



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/CINDY BARGER), BUILDING 230, FORT SHAFTER, HI 96858-5440

SUBJECT: Review Plan Approval for the Waiakea-Palai Streams Flood Risk Management Project Feasibility Report, Island of Hawaii, Hawaii

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 Waiakea-Palai Streams Flood Risk Management Project Feasibility Report, Island of Hawaii, Hawaii, Honolulu District, U.S. Army Corps of Engineers.

2. IAW reference 1.a., the Review Plan (reference 1.b.) was coordinated with the Flood Risk Management Planning Center of Expertise (FRM-PCX) in the South Pacific Division which is the lead office to execute this Review Plan. For further information, contact the FRM-PCX at 415-503-6852. 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](mailto:Russell.K.Iwamura@usace.army.mil).

Encl

GREGORY J. GUNTER  
Colonel, EN  
Acting Commander

**REVIEW PLAN**

**WAIĀKEA-PALAI STREAMS FLOOD RISK MANAGEMENT PROJECT  
ISLAND OF HAWAI‘I, HAWAI‘I**

**Feasibility Study  
Section 209 of the Flood Control Act of 1962**

**U.S. Army Corps of Engineers, Honolulu District**



February 2008 Flood (Photo Courtesy University of Hawai‘i, Hilo)

**MSC Approval Date:** 20 November 2012  
**Last Revision Date:** 27 October 2012



**US Army Corps  
of Engineers** ®

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**REVIEW PLAN**

**WAIĀKEA-PALAI STREAMS FLOOD RISK MANAGEMENT PROJECT  
ISLAND OF HAWAI‘I, HAWAI‘I**

**Feasibility Study**

**Section 209 of the Flood Control Act of 1962**

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## 1. PURPOSE AND REQUIREMENTS

**a. Purpose.** This Review Plan defines the scope and level of peer review for the Waiākea-Palai Streams Flood Risk Management (FRM) Project, Island of Hawai‘i, Hawai‘i, Feasibility Study, Section 209 of the Flood Control Act of 1962.

This review plan was developed using the National Planning Center of Expertise (PCX) review plan template dated 15 June 2011.

### **b. References.**

- (1) Engineering Circular (EC) 1165-2-209, Civil Works Review Policy, 31 January 2012.
- (2) EC 1105-2-412, Assuring Quality of Planning Models, 31 March 2011.
- (3) Engineering 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) ER 1105-2-101, Risk Analysis for Flood Damage Reduction Studies, 3 January 2006.
- (6) Waiākea-Palai Streams FRM Project Management Plan (PMP), dated January 2011.
- (7) U.S. Army Corps of Engineers (USACE) Pacific Ocean Division (POD) Quality Management Plan, December 2010.
- (8) 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 the 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 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 FRM-PCX.

The RMO will coordinate with the Cost Engineering Directory of Expertise (DX) 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. Study Authority.** The authority for the Waiākea-Palai Streams FRM Project Feasibility Study is provided by Section 209 of the Flood Control Act of 1962, in accordance with the policies and procedures prescribed by the Chief of Engineers.

**b. Decision Document.** An integrated feasibility report and Environmental Assessment (EA) is being developed consistent with ER 1105-2-100. The Chief of Engineers is the approval authority for this feasibility report/EA. If approved by the Chief of Engineers, Congressional authorization is required for the project to proceed to construction.

### **c. Study/Project Description.**

Project Location: The study area encompasses the Palai Stream watershed and the Waiākea Stream watershed near the town of Hilo, Hawai‘i, located on the northeastern coast of the island of Hawai‘i. The hydrologic connection between these two streams encourages a comprehensive assessment of the FRM issues in the area. (Figure 1).

