $750-$1000 minimum.	Medium	Budget increase	Re-visit the unit prices.

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Comment No.	Black & Veatch Reviewer Name	Area(s) of Experience	Reviewer Agency	Report Section	Page #	Discipline	Comment	Significance of Concern	Basis of Concern	Suggested action to remedy/resolve concern
145	Todd Bednar	Cost Estimator	Black & Veatch	Appendix B, Cost	195	Cost Estimate	The floor grating cost is low. Is the grating steel, FRP, or SST? When the perimeter support angles, galvanizing costs are included, the unit price is not sufficient. The expected price is about $70-$90/sf.	Medium	Budget increase	Re-visit the unit prices.
146	Dave Friesen	Real Estate	Black & Veatch	Appendix D.17	D7	Real Estate	If SFWMD has issues acquiring necessary land rights, it can request the Corps do so pursuant to its Master Agreement. However, the quoted portion of the 'MA' does not require provision of lands (only that a request be submitted), and that SFWMD is responsible for costs, including any clean-up and response. Even if Corps is able to annex land from private owners, this is a process that could likely result in unexpected costs and delays.	High	Negotiation breakdown / costs	The potential cost and schedule impacts should be refined and tracked in the PED.
147	Dave Friesen	Real Estate	Black & Veatch	Appendix D.23	D9	Real Estate	There are a great deal of project specifics are still unknown. Estimate accuracy of any such costs would likely be highly questionable.	High	Costs and timeline	The potential cost/schedule impacts of such items should be refined and tracked in the PED.
148	Terry Hull	Coastal, H&H	Black & Veatch	Annex A-2.2	general	H&H	I didn't see wave setup discussed. Was it included in the total water surface elevation? If not, it may be because it's not in the DCM. However, as I recall the DCM was based on flat topo and constant water depth like in STAs typically. In these cases, wave setup would be neglible. LOCAR has unique bathymetry similar to beach conditions with the northern portion being nearshore and southern portion being offshore. The large waves would break propagating north to the shallow portion and create wave setup.	Moderate	Possible underestimated overtopping; a quick calculation produces about 2-3 ft of wave setup to add to wind setup before calculating runup.	Add wave setup through calculations or coupling your STWAVE model with ADCIRC to get the total water level including wind and wave setup.
149	Zan Kugler	Pump Station Design	Black & Veatch	A.12.2.6 System Analysis of Pump Stations Model Studies	177	Mech	"The HI standard ANSI/HI 9.8 - 2009 recommends intakes of pump stations with an individual pump capacity exceeding 40,000 gpm, or non-uniform flow to the pump sump be modelled. However, the designer must decide the necessity of a model study on a case-by-case basis."	Low	The SFWMD requires a physical model study be performed as per HI recommendation. A CFD model study most likely also be required of the approach channel.	Revise text to indicate SFWMD requires physical model study.
150	Zan Kugler	Pump Station Design	Black & Veatch	A.12.2.6 System Analysis of Pump Stations System Design Requirements	174	Mech	Have the intake losses produced by the trash rack been considered in the determination of the total static head? Typically a 0.5 ft. loss is considered for a partially blocked rack to establish the low water shut off in the intake bay.	Moderate	The total static head calculations should include intakes losses.	Revise total static head calculations.
151	Zan Kugler	Pump Station Design	Black & Veatch	A.12.2.6 System Analysis of Pump Stations System Design Requirements	175	Mech	"The maximum static head at PS-2 is based on the minimum Inflow-Outflow Canal stage of 22 ft NAVD88, the reservoir NFSL or pump shut-off elevation of 51.70 ft NAVD88 and a siphon in the pump discharge. Maximum static head over the hump is based on water elevation in the discharge pipe when 2/3 full. The minimum static head is surface-to-surface between the canal and the reservoir in empty conditions and with a siphon established." What is the maximum siphon recovery for PS-2 and SPS-1?	High	With a siphon assist system, it is required that the siphon recovery is not greater than 28 feet. The value of 28 feet is used to prevent possible water vaporization and siphon priming problems.	Revise concept design if siphon recovery is over 28 ft.
152	Zan Kugler	Pump Station Design	Black & Veatch	A.12.2.6 System Analysis of Pump Stations System Design	175	Mech	"Maximum static over the hump is based on water elevation in the discharge pipe when 2/3 full."	Low	It would be beneficial if the calculation of the critical depth for the discharge pipe be provided.	Provide calculation.
153	Zan Kugler	Pump Station Design	Black & Veatch	A.12.2.2 Equipment	160	Mech	Add the intake low water shut-off stage and motor Hp to the tables.	Low	The additional of the intake low water shut-off stage and motor Hp to the tables would be beneficial.	Revise tables.

