



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
SOUTH PACIFIC DIVISION, CORPS OF ENGINEERS
1455 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94103-1399

CESPD-DE

29 Sep 14

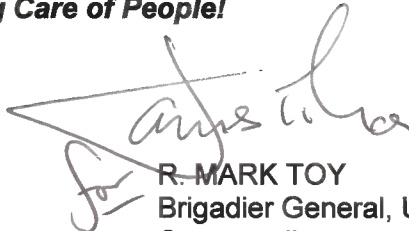
MEMORANDUM FOR Commander, U.S. Army Corps of Engineers, Los Angeles District, P.O. Box 532711, Los Angeles, California, 90053-2325, (ATTN: CESPL-PD-W, Mr. Michael Green)

Subject: Virgin River, Continuing Authorities Program (CAP), Section 205, Mesquite, Nevada, Review Plan Approval

1. The Virgin River, Continuing Authorities Program (CAP), Section 205, Flood Risk Management, Detailed Project Report (DPR), Mesquite, Nevada, Review Plan that is enclosed is in accordance with Engineering Circular (EC) 1165-2-214, Review of Decision Documents, dated 15 Dec 2012. The South Pacific Division (SPD), Planning and Policy Division, Regional Business Technical Division, and Los Angeles District Support Team have reviewed the Review Plan that has been submitted. The South Pacific Division approves the Virgin River, CAP Section 205 Review Plan.
2. With MSC approval the Review Plan will be made available for public comment via the internet and the comments received will be incorporated into future revisions of the Review Plans. The Flood Risk Management Planning Center of Expertise (FRM-PCX) is designated as the Review Management Organization (RMO) for the Virgin River, CAP Section 205 DPR. The Review Plan includes Type I Independent External Peer Review.
3. I hereby approve the Review Plan which is subject to change as study circumstances require. This is consistent with study development under the Project Management Business Process. Subsequent revisions to the Review Plan after public comment or during project execution will require new written approval from this office.
4. Points of contact for this action are Mr. Kurt Keilman, CESPD-PDP, (415) 503-6596, kurt.keilman@usace.army.mil and Mr. Paul Bowers, CESPD-PDC, 415-503-6556, paul.w.bowers@usace.army.mil.

BUILDING STRONG and Taking Care of People!

Encl


R. MARK TOY
Brigadier General, USA
Commanding

REVIEW PLAN

***Section 205 Flood Risk Management Virgin River, Mesquite, Nevada
Detailed Project Report***

Los Angeles District

MSC Approval Date: *Pending*
Date: September 10, 2014



**US Army Corps
of Engineers ®**

ENCL

REVIEW PLAN

***Section 205 Flood Risk Management
Virgin River, Mesquite, Nevada
Feasibility Report***

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1. PURPOSE AND REQUIREMENTS

a. **Purpose.** This Review Plan defines the scope and level of peer review for the Virgin River, Mesquite, Nevada Section 205 Flood Risk Management Study (Virgin River Study). The Detail Project Report (DPR) process is anticipated to demonstrate that Federal participation in a specific project is warranted, culminating in approval of the decision document.

b. References

- (1) Engineering Circular (EC) 1165-2-214, Civil Works Review Policy, 15 Dec 2012
- (2) EC 1105-2-412, Assuring Quality of Planning Models, 31 Mar 2011
- (3) Engineering Regulation (ER) 1110-1-12, Quality Management, 30 Sep 2006
- (4) ER 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 Nov 2007; and Appendix F, Continuing Authorities Program, Amendment #2, 31 Jan 2007
- (5) *PMP Section 205 Flood Control Virgin River, Mesquite, Nevada*
- (6) CESP R 1110-1-8, South Pacific Division Quality Management Plan, 30 Dec 2002
- (7) Director of Civil Works' Policy Memorandum #1, Jan 19, 2011

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

2. REVIEW MANAGEMENT ORGANIZATION (RMO) COORDINATION

The RMO is responsible for managing the overall peer review effort described in this RP. The RMO for decision documents is typically either a Planning Center of Expertise (PCX) or the Risk Management Center (RMC), depending on the primary purpose of the decision document. The RMO for CAP decision documents is the MSC, however the RMO for this RP will be the Flood Risk Management Planning Center of Expertise (FRM-PCX) under agreement with the MSC, South Pacific Division (SPD), in accordance with EC 1165-2-214.

The Los Angeles District will post the approved review plan on its public website. A copy of the approved review plan (and any updates) will be provided to the FRM-PCX to keep the PCX apprised of requirements and review schedules.

The RMO for Type II IEPR is the US Army Corps of Engineers (USACE or Corps) Risk Management Center (RMC). Panel members will be selected using the National Academies of Science (NAS) policy for selecting reviewers. The District Chief of Engineering, as the Engineer-In-Responsible-Charge, will ensure that Type II IEPR is conducted in accordance with EC 1105-2-214, and will fully coordinate with the Chief of Construction, the Chief of Operations, and the Project Manager through the Pre-Construction

Engineering and Design (PED) and Construction phases. The Project Manager will coordinate with the RMO to develop the review requirements and to include them in the RP.

