



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

0 5 FEB 2015

CEPOD-PDC

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 Control Project Design Deficiency, Island of Maui, Hawaii, Engineering Documentation Report.

1. References:

- a. Engineer Circular 1165-2-214, Civil Works Review, 15 December 2012.
 - b. Review Plan for the Iao Stream Flood Control Project Engineering Documentation Report, Honolulu District, U.S. Army Corps of Engineers (Encl).
2. This memorandum constitutes approval of the Review Plan for the Iao Stream Flood Control Project Engineering Documentation Report, Honolulu District, U.S. Army Corps of Engineers, which includes a Type II Independent External Peer Review.
3. The approved Review Plan is subject to change as circumstances require, consistent with project development under the Project Management Business Process. Subsequent significant revision to this Review Plan requires my written approval.
4. For further information or clarification about the review process, please contact the U.S. Army Corps of Engineers Risk Management Center at 304-399-5217.
5. POC is Mr. Russell Iwamura, Senior Economist, Civil Works Integration Division, at 808-835-4625 or email Russell.K.Iwamura@usace.army.mil.

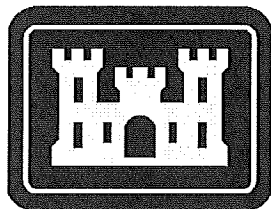
Encl


for: JEFFREY L. MILHORN, P.E.
Brigadier General, USA
Commanding

**Review Plan
U.S. Army Corps of Engineers
Honolulu District
Pacific Ocean Division**

**Iao Stream Flood Control Project
Wailuku, Maui, Hawaii**

**MSC Approval Date: 5 February 2015
Revised Date: 24 November 2014
Original Date: 19 November 2012**



**US Army Corps
of Engineers®**

*24 November 2014
Supersedes RP dated 19 November 2012*

Table of Contents

1. PURPOSE AND REQUIREMENTS	1
2. REVIEW MANAGEMENT ORGANIZATION.....	2
3. PROJECT DESCRIPTION AND INFORMATION	2
4. DISTRICT QUALITY CONTROL (DQC)	3
5. AGENCY TECHNICAL REVIEW (ATR).....	4
6. INDEPENDENT EXTERNAL PEER REVIEW (IEPR).....	7
7. POLICY AND LEGAL COMPLIANCE REVIEW	9
8. REVIEW SCHEDULE AND COSTS.....	9
9. PUBLIC PARTICIPATION	9
10. REVIEW PLAN APPROVAL AND UPDATES	10
11. MODELS	10
ATTACHMENT 1 COMPLETION OF AGENCY TECHNICAL REVIEW	13
ATTACHMENT 2: TEAM ROSTERS	14
ATTACHMENT 3: REVIEW PLAN REVISIONS	17
ATTACHMENT 4: MAPS	18

1. PURPOSE AND REQUIREMENTS

a. Purpose. This Review Plan is intended to ensure a quality-engineering project is developed by the U.S. Army Corps of Engineers (USACE). This Review Plan has been developed for Iao Stream Flood Control Project, Kahului, Maui, Hawaii. This Review Plan was prepared in accordance with Engineer Circular (EC) 1165-2-214, "Civil Works Review Policy." The Review Plan shall layout a value added process that assures the correctness of the information shown. It is imperative that the vertical teaming efforts are proactive and well coordinated to assure collaboration of the report findings, conclusions, and recommendations, and that there is consensus at all levels of the organization with the recommended path forward. This Review Plan describes the scope of review for the current phase of work, and is included in the Project Management Plan (PMP) (P2 #102968). All appropriate levels of review (District Quality Control (DQC), Agency Technical Review (ATR), Independent External Peer Review (IEPR), Biddability, Constructability, Operability, Environmental, Sustainability (BCOES) reviews, and Policy and Legal Review) will be included in this Review Plan as appropriate, and any levels not included will require documentation in the Review Plan of the risk-informed decision not to undertake that level of review. The Review Plan identifies the most important skill sets needed in the reviews and the objective of the review and the specific advice sought, thus setting the appropriate scale and scope of review for the individual project. This Review Plan should be provided to the Project Delivery Team (PDT), DQC, ATR and IEPR Teams.

b. Guidance and Policy References.