Comment No.	Black & Veatch Reviewer Name	Area(s) of Experience	Reviewer Agency	Report Section	Page #	Discipline	Comment	Significance of Concern	Basis of Concern	Suggested action to remedy/resolve concern
154	Zan Kugler	Pump Station Design	Black & Veatch	A.1.2 Proposed Improvements at S-84 Site	15	Mech	A gated spillway (S-84+), with a maximum design flow capacity of 9,000 cfs, is proposed to replace S-84 and S-84X. Will the new structure have similar hydraulic design criteria as the existing S84 and S84X spillways? Do the existing S84 and S84X spillways have ogee weirs. If not then why was this weir type selected?	Low	The basis for the 9000 cfs flow capacity is not evident.	Add narative to support proposed design criteria.
155	Zan Kugler	Pump Station Design	Black & Veatch	2.0 Pump Station Hydraulic Calculations	228	Mech	The pump drawings indicate a bell inlet. Does the pump curves and calculations include the suction losses for the FSI inlet?	Low	FSI suction losses not included in curves.	Add note to indicate that the curves will be revised at a later design phase.
156	Zan Kugler	Pump Station Design	Black & Veatch	A.13.1 Design Criteria Utility Power	189	Mech/Elec	The anticipated power demands should be defined. Is there a concern the existing utility service is inadequate? And if so, were additional costs added to the project estimate for utility improvements required for service to the proposed facilities?	Moderate	The SFWMD has had service issues in the past with Glades Electric. This project will require a significant power demand that may not currently be available in this area .Any extension of existing power transmission facilities required to make this energy available at the pump station site is the responsibility of the Government.	Add narative that followup with utilities to confirm availability of service will be made in the future design phase.
157	Zan Kugler	Pump Station Design	Black & Veatch	A.12.2.10 Requirements for Mechanically Cleaned Trash Racks	186	Mech	“The screening system consists of heavy-duty bars with a 3-inch clear spacing set on a 70° angle from horizontal.”	Moderate	The SFWMD standard is a 60 degree inclination. It is assumed the 3" bar clearance was specified by Flygt.	Confirm the 70 degree inclination is acceptable to SFWMD.
158	Zan Kugler	Pump Station Design	Black & Veatch	A.12.2.8 Requirements for Electric Motor Drivers	183	Mech	“When used for driving vertical, axial/mixed flow wet pit pumps, the electric motor couples to a right-angle gearbox (drive) through a short horizontal drive shaft with universal joints on each end.” This is a confusing and contradictory statement given the station section illustrations provided and other narrative such as: “Pump manufacturers should provide pump and motor as a single unit. The pump column and base plate will support the motor.” and “Pump manufacturers will provide the coupling between the motor and the pump.” These comments indicate a direct drive slow speed motor. Also the Flygt pumps shown in A.12.2.8 Requirements for Electric Motor Drivers are direct drive pumps.	Moderate	The narative is a confusing and contradictory to the concept design presented in the majority of of the text and illustrations.	Revise text to be consistent.
159	Zan Kugler	Pump Station Design	Black & Veatch	A.12.3.2 Gate Hoist	188	Mech	“Gate hoists consist of drums, drive shafts, couplings, worm gear reducer, drive motor, brake, sheaves, wire rope fittings, welded rigid steel base frame, anchor bolts, electrical equipment, hoist cover, gate position indicator, slack cable limit switch and all accessories.”	Low	Somewhat confusing text.	Suggest adding the hoist name to the component description, “Drum and Cable”.
160	Zan Kugler	Pump Station Design	Black & Veatch	A.12.2.7 Requirements for Axial Flow Pumps “	181	Mech	“The FSI will be designed in accordance with the ACE standard for the Type 10 FSI (ETL No. 110-2-327.)”	High	This FSI minimizes the submergence which can create approach flow problems. It typically requires significantly less submergence than the HI standard.	Indicate this FSI type will require a physical model study to ensure there is adequate submergence and no vortex formations.

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Comment No.	Black & Veatch Reviewer Name	Area(s) of Experience	Reviewer Agency	Report Section	Page #	Discipline	Comment	Significance of Concern	Basis of Concern	Suggested action to remedy/resolve concern
161	Zan Kugler	Pump Station Design	Black & Veatch	A.12.2.8 Requirements 1 for Electric Motor Drivers	183	Mech	“Based on the site of the location of the LOCAR Pump Station, there is sufficient available electrical capacity to use electric motors on the larger pumps."	Low	This statement is confusing given the discussion in Electrical section A.13.1 Design Criteria which indicated the utility companies did not respond to the communication of the anticipated power demands.	Revise text to indicate the availability of service will be confirmed with utility companies and if servive improvements are required agreements with the companies will be made to provide service.
162	Zan Kugler	Pump Station Design	Black & Veatch	A.4.4.1 General	27	General	It may be of benefit to add the SFWMD and Jacksonville District reached agreement on several design memoranda to help standardize projects under the Comprehensive Everglades Restoration Plan. Design Criteria Memorandum DCM-5 officially requires the use of the MPSEG on major pumping stations in the SFWMD’s area. Major pumping stations are defined in the guidelines as stations having axial or mixed flow pump machinery with a minimum total station capacity of 1,500 cfs excluding seepage and low flow capacity.	Low	Ensure there is clarity as to the design criteria that is to be followed.	Add text as indicated.
163	Zan Kugler	Pump Station Design	Black & Veatch	A.12.2.7 Requirement for Axial Flow Pumps Bearings	182	Mech	The mechanical section had an appreciable amount of rewritten technical specifications that tend to cloud various important design criteria, i.e. providing detailed specifications for the sleeve bearings but not stating the pumps are to be water (product) lubricated.	Low	Some basic design criteria is lost in the detailed descriptive text.	Add text to indicate the pumps are to be water lubricated. Check to see if other basic design criteria has been overlooked as a result of the enclusion of the rewritten technical specifications.

Lake Okeechobee Section 203 Government A

Comment No.	Black & Veatch Reviewer Name	Response	Backcheck	Response2	Comment Closed
1	Todd Schellhase	Sections A.10.3.6 and A.10.3.7 have been revised to address this comment.	Concur		X
2	Todd Schellhase	Section A.10.4 has been revised to address this comment.	Concur		X
3	Heriberto Torres	Section A.11.4 has been updated to address this comment.	Concur		X
4	Amr Ewais	"Shallow" and "Deep" are defined by the installed depths shown in Table 2 (previous page)	Response Noted. The comment recommend not only stating the depths of the screens but also the reasons for installing them at these depths. Also, were the collected data enough to address these reasons. For example, was an artesian pressure anticipated and was it confirmed? Recommended to Provide more details in PED.	Edited 1/12/24: The referenced geotechnical data report by Ardaman is a final signed & sealed report, and there are no plans to edit at this time. A section titled "Piezometers" was added to address the comment. There was no anticipated artisan pressure; the varied depths were installed to collect additional data. The screen intervals attempted to target areas with relatively higher hydraulic conductivity. Few data points were collected on the instruments. Boring logs which can provide profile information for the reader are provided in the report for each piezometer. Recommend continued reading of the instruments and no further changes to the report.	X
5	Amr Ewais	Perm data is provided in Appendix VII; Triax tests were performed with data provided to assist with future PED phases of design. Embankments with a 3:1 slope with sand consistent with the available borrow materials have been widely used in Florida for several years. For this Feasibility level study, the slope stability results are consistent with years of experience and judgement. Additional testing and analyses can be performed in a more detailed future phase of design.	Response Noted, Recommended to Provide more details in PED.	Noted	X
6	Amr Ewais	Comment should be evaluated in PED.	Concur		X
7	Amr Ewais	A parenthetical notation that explains the existing topogrphic condition that each typical section represents has been added to the bulleted list of the typical sections. Since typical sections A, B and C capture the average, low, and high existing topogrphic condition along the perimeter dam, it is not necessary at this stage of the design to have additional typical sections of the perimeter dam for geotechnical analyses.	Concur		X
8	Amr Ewais	Boundary Conditions and Rapid Drawdown are both discussed in A.8.7.2. Conditions used for the model (24-hour full drawdown) are extremely conservative, but given that those conditions show acceptable FOS, a slower drawdown will also be acceptable.	Concur		X
9	Amr Ewais	Updated as recommended. "Steady State Seepage with PMF/PMP Pool" now shows FOS = 1.4 per Table 3-1 of EM 1110-2-1902.	Concur		X
10	Amr Ewais	Updated in A.8.4.2 list, as suggested.	Concur		X

