REVIEW PLAN

Rio Grande de Arecibo, Puerto Rico, Post Authorization Change Report (Arecibo PAC)

Jacksonville District

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US Army Corps of Engineers ®

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1. PURPOSE AND REQUIREMENTS

a. Purpose. This Review Plan defines the scope and level of peer review for the Rio Grande de Arecibo, Puerto Rico, Post Authorization Change Report (Arecibo PAC).

b. References

(1) Engineering Circular (EC) 1165-2-214, Civil Works Review Policy, 15 Dec 2012
(2) EC 1105-2-412, Assuring Quality of Planning Models, 31 Mar 2011
(3) Engineering Regulation (ER) 1110-1-12, Quality Management, 21 Jul 2006
(4) ER 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 Nov 2007

c. Requirements. This review plan was developed in accordance with EC 1165-2-214, which establishes an accountable, comprehensive, life-cycle review strategy for Civil Works products by providing a seamless process for review of all Civil Works projects from initial planning through design, construction, and operation, maintenance, repair, replacement and rehabilitation (OMRR&R). The EC outlines four general levels of review: District Quality Control/Quality Assurance (DQC), Agency Technical Review (ATR), Independent External Peer Review (IEPR), and Policy and Legal Compliance Review. In addition to these levels of review, decision documents are subject to cost engineering review and certification (per EC 1165-2-214) and planning models are subject to certification (per EC 1105-2-412).

2. REVIEW MANAGEMENT ORGANIZATION (RMO) COORDINATION

The RMO is responsible for managing the overall peer review effort described in this Review Plan. The RMO for decision documents is typically either a Planning Center of Expertise (PCX) or the Risk Management Center (RMC), depending on the primary purpose of the decision document. The RMO for the peer review effort described in this Review Plan is the Flood Risk Management Planning Center of Expertise (FRM-PCX). The RMO will coordinate with the Cost Engineering Mandatory Center of Expertise Cost Engineering (MCX) to ensure the appropriate expertise is included on the review teams to assess the adequacy of cost estimates, construction schedules and contingencies.

3. STUDY INFORMATION

a. Decision Document. The Arecibo PAC, to be prepared in accordance with ER 1105-2-100, Sections 4-1 and 4-5, and Appendix G, dated 30 June 2004, will document design refinements and increases in total project costs. The level of report approval is at Headquarters and Congressional authorization will be required for the increase in cost. To ensure that the environmental effects of the recommended project's refinements will not cause adverse impacts to the quality of the human environment, natural or cultural resources of the area the NEPA documentation currently on file will be evaluated to determine its adequacy. Previous documentation included a 1993 Environmental Impact Statement (EIS) and a 2004 Environmental Assessment (EA) to address changes to the borrow/disposal area. Also, informal coordination with the Federal and Commonwealth of Puerto Rico resource agencies under the Section 7 of the Endangered Species Act will be conducted to ensure that the proposed refinements will not jeopardize the continued existence of any listed species as threatened or endangered in the vicinity of the authorized project. It is anticipated that the existing NEPA documentation will be adequate for the PAC

report. If, as expected, an additional NEPA document is not required, the decision will be documented in a Memorandum for Record (MFR).

b. Study/Project Description. The Arecibo PAC is intended to document the increases in total project costs. As of 18 April 2012, the estimated 902 limit was $36,140,000 with a fully funded project cost of $63,745,000. These cost increases result from: growth of Real Estate values, value added design modifications, modifications resulting from more detailed field data, adjustment to contract cost for changed site conditions, and required design adjustments addressing significant problems associated with impacts of Hurricane Georges. Project economics will be updated. The Arecibo project purpose is to address flood damages caused by the overflow of the Tanama, Santiago and Arecibo rivers to the city of Arecibo, Puerto Rico. In general, the authorized project consists of levees to protect from Arecibo River and Tanama River flooding, a diversion channel to protect from Rio Santiago flooding, Rio Santiago channel improvements, five bridge replacements, a drainage structure, recreational features, wetland mitigation, and archeological mitigation. The project was phased based on useable increments for a 100-yr storm event. Phase 1 provides 25% of the total benefits, phase 2 provides 25% of the total benefits and is subdivided into parts 2a and 2b, and phase 3 provides 50% of the total benefits. The construction of phase 1 is complete. After the construction of phase 2a there will not be enough funding authorization left to continue construction. Continuing construction requires a Congressional authorization to increase the maximum project cost per section 902 of WRDA 1986, commonly called a 902 limit correction.