- (1) Engineer Circular (EC) 1165-2-214, Civil Works Review, 15 December 2012.
- (2) Engineer Circular (EC) 1105-2-412 Assuring Quality of Planning Models, 31 March 2011.
- (3) Engineer Regulation (ER) 5-1-11, USACE Business Process, 12 January 2007.
- (4) ER 1110-2-1156, Safety of Dams – Policy and Procedure, 31 March 2014.
- (5) ER 1105-2-412, Assuring Quality of Planning Models, 31 March 2011.
- (6) ER 1110-1-12, Quality Management, 31 March 2011.
- (7) ER 1105-2-100, Planning Guidance Notebook, 22 April 2000.
- (8) ER 1110-2-1150, Engineering and Design for Civil Works Projects, 31 August 1999.
- (9) ER 1165-2-119, Modifications to Completed Projects, 20 September 1982.
- (10) Iao Stream Project Management Plan (PMP), November 2002.

(11) USACE Pacific Ocean Division (POD) Quality Management Plan, November 2014.

(12) 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 1165-2-214, 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: DQC, ATR, IEPR, and Policy and Legal Compliance Review.

2. REVIEW MANAGEMENT ORGANIZATION

The USACE Risk Management Center (RMC) is the Review Management Organization (RMO) for this project. Contents of this Review Plan have been coordinated with the RMC and the Pacific Ocean Division (POD), the Major Subordinate Command (MSC). In-Progress Review (IPR) team meetings with the RMC, POH, POD, and HQ will be scheduled on an "as needed" basis to discuss programmatic, policy, and technical matters. This Review Plan will be updated for each new project phase.

3. PROJECT DESCRIPTION AND INFORMATION

a. Authority. The Iao Stream Flood Control Project, located in Wailuku, Maui, Hawaii, was authorized under Section 203 of the Flood Control Act of 1968, Public Law (PL) 90-483 and completed in 1981. A memorandum titled, Modifications to Completed Project Report for the Iao 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 Iao Stream. Modifications are being pursued under the original project authority pursuant to paragraph 7a of ER 1165-2-119.

b. Implementation Document. The project is in the Preconstruction Engineering and Design phase. An Engineering Documentation Report and Environmental Assessment are being prepared in accordance with ER 1110-2-1150 to analyze and determine a recommended plan to correct the design deficiency and continue into design.

c. Study/Project Description. The Iao 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 Kahoolewa and Kapilau Ridges to the Pacific Ocean (See Figure 1 in Attachment 4). 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 Iao Valley, the largest valley in West Maui, which extends from the coastal plain to the summit of Puu 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 Iao Stream Flood Control 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 ft 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 ft 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 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 (See Figure 2 in Attachment).

d. Project Sponsor. The non-federal sponsor for this project is the County of Maui, Department of Public Works. There will be no in-kind contributions for this effort.

4. DISTRICT QUALITY CONTROL (DQC)

All implementation documents (including supporting data, analyses, environmental compliance documents, etc.) shall undergo a DQC. A 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 the DQC. Documentation of DQC activities is required and should be in accordance with the Quality Manual of POH and POD. Basic quality control tools include a Quality Management Plan providing for seamless review, quality checks and reviews, supervisory reviews, project PDT reviews, etc. Quality checks may be performed by staff responsible for the work, such as supervisors, work leaders, team leaders, designated individuals from the senior staff, or other qualified personnel. However, they should not be performed by the same people who performed the original work, including managing/reviewing the work in the case of contracted efforts. Additionally, the PDT is responsible to ensure consistency and effective coordination across all project disciplines during project design and construction management. See Table 1 below for expertise needed for the DQC and Attachment 2 for DQC members and disciplines.

Documentation of DQC activities is required and should be in accordance with the Quality Manual of POH and POD. DrCheckssm review software can be used to document DQC comments.