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Comment No.	Black & Veatch Reviewer Name	Response	Backcheck	Response2	Comment Closed
11	Amr Ewais	Water elevations at perimeter canal considered for the seepage analysis are described in Paragraph A.8.7.2 for each Cross Section. In addition, Table A.8-3 was updated to include the water elevations for each scenario. Downstream water level at dry season was included for Sections A and C where the control elevation changed and estimated seepage results are also included in Table A.8-3.	Concur		X
12	Amr Ewais	Text updated	Concur		X
13	Amr Ewais	The models were defined as saturated/unsaturated to allow further time-dependent advanced analyses in the future PED phases (if considered necessary), where the water transfer and storage within the soil porous media may be studied with more amount of high quality subsurface data for input. While it simulates the movement of water across the soil types considered for transient seepage analyses, changes in the steady state model as selected are much more subtle.	Concur, Recommended to Provide more details in PED.		X
14	Amr Ewais	More detailed review and analyis of materials properties may be performed during PED. Material properties used are consistent with literature for similar sands.	Concur		X
15	Amr Ewais	Don't disagree. However, the 2D seepage analyzed in the feasibility-level study is more conservative assuming a lower anisotripy ratio (i.e. lower ratio = higher vertical conductivity = more seepage around the cutoff wall versus through). Additionally, a ration of 5 is not unreasonable for sands, albeit the stratified nature of the sands on this site is acknowledged. A ration of 10+ was used in the sensitivity analysis presented in A.8.10, and both stability and seepage factors of safety were improved as a result.	Concur		X
16	Amr Ewais	Table A.8-3 was updated and presents a summary of water elevations used upstream and downstream for each cross section used in the analyses.	Concur		X
17	Amr Ewais	Addressed as suggested (A.8.7.2) and as discussed in previous comment (A.8.4.2)	Concur		X
18	Amr Ewais	Text modified to clarify that the dissipation mentioned was the modeled drawdown conditions.	Concur		X
19	Amr Ewais	Good catch, critical gradient equation was updated. Exit gradients were estimated from the SEEP/W models at the critical exit point in the perimeter canal. Tables have been revised and updated accordingly.	Concur		X
20	Amr Ewais	It appears the review was performed on a older draft of the report. Footnotes (1) and (2) were removed in the latest draft.	Concur		X
21	Amr Ewais	Different boundary conditions were tested during development of the model with negligible change to the results or flow in/out of the model. Further evaluation may be considered during PED.	Concur		X
22	Amr Ewais	Acknowledged that there are many factors that contribute to changes, and that other factors likely contributed to some amount of change. The mentioned condition was evaluated in detail by several geotechnical engineers with modeling experience. Modifications were made to the model to test and verify the stated condition was the reason for the somewhat unexpected results. We are confident that the condition mentioned is accurate and the effort made to specifically explain the result was warranted.	Concur		X

Comment No.	Black & Veatch Reviewer Name	Response	Backcheck	Response2	Comment Closed
23	Amr Ewais	Modified	Concur		X
24	Amr Ewais	The purpose of the sensitivity analysis in tables Tables A.8-5 to -7 is not to evaluate the PMP condition. It was to show (a) the effect of changing the pool elevation in the model and (b) the effect of changing the reservoir embankment elevation. PMP was already evaluated in the normal, non-sesitivity analyses. Aditionally, to satisfy the comment, results provided for "Pool Elevation" at Normal Elevation +4 is close to PMP.	Concur		X
25	Amr Ewais	Added statement for "removal of organics"	Concur		X
26	Amr Ewais	Acknowledged. Color change to be considered for next set of analyses during PED phase of design.	Concur		X
27	Joe Santogatta	Concur. Added sizing and location to the 4,160V MCC to match switchgear and panel in Figure A.13-1. Used assumptions due to no building layout and electrical motor data sheets being provided yet due to this project design stage being a feasibilty study report.	Concur		X
28	Joe Santogatta	Concur. Added sizing and location to the MCCs to match switchgear and panels in Figure A.13-2. Used assumptions due to no building layout and electrical motor data sheets being provided yet due to this project design stage being a feasibilty study report.	Concur		X
29	Joe Santogatta	Concur. Replaced "Yes" with "No" in the description in Figure A.13-2.	Concur		X
30	Joe Santogatta	Non-Concur. This is a feasibility study report, so Mechanical team did not provide any electrical motor data sheets for the main pumps and any electrical information on the ancillary equipment. When the project proceeds to the PED phase, and specific electrical information is provided, generator calculations will be completed and results will be incorporated into the design.	Noted		X
31	Joe Santogatta	For Information Only. The District Standard is RGS conduit for exposed conduit and this project is located away from the coast. Design team will consider use of aluminum conduit or other more chemical resistant conduit like PVC coated RGS depending on District Field Station input if the design contains caustic areas. At this time, the design does not contain any caustic areas.	Concur		X
32	Kevin Shelton	This text is part of the completed Biological Assessment prepared by USACE for the U.S. Fish and Wildlife Service and is not subject to any further modifications.	Response noted.		X
33	Kevin Shelton	This text is part of the completed Biological Assessment prepared by USACE for the U.S. Fish and Wildlife Service and is not subject to any further modifications.	Response noted.		X
34	Kevin Shelton	This text is part of the completed Biological Assessment prepared by USACE for the U.S. Fish and Wildlife Service and is not subject to any further modifications.	Response noted.		X
35	Kevin Shelton	This text is part of the completed Biological Assessment prepared by USACE for the U.S. Fish and Wildlife Service and is not subject to any further modifications.	Response noted.		X
36	Kevin Shelton	This text is part of the completed Biological Assessment prepared by USACE for the U.S. Fish and Wildlife Service and is not subject to any further modifications.	Response noted.		X
37	Kevin Shelton	This text is part of the completed Biological Assessment prepared by USACE for the U.S. Fish and Wildlife Service and is not subject to any further modifications.	Response noted.		X
38	Kevin Shelton	This text is part of the completed Biological Assessment prepared by USACE for the U.S. Fish and Wildlife Service and is not subject to any further modifications.	Response noted.		X