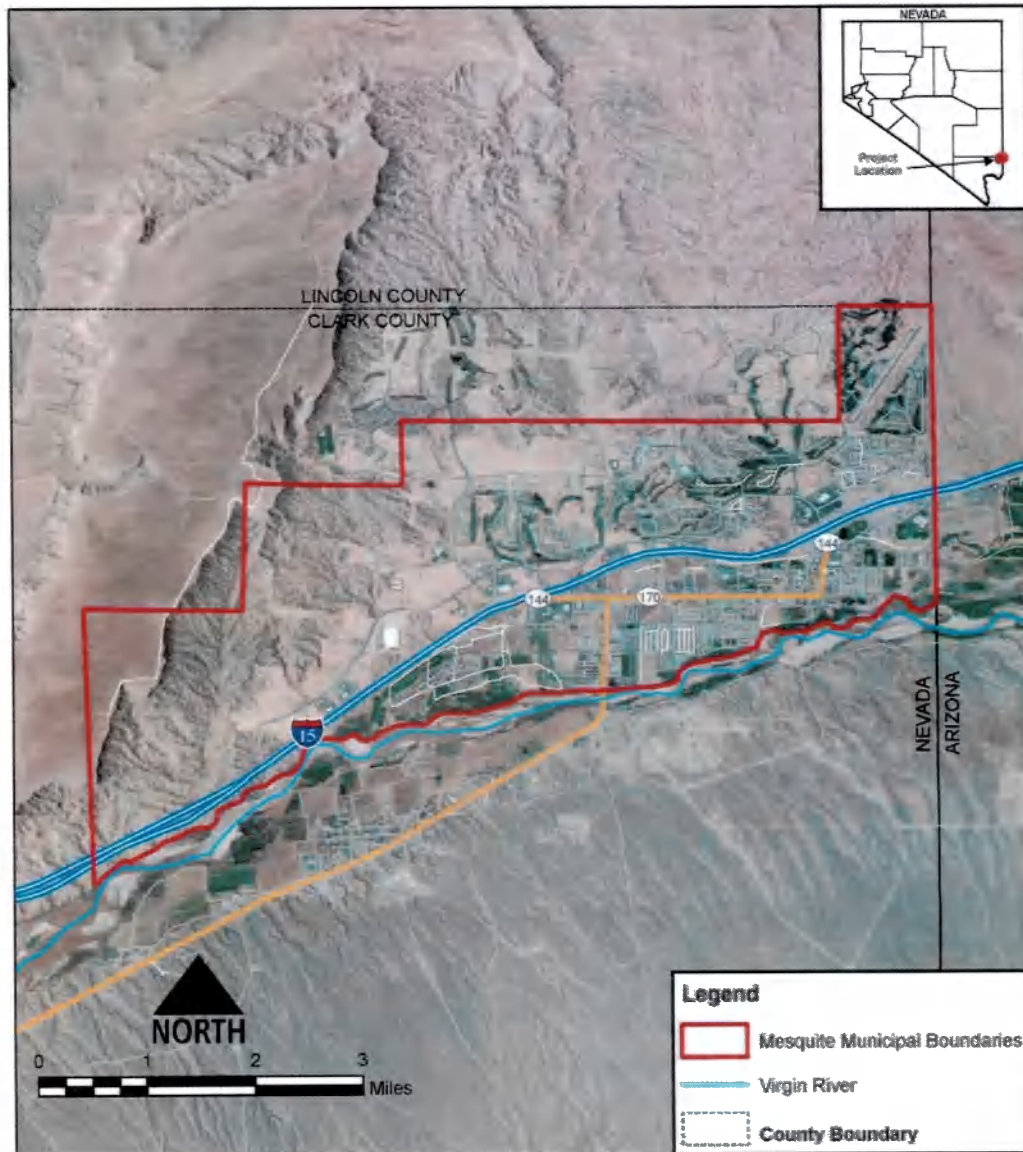
3. STUDY INFORMATION

- a. **Decision Document.** The Virgin River Study is being conducted under the Continuing Authorities Program (CAP), Section 205, of the 1948 Flood Control Act, as amended. The purpose of the decision document is to demonstrate that Federal participation in a specific project is warranted, culminating in approval of the decision document. Pursuant to CAP, the decision document is submitted through the District Commander to the Major Subordinate Command Commander to approve the recommended project for implementation. Under CAP 205, additional Congressional authorization is not required for project implementation. A NEPA compliant environmental assessment (EA) is anticipated to be required for furtherance of this study.
- b. **Study/Project Description.** The City of Mesquite, which encompasses an area of approximately 15 miles, is located in southeast Nevada approximately 80 miles to the northeast of Las Vegas near the Nevada/Arizona border. Figure 1 shows the study area in the vicinity of Mesquite.

The City of Mesquite lies within the Virgin River Watershed. The watershed has been experiencing a significant level of development and infrastructure growth in Washington County, Utah and northeast Clark County, Nevada. Much of this development is occurring in lowland areas, adjacent to floodplains and high flood hazard areas, which are also important habitat for wildlife species.

