



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
PACIFIC OCEAN DIVISION, U.S. ARMY CORPS OF ENGINEERS
FORT SHAFTER, HAWAII 96858-5440

CEPOD-PDC

20 NOV 2012

MEMORANDUM FOR COMMANDER HONOLULU ENGINEER DISTRICT (CEPOH-PP-C/NANI SHIMABUKU), BUILDING 230, FORT SHAFTER, HI 96858-5440

SUBJECT: Review Plan Approval for the Iao Stream Flood Risk Management Project Design Deficiency, Island of Maui, Hawaii, Engineering Documentation Report

1. References:

a. Engineering Circular 1165-2-209, Civil Works Review Policy, 31 January 2010, and Change 1, 31 January 2012.

b. Review Plan for the Iao Stream Flood Risk Management Project Design Deficiency, Island of Maui, Hawaii, Engineering Documentation Report, Honolulu District, U.S. Army Corps of Engineers.

2. The enclosed Review Plan (reference 1.b.) for the Iao Stream Flood Risk Management Project Design Deficiency Engineering Documentation Report was prepared IAW references 1.a. The Pacific Ocean Division Civil Works Division is the lead office to execute this Review Plan. This Review Plan includes Type I Independent External Peer Review.

3. I approve this Review Plan. It is subject to change as circumstances require, consistent with project development under the Project Management Business Process. Subsequent revisions to this Review Plan or its execution will require new written approval from this office.

4. The point of contact for this memorandum is Mr. Russell Iwamura, Senior Economist, Civil Works Integration Division, at 808-835-4625 or email Russell.K.Iwamura@usace.army.mil.

Encl

GREGORY J. GUNTER
Colonel, EN
Acting Commander

REVIEW PLAN

**‘Īao Stream Flood Risk Management Project Design Deficiency, Island Of Maui, Hawai‘i
Engineering Documentation Report**

U.S. Army Corps of Engineers, Honolulu District



MSC Approval Date: 20 November 2012

Last Revision Date: 19 November 2012



**US Army Corps
of Engineers®**

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REVIEW PLAN

‘Īao Stream Flood Risk Management Project Design Deficiency, Island of Maui, Hawai‘i Engineering Documentation Report

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1. PURPOSE AND REQUIREMENTS

a. Purpose. This Review Plan defines the scope and level of peer review for the ‘Īao Stream Flood Risk Management Project Design Deficiency, Wailuku, Island of Maui, Hawai‘i. Engineering Documentation Report (EDR) and Environmental Impact Statement (EIS).

This review plan was developed using the U.S. Army Corps of Engineers (USACE) National Planning Center of Expertise (PCX) review plan template dated 15 June 2011.

b. References

(1) Engineer Circular (EC) 1165-2-209, Civil Works Review Policy, 31 January 2010 and Change 1, 31 January 2012.

(2) EC 1105-2-412, Assuring Quality of Planning Models, 31 March 2011.

(3) Engineer Regulation (ER) 1110-1-12, Quality Management, 30 September 2006.

(4) ER 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 November 2007.

(5) ‘Īao Stream Flood Risk Management Design Deficiency Project Management Plan (PMP), November 2002 (update in progress).

(6) USACE Pacific Ocean Division (POD) Quality Management Plan, December 2010.

(7) USACE Honolulu District (POH) Civil Works Review Policy (ISO CEPOH-C_12203), 1 November 2010.

c. Requirements. This review plan was developed in accordance with EC 1165-2-209, 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, certification (per EC 1165-2-209), and planning model certification/approval (per EC 1105-2-412) and the Value Management Plan requirements in the Project Management Business Process (PMBP) Reference 8023G and ER 11-1-321, Change 1.

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 approval authority for the EDR and EIS is the POH Commander. As such, the RMO for the peer review effort described in this Review Plan is POD.

The RMO will coordinate with the Cost Engineering Mandatory Center of Expertise (MCX) to ensure the appropriate expertise is included on the review teams to assess the adequacy of cost estimates, construction schedules and contingencies. POD will coordinate with the RMC on life safety issues and the Flood Risk Management (FRM) PCX as needed.