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Comment No.	Black & Veatch Reviewer Name	Response	Backcheck	Response2	Comment Closed
39	Kevin Shelton	This text is part of the completed Biological Assessment prepared by USACE for the U.S. Fish and Wildlife Service and is not subject to any further modifications.	Response noted.		X
40	Kevin Shelton	This text is part of the completed Biological Assessment prepared by USACE for the U.S. Fish and Wildlife Service and is not subject to any further modifications.	Response noted.		X
41	Kevin Shelton	Text added to Section C.3.2.2.	Concur		X
42	Kevin Shelton	Text has been modified in Section C.3.2.7 and Table 7-1.	Concur		X
43	Kevin Shelton	Text added to Section C.3.2.11.	Concur		X
44	Kevin Shelton	Text updated	Concur		X
45	Kevin Shelton	CFR, USFWS, PED, LOW, NEPA, NOI, SHPO, ROD, SFWMD, DoD, FAC, and CWA abbreviations have been defined.	Concur		X
46	Drew Ackerman	The PLSM was used to achieve a conservative and simplified estimate of potential P loads changes to Lake O under the FWO and LOCAR alternative conditions. It uses the daily output data from the much larger and more complex RSM-BN model, but the outputs of PLSM itself are annual. Due to the conservative nature of the model, The PLSM is set up to compare longterm P loading differences between different scenarios (e.g. Alt 1,2,3) rather than compare the interannual varibility within a particular scenario, which would require a more complex model.	Concur. Be sure to pay attention to the inter-annual variability with subsequent more detailed assessments.		X
47	Drew Ackerman	A single baseline P concentration has not been determined for the FWO condition, and therefore a range of baseline concentrations was used to assess the alternative reservoir options. Rather than just choosing arbitrary numbers, the minimum value was set as the TMDL (40ul), the max as the concentration in the Upper Kissimmee for the POR (100ul), and 60ul and 80ul to complete the range.	Concur. Be sure to pay attention to the impacts of varying concentrations in subsequent detailed assessments.		X
48	Drew Ackerman	The minor discrepancy between the alternatives is due to the rounding of small numbers. However, Alt2 has the highest surface area and the highest atmospheric deposition and rainfall, while Alt1 has the lowest.	Concur		X
49	Drew Ackerman	The focus of the PLSM was the contribution of flows and loads to Lake Okeechobee, not the reservoir. If additional modeling regarding flows and loads to the reservoir is required, a different model will need to be used	Concur. The response doesn't address the comment. A table of the data would be helpful to present that information but likely isn't critical at this time		X
50	Drew Ackerman	The graph is simply to show that the reservoir is predicted to have the same percentage impact on total P loads to Lake O, regardless of the baseline P concentration.	Concur		X
51	Jeff Beriswill	Section ES.6 has been revised to state the correct average height of the perimeter dam (39'), based on the revised design of the Recommended Plan. This same correction was made to Section 6.1.1.	Concur		X
52	Jeff Beriswill	The statement on ES-16 references to modeled runs with LOSOM rather than LORS08. The statement will be updated to make it clear that the Recommended Plan modeled with LOSOM operations produces these results.	Concur		X
53	Jeff Beriswill	The first paragraph of Section A.3.2 has been revised to address this comment.	Concur		X

Comment No.	Black & Veatch Reviewer Name	Response	Backcheck	Response2	Comment Closed
54	Jeff Beriswill	Section A.4.2 has been revised to address this comment.	Concur		X
55	Jeff Beriswill	Section locations are shown in Figure A.8-1	Concur		X
56	Jeff Beriswill	Acknowledged that figures do not include conductivity and it would help with review of each individual figure. REcommend comment be addressed during the next phase of design. In lieu of reprinting each of dozens of figures, please reference Table A.8-1 for all seepage and stability parameters. Saturated Kh value will be added for next printout during PED phase.	Concur		X
57	Jeff Beriswill	Acknowledged. Recommend labels with soil strata be added to each figure for the next set of analyses during PED. In the meantime refer to Figures A.8-2.A thru A.8-2.D for the soil strata references.	Concur		X
58	Jeff Beriswill	A.7-2 text updated	Concur		X
59	Jeff Beriswill	Comment acknowledged and a paragraph for "Settlement and Waiting Periods" was added to the recommendations section to address the need for further evaluation during PED. Of note, a large majority of the Loose "SC" material in the upper 40' was lower fines (12-30%) material which is expected to experience most settlement during construction. Only thin (< 5') layers of CH were present to those depths. Higher clay content (30-90%) and thicker CH layers were more frequent below 40-feet.	Concur		X
60	Renee Murch	The 100-yr design storm rainfall depth for design case 2 was changed from the DCM-2 depth of 12" to the more up-to-date NOAA atlas 14 depth of 10.9" because USACE directed us to make this change when they were conducting their risk assessment of the project. USACE does not want us to be unnecessarily over conservative, by using the DCM-2 rainfall depth, since it is based on less recent historical rainfall data than the NOAA Atlas 14 rainfall depths. Section A.5.2.2 of Appendix A has been revised to explain why the NOAA Atlas 14 rainfall was used instead of the DCM-2 rainfall.	The addition of text as noted should sufficiently address the comment.		X
61	Renee Murch	Footnote No. 2 for Tables A.5-3 and A.5-4 has been revised to include the maximum fetch length used to calculate the maximum wind setup.	The noted footnote addresses the comment.		X
62	Jeff Beriswill	Table A.11-1 has been updated to be consistent with the current design.	Concur		X
63	Renee Murch	Figure 1-5 has been revised by adding the fetch length radials to the West Cell.	The noted figure modifications address the comment.		X
64	Renee Murch	Section 2.2 of Annex A-2.2 has been revised to include the same explanation added to Section A.5.2.2 of Appendix A (see response to comment on row 62).	The revisions address the comment.		X
65	Renee Murch	Text was added to explain the two polygons when Figure 6 is introduced. Based on the comment, no changes are warranted for Figure 6.	The addition of text as noted should sufficiently address the comment.		X