The following projected changes to the original authorized project will be described in the PAC, in detail:

Rio Santiago Channel
- Realigned to minimize real estate impacts
- Replaces only 4 of 5 bridges, because one was rebuilt from Hurricane Georges
- Bridge designs will need to be improved
- Temporary weir to be constructed

Rio Santiago Diversion Channel
- Realigned to avoid historical/cultural impacts
- Channel banks armored
- Additional impacts to PR Authority lands and acquisitions at Abra de San Francisco
- Culvert was lengthened and upped from 5 to 6-barrels
- Flap Gates replaced with tide-flex valves

Rio Grande de Arecibo Clean Out
- Eliminated due to Hurricane Georges

Rio Grande de Arecibo Tributary Drainage Channel
- Added new feature to carry flows along levee
- Requires a small culvert

Rio Grande de Arecibo Main Earth Levee
- Realigned and extended due to Hurricane Georges damages
- Added Floodway
- Rip Rap revetment added

- Requires additional studies
- Two culverts added
- Road ramp added
- Additional land acquisitions
- Additional structure relocations
- Several homes demolished

Rio Grande de Arecibo Cellular Floodwall
- Eliminated due to Hurricane Georges

Rio Grande de Arecibo Stone Jetty
- Eliminated due to Hurricane Georges

Rio Grande de Arecibo Floodwall under Highway 2
- Needs to be redesigned and extended

Rio Grande de Arecibo Levee Culvert Structure
- New six barrel structure added due to Hurricane Georges damages
- Added tide-flex valves
- Added rip rap slope revetment

Rio Santiago Tributary Drop Structure
- Added new feature
- Add rip rap

Rio Tanama Levee
- Only 1 of 4 levee ramps built
- Two roads were relocated
- Eliminated gabion baskets (channel)
- Added long gabion mattresses (levee)
- Additional Utility Relocations
- Additional Acquisitions
- Additional studies

Bank Protection
- Several new needs for armoring have been identified

Borrow, Disposal, And Staging Areas
- New expanded Borrow/Disposal Site
- Staging Areas Added
- Additional Staging Areas needed

Mitigation Area for Environmental Wetlands
- Authorized site is not available
- Need to identify and develop plan for new area

Recreational Facilities
- Boat Ramp and Jogging/Bike path no longer needed for relocation
- Add parking lot, small pavilion, benches, tables, railing, and walkway.

Real Estate and Buildings
- More acquisitions were needed
- More structures were taken too

Utility Relocations
- No longer need to relocate 72" Sewer Line
- Utility relocations were more difficult than expected
- Additional Utility relocations expected

c. Factors Affecting the Scope and Level of Review. *This section discussed the factors affecting the risk informed decisions on the appropriate scope and level of review. The discussion is intended to be detailed enough to assess the level and focus of review and support the PDT, PCX, and vertical team decisions on the appropriate level of review and types of expertise represented on the various review teams. The following factors were considered:*

- *If parts of the study will likely be challenging* The Arecibo PAC will document increases in costs primarily due to changes in Real Estate values and design refinements. No substantial challenges have been encountered during project implementation that would affect the scope and level of review for the PAC.

- *A preliminary assessment of where the project risks are likely to occur and what the magnitude of those risks might be:* It is not anticipated that the requested design refinements and relocations as well as associated increase in the 902 limit will increase general project risks. The changes to the project should serve to further reduce risks and ensure success of project purposes. In regards to life safety, a Safety Assurance Review (SAR) will be conducted on the LRR to ensure that there are no risks to life safety.

- *If the project will likely be justified by life safety or if the project likely involves significant threat to human life/safety assurance – the discussion of life safety should include the assessment of the home District Chief of Engineering on whether there is a significant threat to human life associated with the project:* A life safety risk assessment was not conducted as part of the original, authorized report and, as stated in the previous paragraph, will be conducted to determine if threat to human life/safety assurance exists.

- *If there is a request by the Governor of an affected state for a peer review by independent experts:* There has not been such a request.

- *If the project/study is likely to involve significant public dispute as to the size, nature, or effects of the project:* Because the design refinements will be made to reduce impacts to real estate interests and cultural resources, and the associated increase in the 902 limit, the changes are not expected to increase public dispute. The project is characteristic of other flood risk management projects that have been implemented by the USACE throughout the nation. There

is currently no public dispute and the size, nature and effects of the project changes should not lead to any public dispute of the project.