In response to the 2006 Energy and Water Development Act (PL 109-103), the Secretary of the Army was directed to conduct “at full Federal expense, comprehensive analyses that examine multi-jurisdictional use and management of water resources on a watershed or regional scale.” The Comprehensive Watershed Analysis of the Virgin River Watershed is one of five federally funded watershed studies conducted as part of that effort. In carrying out the analysis, the U.S. Army Corps of Engineers (Corps) worked in close partnership with local and county governments, tribal, state, and Federal agencies, municipalities, landowners, citizen groups, non-governmental organizations, and the public. This collaborative effort produced a floodplain management strategy (*Virgin River and Tributaries, Utah, Arizona & Nevada; U.S. Army Corps of Engineers, March 2008*) and a watershed strategy (*Virgin River Watershed – Utah, Arizona and Nevada; U.S. Army Corps of Engineers, August 2008*) to assist stakeholders in the successful management of the river, tributaries, and related resources

Figure 1: Site Vicinity Map



- c. **Factors Affecting the Scope and Level of Review.** Flooding impacts to the City of Mesquite from the Virgin River have resulted in damage from inundation, erosion, and sedimentation to private lands and structures, and to public infrastructure. Much of the riverine area is included in the 100-year regulatory Federal Emergency Management Agency (FEMA) Special Flood Hazard Area. Flood flows near or at the magnitude of a 100-year (0.01) frequency event occurred in 1966, 2005 and 2010. In January 2005, 86 residential structures located in two subdivisions to the north of the river, near the eastern boundary of the City of Mesquite in the vicinity of the Nevada-Arizona border, were flooded and received moderate to significant damage. On one street floodwater depth was up to 5 feet deep. An emergency levee was constructed in December 2010 by the City of Mesquite Public Works during a major storm event to protect the same residential communities. Though the levee survived the high water peak of that event, limiting the damages to only two homes, it is not an engineered

structure and lacks the structural integrity to preclude future flood damage. The Public Works Department inspects the levee annually and also following storm events to make any needed repairs. The levee was constructed largely on U.S. Bureau of Land Management (BLM) land.

Drought years enhance conditions for flooding in subsequent wet years as the pre-flood active channel narrows due to sedimentation effects and vegetation encroachment. Invasion of dense non-native tamarisk on the Virgin River floodplain and channel banks altered the expected natural flood response during the 2005 flood. As the 2005 flood widened the channel, it accumulated a large load of vegetation debris from bank erosion. This debris frequently becomes trapped by remaining bank and channel vegetation, resulting in the formation of debris obstructions that created backwater, which raised the water surface elevations and forced flow abruptly into the overbank floodplain. These realigned flows, known as avulsions, can travel a great distance before re-joining the main (active) channel. Avulsion paths typically coincide with historic flow paths of the main channel. Anecdotal and the results of geomorphic analysis (J.E. Fuller, 2006) conducted for the CCRFCC indicated that an avulsion which occurred in the 2005 flood event was a primary contributor to the inundation and erosion damage caused to the residential tracts in the City of Mesquite. The geomorphic analysis concluded that the combination of the debris obstruction and location of the historical main channel caused in the initial 2005 avulsion. This issue is multi-jurisdictional as the channel avulsion occurred in Arizona, and the impacts were experienced in Nevada.

The City of Mesquite has very limited infrastructure to provide protection against lateral channel migration, which includes both channel avulsion and more gradual erosive migration.

Preliminary measures that would be considered in the formulation of flood risk reduction alternatives for the City of Mesquite would consist of the following structural and non-structural solutions:

- Levee with slope protection (riprap, soil cement, or roller compacted concrete)
- Flood wall
- Raising of structures
- Relocation of structures
- Acquisition of structures and land
- Floodproofing structures
- Open riparian conveyance corridor along main channel

A flood warning system consisting of a coordinated watershed-wide flood detection network and flood response plan is already in place, and will therefore not need to be further addressed as part of a feasibility study effort. A cost analysis of potential alternatives has not been performed by the Corps; however, typical costs to construct one mile of levee in the study area would be several million dollars. The cost of non-structural measures are not known but would be evaluated in a full feasibility study effort.

Documented flood events from the last 50-years and related damage to residential structures in the community present a threat to public health, life and safety. The characteristics of the flood events will be assessed after the H&H analysis has been completed and the preliminary measures will be evaluated during the feasibility stage of the study. The sponsor supports a structural solution (Levee or flood wall) but has not ruled out nonstructural measures.

- d. **Life Safety.** In accordance with EC 1165-2-214, for any project where potential hazards pose a significant threat to human life (public safety); the Federal action is justified by life safety; or the failure of the project would pose a significant threat to human life, i.e. when life safety issues exist, a Type I IEPR is required. In addition, since design initiates in the decision document phase, a Safety Assurance Review (SAR) should be incorporated into the Type I IEPR when life safety issues exist.

An assessment by the District Chief, Engineering Division, that there is a significant threat to human life associated with this project is included as Attachment 1 to this Review Plan.

- e. **In-Kind Contributions.** Products and analyses provided by non-Federal sponsors as in-kind services are subject to DQC, ATR, and IEPR. The in-kind products and analyses to be provided by the non-Federal sponsor include: No in-kind products are anticipated.