Comment No.	Black & Veatch Reviewer Name	Response	Backcheck	Response2	Comment Closed
66	Renee Murch	The model sensitivity to the weir coefficient was not evaluated as it was not part of the objectives of the study.	No changes were made. The lack of sensitivity evaluation should be noted in the documentation.	Text was added to the dam breach memo to address this backcheck comment.	X
67	Renee Murch	Evaluating conveyance of C-41A was outside the scope of this effort and can be evaluated as part of PED.	No changes were made. The lack of examination of C-41A flow time series should be noted as necessary for inclusion in the PED.	Text was added to the dam breach memo to address this backcheck comment.	X
68	Renee Murch	Sensitivity of parameterization and location of 2-D flow areas was not evaluated as it was not part of the objectives of the study.	No changes were made. Text similar to the response should be noted in the documentation.	Text was added to the dam breach memo to address this backcheck comment.	X
69	Renee Murch	Part 9, under Section C.7.1.1 has been revised to address this comment.	Additional text should be sufficient to address comment.		X
70	Renee Murch	Text comparing other studies was added to Section A.9.2.2.	Additional text should be sufficient to address this comment.		X
71	Renee Murch	Max/min information was added to Table A.9-1.	Additional table columns should be sufficient to address this comment.		X
72	Renee Murch	The anisotropy ratios were determined by the geotechinical engineering material analysis, please refer to Sections A.7 and A.8. Text was added to Section A.9.2.2 referencing these sections.	Additional text should be sufficient to address this comment.		X
73	Renee Murch	The horizontal conductivities that were calibrated for the surficial aquifer in the LKBGWM (Butler et al., 2014) range from 1.8 to 115 ft/day within the LOCAR groundwater model area. Thus, the LOCAR horizontal conductivities are mostly within the range calibrated for the 2014 study, except for Unit D, which falls just below the low range (1.4 ft/d). Text was added to Section A.9.2.2 to include this information.	Added text should be sufficient.		X
74	Renee Murch	The reservoir in the model is a fixed head boundary. Thus, the stages are assumed to be constant and will not be impacted by ET or seepage. This is a conservative assumption to maximize the head differential between the reservoir and surrounding land.	The Response text or something similar could be noted in the text. This tends to be the "worst case" scenario and also highlights the uncertainty in the seepage estimates.	Text was added to the A9 document to address this backcheck comment.	X
75	Renee Murch	Text was added to Section A.9.3.4, to indicate that a sensitivity analysis with the dry season model should be conducted during the PED phase.	Added text should be sufficient.		X
76	Renee Murch	Reference to section 6.1.1 and text describing the refinement of the footprint and design has been added to section 3.2.1. and section E.5.1	Added text should be sufficient.		X

Comment No.	Black & Veatch Reviewer Name	Response	Backcheck	Response2	Comment Closed
77	Renee Murch	The requested detail is already included in the Section 4.1.1.3 txt: "The simulated Future Without Project condition (FWOL) assumes a LORS08-based schedule consistent with the current draft Project Operating Manual for the EAA Reservoir. However, recent project planning efforts have identified the LOSOM schedule as the successor to LORS08, and it is expected that future implementations of Lake Okeechobee regulation schedules will not return to LORS08-like protocols, but rather would continue to evolve the LOSOM-like operational mindset." As such, the required savings clause comparison to ECB and the consistent Alternative comparisons to the LOSOM-based FWOLL show that the LOCAR feature improves water supply and while some FWOL performance may indeed be preferable, the use of LOSOM-based protocols is warranted for LOCAR.	This text is sufficient.		X
78	Heriberto Torres	Section C.21 has been revised to address this comment and include content about operations during construction per CGM #5.	Concur		X
79	Renee Murch	We did not consider calculating overtopping rates using previous methodologies as the methods in EurOtop (2018) are the result of years of advancements that were built upon the previous 1976/1977 equations. We don't feel that comparing these methods is necessary to validate these equations. No edits were made.	ACES is not recommended to validate the EurOtop but rather to provide a weight of evidence approach as has been done on other District design projects follow the guidelines outlined in DCM-2, which specifies the use of ACES. If it is not used, literature should be cited to describe why it is not used and provide more context on the use of EurOtop.	The method used in ACES is based on a methodology proposed by John Ahrens (Prediction of Irregular Wave Overtopping. John Ahrens. Coastal Engineering Technical Aid No. 77-7. December 1977). The method is based on monochromatic wave overtopping tests and is essentially a summation of single wave overtopping volumes, which does not really represent the dynamics of wave overtopping from irregular waves. Ahrens (1977) indicates that at the time of publication, no guidance for predicting overtopping for irregular wave conditions was available and the proposed method was provided as interim guidance until results of laboratory study of runup and overtopping by irregular waves was available. A lot has been learned about runup and overtopping in the almost 50 years since this methodology was proposed and we don't feel that including results from this method would provide additional information of value. Additional text was added in Section 4.2 of Annex-2.2 to explain why EurOtop was used.	X
80	Heriberto Torres	During the PED phase, geotechnical borings will be performed at all locations of proposed bridges. Currently the project only includes the construction of one bridge (Bridge BR-1 over CNL-2). A sentence has been added to Appendix A, Section A.16 concerning the requirement for borings to be performed at the final location determined for all dam structures and water mgmt. structures to be built outside of the reservoir dam.	Concur		X
81	Terry Hull	Section A.5.2.1 has been revised to more clearly describe the DCM-2 PMP Scenario 1 routing analysis that was used to determine the MWSL for the reservoir. A reference to the Scenario 1 hyetograph and reservoir discharge hydrograph figure in Annex A-2.1 was added to Section A.5.2.1.	Concur		X