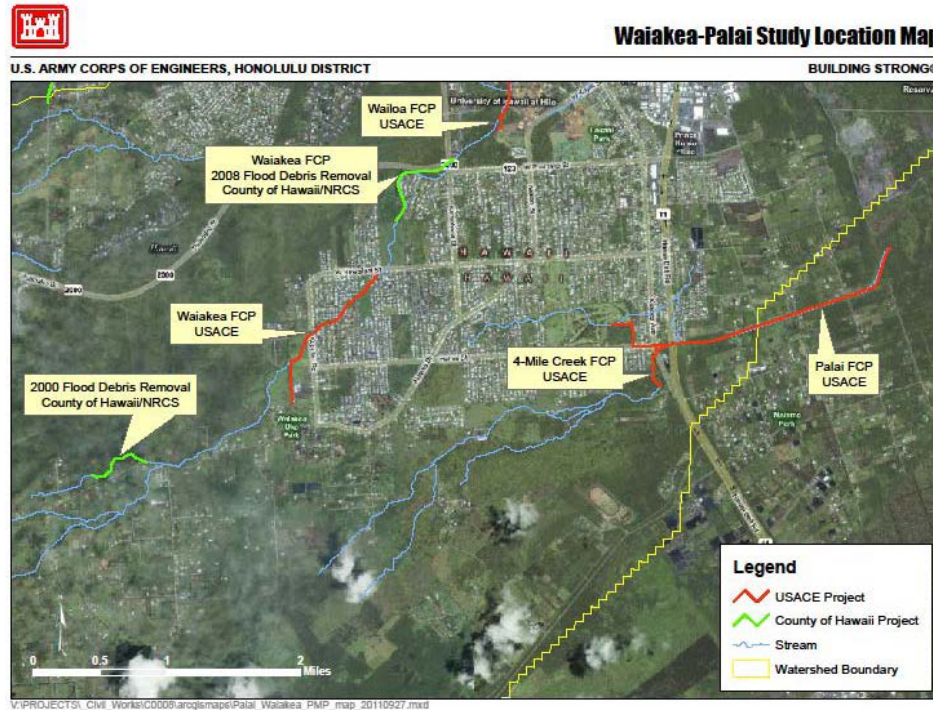
Waiākea Stream, Palai Stream, and Four Mile Creek are three of the five tributaries within the principal Wailoa River system, which drains a total of about 160 square miles and empties into Hilo Bay.

Project Sponsor: The non-Federal Sponsor for this project is the County of Hawai‘i, Department of Public Works.

Background: The Waiākea Stream, Hawai‘i Feasibility Study and the Palai Stream Flood Damage Reduction, Hilo, Hawai‘i Feasibility Study were originally initiated as two separate Continuing Authorities Program (CAP) feasibility studies under Section 205 of the Flood Control Act of 1948 (Public Law 80-858). The watersheds for these two CAP studies are adjacent to each other and share hydraulic linkage and flooding in the area that connects both watersheds. Therefore, the non-Federal Sponsor requested combining the two studies into a single study to better address the flood risk in both watersheds.

The combined Waiākea-Palai FRM Feasibility Study will be conducted under the USACE's Investigations program. Information collected from the separate studies will be utilized to combine this into a single comprehensive study. Areas not covered in the previous studies will be addressed in the feasibility study.

**Figure 1: Waiākea-Palai Stream Project Location**



**Problems:** Major flood damages occurred in the study area in February 2008, November 2000, August 1994, March 1980, and February 1979. For much of Palai Stream there is not a well defined channel. As a result, flood waters are not well contained and transported and neighborhoods flood frequently. For Waiākea Stream, the stream channel provides limited protection for the adjacent areas and additional capacity is needed.

- The Waiākea Stream and the Palai Stream are susceptible to flash flooding events. Concentrated storm events can produce flood conditions in a matter of hours.
- Poorly defined channels provide inadequate capacity to transport flood waters. Some of the channels in the study area are naturally small with limited capacity. Streamflow is typically intermittent.
- Boulders, vegetation and woody debris that naturally occur in the riparian area and stream beds exacerbate flooding. When floods waters rise, the boulders and debris clog the stream channel. The fast moving waters often transport the debris far downstream of the source.