3. STUDY INFORMATION

a. Decision Document. The ‘Īao Stream FRM Project located in Wailuku, Island of Maui, Hawaii was authorized under Section 203 of the Flood Control Act of 1968, Public Law (PL) 90-483. Construction of the project was completed in 1981. A memorandum titled, Modifications to Completed Project Report for the ‘Īao Stream Flood Risk Management Project, dated 28 March 1995, concluded that the original project design was deficient and recommended modifications to correct the undermining of the levee toe resulting from natural streambed erosion processes in ‘Īao Stream. Modifications are being pursued under the original project authority pursuant to paragraph 7a of ER 1165-2-119, dated 20 September 1982. The project is in the Preconstruction Engineering and Design phase, and an Engineering Documentation Report and Environmental Impact Statement are being prepared in accordance with ER 1110-2-1150 (dated 31 August 1999) to analyze and determine a recommended plan to correct the design deficiency and continue into design.

b. Project Sponsor. The non-federal sponsor for this project is the County of Maui, Department of Public Works.

c. Study/Project Description. The ‘Īao Stream drainage basin is a 10 square mile area that begins at the boundary between the Lahaina and Wailuku Judicial districts and extends along the crests of the Kaho‘olewa and Kapilau Ridges to the Pacific Ocean (Figure 1). The basin is eight miles long and averages 1.25 miles in width. It is characterized by two major topographic features: a coastal plain that extends about three miles inland, and ‘Īao Valley, the largest valley in West Maui, which extends from the coastal plain to the summit of Pu‘u Kukui at an elevation of 5,800 ft above sea level. The stream drains into a steep valley with stream flows at the upstream project limit conveyed into a debris basin.

Construction of the ‘Īao Stream FRM Project was initiated in 1977 and completed in 1981. The existing project consists of a debris basin located 2.5 miles upstream from the stream mouth, a 3,500-foot long channel downstream from the debris basin: levees along the left and right bank, flood plain management along 6,950 ft of the left bank, and stream realignment for a 1,730-foot reach to the shoreline. In the flood plain management reach, levees are located on the right stream bank and are offset up to 80 ft beyond the existing stream bank. The proposed modifications to the 1981 FRM Project extend from above Waiehu Beach Road (Sta 22+00) to the debris basin at the upstream limits of the project, a distance of approximately 2.5 miles (Figure 2).