Comment No.	Black & Veatch Reviewer Name	Response	Backcheck	Response2	Comment Closed
82	Terry Hull	Both Table 3 and Figure 3 present results of the calculations described at the bottom of page 9. Cumulative overtopping volumes are representative of the integration of the curve but on a relatively rough (1 hour) time step. No changes are recommended.	Concur		X
83	Terry Hull	EurOtop (2018) presents equations for calculating the probability of overtopping, which is equal to the percentage of waves that overtop the embankment. Text was edited to indicate that this was calculated based on equations in EurOtop (2018).	Concur		X
84	Terry Hull	Yes. The single wave volume calculated as per EurOtop (2018) is a function of the number of overtopping waves, which was calculated from the storm duration, the mean wave period, and the percentage of overtopping waves. Text has been edited to reflect this.	Concur		X
85	Terry Hull	Text updated.	Concur		X
86	Terry Hull	The only elevations shown in Table A.16-1 are 34 and 27. The header for the row that these elevations appear in clearly states that the elevations are in NAVD88.	Concur; the reference to sea level confused me.		X
87	Jhon Arbelaez-Novak	NGVD29 has been converted to NAVD88 throughout the document.	Concur		X
88	Jhon Arbelaez-Novak	The two-mile radius was used in the original report prepared a few years ago, so that radius was kept for consistency. Per that report, a two-mile radius was chosen as an initial estimate of project siting and potential effects to facilitate the EJ analysis. Those in that immediate project area have the potential to be the most impacted by the project. The analysis goes on to look at the larger study area that includes the counties and tribal land, and therefore looks at both smaller and larger scale geographies.	Concur		X
89	Jhon Arbelaez-Novak	Low-income is the proportion of people whose income is below the poverty level.	Understood. It would be helpful to include that criteria in the document for clarity.	The first reference to low income on PDF page 102, page C.1-98, was updated to include "populations whose income is below the poverty level."	X
90	Jhon Arbelaez-Novak	Yes, tribal consultation has been on-going. The ACOEis responsible for government to government consultation. Correspondence is included in the LOCAR EIS.	Concur		X
91	Eric Gates	A DEP OCULUS desktop search was conducted to determine if there were identified environmental concerns for the planning area. The findings of this historical search are included in Annex G. Upon congressional authorization and prior to entering the PED, a complete Phase I/II will be conducted for the project footprint.	Concur		X
92	Terry Hull	Annex H was originally developed for and discusses the climate change assessment conducted by the Corps for LOWRP. It is not subject to any further modifications.	Concur		X
93	Terry Hull	For the water control structures included in the model, structure book pages were used to obtain information on the discharge characteristics, hydraulic description, and Maximum Allowable Gate Opening curves. The model assumed that these structures would not be blown out by a breach. Previous model iterations did not include the structures and the extent of inundation was greater.	I assume this means the structures are designed to withstand the hydraulic/erosive forces of a breach. As you note, flooding is worse if they fail. Concur		X
94	Terry Hull	Pages 23 through 28 of the Civil Plates (Annex C-1) show the planning level design cross-section of each structure that will penetrate the reservoir perimeter dam and divider dam. Wave loads on these structures (including loads from overtopping waves) will be calculated during the PED phase in order to finalize the structural design of each of these structures. A statement has been added to Appendix A, Section A.5.4.5 to that effect, which references the flood/wave load design requirement in Section A.10.3.8. Also, in the Civil Plates, the callout of the wave wall shown in front of the control bldg. on top of the dam crest for the dam structure cross-sections, has been edited to include a statement that the proposed wave wall in front of the control bldg. is for wave energy dissipation adjacent to the control bldg.	Concur		X

Comment No.	Black & Veatch Reviewer Name	Response	Backcheck	Response2	Comment Closed
95	Bryce Weinand	Annex H was originally developed for and discusses the climate change assessment conducted by the Corps for LOWRP. It is not subject to any further modifications.	Concur		X
96	Bryce Weinand	Annex H was originally developed for and discusses the climate change assessment conducted by the Corps for LOWRP. It is not subject to any further modifications.	Concur		X
97	Bryce Weinand	Annex H was originally developed for and discusses the climate change assessment conducted by the Corps for LOWRP. It is not subject to any further modifications.	Concur		X
98	Bryce Weinand	Annex H was originally developed for and discusses the climate change assessment conducted by the Corps for LOWRP. It is not subject to any further modifications.	Concur		X
99	Bryce Weinand	Annex H was originally developed for and discusses the climate change assessment conducted by the Corps for LOWRP. It is not subject to any further modifications.	Concur		X
100	Kevin Shelton	Table updated.	Concur		X
101	Kevin Shelton	Table G.10 format updated.	Concur		X
102	Kevin Shelton	Table title updated.	Concur		X
103	Kevin Shelton	The modeling document report (LOCAR MDR) is a part of the feasibility study in Appendix A, Annex A2.4. All of the modeled operations are documented (and/or cited) in the LOCAR MDR. In particular, Section 3.1 of the MDR described the as-authorized LORS-based EAA reservoir FWO, Section 3.2 describes the LOCAR LOSOM-based proposed operations and the MDR Appendix B describes a LOSOM-based version of the EAA reservoir FWO which is the cleanest way of showing the LOCAR storage benefits independent of Lake regulation schedule changes.	The explanation for the modeling is good and the hydrologic and habitat benefits of each LOCAR Alternative are well documented. A discussion of the FWO vs LOCAR Alternatives for the SLE would still be beneficial as the model shows a decrease in Habitat Units for all LOCAR Alternatives vs HUs without the project entirely. Section G.4.2 discusses the total Northern Estuary Alternative Performance and the overall increase in HUs for the project is considerable, but the SLE does appear to suffer.	Section 5.3.3.1 discusses the sensitivity run of LOSOM-like operations that includes the LOSOM FWO modeled results. A statement was added to the end of section G.4.1.5 that states "Section 5.3.3 of the main repot discusses the performance of alternatives, including the sensitivity analysis conducted to compare a FWO scenario with different Lake Okeechobee operations. The FWO results presented here are based on currently authorized operations."	X
104	Jhon Arbelaez-Novak	Additional language has been added to Section C.3.4 (Wetlands). Any impacts to wetlands resulting from implementation of the project component will be avoided, minimized, and mitigated, as appropriate.	Concur		X
105	Jhon Arbelaez-Novak	A statement was added to Section C.2.13 regarding the long-term benefits to water supply. Text was also radded to Table C.2-16 to clarify the model runs and their benefits for water supply.	Concur		X
106	Jhon Arbelaez-Novak	30-day review period under the on-going consultation with the Tribes expired December 11th. Provided no comments are received, the consultant is currently finalizing the report. Under the current project alternative footprint, all known CRs sites have been avoided.	Concur		X
107	Jhon Arbelaez-Novak	Yes, tribal consultations have been on-going. The ACOE is responsible for government to government consultation. The ACOE Correspondence is included in the LOCAR EIS.	Concur		X