- Significant rainfall events result in sheet flow of water across the watershed and towards the streams. The natural stream channels do not have the capacity to transport this additional water. Streams overtop and flood downstream areas.
- Along Kupulau Street, there are a few locations where the street elevation is very low. Sheet flow water will flow across these areas towards the stream, causing a hazard for drivers. In a flood event, the County of Hawaii currently places barricades at these locations to prevent motorists from crossing the street. Traffic signs are posted in this area to warn motorists not to cross flood waters.
- Accumulation of woody debris and vegetation can cause blockages within the channel and at bridge locations.
- Upstream of the Kupulau Street Bridge, the natural topography of the stream bed is higher than the elevation under the bridge. As a result, a hydraulic jump is induced during high flood events, causing flood water to overtop Kupulau Street Bridge.
- The stream channels are classified as perched or partially perched and overtop frequently during heavy rain events, flooding the surrounding areas. There is a layer of volcanic rock that inhibits percolation of rainwater in the stream channel in these areas.
- The County of Hawaii constructed Kupulau Ditch to help with drainage and reduce flooding from frequent small rain events. The ditch capacity is exceeded during heavy rain events. In addition, when the upper area of Waiākea Stream reaches capacity and overtops the flood waters sheet flow across the land and into Kupulau Ditch.
- When Kupulau Ditch reaches capacity and overtops, the flood waters flow across Kupulau Street and proceed overland along Haihai Street, eventually flowing into Palai Stream. Homes in this area were flooded in the 2000 and 2008 floods. In 2000 rapidly rising flood waters reached 6 feet in depth at one home and required a resident to be rescued by emergency personnel.

Alternatives: During the CAP studies for Waiākea and Palai streams, the following management measures were identified. The Project Delivery Team (PDT) will review the existing management measures within a watershed perspective and formulate alternatives that will address the full study area.

- Kupulau Ditch Overflow Channel. Extend the channel of Kupulau ditch to serve as an overflow channel for Waiākea Stream, providing additional capacity for greater than “10-year flood” events.
- Kupulau Ditch Levee/Floodwall. Construct a new levee or floodwall on the right bank of Kupulau Ditch. The levee would begin 700 feet downstream at Hoaka Road and end downstream of New Hope Chapel. The new levee/floodwall would reduce flooding and damages to homes and roads on the Kupulau Ditch right bank.

- Palai Stream Conveyance Channel. Convey Palai Stream flows into the existing Waiākea-Uka Flood Control Channel.
- Palai Stream Diversion. Extend the Waiākea-Uka Flood Control Channel from Hilo Golf Course to Palai Stream. Divert flows into an unlined open channel below the golf course.
- Palai Stream Maintenance. Maintain an unlined open channel for 1,400 lineal feet (LF) along the perimeter of the Hilo Golf Course until it reaches Haihai Street.
- Underground Box Culvert. Install a 1,000 linear foot underground box culvert from Haihai Street to Kanaeolehua Avenue Bridge to convey flow discharge to open channel at the bridge.

**d. Factors Affecting the Scope and Level of Review.** The primary review issue for the Waiākea-Palai Streams FRM Project feasibility study is the potential for life safety issues related to FRM. The PDT is assuming that an IEPR will be required. During plan formulation, the study analyses will determine if the project requires redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design construction schedule to address life safety issues.

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. If life safety issues are minimized during the formulation of the Tentatively Selected Plan (TSP), the assessment will be reviewed by the POH Chief of Engineering and Construction. If appropriate, POH will request an exemption from IEPR consistent with EC 1165-2-209.

The study does not meet the other criteria for consideration for IEPR outlined in EC 1165-2-209.