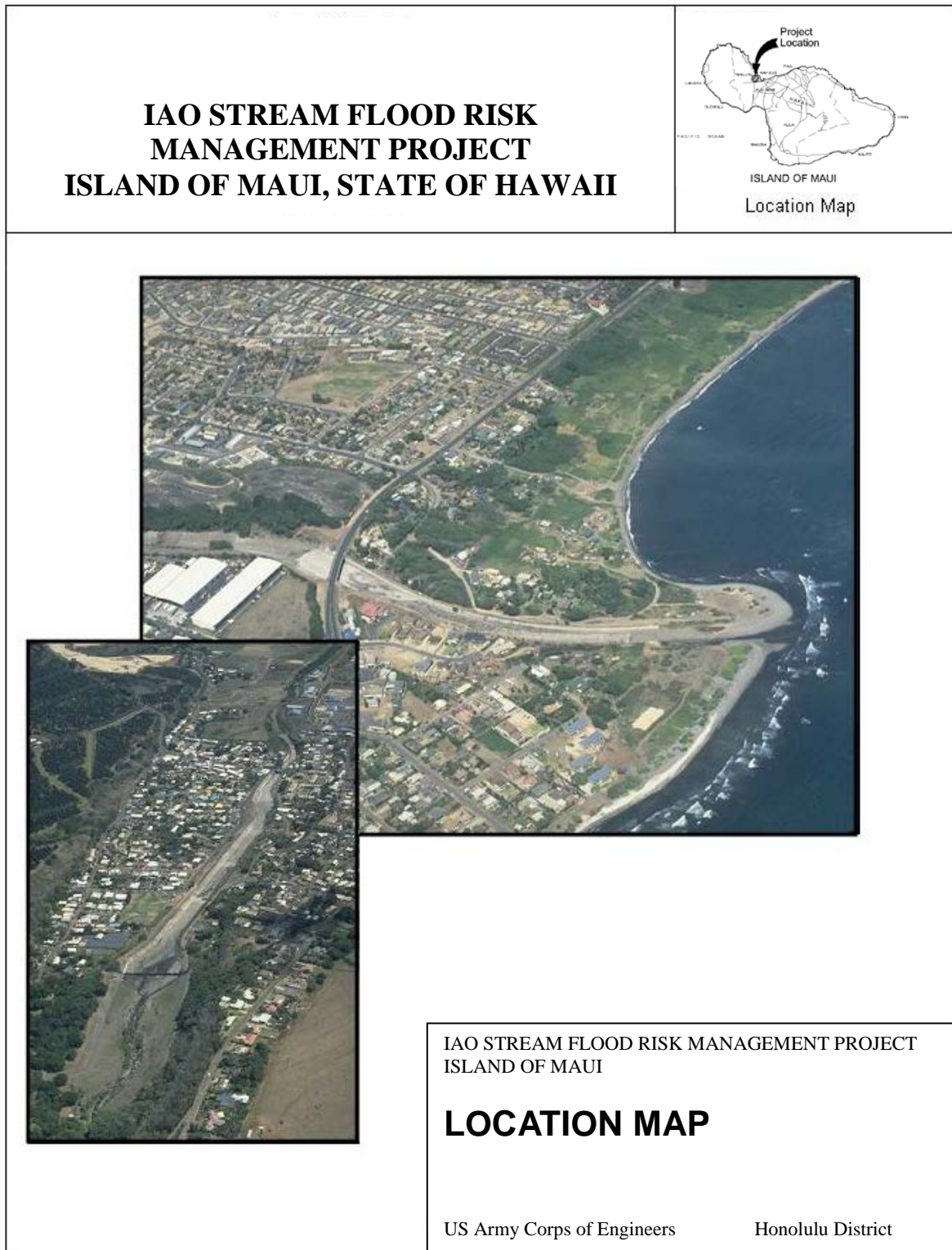


FIGURE 1. Location Map

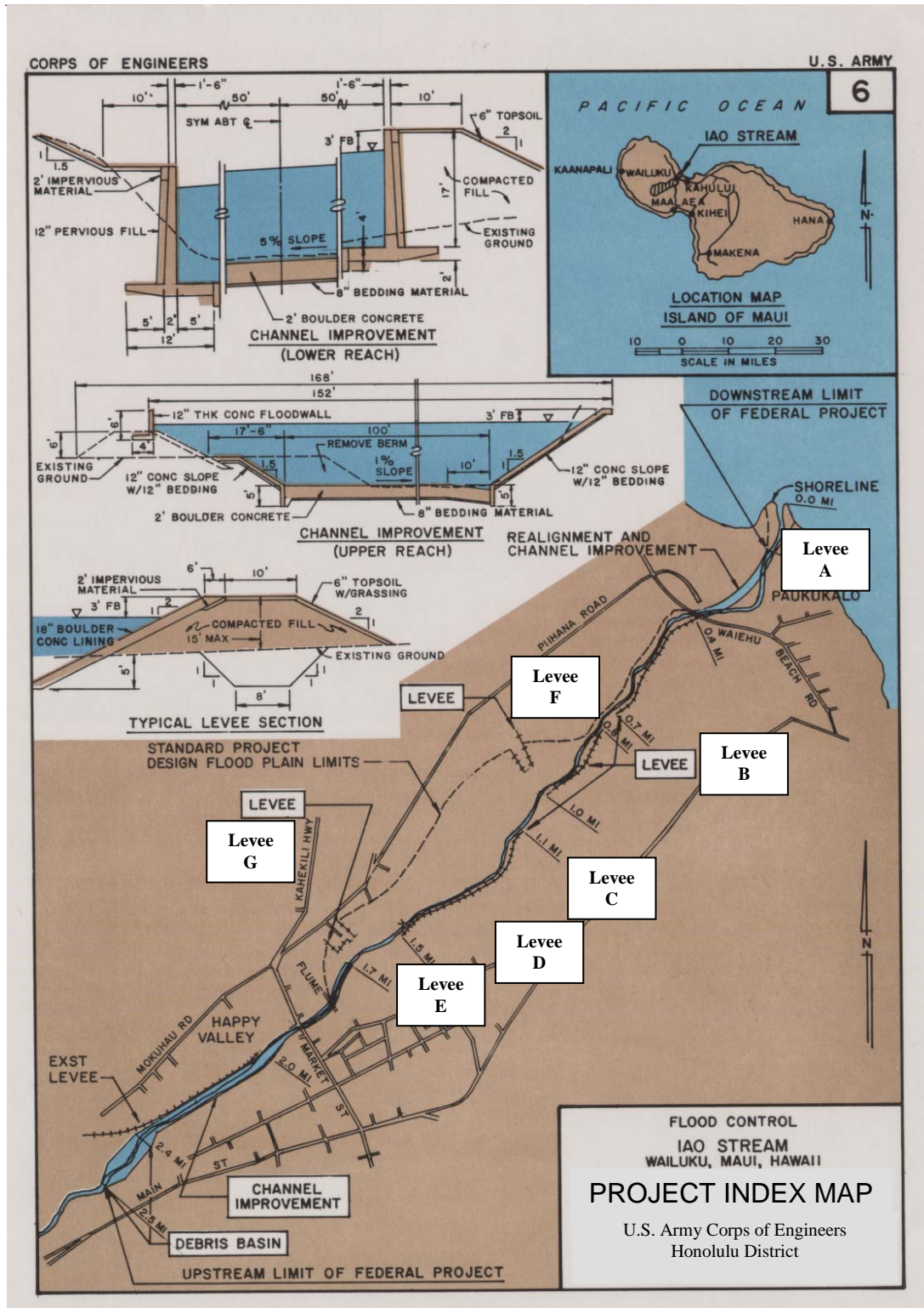


Figure 2: Current Project Condition

A total of five alternatives, including the no action alternative, will be analyzed to determine the recommended alternative to repair the existing project and enable it to function as was originally intended. USACE is authorized to implement flood damage reduction repairs to ‘Īao Stream that meet the Standard Project Flood requirements to protect the existing Wailuku community. Existing levees continue to be undermined and will ultimately fail if nothing is done. Alternatives developed to date include: A) No Action, B) Removal of Flood Risk Management Improvements, C) Roller Compacted Concrete (RCC) and Boulder Invert Channel Following Existing Alignment, D) Dual Stilling and Sedimentation Basins, and E) RCC Channel with Grade Control Structures.

d. Estimated Construction Costs. The estimated cost for construction of the repair of the design deficiency is \$30 million.

e. Factors Affecting the Scope and Level of Review. USACE has determined that the damages incurred by the 1981 FRM Project during the years immediately following the completion of the project are due to design deficiencies of the original project and an EDR is needed to implement appropriate modifications. POH has determined that the EDR will require both Type I and Type II IEPR because of the following issues:

- The project likely involves significant threat to human life/safety as ‘Īao Stream drainage basin includes the potential for flood damages to a myriad of businesses and residents of Wailuku, Island of Maui, Hawai‘i. Consistent with EC 1165-2-209, Mr. Todd Barnes, POH Chief of Engineering and Construction, concurs with the assessment that there is potential life safety issues at this stage in plan formulation;
- An EIS is required for the project;
- The project does not meet the other criteria for Type I IEPR. Plan formulation is not expected to be challenging or novel. The project is not anticipated to require redundancy, resiliency and/or robustness, unique construction sequencing, or reduction in overlapping design construction schedules. There has been no request by the Governor of the State of Hawai‘i for peer review by independent experts, nor is there significant public dispute over any aspect of the proposed project.

f. In-Kind Contributions. Products and analyses provided by non-Federal sponsors as work-in-kind services are subject to DQC, ATR, and IEPR. There are no in-kind contributions proposed as part of this project.

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 PMP. POH shall manage DQC. Documentation of DQC activities is required and should be in accordance with the Quality Manual of the POH and POD.