Comment No.	Black & Veatch Reviewer Name	Response	Backcheck	Response2	Comment Closed
108	Dusty Miller	Environmental point values for UDV were developed following USACE Economic Guidance Memorandum (EGM) 23-03. Adverse impacts to water quality can be considered for the environmental point value under the environmental point value, but these adverse impacts were deemed to likely be negligible.	Concur		X
109	Dusty Miller	The second half of section F.3.5 provides step-by-step details on how visitation was estimated, and we relied heavily on the FDEP SCORP to build to our estimates. No other suitable data sources could be found, and data from the SCORP was deemed the best available. Our methodology follows an approach used in previous SFWMD and USACE studies. Unfortunately the sources recommended in the comment do not provide clear guidance on estimating visitation.	Concur		X
110	Dusty Miller	Potential water pollution from recreational activities likely to be negligible. These kind of costs are not typically included in this kind of cost-benefit analysis.	Concur		X
111	Bryce Weinand	Annex H was originally developed for and discusses the climate change assessment conducted by the Corps for LOWRP. It is not subject to any further modifications.	Concur		X
112	Todd Bednar	Majority of sheetpiling in estimate is temporary sheet piles that would be driven and extracted. Unit price for that is much less as material can be salvaged and reused. For permanent sheet pile items, current unit prices is around $75/sf.	Concur		X
113	Todd Bednar	Detailed line items for concrete typically include a 10% quantity increase to account for waste/loss of concrete placement.	Concur		X
114	Dave Friesen	SFWMD is responsible for certifying the lands, and all anticipated lands needed have been identified. No offsite impacts to adjacent lands are anticipated. Please see Real Estate Appendix for details.	Concur		X
115	Todd Bednar	The estimate does not account for reinforcing steel within each of the specific features' folder. So unit prices are low. Once factoring in reinforcing to the unit price of concrete, the average unit price is around $1,100/cy, which is in line with prices listed in comment.	Concur		X
116	Bryce Weinand	Annex H was originally developed for and discusses the climate change assessment conducted by the Corps for LOWRP. It is not subject to any further modifications.	Concur		X
117	Todd Bednar	Overhead bridge crane unit prices is approximately $190k. There is no design currently for crane, and estimate uses relevant cost book item for now. Cost can be reviewed in subsequent phases of project, once more design details become available.	Concur		X
118	Todd Bednar	No design details are available for fire equipment, and estimate is based on relevant cost book line item. Cost item can be reviewed in subsequent phases of project, once more design details become available.	Concur		X
119	Dave Friesen	SFWMD is responsible for certifying the lands, and all anticipated lands needed for the project have been identified. Please see Real Estate Appendix for details.	Concur		X
120	Todd Bednar	The land is majority existing pasture-land, and little amount of old citrus groves. Grubbing will be limited, and current unit price is in line with other on-going projects in the area.	Concur		X
121	Todd Bednar	Material cost will be adjusted to increase unit price for silt fencing.	Concur		X

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Comment No.	Black & Veatch Reviewer Name	Response	Backcheck	Response2	Comment Closed
122	Todd Bednar	Current unit price is based on recent contracted price for C-43 project, and totals to $19.21/sf. Adjustments to crews and labor rates are on going, and new unit price will be within the $20-25/sf range.	Concur		X
123	Dave Friesen	Land acquisition and easements will be acquired after the project receives Congressional Authorization.	Concur		X
124	Todd Bednar	MCACES software does not have the "vsf" unit of measure, therefore SF will remain in use.	Concur		X
125	Dave Friesen	Agree. Environmentally sensitive areas will be avoided if possible.	Concur		X
126	Todd Bednar	Tax rate has been updated to 7.5%.	Concur		X
127	Dave Friesen	According to the Savings Clause Analysis, the project cannot impact offsite adjacent landowners, and the analysis indicates that there are no offsite impacts. In addition, there are dam safety features for flooding such as a seepage canal. No additional lands for flooding are required.	Concur		X
128	Todd Bednar	This is a risk discussed in the CSRA. Also labor rates have been increased to include additional wages to entice workers in the region. Subsequent phases of the project will look at this in more detail, but this risk is accounted for in the estimate and contingency development.	Concur		X
129	Dave Friesen	Lands and Damages were evaluated in the Risk Register. Land ownership does have a high risk of impacting the schedule. Discussions with the landowner have been initiated. Land acquisition will occur after the project is Congressionally Authorized.	Concur		X
130	Dave Friesen	Acknowledged.	Concur		X
131	Todd Bednar	Acknowledged. This is accounted for in the CSRA risk register.	Concur		X
132	Dave Friesen	Acknowledged.	Concur		X
133	Dave Friesen	Acknowledged. If HTRW is identified, SFWMD will be responsible for the assessment, remediation and cost associated with these activities.	Concur		X
134	Todd Bednar	Subsequent phases of project will revise schedule. Currently, a conservative schedule has been developed and coordinated with local sponsors and USACE. No change at this time.	Concur		X
135	Dave Friesen	Discussions with the landowner have been initiated.	Concur		X
136	Todd Bednar	Subsequent phases of project will revise schedule. Currently, a conservative schedule has been developed and coordinated with local sponsors and USACE. No change at this time.	Concur		X
137	Todd Bednar	Subsequent phases of project will revise schedule. Currently, a conservative schedule has been developed and coordinated with local sponsors and USACE. No change at this time.	Concur		X

Comment No.	Black & Veatch Reviewer Name	Response	Backcheck	Response2	Comment Closed
138	Kevin Shelton	We agree, and there's a distinction made between the time a response can be expected vs the time a response might be detected due to project vs climate variability. We feel the 3rd to last paragraph on p. D.1-15 explains that this is not a short-term extreme monitoring time-frame, but should be expected to cover 5-10 years to account for climate variability, etc. In other words, it's a response that could be seen in the short-term, but would be evaluated over a longer time period to assess real trends and causal factors.	The explanation of the monitoring period is noted and acceptable. The 50% reduction criteria proposed for the monitoring of "SAV and EAV, cyanobacteria, phytoplankton and sportfish" will be evaluated in the nearshore areas where changes in "lake stages have the most immediate impact" and are subject to high variability is appropriate. Snail kite reductions below the 3-year moving average will detect fairly small changes before significant losses occur. The criteria for a large reduction in wading bird abundance is still a concern. A 50% reduction in wading bird population "throughout the marsh" would be alarming.	We concur that such a large reduction in wading bird abundance sounds concerning, however, both nest numbers and foraging numbers within and between seasons can be highly variable on the Lake. It's not uncommon for us to see >50% declines in nesting numbers from one year to the next, or a 3-fold increase, for example. Most of that is tied to climate variability and water management decisions, though conditions outside the lake can also affect wading bird activity within the levee (they can forage in the watershed and nest in the lake). Due to the high variability in our monitoring data, we would need to see significant reductions relative to historical variation, and see that across several years and climatic conditions. While a decline of half sounds concerning, the highly variable use of the lake by these indicators makes it hard for us to detect changes at higher levels of sensitivity.	X
139	Kevin Shelton	Table updated.	Concur		X
140	Kevin Shelton	Text updated.	Concur		X
141	Renee Murch	A reference will be added to direct readers to the Modeling Documentation Report.	An added reference should be sufficient.		X
142	Jhon Arbelaez-Novak	No changes were made. The name of current operations is LORS08 which is the abbrieviated 2008 Lake Okeechobee Regulation Schedule.	Response noted.		X
143	Dusty Miller	The public would fish for whatever naturally recruited within the reservoir, which would likely be both native and invasive exotic species; there would be no stocking of game fish species. Littering can be managed with enforceable rules, information, garbage cans, regular pick-up service, and law enforcement; although illegal dumping will always be an issue in remote areas. Lead ammo is prohibited for use in waterfowl and alligator hunting over water. As of now, the only boats that would likely be permitted for use in the Reservoir would be canoes/kayaks/electric trolling motors (possibly small outboards <25 h.p.?) as in the A-1 FEB in Palm Beach County, where a limited number of quota hunting permits are issued Fri-Sun during the hunting season only. Either way, the numbers of users will be limited using the District's Special Use Licensing system, FWC hunting quotas, and hours of operation to minimize the impacts of public use. Dogs will be prohibited except for retrievers during hunting season, which will have minimal impact on nutrient input into this 11,000 acre reservoir. Restroom waste is self-contained in underground vaults. The parking area will be relatively small with approximately 40 parking spaces total. All District lands and CERP projects are open for public use. Recreation activities at planned large reservoirs will be adjusted accordingly for safe use. The recreation features are designed for passive use and not to negatively impact the planned feature or have impacts to water quality.	Concur		X
144	Todd Bednar	No design information is available for generators, as such a cost book item was used. A more expensive cost book item will be used to increase cost for generators.	Concur		X