Table 1: DQC Expertise

DQC Team Members/Disciplines	Expertise Required
Hydrology and Hydraulic Engineering	The Hydrologic 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.
Economics	Reviewer must be experienced in standard Civil Works flood risk management economics. The individual may also review the socio-economic evaluation as qualified.
Cost Engineering	Reviewer must be experienced in design requirements for standard flood risk management measures.
Real Estate	Reviewer must be experienced in standard Civil Works real estate laws, policies and guidance and experience working with sponsor real estate issues.
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.

5. AGENCY TECHNICAL REVIEW (ATR)

ATR is mandatory for all implementation 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. Management of ATR reviews is dependent upon the phase of work and the reviews are conducted by a qualified team from outside POH that is not involved in the day-to-day production of the project/product. The goal is to have early involvement of the ATR team, especially when key decisions are made. The ATR Lead should be invited virtually to all PDT meetings, in order to understand the design efforts and to know when to engage other ATR members for key decisions. Value added Lessons Learned from the ATR team should be shared early on to have the best chance of being adopted by the PDT. Most of the ATR effort should be accomplished midway through the design effort; after

completion of design the ATR will check that the effort agreed to at mid point was accomplished. This is consistent with the requirement that the ATR members shall not be 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 come from an organization outside POD. A site visit will not be scheduled for the ATR Team. See Attachment 2 for ATR members.

DrCheckssm review software will be used to document all ATR comments, responses and associated resolutions accomplished throughout the review process. Comments will 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 been 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 DrCheckssm includes 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 POH, RMO, POD, 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. Certification of ATR should be completed, based on work reviewed to date, for the final report. A draft ATR certification is included in Attachment 1.

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.

Required ATR Team Expertise: The ATR team will be chosen based on each individual's qualifications and experience with similar projects. See Table 2 below for expertise needed for the ATR.

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 sample Certification of Technical Review is included in Attachment 1.

Table 2: ATR Expertise

ATR Team Members/Disciplines	Expertise Required
ATR Lead	The ATR lead should be a senior professional with extensive experience in preparing Civil Works implementation 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.
Hydrology & Hydraulics Engineering	The reviewer will be an expert in the field of hydraulics and have a thorough understanding of the flashy nature of 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.
Economics	Reviewer must be experienced in standard Civil Works flood risk management economics. The individual may also review the socio-economic evaluation if qualified.
Cost Engineering	Reviewer must be experienced in design requirements for standard flood risk management measures.
Real Estate	Reviewer must be experienced in standard Civil Works real estate laws, policies and guidance and experience working with sponsor real estate issues.
Environmental Resources	The reviewer must be experienced with the NEPA compliance and CWA Section 404 (B)(1) analysis.

6. INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

IEPR may be required for implementation documents under certain circumstances. IEPR is the most independent level of review, and is applied in cases that meet certain criteria where the risk and magnitude of the proposed project are such that a critical examination by a qualified team outside of USACE is warranted. A risk-informed decision, as described in EC 1165-2-214, is made as to whether IEPR is appropriate. IEPR panels will consist of independent, recognized experts from outside of the USACE in the appropriate disciplines, representing a balance of areas of expertise suitable for the review being conducted. See Table 3 below for expertise needed for the IEPR.

Decision on Type I and II IEPR. A risk informed decision was made based on the factors outlined in EC 1165-2-214, Section 10.d, Appendix D, Section 1.b and Appendix E, Sections 2(a) through (c) and coordinated with the RMC that a Type I IEPR will not be required, however, a Type II IEPR will be performed on the activities associated with the implementation, design, and construction of features addressing the design deficiencies at Iao Stream. The EDR is an implementation document, for which generally only Type II IEPRs are done. In addition, the total project cost is not anticipated to exceed \$45M, no request by a Federal or State head of an affected state has been received, there are no significant public disputes of the project and no novel methods presented. Specifically, this project does pose a significant threat to human life (public safety) since it involves the existing Iao Stream Flood Control Project and a Safety Assurance Review (SAR) is required under Type II IEPR. The IEPR review panel members will be made up of independent, recognized experts from outside USACE in the appropriate disciplines, representing a balance of expertise suitable for the review being conducted. The IEPR review panel members will be selected using the National Academy of Science (NAS) policy which sets the standard for "independence" in the review process.