- The estimated cost of construction is estimated at \$40 million (less than \$45 million) based on a reasonable estimate during the CAP studies.
- There has been no request nor expected to have a request by the Governor of the State of Hawai‘i for peer review by independent experts.
- No significant public dispute has been voiced over any aspect of the proposed project, including the size, nature, or effects of neither the project nor the economic or environmental cost or benefit of the project.
- The study is not likely to contain influential scientific information or be a highly influential scientific assessment.
- At this time, there has been no charge by a Federal or state agency that the project is likely to have a significant adverse impact on environmental, cultural or other resources under

the jurisdiction of the agency after implementation of proposed mitigation plans. There has been no request by a head of a Federal or state agency for peer review by independent experts.

- At this time, POH has determined that an EA would be adequate National Environmental Policy Act (NEPA) documentation for this project. In the event that the EA results in a finding of significant impact, an Environmental Impact Statement (EIS) will be developed and reviewed consistent with EC 1165-2-209.
- The project is not controversial.
- The project is anticipated to have negligible adverse impacts on scarce or unique tribal, cultural or historic resources.
- The project is anticipated not to have substantial adverse impacts on fish and wildlife species and their habitat prior to the implementation of mitigation measures.
- The project is anticipated to have no more than a negligible adverse impact, before implementation of mitigation measures, on a species listed as endangered or threatened under the Endangered Species Act (ESA) of 1973 or the critical habitat of such species designated under ESA.
- There is ample experience within USACE and industry to treat the activity as being routine.
- The study is not likely to contain influential scientific information or be a highly influential scientific assessment.
- The project is not likely to have significant interagency interest.
- The project is not expected to incorporate challenging technical solutions.
- The information in the decision document or anticipated project design is not likely 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 practice.

**e. In-Kind Contributions.** Products and analyses provided by non-Federal sponsors as work-in-kind services are subject to DQC, ATR, and IEPR. The anticipated non-Federal sponsor's in-kind services for this study are discussed in the study PMP. All in-kind products used in the study will undergo DQC, ATR, and IEPR.

#### **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 Manuals of 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:

- Draft and final integrated feasibility report/EA.
- All technical reports and appendices developed in support of the integrated feasibility report/EA.
- The draft and final EA decision.

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

**Table 1: DQC Expertise**

<b>DQC Team Members/Disciplines</b>	<b>Expertise Required</b>
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 feasibility studies and expertise in FRM planning.
Economics	The economics reviewer should have experience/credentials in FRM in small state or island economies.
Environmental Resources	The environmental reviewer should have environmental regulatory expertise in NEPA, Clean Water Act (CWA), Fish and Wildlife Coordination Act (FWCA), and ESA. In addition, the environmental expert should be familiar with tropical stream ecology and changes in stream function and processes due to implementation of FRM structures. In addition, the reviewer will have experience with complying with Executive Order (EO) 11988: Floodplain Management.

<b>DQC Team Members/Disciplines</b>	<b>Expertise Required</b>
Hydrology and Hydraulic Engineering	The hydrology and hydraulics engineering reviewer will be an expert in the field of hydraulics and have experience with flash-flood systems in urbanized watersheds. The reviewer should be familiar with 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. In addition, the reviewer will have experience with complying with Executive Order (EO) 11988: Floodplain Management.
Geotechnical Engineering	The geotechnical engineering reviewer should have an extensive experience in geotechnical evaluation of FRM structures such as static and dynamic slope stability evaluation, evaluation of the seepage through the foundation of the FRM structures, including debris basins, floodwalls, and in settlement evaluation of the structures.
Civil/Structural Engineering	The civil/structural engineering reviewer should have an extensive experience in FRM structures, including debris basins, floodwalls, and in settlement evaluation of the structures.
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.

**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 ensure 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 FRM-PCX and will be 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.** The following products will be subject to ATR:

- Draft and final integrated feasibility study/EA.

- All technical reports and appendices developed in support of the integrated feasibility study/EA.

- The draft and final EA decision.