Comment No.	Black & Veatch Reviewer Name	Response	Backcheck	Response2	Comment Closed
145	Todd Bednar	Steel grating cost will be increased.	Concur		X
146	Dave Friesen	Upon Congressional Authorization of the project, under CERP it is the responsibility of the non-federal sponsor to provide the lands needed for the project.	Concur		X
147	Dave Friesen	Agree. Lands and Damages were evaluated in the Risk Register that inform the cost estimate. A 54% contingency has been added to the project cost to account for unknowns and risk.	Concur		X
148	Terry Hull	Wave setup was not included in the overtopping assessment. This is not typically done since wave setup is a highly localized affect and to a large extent is implicit to the wave overtopping equations in EurOtop, which are based on physical model tests which reproduce wave setup for the given water level and wave conditions. The EurOtop manual indicates "there is, in general, no requirement to add on an additional water level increase for wave set-up when calculating overtopping discharges using the methods reported in this document unless the foreshore is very long and very gently (sic). In that case numerical models should give the wave set-up one or two wave lengths in front of the toe of the structure." We will check the potential influence wave setup could have at LOCAR the week of January 8 when our modeler returns from PTO and provide an updated response.	Concur; I think the foreshore physiography may meet the conditions requiring modeling or other consideration, but I just wanted to bring it to your attention.	We checked the potential for additional wave setup using the hydrodynamic model, MIKE21-HD alone to model the response of the LOCAR East Cell to the wind and water levels from Design Case 2 and linked with the spectral wave model, MIKE21-SW. Differences in water levels approximately 1 and 2 wavelengths (approximately 100 and 200 feet) from the embankment toe were increases of 0.014 meters (0.55 inches) and 0.001 meters (0.04 inches), respectively. This difference is not significant for the embankment design.	X
149	Zan Kugler	The text in Section A.12.2.6, Model Studies, has been revised to address this comment by requiring that a physical model study be completed during the PED phase.	No additional comments, Concur.		X
150	Zan Kugler	Calculations have been revised to include 0.5 feet headloss through the trash rack.	Concur with revisions. Designer to confirm the maximum static head is minimum water level in the intake to the high point of the flow stream. I can't find any mention of the pump intake low water shut-off stage in the static head calculations.		X
151	Zan Kugler	Design concept was modified to reduce the siphon recovery to less than 28 feet by raising the saxophone dissipator in the reservoir. The siphon recovery limit was identified as an item to be addressed in the PED phase.	No additional comments, Concur.		X
152	Zan Kugler	Critical depth was added for the discharge pipe.	No additional comments, Concur.		X
153	Zan Kugler	Table was revised to include pump low water shut off and Hp.	Concur. Assume low water shut-off within the intake was based on the canal design low water stage minus the trash rack loss?		X

Comment No.	Black & Veatch Reviewer Name	Response	Backcheck	Response2	Comment Closed
154	Zan Kugler	The design capacity for S-84+ of 9,000 cfs (which is the 100% SPF peak discharge rate to C-41A upstream of S-84+) is explained in Section A.5.3.3, as the flow capacity needed at S-84+ to allow for a peak discharge rate from the reervoir of 1,500 cfs during the PMP and storms with less precipitation. A sentence has been added at the end of Section A.1.2 to point the reader to Section A.5.3.3 for more information concerning the design capacity of S-84+. S-84+ has been designed to be gated spillway that is siilar to the design of S-84 and S-84X. The S-84 and S-84X bays each have an ogee weir as shown on the record drawings for these structures.	No additional comments, Concur.		X
155	Zan Kugler	Note was added to include the FSI losses in the PED Phase.	No additional comments, Concur.		X
156	Zan Kugler	A sentence has been added to the end of Sections A.13.1.1 through A.13.1.4 to address this comment.	No additional comments, Concur.		X
157	Zan Kugler	Trash screening angle varies by manufacturer, i.e. hydro components uses 70 degress, duperon uses 60 degress. Text was modified to indicate that the trash rack angle may vary based on raker type selected during the PED phase.	Concur with text change response however the review of the text modification indicated: "The screening system consists of heavy-duty bars with a 3-inch clear spacing set on an 60° angle" Also note: If there is a possibility for the presence of manatees, the maximum inclination shall be determined to conform with the permit requirements of the FWC/FDEP and confirmed with the rake MANUFACTURER.		X
158	Zan Kugler	Text has been revised to reflect direct coupled electric motors.	No additional comments, Concur.		X
159	Zan Kugler	Concur, text was revised to clarify.	No additional comments, Concur.		X
160	Zan Kugler	A requirement for a physical model study was added.	No additional comments, Concur.		X

Comment No.	Black & Veatch Reviewer Name	Response	Backcheck	Response2	Comment Closed
161	Zan Kugler	The extension of electrical service to PS-2 is already discussed in Section A.13.1.2 and shown in Annex E-1; therefore, this sentence has been deleted from A.12.2.8. See response to Comment No. 156.	No additional comments, Concur.		X
162	Zan Kugler	Section A.4.4.1 has been revised to address this comment.	No additional comments, Concur.		X
163	Zan Kugler	Text was added to reflect water lubricated bearings.	No additional comments, Concur.		X