DrCheckssm review software will be used to document the Type II IEPR comments and aid in the preparation of the Review Report. Comments should address the adequacy and acceptability of the economic, engineering and environmental methods, models, and analyses used. Type II IEPR comments should generally include the same four key parts as described for ATR comments in Section 5. An A/E contractor will be

responsible for compiling and entering comments into DrCheckssm. The Type II IEPR team will prepare the Review Report that will accompany the publication of the final report for the project 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 prepared by the RMC;
- 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 Type II IEPR Review Report, USACE response, and all other materials related to the Type II IEPR will be made available on the internet at <http://www.usace.army.mil/Missions/CivilWorks/ProjectPlanning/CompletedPeerReviewReports.aspx>

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 the NEPA, CWA, Fish and Wildlife Coordination Act (FWCA) and 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 Engineer	The hydraulic engineering reviewer should have extensive experience in flood risk management in flash-flood urbanized systems (preferably tropical systems). The geotechnical engineering reviewer should have an 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 the flood risk management structures, including debris basins,

	floodwalls, and in settlement evaluation of the structures.
--	---

7. POLICY AND LEGAL COMPLIANCE REVIEW

All implementation documents will be reviewed throughout the project for their compliance with law and policy. 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.

8. REVIEW SCHEDULE AND COSTS

Practical reviews should not extend the design schedule, but should be embedded in the design process. Reviewers should be involved at key decision points and are encouraged to provide timely over the shoulder comments.

a. ATR Schedule and Cost. The preliminary review schedule is listed in the table below. The cost for the ATR is approximately \$50K.

b. IEPR Schedule and Cost. A Type II IEPR will be required for this project. Initial indications are that the estimated cost for the Type II IEPR is in the range of \$50K to \$70K at this current phase of the project. This estimate will be refined when the Scope of Work for the Type II IEPR contract is completed. The Type II IEPR contractor will be involved with the project through the construction phase and into the Operations, Maintenance, Repair, Replacement & Rehabilitation (OMRR&R) phase. More specific milestone dates will be added in the future during the construction phase, but can be assumed to occur near the mid-point of construction and near the end of construction. These dates are dependent on the execution of the Project Partnership Agreement, and the acquisition of both Federal and non-Federal funding.

Project Phase / Submittal	Review Start	Review Complete
DQC Review	August 2014	October 2014
ATR Review	October 2014	May 2015
Report Revisions and Backcheck	May 2015	June 2015
Complete Draft Reports		June 2015
Conduct Public Review (30 days)	June 2015	July 2015
IEPR (45 days)	June 2015	July 2015

9. PUBLIC PARTICIPATION

The opportunity for public comment remains open until the end of the environmental document review period. A summary of significant and relevant public comments will be provided to reviewers before they conduct their review. Final implementation documents, associated review reports, and USACE responses will be made available to the public through the use of press releases and media interviews and will be available

on the POH website (<http://www.poh.usace.army.mil/>) or the Project's website (<http://www.iaostreamea.com>), as applicable.

A formal public comment and review period will be conducted when the Environmental Assessment is released. The public will have 30 days to provide comments on the documents at the public meeting, in writing, or on the Project's website. Comments will be provided to the technical reviewers and responses will be provided to the public, as well as, the final decision documents, associated review reports, and USACE responses to comments (if applicable).

As required by EC 1165-2-214, this approved Review Plan will be posted on the District's POH website. The PDT will consider comments received and determine if revisions to the Review Plan are necessary.