- *If the project/study is likely to involve significant public dispute as to the economic or environmental cost or benefit of the project:* The design refinements and associated increase in the 902 limit is not expected to increase public dispute as to the economic or environmental cost or benefit of the project. Initial economic analyses indicate that the project would still produce substantial benefits without any severe environmental consequences.

- *If the information in the decision document or anticipated project design is likely to contain influential scientific information or be a highly influential scientific assessment, to be based on novel methods, involve the use of innovative materials or techniques, present complex challenges for interpretation, contain precedent-setting methods or models, or present conclusions that are likely to change prevailing practices: No*. The requested design refinements and relocations and associated increase in the 902 limits are based upon the following: growth of Real Estate values, value added design modifications, modifications resulting from more detailed field data, adjustment to contract cost for changed site conditions and required design adjustments addressing significant problems associated with impacts of Hurricane Georges. None of the refinements or relocations were considered innovative or precedent-setting and would not introduce changes to prevailing practices. The changes to the project are considered typical post-authorization changes to improve project performance. The PAC or the resulting project modifications will not likely contain influential scientific information or be a highly influential scientific assessment.

- *If the project design is anticipated to require redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design construction schedule:* The authorized project did not incorporate increased redundancy, resiliency and/or robustness, nor did the design refinements and relocations. Construction sequencing would remain the same and is commonplace for this type of project. No substantial changes are expected for the construction schedule save for possible delays due to the need for a PAC.

d. In-Kind Contributions. Products and analyses provided by non-Federal sponsors as in-kind services are subject to DQC, ATR, and IEPR. The in-kind products and analyses to be provided by the non-Federal sponsor include: None.

4. DISTRICT QUALITY CONTROL (DQC)

All decision documents (including supporting data, analyses, environmental compliance documents, etc.) shall undergo DQC. DQC is an internal review process of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Management Plan (PMP). The home district shall manage and document DQC.

a. Documentation of DQC. Internal District control of product quality will be accomplished by PDT and supervisory reviews of interim and final products. DQC documentation will be maintained in the project file.

b. Products to Undergo DQC. The draft PAC and all related appendices.

5. AGENCY TECHNICAL REVIEW (ATR)

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

a. Products to Undergo ATR. ATR will be conducted on the draft report. The draft report ATR is anticipated to be comprehensive. After coordination with USACE SAD and HQ, it was determined that no additional NEPA documentation will be required for the LRR and that existing NEPA documentation is sufficient.

b. Required ATR Team Expertise. The ATR team members should be subject matter experts or regional technical specialists for their fields. The ATR team will be nominated and identified by the RMO/PCX and will be comprised of individuals from all the technical disciplines that were significant in the preparation of the report. Nine technical disciplines determined to be appropriate for this review include: Plan Formulation, Economics, Environmental Resources, Civil Engineering, Hydraulic Engineering and Water Control, Cost Engineering, Geotechnical Engineering, and Real Estate.

ATR Team Members/Disciplines	Expertise Required
ATR Lead	The ATR lead should be a senior professional with extensive experience in preparing Civil Works decision documents and conducting ATR. The lead should also have the necessary skills and experience to lead a virtual team through the ATR process. The ATR lead may also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc).
Plan Formulation	Plan formulation reviewer should be familiar with the requirements of reporting requirements for post authorization change reports and experienced in conducting flood risk management studies. Preferably familiar with Puerto Rico issues (but not mandatory).
Economics	The economist should be experienced in economic analysis of flood risk management projects. Preferably familiar with economic issues in Puerto Rico (but not mandatory).
Environmental Resources	The Environmental Resources Specialist should be experienced in NEPA compliance, particularly for analysis of flood risk management projects, and associated potential mitigation requirements. Preferably familiar with environmental issues in Puerto Rico (but not mandatory).
Hydraulic Engineering and Water Control	The hydraulic engineering reviewer will be an expert in the field of hydraulics and have a thorough understanding of open channel