a. Documentation of DQC. Consistent with the POH Quality Manual, DQC will be documented using the POH DQC review table. When all comments have been addressed and back checked, the DQC lead will sign a DQC certification in compliance with the POH Quality Manual. The DQC comments and responses will be provided for the ATR team at each review.

b. Products to Undergo DQC. The following products will be subject to DQC:

- The draft EDR and final report (including NEPA/environmental compliance documentation and technical appendices.).

c. Required DQC Expertise. The following expertise is needed for DQC.

Table 1: DQC Expertise

DQC Team Members/Disciplines	Expertise Required
DQC Lead	The DQC lead should be a senior professional with extensive experience in preparing Civil Works decision documents and conducting DQC.
Planning	The Planning reviewer should be a senior water resources planner with experience in the development of design deficiency documents and expertise in flood risk management planning.
Economics	Reviewer must be experienced in standard civil works flood risk management economics. The individual may also review the socio-economic evaluation if qualified.
Environmental Resources	The reviewer must be experienced with the National Environmental Policy Act (NEPA) compliance and the Clean Water Act (CWA) Section 404 (B)(1) analysis.
Hydrology and Hydraulic Engineering	The Hydrology and Hydraulic engineering reviewer will be an expert in the field of hydraulics and have a thorough understanding of the flashy nature of Hawaii streams—including knowledge of stream flash flood dynamics, application of detention/retention basins, application of flood walls, non-structural solutions involving flood warning systems and flood proofing, etc and/or computer modeling techniques that will be used such as HEC-RAS, or Hydraulics and HEC-HMS.
Geotechnical Engineering	Reviewer must be experienced in design requirements for standard flood risk management measures.
Civil/Structural Engineering	Reviewer must be experienced in design requirements for standard flood risk management measures.
Cost Engineering	Reviewer must be experienced in design requirements for standard flood risk management measures.

DQC Team Members/Disciplines	Expertise Required
Real Estate	Reviewer must be experienced in civil works real estate laws, policies and guidance and experience working with sponsor real estate issues.
Ecosystem Restoration/Biologist	Reviewer must be experience in Habitat Equivalency Protocol (HEP) ecosystem restoration model to be used to determine requirements (if any) for compensatory mitigation and to evaluate benefits from proposed ecosystem restoration measures.