4. DISTRICT QUALITY CONTROL (DQC)

All decision documents (including supporting data, analyses, environmental compliance documents, etc.) shall undergo DQC. DQC is an internal review process of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Management Plan (PMP). The home district shall manage DQC. Documentation of DQC activities is required and should be in accordance with the Quality Manual of the District and the home MSC. DQC will be completed and DQC documentation will be provided to the ATR Team prior to initiation of any ATR effort.

- a. **Documentation of DQC.** Non-Project Delivery Team (PDT) members and/or supervisory staff will conduct DQC review for major draft and final products, including products provided by the non-federal sponsor as in-kind services. It is expected that the Major Subordinate Command (MSC)/District QMP will address the conduct and documentation of this fundamental level of review. The conclusions/agreements reached should be documented, with copies retained by each participant and distributed to the ATR Lead and the PDT leader. The documentation shall become part of the project technical review file.

The software system DrChecks, Microsoft Word, or email may be used to document issues raised during the DQC. Specific issues raised in the review shall be documented in a comment, response, discussion, action required, action taken and, if appropriate, lessons learned format. Unresolved differences between the PDT and reviewers shall be documented, along with the basis for the function chief's decision on the issue. The PDT member who developed the document being reviewed shall prepare a brief memorandum after each review that will document when the review was completed, who conducted the review, and any outstanding issues. This memo, along with the comments and responses, shall become part of the review team's records. These DQC reviews should be completed prior to major decision points in the planning process so that the technical results can be relied upon in setting the course for further study activities.

- b. **Products to Undergo DQC.** For Virgin River Study the plan formulation, environmental resources, cultural resources, hydrology and hydraulic analyses, geotechnical analyses, civil design, economics, real estate and cost engineering products would undergo DQC. Products that summarize existing background information without using models or making assumptions, such as a Phase I Cultural Resources Survey or an existing condition levee report, will not normally undergo DQC other than to

verify the accuracy of the summaries. The documents that the summaries are based on will be available at the time of the DQC for the reviewer to verify accuracy of the summaries.

- c. **Required DQC Expertise.** Review teams shall be assigned representatives that are senior experienced staff that mirror the expertise of the PDT. A goal will be the establishment of an informed review team with full accountability to maintain objectivity. To ensure this objectivity, the members of the review teams must be independent from those who perform the work. DQC reviewers will need to have expertise similar to that outlined for the ATR team in Table 1 below.

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 policy, and that the document explains the analyses and results in a reasonably clear manner for the public and decision makers. ATR is managed within USACE by the designated RMO and is conducted by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. ATR teams will be comprised of senior USACE personnel and may be supplemented by outside experts as appropriate. The ATR team lead will be from outside the home MSC.

- a. **Products to Undergo ATR.** ATR will be performed for the Draft Report and the Final Report. The Hydraulic and Hydrologic Appendix and the Economic Analysis Appendix will each undergo scaled ATR prior to the completion of the Draft Report. If the PDT determines, in coordination with the RMO or ATR Lead as appropriate, that additional interim technical products should undergo ATR, the review plan will be updated and the appropriate schedule and budget for the ATR negotiated with the RMO sufficiently in advance of the review to allow the necessary ATR team member(s) to be engaged.
- b. **Required ATR Team Expertise.** The Agency Technical Review Team (ATRT) will be comprised of individuals that have not been involved in the development of the decision document and will be chosen based on expertise, experience, and/or skills. The members will roughly mirror the composition of the PDT and, wherever possible, reside outside of the SPD region. It is anticipated that the team will consist of not more than eight reviewers. Multiple disciplines might be performed by one experienced, senior ATR member – For example ATR Lead, Planning and/or Economics; Environmental Resources and Cultural Resources; Risk Analysis and Economics; Civil Engineering and Geotechnical Engineering. The ATRT members will be identified at the time the review is conducted and will be presented in Attachment 2.

ATR Team Members/Disciplines	Expertise Required
ATR Lead	The ATR lead should be a senior professional with extensive experience in preparing Civil Works decision documents and conducting ATR. The lead should also have the necessary skills and experience to lead a virtual team through the ATR process. The ATR lead may also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc).
Planning	The Planning reviewer should be a senior water resources planner with experience in plan formulation for multi-purpose projects,