	dynamics, enclosed channel systems, application of detention/retention basins, application of levees and flood walls. The reviewer will have at least seven years of experience in the field and be a licensed Professional Engineer (P.E.).
Geotechnical Engineering	Geotechnical Engineer should have extensive knowledge and experience evaluating major civil works structures and geotechnical aspects of construction. Should have design experience evaluating flood risk management projects. Preferably familiar with Puerto Rico (but not mandatory). The reviewer will have at least seven years of experience in the field and be a licensed Professional Engineer (P.E.).
Risk Analysis	The risk analysis reviewer will be experienced with performing and presenting risk analyses in accordance with ER 1105-2-101 and other related guidance, including familiarity with how information from the various disciplines involved in the analysis interact and affect the results. The risk analysis review will be provided by the FRM-PCX.
Civil Engineering	The Civil Engineer should be experienced in civil engineering for flood damage reduction projects. The reviewer will have at least seven years of experience in the field and be a licensed Professional Engineer (P.E.). Preferably familiar with Puerto Rico (but not mandatory).
Cost Engineering	Cost Engineer should be experienced in cost engineering for flood damage reduction projects. Preferably familiar with Puerto Rico (but not mandatory). The cost engineering reviewers will be selected by the Cost MCX. The reviewer will have at least seven years of experience in the field and be a licensed Professional Engineer (P.E.).
Real Estate	The Real Estate Specialist should have experience with acquisition of diverse properties in support of flood risk management projects. Preferably familiar with pertinent real estate nuances in Puerto Rico (but not mandatory).

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

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

(4) The probable specific action needed to resolve the concern – identify the action(s) that the reporting officers must take to resolve the concern.

In some situations, especially addressing incomplete or unclear information, comments may seek clarification in order to then assess whether further specific concerns may exist.

The ATR documentation in DrChecks will include the text of each ATR concern, the PDT response, a brief summary of the pertinent points in any discussion, including any vertical team coordination (the vertical team includes the district, RMO, MSC, and HQUSACE), and the agreed upon resolution. If an ATR concern cannot be satisfactorily resolved between the ATR team and the PDT, it will be elevated to the vertical team for further resolution in accordance with the policy issue resolution process described in either ER 1110-1-12 or ER 1105-2-100, Appendix H, as appropriate. Unresolved concerns can be closed in DrChecks with a notation that the concern has been elevated to the vertical team for resolution.

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

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

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

6. INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

Type I IEPR is required for all decision documents except where no mandatory triggers apply, criteria for an exclusion are met, and a risk-informed recommendation justifies exclusion. IEPR is the most independent level of review, and is applied in cases that meet certain criteria where the risk and magnitude of the proposed project are such that a critical examination by a qualified team outside of USACE is warranted. A risk-informed decision, as described in EC 1165-2-214, is made as to whether IEPR is appropriate. IEPR panels will consist of independent, recognized experts from outside of the USACE in the appropriate disciplines, representing a balance of areas of expertise suitable for the review being conducted. There are two types of IEPR:

- Type I IEPR. Type I IEPR reviews are managed outside the USACE and are conducted on project studies. Type I IEPR panels assess the adequacy and acceptability of the economic and

environmental assumptions and projections, project evaluation data, economic analysis, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, models used in the evaluation of environmental impacts of proposed projects, and biological opinions of the project study. Type I IEPR will cover the entire decision document or action and will address all underlying engineering, economics, and environmental work, not just one aspect of the study. For decision documents where a Type II IEPR (Safety Assurance Review) is anticipated during project implementation, safety assurance shall also be addressed during the Type I IEPR per EC 1165-2-214.

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

a. Decision on IEPR. The purpose of the PAC is to request an increase in the 902 limit, based upon growth of Real Estate values, value added design modifications, modifications resulting from more detailed field data, adjustments to contract cost for changed site conditions, and required design adjustments addressing significant problems associated with impacts of Hurricane Georges. Today's estimated total project costs are increased the greatest from lapsed years of escalation factors and due to the engineering refinements (see Section 3.b). The refinements to the authorized design were made for a variety of reasons, including value engineering, differing site conditions, and witnessed damages from Hurricane Georges. Most importantly, the proposed engineering refinements will help best achieve the project's intent of providing a 100-year level of flood protection for the city and preserving the socio-economic stability of the region. The total cost of the design refinements addressed in the PAC would be more than $45 million, triggering the requirement for Type I IEPR even though they are minor, relative to the total authorized project. Additionally, the proposed refinements do not necessitate project reformulation; however, at this time, there is not enough information to conduct an assessment of life safety risk. As such, *the Jacksonville District conclusion is that this project is recommended for Type I IEPR.*

The Type I IEPR will include a Safety Assurance Review (SAR) to address life safety risk. Detailed scope of the IEPR will be determined in advance of the review. Preliminarily, the cost of IEPR is anticipated to be approximately $200K. Significant or relevant public or agency comments received prior to or during IEPR will be provided to the panel of reviewers.