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 POD, and is conducted by a qualified team from outside POH 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 POD.

a. Products to Undergo ATR. An ATR was previously completed on the Draft EDR and EA. The following additional products will be subject to ATR:

- Revised Draft EDR and EIS;
- Final EDR and EIS; and,
- Key technical and interim products.

b. Required ATR Team Expertise. The following ATR expertise is required for this project. Where possible ATR team members will address multiple disciplines and emphasis. The PM will work with the RMO, vertical team and other appropriate centers of expertise to identify the final make-up of the ATR team and identify the ATR team leader. Once identified, the ATR team members for this study and a brief description of their credentials will be added in Attachment 1.

Table 2: ATR Required Expertise

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

ATR Team Members/Disciplines	Expertise Required
	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.
Planning	The Planning reviewer should be a senior water resources planner with experience in the development of design deficiency documents and expertise in flood risk management planning.
Economics	Review must be experienced in standard civil works flood risk management economics. The individual may also review the socio-economic evaluation if qualified.
Environmental Resources	The reviewer must be experienced with the NEPA compliance and CWA Section 404 (B)(1) analysis.
Hydrology and Hydraulic Engineering	The Hydrology and Hydraulic engineering reviewer will be an expert in the field of hydraulics and have a thorough understanding of the flashy nature of Hawai‘i streams—including knowledge of stream flash flood dynamics, application of detention/retention basins, application of flood walls, non-structural solutions involving flood warning systems and flood proofing, etc and/or computer modeling techniques that will be used such as HEC-RAS, or Hydraulics and HEC-HMS.
Geotechnical Engineering	Reviewer must be experienced in design requirements for standard flood risk management measures.
Civil/Structural Engineering	Reviewer must be experienced in design requirements for standard flood risk management measures.
Cost Engineering	Reviewer must be experienced in design requirements for standard flood risk management measures.
Real Estate	Reviewer must be experienced in civil works real estate laws, policies and guidance and experience working with sponsor real estate issues.
Ecosystem Restoration Expert/Biologist	Reviewer must be experience in HEP ecosystem restoration model to be used to determine requirements (if any) for compensatory mitigation and to evaluate benefits from proposed ecosystem restoration measures.
Construction and Operations	Construction reviewer will have expertise in flood risk management structures.

c. Documentation of ATR. DrCheckssm 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:

- The review concern – identify the product’s information deficiency or incorrect application of policy, guidance, or procedures;
- The basis for the concern – cite the appropriate law, policy, guidance, or procedure that has not been properly followed;
- 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
- 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 where information is incomplete or unclear, comments may seek clarification in order to then assess whether further specific concerns may exist.

The ATR documentation in DrCheckssm will include the text of each ATR concern, the Project Delivery Team (PDT) response, a brief summary of the pertinent points in any discussion, including any vertical team coordination (the vertical team includes POH, POD, and possibly the FRM-PCX 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 DrCheckssm 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 draft report, and final report. A sample Statement of Technical Review is included in Attachment 2.

6. INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

IEPR may be required for decision documents under certain circumstances. IEPR is the most independent level of review and is applied 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 1165-2-209, is made to assess whether an IEPR is appropriate. IEPR panels will consist of independent, recognized experts from outside of the USACE in the appropriate disciplines. The IEPR panel will represent 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 by an Outside Eligible Organization (OEO) 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 (SAR)) is anticipated during project implementation, safety assurance shall also be addressed during the Type I IEPR per EC 1165-2-209.

- **Type II IEPR.** Type II IEPR, or SAR, is managed by the RMC and is 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.** This project meets a number of the mandatory triggers for Type I IEPR described in Paragraph 11.d.(1) and Appendix D of EC 1165-2-209. Accordingly, it will undergo both a Type I IEPR for the decision document and Type II IEPR for the design and follow-on project implementation. Safety Assurance will also be addressed during the Type I IEPR per Paragraph 2.c.(3) of Appendix D of EC 1165-2-209.

b. Products to Undergo Type I IEPR.

- Draft EDR and EIS.

c. Required Type I IEPR Panel Expertise. The following IEPR expertise is required for this project. Where possible IEPR panel members will address multiple disciplines and emphasis. The PM will work with POD, vertical team and other appropriate centers of expertise to identify the final make-up of expertise required for the IEPR team. The panel will include the necessary expertise to assess the engineering, environmental, and economic adequacy of the decision document as required by EC 1165-2-209, Appendix D. The Outside Eligible Organization (OEO) will determine the final participants on the panel. The following table provides the disciplines that will be included on the IEPR team and a sample description of the expertise required. The IEPR panel members for this study and a brief description of their credentials will be included in Attachment 1 once they are identified.