10. REVIEW PLAN APPROVAL AND UPDATES

The MSC is the Pacific Ocean Division. The POD Commander is responsible for approving this Review Plan. The Commander's approval reflects vertical team input (involving POH, POD, and RMC) as to the appropriate scope and level of review for the study and endorsement by the RMC. 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 will be documented in an attachment to this plan. Significant changes to the Review Plan (such as changes to the scope and/or level of review) should be re-endorsed by the RMC and 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 POD Commander's approval memorandum, will be posted on the POH webpage <http://www.poh.usace.army.mil/> and linked to the HQUSACE webpage. The latest Review Plan should also be provided to the RMO and POD.

11. MODELS

The use of certified or approved models for all activities is required to ensure that the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. 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. 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). See Table 4 below for models that are anticipated to be used in the development of the implementation documents:

Table 4: Models

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 Iao Stream to aid in the selection of a recommended plan to manage flood risk.	Certified
IWR Planning Suite	This model assists with formulating plans, cost-effectiveness, and incremental cost analysis, 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.	Certified
Habitat Evaluation and Mitigation model	The Hawaiian Stream Habitat Evaluation Procedure (HSHEP) model follows the overall concepts developed by the U.S. 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 status pending
HEC-RAS 4.0 (River Analysis System)	The Hydrologic Engineering Center's River Analysis System (HEC-RAS) program provides the capability to 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.	HH&C CoP Preferred 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	Approved

	or natural watershed runoff. The program will be used to evaluate different storms in the Iao Stream watershed to produce hydrographs which will then be used in the HEC-RAS models.	
HEC-SSP 2.0 (Statistical Software Package)	The Hydrologic Engineering Center's Statistical Software Package (HEC-SSP) program performs 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 Iao Stream.	Approved

ATTACHMENT 1: COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the Engineering Documentation Report and Environmental Assessment for Iao Stream Flood Control Project, Wailuku, Maui, Hawaii. 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 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

Michael D. Robinette
ATR Team Leader
CELRH-DSPC-G

Date

SIGNATURE

Lorayne P. Shimabuku
Project Manager
CEPOH-PP-C

Date

SIGNATURE

Nathan J. Snorteland
Director, Risk Management
CEIWR-RMC

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

Todd C. Barnes
Chief, Engineering Division & Dam Safety Officer
CEPOH-EC

Date

¹ Only needed if some portion of the ATR was contracted

² Only needed if different from the Chief, Engineering Division.

ATTACHMENT 2: TEAM ROSTERS**Project Delivery Team (PDT)**

DISCIPLINE	OFFICE
Project Manager	CEPOH-PP-C
Non-Federal Sponsor	County of Maui, Department of Public Works
Program Analyst	CEPOH-PP-PC
Hydraulic & Hydrology Engineer	CEPOH-EC-T
Geotechnical Engineer	CEPOH-EC-Q
Structural Engineer	CEPOH-EC-Q
Economist	CEPOH-EC-T
Cost Engineering	CEPOH-EC-S
Real Estate	CECO-C-RAO
Environmental	CEPOH-PP-E GSI Pacific
Value Engineering	CEPOH-EC-S
Archaeologist	CEPOH-PP-E
Contracting	CECT-POH
Small Business	CEPOH-DB
Public Affairs	CEPOH-PA

District Quality Control (DQC) Review Team

DISCIPLINE	OFFICE
Civil, Hydrology and Hydraulic Engineer	CEPOH-EC-T
Geotechnical Engineer	CECO-C-RAO
Structural Engineer	CEPOH-EC-Q
Economics	CEPOH-EC-T
Cost Engineer	CEPOH-EC-S
Real Estate	CEPOH-PP-R
Environmental/Cultural Resources	CEPOH-PP-C

Agency Technical Review (ATR) Team

DISCIPLINE	OFFICE
ATR Lead	CELRH-DSPC-GS
Hydrology and Hydraulics	CESPK-ED-HA
Geotechnical Engineering	CELRH-DSPC-GS
Civil/Structural Engineering	CEMVP-EC-D
Economics	CENWK-PM-PF
Cost Engineering	CENWW-EC-X
Real Estate	CELRL-RE-C
Environmental/Cultural Resources	CESPK-PD

ATR Team Credentials:

ATR Lead and Geotechnical Engineering technical expert is a PE with over 24 years of geotechnical engineering experience, performing subsurface investigations, developing soil lab testing programs, seepage and slope stability analyses, streambank erosion protective designs, and construction of earthen levees. The reviewer has been involved in a multitude of ATRs as the geotechnical reviewer and leading engineer of virtual teams from early design through construction.