Type II IEPR: As stated above, the Type I IEPR will include a SAR. Based on the project as currently envisioned, the District Chief of Engineering, as the Engineer-In-Responsible-Charge, recommends a Type II IEPR Safety Assurance Review of this project. A final risk-informed decision concerning the timing and the appropriate level of reviews including a Type II IEPR for the project implementation documents will be prepared and submitted for approval in an updated Review Plan prior to initiation of the design/implementation phase of this project.

b. Products to Undergo Type I IEPR: The Draft Post Authorization Change Report with technical appendices will be subjected to IEPR. Scope of IEPR I should include:

- General review of the draft report for completeness.
- Completeness and appropriateness of flood risk management analyses.
- Completeness and appropriateness of economic analyses.
- Completeness and appropriateness of engineering analyses.
- Safety Assurance (review of final risk assessment) and safety-related conceptual assumptions and design.

c. Required Type I IEPR Panel Expertise:

IEPR Panel Members/Disciplines	Expertise Required
Economics	The Economics Panel Member should be a professional from academia, a public agency or an Architect-Engineer or Consulting Firm with a minimum 5 years demonstrated experience in evaluating and conducting complex multi-objective public works projects with high public and interagency interest.
Plan Formulation	The Planner Panel Member will be a professional from academia, a public agency or an Architect-Engineer or Consulting Firm with a minimum 10 years demonstrated experience in evaluating and conducting complex multi-objective public works projects with competing trade-offs. Experience should encompass projects with high public and interagency interests and may have nearby project impacted sensitive habitats.
Environmental/Ecological Evaluation	The Ecological Evaluations Panel Member should be a scientist from academia, public agency, non-governmental entity, or an Architect-Engineer or Consulting Firm with a minimum 5 years demonstrated experience in evaluating and conducting ecological evaluations for complex public works projects with competing trade-offs. Experience should encompass projects with high public and interagency interests and that may have effects on sensitive habitats.
Cost Engineering	The Cost Engineering Panel Member should be an Engineer from academia, a public agency, non-governmental entity, or an Architect-Engineer or Consulting Firm with a minimum 5 years demonstrated experience in performing cost engineering/construction management for all phases of the project, including safety assurance. Active participation in related professional societies is encouraged. Panel member should be familiar with the construction industry and practices used in Florida and/or the Southeastern United States.
Construction Management	The Construction Management Panel Member should be an Engineer from academia, a public agency, non-governmental

	entity, or an Architect-Engineer or Consulting Firm with a minimum 5 years demonstrated experience in performing cost engineering/construction management for all phases of the project, including safety assurance. Active participation in related professional societies is encouraged. Panel member should be familiar with the construction industry and practices used in Florida and/or the Southeastern United States.
Hydraulic Engineer	Hydraulic Engineering Panel Member should be from academia, public agency or an Architect-Engineer or Consulting Firm with a minimum 5 years demonstrated experience in hydraulic engineering. Active participation in related professional societies is encouraged.
Geotechnical Engineer	The Geotechnical Panel Member should be a Professional Engineer from academia, a public agency, or an Architect-Engineer Consulting Firm with a minimum 5 years demonstrated experience in embankment design (i.e. slope stability, seepage evaluation, settlement analysis, and construction methods) for flood control and water storage, cut/fill operations, construction dewatering, and seepage control. Experience should also include geotechnical evaluation of flood risk management structures. Active participation in related professional societies is encouraged.
Risk Analysis	The risk analysis reviewer will be experienced with performing and presenting risk analyses in accordance with ER 1105-2-101 and other related guidance, including familiarity with how information from the various disciplines involved in the analysis interact and affect the results. The risk to be evaluated is primarily, but, not limited to, flood risk and related life/safety risk.

d. Documentation of Type I IEPR. The IEPR panel will be selected and managed by an Outside Eligible Organization (OEO) per EC 1165-2-214, Appendix D. Panel comments will be compiled by the OEO and should address the adequacy and acceptability of the economic, engineering and environmental methods, models, and analyses used. IEPR comments should generally include the same four key parts as described for ATR comments in Section 4.d above. The OEO will prepare a final Review Report that will accompany the publication of the final decision document and shall:

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

The final Review Report will be submitted by the OEO no later than 60 days following the close of the public comment period for the draft decision document. USACE shall consider all recommendations contained in the Review Report and prepare a written response for all

recommendations adopted or not adopted. The final decision document will summarize the Review Report and USACE response. The Review Report and USACE response will be made available to the public, including through electronic means on the internet.