Table 3: IEPR Expertise

IEPR Panel Members/Disciplines	Expertise Required
Economics	The economics panel member should have experience/credentials in flood risk management in small island economies.
Environmental–NEPA Compliance Expert and Tropical Stream Ecology	The environmental panel member should have environmental regulatory expertise in NEPA, CWA, Fish and Wildlife Coordination Act (FWCA) and the Endangered Species Act (ESA). In addition, the environmental expert should have expertise in tropical stream ecology and changes in stream function and processes due to implementation of flood risk management structures.
Engineering Hydraulic Engineer AND Geotechnical/Civil/Structural Engineer	<p>The hydraulic engineering reviewer should have extensive experience in flood risk management in flash-flood urbanized systems (preferably tropical systems).</p> <p>The geotechnical engineering reviewer should have extensive experience in geotechnical evaluation of flood risk management structures such as static and dynamic slope stability evaluation, evaluation of the seepage through the foundation of various flood risk management structures, like debris basins and floodwalls, and in settlement evaluation of the structures.</p> <p>The Civil/Structural engineering reviewer should have extensive experience in the design and construction of reinforced concrete channels and other related flood risk management structures.</p>

IEPR Panel Members/Disciplines	Expertise Required
	The engineering reviewer will also perform Type II IEPR required SAR during the Type I IEPR review.

d. Documentation of Type I & Type II IEPR. The IEPR panel will be selected and managed by an OEO per EC 1165-2-209, 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 5.c 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 POD 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 MANDATORY 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 (if required) and in the development of the review charge(s). The MCX will also provide the Cost Engineering Certification. POD is responsible for coordination with the Cost Engineering MCX.

9. MODEL CERTIFICATION AND APPROVAL

a. Planning Models. EC 1105-2-412 mandates the use of certified or approved models for all planning activities to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. Planning models, 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 (if required).

In accordance with EC 1105-2-412 Paragraph 5.c, models that are single-use or study-specific require approval that the model is a technically and theoretically sound and functional tool that can be applied during the planning process by knowledgeable and trained staff for purposes consistent with the model’s purpose and limitation. For this project, the PM will coordinate with the Ecosystem Restoration (ECO) PCX in determining the appropriate level of review for model approval. At this time, an additional ATR reviewer has been added to specifically approve models for site specific use.

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

Table 4: Planning Models and Certification/Approval Status

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Certification / Approval Status
HEC-FDA 1.2.4 (Flood Damage Analysis)	The Hydrologic Engineering Center’s Flood Damage Reduction Analysis (HEC-FDA) program provides the capability for integrated hydrologic engineering and economic analysis for formulating and evaluating flood risk management plans using risk-based analysis methods. The program will be used to evaluate and compare the future without- and with-project plans along the ‘Īao	Certified

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Certification / Approval Status
	Stream to aid in the selection of a recommended plan to manage flood risk.	
IWR Planning Suite	This model assists with formulating plans and conducting Cost-Effectiveness/Incremental Cost Analysis (CE/ICA), which are required for ecosystem restoration projects. An “annualizer” module has been included to allow for easy calculations of equivalent annual average values, total net values, and annualizing non-monetary benefits and calculating costs. The IWR Planning Suite will be used for the required CE/ICA analysis associated with identification of the appropriate level of compensatory mitigation.	Certified
‘Īao Stream Study Specific Habitat evaluation and Mitigation model	There is no regional ecosystem output model for Hawai‘i streams. This project proposes the use of a study specific model based on the Hawaiian Stream Habitat Evaluation Protocol (HSHEP) model which follows the overall concepts developed by the US Fish and Wildlife Service. Traditional HEP procedures have been joined with multi-spatial modeling efforts for Hawaiian streams to address management issues on a site, stream reach, whole stream or regional level. The model will be used to assess stream function on a specific reach of the stream in a one-time use.	Approval to be coordinated with the ECO-PCX.

b. Engineering Models. EC 1105-2-412 does not cover engineering models used in planning. The responsible use of well-known and proven USACE developed and commercial engineering software will continue 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).

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

Table 5: Engineering Models and Approval Status

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Approval Status
HEC-RAS 4.0 (River Analysis)	The Hydrologic Engineering Center’s River Analysis System (HEC-RAS) program provides the capability to	HH&C CoP Preferred