Hydrology and Hydraulics technical expert is a PE with over 28 years of hydraulic engineering experience with an emphasis in numerical modeling for flood damage reduction. He was a member of the Committee on Channel Stabilization that participated in the field meeting for the Iao Stream in September of 1999.

Civil/Structural Engineering technical expert is a PE with over 23 years of structural engineer experience. He also has an extensive background experience in flood control projects.

Economist is the senior economist at Kansas City District, has 28 years of experience as a Corps economist, primarily in the area of flood risk management economic analysis in which he has participated in more than 50 studies and is a certified subject matter expert.

Cost Engineering technical expert serves as a national cost engineering consultant, having an accumulated 34 years of engineering experience (14 years construction, 5 years project management and 15 years cost engineering). This technical expert has served as the Cost Engineering Mandatory Center of Expertise (MCX) ATR Coordinator and lead cost reviewer and is also the lead instructor of the Cost ATR process, training planners and estimators throughout the Corps. Since 1992, this technical expert has served as a senior lead cost engineer for Albuquerque District, Europe District and Walla Walla District, being recognized as the USACE Cost Engineer of the Year 2006-2007 and is especially skilled in estimates and reviews related to civil works earthwork and concrete structures, but has been involved in every aspect of civil works projects.

related to storm damage reduction, flood risk management, navigation, and ecosystem restoration. He has assisted the development of the current civil works cost Engineer Guidance documents ER 1110-1-1300, ER 1110-2-1302, ETL 1110-2-573, the current Cost and Schedule Risk Analysis Guidance, the Abbreviated Risk-Based Contingency model, and the Cost ATR Guidance for the U.S. Army Corps of Engineers. He has led many cost ATRs, risk analyses and numerous teams in developing or reviewing multi-billion dollar estimates for the Corps and the Department of Energy.

Real Estate Specialist has 13 years of experience in the Civil Works cost-share field, specializing in non-federal sponsor oversight including P.L. 91-646 relocation assistance and facility/utility relocation administration.

Environmental/Cultural Resources technical expert is a Regional Technical Specialist (RTS) for NEPA Compliance with the Sacramento District, having 30 years of experience in environmental planning. Since 2001, served as South Pacific Division's (SPD) RTS in NEPA resources and compliance. As the NEPA Compliance Specialist, he serves as the District's senior specialist in environmental resources for planning, compliance, methods, policy, and procedures and as a RTS, he reviews work products for technical quality, and provides advice on environmental compliance requirements within SPD. He has served as a team leader and reviewer within the Corps and has been an ATR team leader/reviewer. Outside of SPD, he has also served as NEPA/Environmental Compliance reviewer.