**b. Required ATR Team Expertise.** The following ATR expertise is required for this project. Because the project is small, where possible ATR team members will address multiple disciplines. The FRM-PCX, as the RMO, will identify the final make-up of the ATR team and identify the ATR team lead in coordination with the Project Manager (PM), vertical team, and other appropriate centers of expertise. 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 conducting an 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 and hydraulics, economics, environmental resources, etc).
Planning	The Planning reviewer should be a senior water resources planner with experience in FRM projects and compliance with EO 11988 Floodplain Management.
Economics	The economics reviewer should be a senior economist with experience in FRM projects
Environmental Resources	The environmental reviewer should have experience in FRM projects and Civil Works environmental compliance, including NEPA, National Historic Preservation Act (NHPA), CWA Section 404(b) (1) alternatives analysis; and EO 11988 Floodplain Management.
Ecosystem Restoration/Biology	The Ecosystem Restoration/Biology reviewer will be familiar with the Habitat Equivalency Protocol (HEP) methodology for stream systems. The reviewer will be responsible for reviewing the model for approval for site-specific use consistent with EC 1105-2-412.
Hydrology and Hydraulic Engineering	The hydrology and hydraulic engineering reviewer will be an expert in the field of hydrology and hydraulics and have experience and understanding of tropical and/or flash flood systems. The reviewer will have knowledge on proposed measures of open channel dynamics, levels, and enclosed channel systems.

<b>ATR Team Members/Disciplines</b>	<b>Expertise Required</b>
Cost Engineering	The cost engineering reviewer will have experience in FRM projects.
Real Estate	The real estate reviewer will have experience in FRM projects.
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.
Geotechnical/Structural Engineering	The geotechnical and structural engineering reviewer should have extensive experience in foundation analysis and structural design and evaluation of flood risk management structures (i.e. Concrete channels, floodwalls, levee embankments, etc).

**c. Documentation of ATR.** DrChecks<sup>sm</sup> 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 DrChecks<sup>sm</sup> 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 POH, FRM-PCX, 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 DrChecks<sup>sm</sup> 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 both the draft report and the 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 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 1165-2-209, 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 is managed outside the USACE by an Outside Eligible Organization (OEO) and is 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 1165-2-209.

- **Type II IEPR.** Type II IEPR, or Safety Assurance Review (SAR), is managed by the Risk Management Center (RMC) and is conducted on design and construction activities for hurricane, storm, and FRM 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.** As a FRM project, there is a potential for life safety issues related to FRM reduction measures such as levees, and channel alterations. Residential areas are located adjacent to the streams. Based on potential life safety issues, a Type I IEPR is required.

The project does not meet any of the other criteria for Type I IEPR. The project is not likely to require an EIS. The project will not produce influential scientific information. There have been no requests for an IEPR from a head of a Federal or state agency charged with reviewing the project. There are no innovative materials or techniques proposed. The project design will not require redundancy, resiliency, and/or robustness. The project does not have unique construction sequencing or a reduced or overlapping design construction schedule.

Since the project is a FRM project, a Type II IEPR is anticipated on the design and construction of this project. 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.** The draft integrated feasibility study/EA and draft EA decision and supporting technical documentation will undergo a Type I IEPR. The IEPR will be scheduled with the public review of the report.

- c. Required Type I IEPR Panel Expertise.** The following IEPR expertise is required for this project. Because the project is small, where possible IEPR panel members will address multiple disciplines and emphasis. The RMO will identify the final make-up of the IEPR team in coordination with the Project Manager (PM), vertical team, and other appropriate centers of expertise. Once identified, the IEPR team members for this study and a brief description of their credentials will be added in Attachment 1.