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Approval Status
System)	perform one-dimensional steady and unsteady flow river hydraulics calculations. The program will be used for steady flow analysis to evaluate the future without- and with-project conditions along the ‘Iao Stream and its tributaries.	Model
HEC-HMS 3.5 (Hydrologic Modeling System)	The Hydrologic Engineering Center’s Hydrologic Modeling System (HEC-HMS) program provides the capability to simulate the precipitation-runoff processes of dendritic watershed systems. It is designed to be applicable in a wide range of geographic areas for solving the widest possible range of problems. This includes large river basin water supply and flood hydrology, and small urban or natural watershed runoff. The program will be used to evaluate different storms in the ‘Īao Stream watershed to produce hydrographs which will then be used in the HEC-RAS models.	Approved
HEC-SSP 2.0 (Statistical Software Package)	The Hydrologic Engineering Center’s Statistical Software Package (HEC-SSP) program allows you to perform statistical analyses of hydrologic data. The program will be used to perform flood flow frequency analysis based on Bulletin 17B, “Guidelines for Determining Flood Flow Frequency” (1982) for the ‘Īao Stream.	Approved
Microcomputer Aided Cost Engineering System (MCACES) 2 nd Generation (MII)	The MCACES/MII construction cost estimating software, developed by Building Systems Design Inc., is a tool used by cost engineers to develop and prepare all Civil Works cost estimates. Using the features in this system, cost estimates are prepared uniformly allowing cost engineering throughout USACE to function as one virtual cost engineering team.	Cost Engineering DX Required Model

10. REVIEW SCHEDULES AND COSTS

a. ATR Schedule and Cost. The ATRs for this study will be accomplished in accordance with the cost and schedule in the PMP. As of the approval date of this Review Plan, the ATRs of the various documents are scheduled as follows:

- Draft EDR/EIS report review – 2 months (June 2013).
- Final report review – 2 months (January 2014).
- Estimated cost: \$60,800.00

b. Type I IEPR Schedule and Cost. The IEPR for this study will be accomplished in accordance with the cost and schedule in the PMP. As of the approval date of this Review Plan, the IEPR is scheduled as follows:

- Draft report review – October 2013.
- Estimated Contract Cost - \$100,000.

Pursuant to Section 2034 of the Water Resources Development Act (WRDA) of 2007, this amount is 100% federally funded.

- Estimated Cost of District and FRM PCX Coordination of the IEPR - \$40,000.

c. Model Certification/Approval Schedule and Cost. The ‘Īao Stream Study Specific Habitat ecosystem and mitigation model will be used on a one-time basis. Consistent with EC 1105-2-412, the model will require approval for use. The approval review of the single use site specific model will be coordinated with the ECO-PCX to determine if approval during ATR is acceptable. In the event that the ECO-PCX requires a separate or regional approval, schedule and costs will be adjusted accordingly.

11. PUBLIC PARTICIPATION

As part of the Stakeholder Involvement Plan, public participation will be solicited throughout the planning process. Critical milestones for the public participation include:

- Public postings and individual notices - issue to Federal, State and County resource agencies at various times during the study process
- Public Scoping Meeting – discuss the project scope and seek public input (conducted on August 12, 2003)
- Draft EA Public Hearing – seek public input on the Draft EA (conducted on April 16, 2009).
- State EIS Preparation Notice – the non-Federal sponsor must comply with state law requiring the issuance of an EIS Preparation Notice (published on April 8, 2011 in the Office of Environmental Quality Control (OEQC) Environmental Notice and Federal Register Vol. 76, No. 68).
- Draft EIS Public Hearing – Consistent with NEPA, a public hearing and comment period will be held to seek public input on the Draft EIS.

During the peer review process, significant public comments will be provided to the reviewers at the DQC, ATR and IEPR levels before they conduct their reviews. Copies of previous

comments have been documented as a part of the record and will also be included in all NEPA documents.

A summary of significant and relevant public comments will be provided to reviewers before they conduct their review. The final decision document, associated review reports, and USACE responses to IEPR comments (if applicable) will be made available to the public on the POH website.

12. REVIEW PLAN APPROVAL AND UPDATES

The POD Commander is responsible for approving this Review Plan. The Commander's approval reflects vertical team input (involving POH, POD, and possibly the FRM-PCX and HQUSACE members) 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. POH is responsible for keeping the Review Plan up to date. Minor changes to the review plan since the last POD Commander approval are documented in Attachment 3. Significant changes to the Review Plan (such as changes to the scope and/or level of review) will be re-approved by the POD Commander, following the process used for initially approving the plan. The latest version of the Review Plan, along with the Commanders' approval memorandum, will be posted on the POH webpage. The latest Review Plan will also be provided to POD, FRM-PCX and the RMC.

13. REVIEW PLAN POINTS OF CONTACT

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

Honolulu District

Ms. Nani Shimabuku
Civil and Public Works Branch
Programs and Project Management Division
U.S. Army Corps of Engineers, Honolulu District
Building 230, CEPOH-PP-C
Ft. Shafter, HI 96858-5440
Telephone: (808) 835-4030

Review Management Organization

Mr. Russell Iwamura
U.S. Army Corps of Engineers, Pacific Ocean Division
Building 525, CEPOD-PDC
Ft. Shafter, HI 96858-5440
Telephone: (808) 835-4625

ATTACHMENT 1: TEAM ROSTERS

Table 5: ‘Āo Stream Flood Risk Management Design Deficiency Project Delivery Team