	including flood risk management. The Planning reviewer should also have familiarity with the “Planning Guidance Notebook” (ER-1105-100) and the Water Resources Council’s Principals and Guidelines.
Economics	The economist should be a senior economist with experience conducting economic analysis that includes flood risk management analysis. The economist should also be familiar with flood damage assessments using HEC-FDA; use of RECONS model to address regional economic development and other social effects (OSE) associated with a project; economic justification of projects in accordance with current USACE policy.
Environmental Resources	Integration of environmental evaluation and compliance requirements pursuant to the “Procedures for Implementing NEPA” (ER 200-2-2), national environmental statutes, applicable executive orders, and other Federal planning requirements, into the planning of Civil Works projects. Experience and familiarity with the application of habitat evaluation models to assist with assessment of environmental impact(s) preferred.
Cultural Resources	Archaeologist familiar with records searches, cultural resource survey methodology, area of potential effects, Section 106 of the National Historic Preservation Act, and state and Federal laws/executive orders pertaining to American Indian Tribes.
Hydrology & Hydraulic Engineering	Hydrologist or hydraulic engineer proficient with river hydraulics, GEO-RAS, HEC-RAS, HEC-HMS, and associated one dimensional models, floodplain mapping, hydrologic statistics, sediment transport analysis, levees and floodwalls, channel stability analysis, risk and uncertainty analysis, non-structural solutions, and a number of other closely associated technical subjects.
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 Engineering	Geotechnical engineer familiar with sampling and laboratory testing, embankment stability and seepage analyses, planning analysis, and a number of other closely associated technical subjects.
Civil Engineering	Civil engineer with experience in designing grading plans and levees, levee stability, and levee and bank-protection removal or modification.
Cost Engineering ¹	Cost estimating specialist competent in cost estimating for both construction and ecosystem restoration using MCACES/Mii; working knowledge of construction and environmental restoration; capable of making professional determinations based

	on experience.
Real Estate	Real estate specialist familiar with real estate valuation, gross appraisal, utility relocations, takings and partial takings as needed for implementation of Civil Works projects.

¹Coordination with the USACE Mandatory Center of Expertise (MCX) located in the Walla Walla District will be conducted as required by EC 1165-2-214.

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

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

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

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

ATR may be certified when all ATR concerns are either resolved or referred to the vertical team for resolution and the ATR documentation is complete. For draft and final products, the ATR Lead will prepare a Completion of ATR statement documenting that the ATR has been completed and the issues raised by the ATR team have been resolved (or elevated to the vertical team). Subsequently, the District will prepare (with ATR Lead assistance upon request) a Certification of ATR statement that certifies all concerns resulting from the ATR of the project have been fully resolved. Sample statements of Completion and Certification of Agency Technical Review are included in Attachment 3.

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 1165-2-214, is made as to whether IEPR is appropriate. IEPR panels will consist of independent, recognized experts from outside of the USACE in the appropriate disciplines, representing a balance of areas of expertise suitable for the review being conducted. There are two types of IEPR:

- **Type I IEPR.** Type I IEPR reviews are managed outside the USACE and are conducted on project studies. Type I IEPR panels assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, economic analysis, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, models used in the evaluation of environmental impacts of proposed projects, and biological opinions of the project study. Type I IEPR will cover the entire decision document or action and will address all underlying engineering, economics, and environmental work, not just one aspect of the study. For decision documents where a Type II IEPR (Safety Assurance Review) is anticipated during project implementation, safety assurance shall also be addressed during the Type I IEPR per EC 1165-2-214.
 - **Type II IEPR.** Type II IEPR, or Safety Assurance Review (SAR), are managed outside the USACE and are conducted on design and construction activities for hurricane, storm, and flood risk management projects or other projects where existing and potential hazards pose a significant threat to human life. Type II IEPR panels will conduct reviews of the design and construction activities prior to initiation of physical construction and, until construction activities are completed, periodically thereafter on a regular schedule. The reviews shall consider the adequacy, appropriateness, and acceptability of the design and construction activities in assuring public health safety and welfare.
- a. **Decision on IEPR.** This decision document will present the details of a feasibility study undertaken to evaluate structural and non-structural FRM measures to address problems in the study area. EC 1165-2-214 set forth thresholds that trigger IEPR: Where there is a significant threat to human life; where the project has an estimated cost (including mitigation) of greater than \$45 million; where the Governor of an affected State requests a peer review by independent experts, or; where the DCW or the Chief of Engineers determines that the project study is controversial due to significant public dispute over either the size, nature, or effects of the project or the economic or environmental costs or benefits of the project.

This study is not expected to contain influential scientific information nor contain a highly influential scientific assessment. Although the project may be moderately complex, it is unlikely that this study will utilize precedent setting modeling or result in changes to existing policy. It is anticipated that this project would use typical materials and techniques, engage in standardized construction sequencing and acquisition planning, and follow typical design through construction scheduling.

This project is unlikely to be controversial and will not likely have significant agency and public interest due to the presence of invasive species (tamarisk) in the area where the preliminary structural measures would be constructed.

Impacts to public health, life, and safety may be a concern due to the flood potential of the Virgin River and the City of Mesquite's limited infrastructure to provide protection against lateral channel migration. During the past 50-years there have been three flood events with flood flows near or at the 100-year frequency event. In January 2005, 86 residential structures were flooded and received moderate to significant damage. Floodwater depth was up to 5 feet deep in residential areas of the floodplain. An emergency levee was constructed in December 2010 by the City of Mesquite during a major storm event and damage was limited to 2 residential structures. However, the emergency levee is not an engineered structure and its structural reliability is uncertain during future flood events.

At this pre-feasibility stage of the study, the risk to life and safety is unknown. The H&H analysis has not been completed and the flood event characteristics have not been assessed. The life and safety risks will be investigated when a TSP is identified and included in the study and the review plan updated when more information is available. For these reasons, IEPR will be conducted. IEPR is a project cost. The IEPR panel review will be federally funded. In-house costs associated with obtaining the IEPR panel contract as well as responding to IEPR comments will be cost shared expenses. It is not anticipated that the public, including scientific or professional societies, will be asked to nominate potential external peer reviewers.