7. POLICY AND LEGAL COMPLIANCE REVIEW

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

8. COST ENGINEERING MANDITORY CENTER OF EXPERTISE (MCX) REVIEW AND CERTIFICATION

All decision documents shall be coordinated with the Cost Engineering MCX, located in the Walla Walla District. The MCX will assist in determining the expertise needed on the ATR team and Type I IEPR team and in the development of the review charge(s). The MCX will also provide the Cost Engineering MCX certification. The RMO is responsible for coordination with the Cost Engineering MCX.

9. MODEL CERTIFICATION AND APPROVAL

EC 1105-2-412 mandates the use of certified or approved models for all planning activities to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. Planning models, for the purposes of the EC, are defined as any models and analytical tools that planners use to define water resources management problems and opportunities, to formulate potential alternatives to address the problems and take advantage of the opportunities, to evaluate potential effects of alternatives and to support decision making. The use of a certified/approved planning model does not constitute technical review of the planning product. The selection and application of the model and the input and output data is still the responsibility of the users and is subject to DQC, ATR, and IEPR.

Planning Models. The following planning models are anticipated to be used in the development of the decision document:

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Certification / Approval Status
Regional Economic System (RECONS)	This regional economic impact modeling provides accurate and defendable estimates of regional economic impacts associated with Corps spending. This modeling tool automates calculations and generates	Approved for use.

	estimates of jobs and other economic measures such as income and sales associated with USACE's annual Civil Work program spending, as well as stemming from effects of additional economic activities (for example, water transportations, tourism spending, etc) associated with USACE's core programs. .	
IWR Planning Suite 2.0	Contains an “annualizer” module that allows for easy calculations of equivalent annual average values, total net values, annualizing non-monetary benefits, and calculating various economic costs (including interest during construction)	Approved for use.
Section 902 Analysis Certified Tool	Section 902 of the Water Resources Development Act (WRDA) of 1986 defines the maximum amount that a project may cost. This is often called the 902 Limit or Project Cost Cap. It is, "The maximum project cost limit imposed by Section 902 is a numerical value specified by law which must be computed in a legal manner (ER 1105-2-100 Appendix G)." This tool assists with this calculation.	Approved for use.
HEC-FDA v. 1.2.5	This software provides the capability to perform an integrated hydrologic engineering and economic analysis during the formulation and evaluation of flood risk management plans. HEC-FDA is designed to assist US Army Corps of Engineers (USACE) study members in using risk analysis procedures for formulating and evaluating flood risk management measures (EM 1110-2-1619, ER 1105-2-101). The software, 1)	Certified

	stores hydrologic and economic data necessary for an analysis, 2) provides tools to visualize data and results, 3) computes expected annual damage (EAD) and equivalent annual damages, 4) computes annual exceedance probability (AEP) and conditional non-exceedance probability as required for levee certification, and, 5) implements the risk analysis procedures.	

EC 1105-2-412 does not cover engineering models used in planning. The responsible use of well-known and proven USACE developed and commercial engineering software will continue and the professional practice of documenting the application of the software and modeling results will be followed. As part of the USACE Scientific and Engineering Technology (SET) Initiative, many engineering models have been identified as preferred or acceptable for use on Corps studies and these models should be used whenever appropriate. The selection and application of the model and the input and output data is still the responsibility of the users and is subject to DQC, ATR, and IEPR (if required).

Engineering Models. The following engineering models are anticipated to be used in the development of the decision document:

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Certification / Approval Status
None	None	None

10. REVIEW SCHEDULES AND COSTS

a. ATR Schedule and Cost. ATR of the draft report is estimated to cost about $35K. Review of the draft PAC is scheduled to start in May 2013.

b. Type I IEPR Schedule and Cost. Type I IEPR start (start of panel review) is currently scheduled for June 2013. It is estimated to cost approximately $200K.

c. Model Certification/Approval Schedule and Cost. Not applicable as all models used have been validated/approved for use.