**Table 3: IEPR Required Expertise**

<b>IEPR Panel Members/Disciplines</b>	<b>Expertise Required</b>
Economics	The Economics Panel Member should be a senior economist with experience in FRM projects and EO 11988 Floodplain Management.
Environmental	The Environmental Panel Member should have experience in NEPA, NHPA, CWA Section 404(b) (1) alternatives analysis; and EO 11988 Floodplain Management. No federally listed endangered species occur in the study area.
Engineering	The Engineering Panel Member(s) should have extensive experience in hydraulic engineering in tropical and/or flash flood systems, design/construction of flood risk management structures (i.e. reinforced concrete channel, floodwalls, levee embankments, etc.) and foundation analysis. With knowledge on proposed measures of open channel dynamics, levels, and enclosed channel systems.

**d. Documentation of Type I 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 DIRECTORY OF EXPERTISE (DX) REVIEW AND CERTIFICATION**

All decision documents shall be coordinated with the Cost Engineering DX, located in the Walla Walla District. The DX 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 DX will also provide the Cost Engineering DX certification. The RMO is responsible for coordination with the Cost Engineering DX.

## **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 FRM-PCX and 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**

<b>Model Name and Version</b>	<b>Brief Description of the Model and How It Will Be Applied in the Study</b>	<b>Certification / Approval Status</b>
HEC-FDA 1.2.5 (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 FRM plans using risk-based analysis methods. The program will be used to evaluate and compare the “future without-project” and “future with-project” plans along the Waiākea and Palai Streams to aid in the selection of a recommended plan to manage flood risk.	Certified
Institute of Water Resources Planning Suite	This model assists with formulating plans, cost-effectiveness, and 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 to conduct the CE/ICA necessary to evaluate and identify the appropriate level of compensatory mitigation for the project.	Certified
Waiākea-Palai Stream Study Site Specific Spreadsheet Mitigation Model	Depending on the Tentatively Selected Plan (TSP), an ecosystem output model may be required to assess the mitigation requirements for this study. In the absence of any regionalized ecosystem output model that quantifies habitat benefits for stream habitats in Hawai‘i, a customized spreadsheet model will be developed specifically for use on the Waiākea-Palai Stream FRM Project. This is considered an appropriate approach. A spreadsheet model can be tailored to focus on metrics that are directly applicable to the project mitigation objective. In particular, habitat quality parameters contained within the model can serve as a key dataset for quantification of habitat impacts and benefits in the spreadsheet model. In addition, elements of the Habitat Equivalency Protocol (HEP) approach will be used, as the State of Hawai‘i Division of Aquatic Resources has conducted a state wide stream and watershed assessment using this approach, providing focused baseline information on stream functions throughout the State, including Waiākea and Palai Streams.	Approval review 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 model is anticipated to be used in the development of the decision document:

**Table 5: Engineering Model 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 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 Waiākea and Palai Streams and their tributaries.	HH&C CoP Preferred Model
Microcomputer Aided Cost Engineering System (MCACES) 2 <sup>nd</sup> 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 USACE 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 MCX 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 Integrated Feasibility Report/EA: April 2014.
- Final Integrated Feasibility Report/EA: November 2014.
- Estimated Total ATR Costs: \$80,000.

This assumes \$40,000 for the ATR of the draft report and \$40,000 for the ATR of the final report.

**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 Integrated Feasibility Report/EA: June 2014.
- Estimated Contract Cost: \$144,000. Pursuant to Section 2034 of the Water Resource Development Act (WRDA) of 2007, this amount is 100% federally funded.
- Estimated cost for District and FRM PCX Coordination of the IEPR: \$40,000. This estimate was developed using the Type I IEPR Standard Operating Procedure table provided by the PCXs. This amount is cost-shared between USACE and the non-federal Sponsor.

**c. Model Certification/Approval Schedule and Cost.** Waiākea-Palai Stream Study Site Specific ecosystem output 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

A Public Involvement Plan (PIP) will be developed for the feasibility study to guide the public participation process. Several public meetings were held with the community and stakeholders as part of the CAP planning process. Small group meetings will be conducted to collect specific information relevant to study goals and objectives and provide information to key stakeholders and interest groups relevant to study goals and objectives. A public meeting will be held during the public review process to seek input on the draft report.