- b. Products to Undergo Type I IEPR.** Type I IEPR will be performed for the Draft Feasibility Report and the supporting technical appendices and analyses. Interim Corps and/or contractor products for hydrology, hydraulic design, geotechnical engineering, civil design and economics will be provided before the draft report is released for public review. The full IEPR panel will receive the entire Integrated Draft Feasibility Report/Environmental Document and all technical appendices concurrent with public and agency review.

The final report to be submitted by the IEPR panel must be submitted to the PDT within 60 days of the conclusion of public review. A representative of the IEPR panel may attend any public meeting(s) held during public and agency review of the draft report. The Los Angeles District will draft a response to the IEPR final report and process it through the vertical team for presentation to the Deputy Commanding General of Civil and Emergency Operations (DCG-CEO) for approval. An IEPR panel or OEO representative member will participate in the meeting with the DCG-CEO, preferably in person. The USACE response will accompany the publication of the final report.

- c. Required Type I IEPR Panel Expertise.** The IEPR Panel will be comprised of individuals external to the Corps of Engineers and will be chosen based on expertise, experience, and/or skills. The OEO will determine the final participants on the IEPR panel. It is anticipated that the team will consist of

approximately 4 or 5 IEPR reviewers. The table below shows the disciplines needed to complete the IEPR.

IEPR Team Members/Disciplines	Expertise Required
Planning	The Planning reviewer should be a senior water resources planner with experience in plan formulation for multi-purpose projects, including flood risk management. The Planning reviewer should also have familiarity with the "Planning Guidance Notebook" (ER-1105-100) and the Water Resources Council's Principals and Guidelines.
Economics	The economist should be a senior economist with experience conducting economic analysis that includes flood risk management analysis. The economist should also be familiar with flood damage assessments using HEC-FDA; use of RECONS model to address regional economic development and other social effects (OSE) associated with a project; economic justification of projects in accordance with current USACE policy.
Environmental Resources	Integration of environmental evaluation and compliance requirements pursuant to the "Procedures for Implementing NEPA" (ER 200-2-2), national environmental statutes, applicable executive orders, and other Federal planning requirements, into the planning of Civil Works projects. Experience and familiarity with the application of habitat evaluation models to assist with assessment of environmental impact(s) preferred.
Hydrology & Hydraulic Engineering	Hydrologist or hydraulic engineer proficient with river hydraulics, GEO-RAS, HEC-RAS, HEC-HMS, and associated one dimensional models, floodplain mapping, hydrologic statistics, sediment transport analysis, levees and floodwalls, channel stability analysis, risk and uncertainty analysis, non-structural solutions, and a number of other closely associated technical subjects.

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

- Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
- Include the charge to the reviewers;
- Describe the nature of their review and their findings and conclusions; and

- Include a verbatim copy of each reviewer's comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

The final Review Report will be submitted by the OEO no later than 60 days following the close of the public comment period for the draft decision document. USACE shall consider all recommendations contained in the Review Report and prepare a written response for all recommendations adopted or not adopted. The final decision document will summarize the Review Report and USACE response. The Review Report and USACE response will be made available to the public, including through electronic means on the internet.

- e. **Type II IEPR.** The study team will evaluate structural and non-structural measures to reduce the risk of flooding to the City of Mesquite and vicinity. If a structural solution is recommended for implementation, then Type II IEPR (Safety Assurance Review or SAR) will be required for design and construction activities.

Since Type II IEPR may be required, the SAR will be incorporated into the Type I IEPR (EC 1105-2-214, Appendix D, paragraph 1.b(1)). The Review Panel will consider the following during the Type I IEPR: Is the quality and quantity of the surveys, investigations, and engineering sufficient for a concept design (ER 1110-2-1150); Are the models used to assess hazards appropriate?; Are the assumptions made for the hazards appropriate?, and; Does the analysis adequately address the uncertainty given the consequences associated with the potential for loss of life for this type of project?

7. POLICY AND LEGAL COMPLIANCE REVIEW

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

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

All decision documents shall be coordinated with the Cost Engineering and ATR 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. The RMO is responsible for coordination with the Cost Engineering MCX. For CAP projects, a certified list of Cost Estimators can be used to select the Cost ATR team member in coordination with the MCX.

9. MODEL CERTIFICATION AND APPROVAL

EC 1105-2-412 mandates the use of certified or approved models for all planning activities to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. Approval of planning models under EC 1105-2-412 is not required for CAP projects. MSC commanders remain responsible for assuring the quality of the analyses used in these projects. ATR will be used to ensure that models and analyses are compliant with Corps policy, theoretically sound, computationally accurate, transparent, described to address any limitations of the model or its use, and documented in study reports.

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).

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).