11. PUBLIC PARTICIPATION

At this time, public participation is not anticipated. Informal coordination with the Federal and Commonwealth of Puerto Rico resource agencies under the Section 7 of the Endangered Species Act will be conducted to ensure that the proposed refinements will not jeopardize the continued existence of

any species listed as threatened or endangered in the vicinity of the authorized project. SAJ has coordinated with SAD and HQ and determined that, at this time, no additional NEPA documentation will be required. If additional information arises, SAJ will re-coordinate with SAD and HQ to determine if any additional NEPA documentation will be completed.

12. REVIEW PLAN APPROVAL AND UPDATES

The South Atlantic Division Commander is responsible for approving this Review Plan. The Commander's approval reflects vertical team input (involving district, MSC, RMO, and HQUSACE members as applicable) as to the appropriate scope and level of review for the decision document. Like the PMP, the Review Plan is a living document and may change as the study progresses. The home district is responsible for keeping the Review Plan up to date. Minor changes to the review plan since the last MSC Commander approval are documented in Attachment 3. Significant changes to the Review Plan (such as changes to the scope and/or level of review) should be re-approved by the MSC Commander following the process used for initially approving the plan. The latest version of the Review Plan, along with the Commanders' approval memorandum, should be posted on the Home District's webpage. The latest Review Plan should also be provided to the RMO and home MSC.

13. REVIEW PLAN POINTS OF CONTACT

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

- *Jacksonville District Project Manager, 904-232-1597*
- *MSC, SAD, , 404-562-5228*
- *FRM-PCX Point of Contact, 415-503-6852*

ATTACHMENT 1: TEAM ROSTERS

Team Rosters Intentionally Deleated

ATTACHMENT 2: SAMPLE STATEMENT OF TECHNICAL REVIEW FOR DECSION DOCUMENTS

COMPLETION OF AGENCY TECHNICAL REVIEW

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

SIGNATURE _____ _____

Name Date
ATR Team Leader
Office Symbol/Company

SIGNATURE _____ _____

Name Date
Project Manager
Office Symbol

SIGNATURE _____ _____

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

SIGNATURE _____ _____

Name Date
Review Management Office Representative
Office Symbol

CERTIFICATION OF AGENCY TECHNICAL REVIEW

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

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

SIGNATURE _____ _____

Name Date
Chief, Engineering Division
Office Symbol

SIGNATURE _____ _____

Name Date
Chief, Planning Division
Office Symbol

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

ATTACHMENT 3: REVIEW PLAN REVISIONS

Revision Date	Description of Change	Page / Paragraph Number

ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS

Term	Definition	Term	Definition
AFB	Alternative Formulation Briefing	NED	National Economic Development
ASA(CW)	Assistant Secretary of the Army for Civil Works	NER	National Ecosystem Restoration
ATR	Agency Technical Review	NEPA	National Environmental Policy Act
CSDR	Coastal Storm Damage Reduction	O&M	Operation and maintenance
DPR	Detailed Project Report	OMB	Office and Management and Budget
DQC	District Quality Control/Quality Assurance	OMRR&R	Operation, Maintenance, Repair, Replacement and Rehabilitation
MCX	Directory of Expertise	OEO	Outside Eligible Organization
EA	Environmental Assessment	OSE	Other Social Effects
EC	Engineer Circular	PCX	Planning Center of Expertise
EIS	Environmental Impact Statement	PDT	Project Delivery Team
EO	Executive Order	PAC	Post Authorization Change
ER	Ecosystem Restoration	PMP	Project Management Plan
FDR	Flood Damage Reduction	PL	Public Law
FEMA	Federal Emergency Management Agency	QMP	Quality Management Plan
FRM	Flood Risk Management	QA	Quality Assurance
FSM	Feasibility Scoping Meeting	QC	Quality Control
GRR	General Reevaluation Report	RED	Regional Economic Development
Home District/MSC	The District or MSC responsible for the preparation of the decision document	RMC	Risk Management Center
HQUSACE	Headquarters, U.S. Army Corps of Engineers	RMO	Review Management Organization
IEPR	Independent External Peer Review	RTS	Regional Technical Specialist
ITR	Independent Technical Review	SAR	Safety Assurance Review
MSC	Major Subordinate Command	WRDA	Water Resources Development Act
PAC	Post Authorization Change	USACE	U.S. Army Corps of Engineers