## 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, 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 POD Commander's approval memorandum, will be posted on the Honolulu District's webpage. The latest Review Plan will also be provided to the FRM-PCX and POD.

### **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. Debbie Solis  
Project Manager  
Civil and Public Works Branch  
Programs and Project Management Division  
U.S. Army Corps of Engineers, Honolulu District  
Bldg 230, CEPOH-PP-C  
Ft. Shafter, HI 96858-5440  
Telephone: (808) 835-4035

Pacific Ocean Division

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

Review Management Organization

Mr. Eric Thaut  
Flood Risk Management Planning Center of Expertise  
U.S. Army Corps of Engineers, South Pacific Division  
1455 Market St., Room 2048B  
San Francisco, CA 94103-1398  
Telephone: (415) 503-6852

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

**COMPLETION OF AGENCY TECHNICAL REVIEW**

The ATR has been completed for the <type of product> for Waiākea-Palai Streams Flood Risk Management Project, Island of Hawaii'i, Hawaii'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 USACE policy. The ATR also assessed the 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<sup>sm</sup>.

*SIGNATURE*

Name

ATR Team Leader

Office Symbol/Company

\_\_\_\_\_  
Date

*SIGNATURE*

Name

Project Manager

Office Symbol

\_\_\_\_\_  
Date

*SIGNATURE*

Name

Architect Engineer Project Manager<sup>1</sup>

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*

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*Name*

Chief, Engineering Division

*Office Symbol*

\_\_\_\_\_  
Date

*SIGNATURE*

---

*Name*

Chief, Planning Division

*Office Symbol*

\_\_\_\_\_  
Date

<sup>1</sup> Only needed if some portion of the ATR was contracted.

**ATTACHMENT 3: REVIEW PLAN REVISIONS**

**Table 9: Review Plan Revisions**

<b>Revision Date</b>	<b>Description of Change</b>	<b>Page / Paragraph Number</b>

**ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS**

**Table 10: Standard Acronyms and Abbreviations**

<b><u>Term</u></b>	<b><u>Definition</u></b>	<b><u>Term</u></b>	<b><u>Definition</u></b>
AFB	Alternative Formulation Briefing	NER	National Ecosystem Restoration
ASA(CW)	Assistant Secretary of the Army for Civil Works	NEPA	National Environmental Policy Act
ATR	Agency Technical Review	NHPA	National Historic Preservation 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
DX	Directory of Expertise	OSE	Other Social Effects
EA	Environmental Assessment	PCX	Planning Center of Expertise
EC	Engineer Circular	PDT	Project Delivery Team
EIS	Environmental Impact Statement	PAC	Post Authorization Change
EO	Executive Order	PMP	Project Management Plan
ER	Engineer Regulation	PL	Public Law
FDR	Flood Damage Reduction	POH	U.S. Army Corps of Engineers, Honolulu District
FEMA	Federal Emergency Management Agency	POD	U.S. Army Corps of Engineers, Pacific Ocean Division
FRM	Flood Risk Management	QMP	Quality Management Plan
FSM	Feasibility Scoping Meeting	QA	Quality Assurance
GRR	General Reevaluation Report	QC	Quality Control
HEP	Habitat Equivalency Protocol	RED	Regional Economic Development
HQUSACE	Headquarters, U.S. Army Corps of Engineers	RMC	Risk Management Center
IEPR	Independent External Peer Review	RMO	Review Management Organization
ITR	Independent Technical Review	RTS	Regional Technical Specialist
LRR	Limited Reevaluation Report	SAR	Safety Assurance Review
MSC	Major Subordinate Command	USACE	U.S. Army Corps of Engineers
NED	National Economic Development	WRDA	Water Resources Development Act