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

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Certification / Approval Status
HEC-FDA 1.2.5a (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 Virgin River near the City of Mesquite to aid in the selection of a recommended plan to manage flood risk.	Certified

RECONS	RECONS is a Corps corporate model specifically developed to assess the Regional Economic Development (RED) impacts of Corps civil works projects. This model will be used to support discussion of the RED benefits associated with project implementation. The RECONS model will estimate the impacts to the local economy, in terms of income, employment and tax revenues, resulting from project construction.	Approved for Use
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b. Engineering Models. The following engineering models are anticipated to be used in the development of the decision document:

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Approval Status
HEC-RAS 4.1 (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 Virgin River.	HH&C CoP Preferred Model
HEC HMS	The Hydrologic Modeling System (HEC-HMS) is designed 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. Hydrographs produced by the program are used directly or in conjunction with other software for studies of water availability, urban drainage, flow forecasting, future urbanization impact, reservoir spillway design, flood damage reduction, floodplain regulation, and systems operation.	HH&C CoP Preferred Model
MII	This is a Cost Engineering QTO (Quantity Take-off) cost estimating tool that was developed by Project Time and Cost.	Enterprise Model

10. REVIEW SCHEDULES AND COSTS

- a. **ATR Schedule and Cost.** The ATR process for this document will follow the following timeline. Timing is dependent on annual appropriations, and therefore may change. Actual dates will be scheduled once the period draws closer. All products produced for these milestones will be reviewed, including those produced as in-kind services by the non-Federal sponsor.

The PDT district shall provide labor funding by cross charge labor codes. Funds for travel, if needed, will be provided through government order. The Study Manager will work with the ATR manager to ensure that adequate funding is available and is commensurate with the level of review needed. The cost estimate for ATR reviews of the AFB documentation, draft and final reports is between \$70,000 and \$80,000. The initial AFB review is estimated to cost \$35,000 to \$50,000 with subsequent reviews expected to be limited to updates and changes to the previously reviewed document. Any funding shortages will be negotiated on a case by case basis and in advance of a negative charge occurring. The project is not unusually complex and it is not anticipated there will be a need for additional technical reviews. If circumstances change and additional technical reviews are necessary the RP will be updated to include the type of review, cost and schedule. The duration to complete the ATR will be scheduled for 6 weeks.

- b. **Type I IEPR Schedule and Cost.** Interim Corps and/or contractor products for hydrology, hydraulic design, geotechnical engineering, civil design and economics will be provided before the draft report is released for public review. The full IEPR panel will receive the entire Integrated Draft DPR/Environmental Document and all technical appendixes concurrent with public and agency review. Based on the current study schedule, this will be in November 2015. The final report to be submitted by the IEPR panel must be submitted to the PDT within 60 days of the conclusion of public review. Type I IEPR is typically about a 26 week process.

IEPR is currently estimated to cost \$120,000. IEPR is a project cost. The IEPR panel review cost will be 100% federally funded. In-house costs associated with obtaining the IEPR panel contract as well as responding to IEPR comments will be cost shared expenses.

- c. **Model Certification/Approval Schedule and Cost.** Not applicable for CAP studies per Director of Civil Works Policy Memo #1. Only approved models were used in studying this project.

11. PUBLIC PARTICIPATION

The public and agencies will have multiple opportunities to participate in this study. The earliest opportunity will be as part of the public scoping process during the fall of 2014.

Public review of the Draft Feasibility Report will occur after issuance of the policy guidance memo and concurrence by the SPD Chief of Planning that the document is ready for public release. Public review of the draft report will occur concurrently to the ATR process. The period will last a minimum of 30 or 45 days, depending upon which type of NEPA document (an EA is currently anticipated) is required. One or more public workshops will be held during the public and agency review period. Comments received during the public comment period for the draft report could be provided to the IEPR team prior to completion of the final Review Report and to the ATR team before review of the final Decision Document. The public review of necessary state or federal permits will also take place during this period. A formal State and Agency review will occur concurrently with the public review. However, it is

anticipated that intensive coordination with these agencies will have occurred concurrent with the planning process. Upon completion of the review period, comments will be consolidated in a matrix and addressed, if needed. A comment resolution meeting will take place, if needed, to decide upon the best resolution of comments. A summary of the comments and resolutions will be included in the document.

It is not anticipated that the public, including scientific or professional societies, will be asked to nominate potential external peer reviewers for this study.

12. REVIEW PLAN APPROVAL AND UPDATES

The SPD Commander is responsible for approving this RP. The Commander's approval reflects vertical team input (involving district, MSC, and RMO) as to the appropriate scope and level of review for the decision document. Like the PMP, the RP is a living document and may change as the study progresses. The home district is responsible for keeping the RP up to date. Minor changes to the RP since the last MSC Commander approval are documented in Attachment 4. Significant changes to the RP (such as changes to the scope and/or level of review) should be re-approved by the MSC Commander following the process used for initially approving the plan. The latest version of the RP, along with the Commanders' approval memorandum, should be posted on the Home District's webpage. The latest RP should also be provided to the RMO and home MSC.