DISCIPLINE	NAME	OFFICE
Project Manager	Ms. Nani Shimabuku	PP-C
Non-Federal Sponsor	Mr. Ty Takeno	County of Maui, Department of Public Works
Program Analyst	Mr. Craig Hashimoto	PP-PC
Hydraulic Engineer	Mr. James Pennaz	EC-T
Economist	Mr. Bob Finch	EC-T
Environmental	Ms. Athline Clark	PP-C
Real Estate	Mr. John Crooke	PP-R
Geotechnical Engineering	Mr. Russell Leong	EC-Q
Value Engineering	Mr. Elton Choy	EC-S
Archaeologist	Mr. Kanalei Shun	PP-E
Cost Engineering	Ms. Tracy Kazunaga	EC-S
Office of Counsel	Ms. Lindsey Kasperowicz	OC
Contracting	Mr. Ed Chambers	CT
Small Business	Ms. Catherine Yoza	DB
Public Affairs	Mr. Joe Bonfiglio	PA

Table 6: Review Team

DISCIPLINE	NAME	DESCRIPTION OF CREDENTIALS
DQC Lead	To Be Determined (TBD)	
RMO	Mr. Russell Iwamura	POD
RMC	TBD	TBD
ATR Team Lead	TBD	TBD
Planning	TBD	TBD
Economics	TBD	TBD
Environmental Resources	TBD	TBD
Hydrology and Hydraulic Engineering	TBD	TBD
Geotechnical Engineering	TBD	TBD
Civil Engineering	TBD	TBD
Cost Engineering	TBD	TBD
Real Estate	TBD	TBD
Ecosystem Restoration Expert/Biologist	TBD	TBD
Structural Engineer	TBD	TBD
Construction and Operations	TBD	TBD

Table 7: IEPR Team

DISCIPLINE	NAME	DESCRIPTION OF CREDENTIALS
OEO	TBD	
Economics	TBD	TBD
Environmental Resources	TBD	TBD
Hydrology and Hydraulic Engineering	TBD	TBD
Geotechnical Engineering	TBD	TBD
Civil Engineering	TBD	TBD
Structural Engineering	TBD	TBD

**ATTACHMENT 2: SAMPLE STATEMENT OF TECHNICAL REVIEW FOR
DECISION DOCUMENTS**

COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the <type of product> for ‘Īao Flood Risk Management Project Design Deficiency, Island of Maui, Hawai‘i. The ATR was conducted as defined in the project’s Review Plan to comply with the requirements of EC 1165-2-209. 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 U.S. 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 DrCheckssm.

SIGNATURE

Name
ATR Team Leader
Office Symbol/Company

Date

SIGNATURE

Name
Project Manager
Office Symbol

Date

SIGNATURE

Name
Architect Engineer Project Manager¹
Company, location

Date

SIGNATURE

Name
Review Management Office Representative
Office Symbol

Date

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

Chief, Engineering Division

Office Symbol

Date

SIGNATURE

Name

Chief, Planning Division

Office Symbol

Date

¹ Only needed if some portion of the ATR was contracted

ATTACHMENT 3: REVIEW PLAN REVISIONS

Table 8: Review Plan Revisions

REVISION DATE	DESCRIPTION OF CHANGE	PAGE / PARAGRAPH NUMBER

ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS

Table 9: Standard Acronyms and Abbreviations

<u>Term</u>	<u>Definition</u>	<u>Term</u>	<u>Definition</u>
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
CWA	Clean Water Act	OMB	Office and Management and Budget
DPR	Detailed Project Report	OMRR&R	Operation, Maintenance, Repair, Replacement and Rehabilitation
DQC	District Quality Control/Quality Assurance	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	Engineer Regulation	PMP	Project Management Plan
FDR	Flood Damage Reduction	PL	Public Law
FEMA	Federal Emergency Management Agency	POH	U.S. Army Corps of Engineers, Honolulu District
FRM	Flood Risk Management	POD	U.S. Army Corps of Engineers, Pacific Ocean Division
FSM	Feasibility Scoping Meeting	QMP	Quality Management Plan
GRR	General Reevaluation Report	QA	Quality Assurance
HQUSACE	Headquarters, U.S. Army Corps of Engineers	QC	Quality Control
HEP	Habitat Equivalency Protocol	RED	Regional Economic Development
IEPR	Independent External Peer Review	RMC	Risk Management Center
ITR	Independent Technical Review	RMO	Review Management Organization
LRR	Limited Reevaluation Report	RTS	Regional Technical Specialist
MCX	Mandatory Center of Expertise	SAR	Safety Assurance Review
MSC	Major Subordinate Command	USACE	U.S. Army Corps of Engineers
		WRDA	Water Resources Development Act