Type II Independent External Peer Review (IEPR) Team

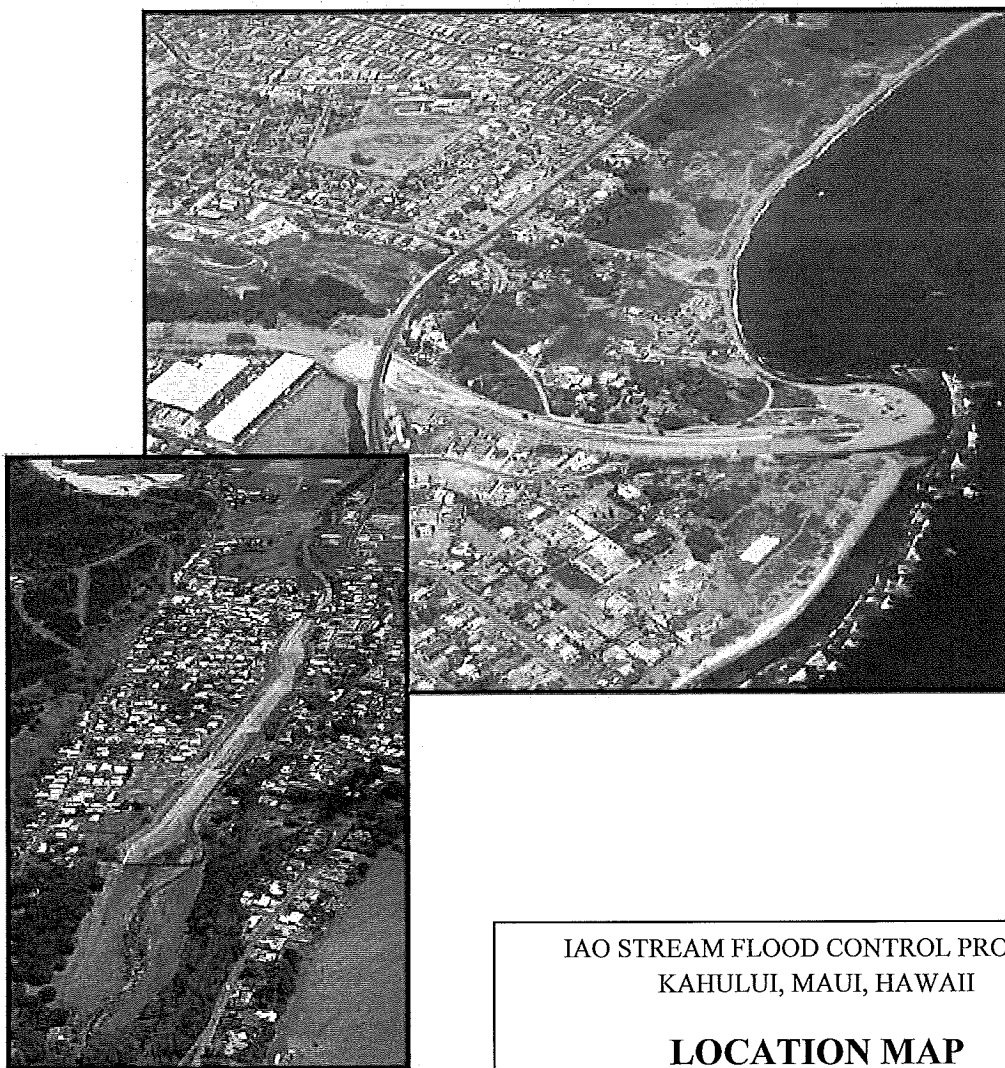
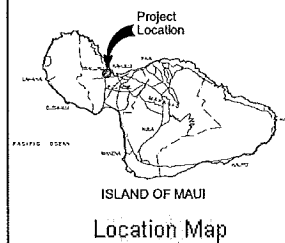
DISCIPLINE	DESCRIPTION OF CREDENTIALS
IEPR Lead	To Be Determined (TBD)
Hydrology and Hydraulics	TBD
Geotechnical Engineering	TBD
Civil/Structural Engineering	TBD
Economics	TBD
Cost Engineering	TBD
Environmental/Cultural Resources	TBD

ATTACHMENT 3: REVIEW PLAN REVISIONS

Revision Date	Description of Change	Page / Paragraph Number
11/2014	This revised Review Plan supersedes the original Review Plan, dated November 2012. Downgraded level of review from a Type I IEPR to a Type II IEPR is as a result of change in scope from developing an EIS to now only doing an EA and the EDR is not a decision document, but an implementation document.	