13. REVIEW PLAN POINTS OF CONTACT

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

- U.S. Army Corps of Engineers, Los Angeles District, Planning Division, 915 Wilshire Blvd, Los Angeles, CA 90017, Mr. Mike Green (213) 452-3812

ATTACHMENT 1: ASSESSMENT OF LIFE SAFETY RISK

The Los Angeles District Chief of Engineering has determined that, due to the history of flood inundation along the Virgin River at Mesquite, Nevada, and the other factors described in this Review Plan, there is a significant threat to human life associated with the Continuing Authorities Program (CAP) Section 205, Virgin River, and Mesquite, Nevada project. If life safety issues are not minimized during the formulation of the Tentatively Selected Plan (TSP), a Type II IEPR, or Safety Assurance Review (SAR), will be conducted on the design and construction activities for the authorized project.



RICHARD J. LEIFIELD, P.E.
Chief, Engineering Division
Los Angeles District
U.S. Army Corps of Engineers

ATTACHMENT 2: TEAM ROSTERS

PRODUCT DELIVERY TEAM

Name	Discipline	Phone	Email
Brian Kenny	Project Manager	602-230-6934	Brian.w.kenny@usace.army.mil
Mike Green	Study Manager/Planning	213-452-3812	michael.p.green@usace.army.mil
Marvin Mai	Civil Design	213-452-3635	marvin.m.mai@usace.army.mil
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Van Crisostomo	Hydrology & Hydraulics	213-452-3551	van.g.crisostomo@usace.army.mil
Jacob Hensel	Economics	213-452-3103	jacob.r.hensel@usace.army.mil
Phillip Eng	Cost Engineering	213-452-3744	phillip.w.eng@usace.army.mil
Joseph Gatti	Real Estate/Lands	602-230-6966	joseph.m.gatti@usace.army.mil
John Killeen	Cultural Resources	213-452-3861	John.J.Killeen@usace.army.mil
Mark Mclarty	Geotechnical Engineering	213-452-3577	mark.w.mclarty@usace.army.mil
Michael Lau	Soils & Materials	213-452-3595	michael.a.lau@usace.army.mil
Kirk Brus	Environ Coordinator	213-452-3867	kirk.c.brus@usace.army.mil
Alan Nichols	Survey & Mapping	626-401-4010	Alan.a.nichols@usace.army.mil

AGENCY TECHNICAL REVIEW TEAM

Name	Discipline	Phone	Email
TBD	ATR Manager/Plan		
TBD	Civil Design		
TBD	Environmental Resources		
TBD	Hydrology/Reservoir		
TBD	Hydraulics		
TBD	Economics		
TBD	Cost Engineering		
TBD	Real Estate/Lands		
TBD	Cultural Resources		
TBD	Geotechnical Engineering		

VERTICAL TEAM

Name	Discipline	Phone	Email
Paul Bowers	District Support Team Lead	415-503-6556	Paul.W.Bowers@usace.army.mil
Pauline Acosta	Regional Integration Team	202-761-4085	Pauline.M.Acosta@usace.army.mil

**PLANNING CENTER OF EXPERTISE
FLOOD RISK MANAGEMENT**

Name	Discipline	Phone	Email
Eric Thaut	Program Manager, PCX Flood Risk Management	415-503-6852	Eric.W.Thaut@usace.army.mil

ATTACHMENT 3: SAMPLE STATEMENT OF TECHNICAL REVIEW FOR DECISION DOCUMENTS

COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the Section 205 Flood Risk Management Detail Project Report for Virgin River in Mesquite, Clark County, Nevada. 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 US Army Corps of Engineers policy. The ATR also assessed the District Quality Control (DQC) documentation and made the determination that the DQC activities employed appear to be appropriate and effective. All comments resulting from the ATR have been resolved and the comments have been closed in DrCheckssm.

SIGNATURE

Name

ATR Team Leader

Office Symbol/Company

Date

SIGNATURE

Brian Kenny

Project Manager

CESPL-PM-C

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

Richard Leifield, PE
Chief, Engineering Division
CESPL-ED

Date

SIGNATURE

Josephine Axt, PhD
Chief, Planning Division
CESPL-PD

Date

¹ Only needed if some portion of the ATR was contracted

ATTACHMENT 4: REVIEW PLAN REVISIONS

Revision Date	Description of Change	Page / Paragraph Number

ATTACHMENT 5: 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
DPR	Detailed Project Report	OMB	Office and Management and Budget
DQC	District Quality Control/Quality Assurance	OMRR&R	Operation, Maintenance, Repair, Replacement and Rehabilitation
EA	Environmental Assessment	OEO	Outside Eligible Organization
EC	Engineer Circular	OSE	Other Social Effects
EIS	Environmental Impact Statement	PCX	Planning Center of Expertise
EO	Executive Order	PDT	Project Delivery Team
ER	Ecosystem Restoration	PAC	Post Authorization Change
FDR	Flood Damage Reduction	PMP	Project Management Plan
FEMA	Federal Emergency Management Agency	PL	Public Law
FRM	Flood Risk Management	QMP	Quality Management Plan
FSM	Feasibility Scoping Meeting	QA	Quality Assurance
GRR	General Reevaluation Report	QC	Quality Control
Home District/MSD	The District or MSD responsible for the preparation of the decision document	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
MCX	Mandatory Center of Expertise	USACE	U.S. Army Corps of Engineers
MSC	Major Subordinate Command	WRDA	Water Resources Development Act