ATTACHMENT 4: MAPS

IAO STREAM FLOOD CONTROL PROJECT KAHULUI, MAUI, HAWAII



IAO STREAM FLOOD CONTROL PROJECT
KAHULUI, MAUI, HAWAII

LOCATION MAP

U.S. Army Corps of Engineers
Honolulu District

FIGURE 1. Location Map

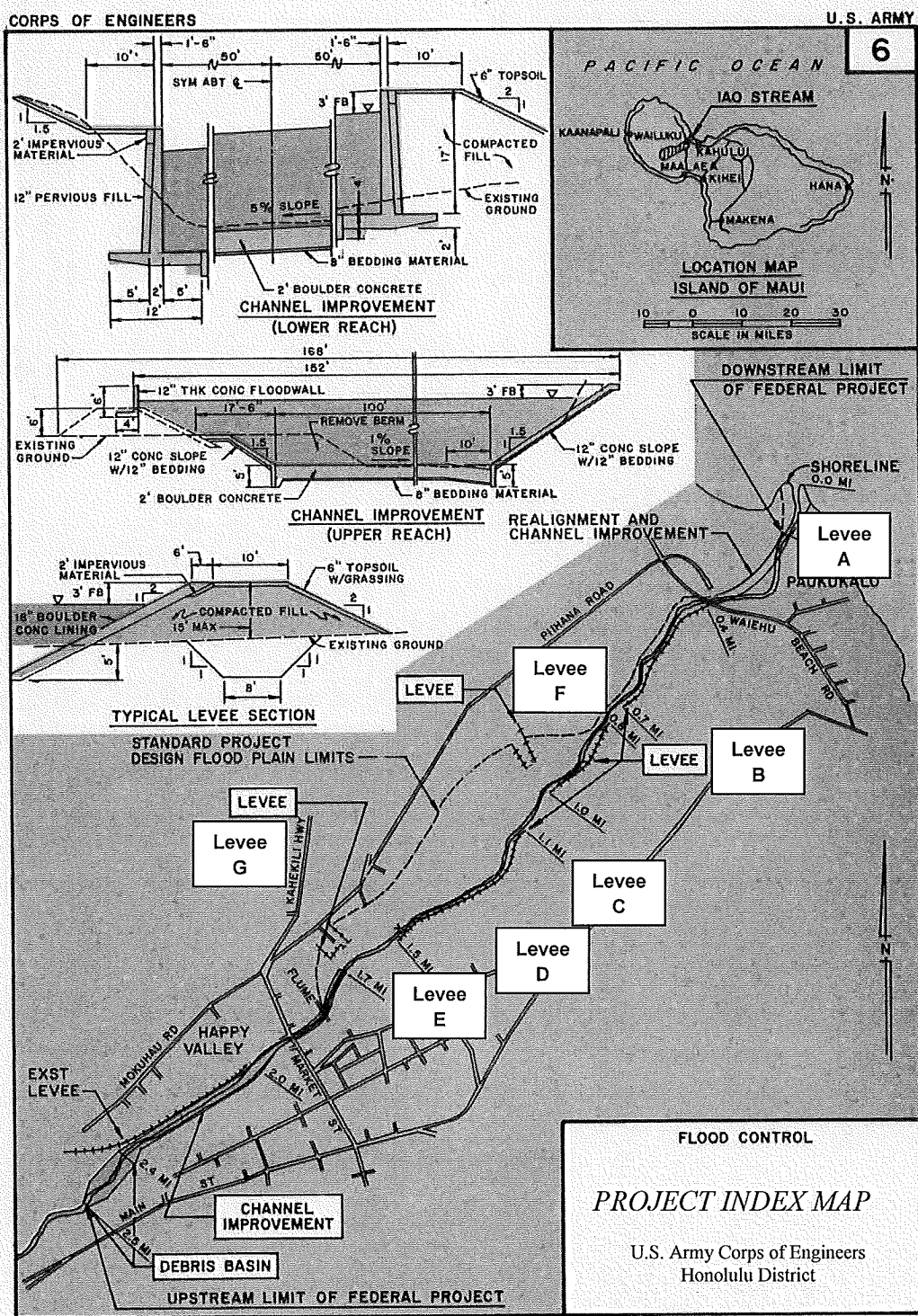


Figure 2. Project Index Map