REVIEW PLAN

Middle Rio Grande Flood Protection Project, Bernalillo to Belen, New Mexico
General Reevaluation Report and Supplemental Environmental Impact Statement

U.S. Army Corps of Engineers
Albuquerque District

MSC Approval Date: 10 December 2012
Last Revision Date: 5 January 2018

US Army Corps of Engineers ®

REVIEW PLAN

Middle Rio Grande Flood Protection Project, Bernalillo to Belen, New Mexico
General Reevaluation Report and Supplemental Environmental Impact Statement

TABLE OF CONTENTS

1. PURPOSE AND REQUIREMENTS

a. Purpose. This Review Plan defines the scope and level of peer review for the Middle Rio Grande Flood Protection Project, Bernalillo to Belen, New Mexico General Re-evaluation Report and Supplemental Environmental Impact Statement (GRR/SEIS), a single purpose Flood Damage Reduction study.

b. References

1) Engineering Circular (EC) 1165-2-217, Civil Works Review Policy, TBD
2) EC 1105-2-412, Assuring Quality of Planning Models, 13 Mar 2011
3) Engineering Regulation (ER) 1105-2-101, Risk Analysis for Flood Damage Reduction Studies, 3 January 2006
4) Engineering Manual (EM) 1110-2-1619, Risk-Based Analysis for Flood Damage Reduction Studies, 1 August 1996
5) ER 1110-1-12, Quality Management, 30 Sep 2006
6) ER 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 Nov 2007
7) CECW-CP Memo for Distribution, "Peer Review Process", 30 Mar 2007
8) QMS 02500-SPD, Preparation and Approval of Review Plans
9) QMS 02500.1-SPD, Supplemental Review Plan Checklist
10) Project Management Plan

c. Requirements. This review plan was developed in accordance with EC 1165-2-217, 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 1165-2-217) and planning model certification/approval (per EC 1105-2-412).

2. REVIEW MANAGEMENT ORGANIZATION (RMO) COORDINATION

The RMO is responsible for managing the overall peer review effort described in this Review Plan. The RMO for decision documents is typically either a Planning Center of Expertise (PCX) or the Risk Management Center (RMC), depending on the primary purpose of the decision document. The RMO for the peer review effort described in this Review Plan is the Flood Risk Management 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. Decision Document. The GRR / SEIS's Mountain View, Isleta, and Belen units are within the comprehensive plan of development for flood control in the Rio Grande Basin, New Mexico that was authorized for construction by Section 401 of the Water Resources Development Act of 1986 (Public Law 99-662), in accordance with the recommendation of the Chief of Engineers, dated 23 June 1981.

EC 1165-2-217 requires coordination with the appropriate RMO. The Flood Risk Management - Planning Center of Expertise (FRM-PCX) is the RMO for this study. It is anticipated that while this study will be

challenging and beneficial, it will not be novel, controversial or precedent setting, nor have significant national importance. However, the estimated cost of the project is projected to be in excess of $45 million dollars, a Supplemental Environmental Impact Statement (EIS) will be prepared, and the study will require an Independent External Peer Review (IEPR).

b. Study/Project Description. The Middle Rio Grande Flood Protection Project was designed in response to a series of six Congressional actions authorizing studies of the Rio Grande, particularly the Middle Rio Grande Valley. The flooding problems along the Middle Rio Grande between Bernalillo and Belen, New Mexico are documented in a 1979 feasibility report, Middle Rio Grande Flood Protection, Bernalillo to Belen, New Mexico, Interim Feasibility Report. There has been no significant flooding in the project area since those listed in the 1979 report.

During the course of a Limited Re-evaluation Report (LRR) study for the Belen East and West units, several events occurred that impacted the study and have resulted in expanding the scope of the Belen LRR study into the current GRR. These include the following:

A longer period of record for hydrological data is now available, which permits improved and updated hydrological analysis. A levee design modification has been added to address long duration flows: any proposed plan would have to incorporate design features to prevent seepage through the levee due to prolonged flow against the riverward toe.

The Corps has departed from the use of the freeboard methodology to account for uncertainty and instead uses probabilistic determination of flood risk and levee design.
Three species have been listed as threatened or endangered since 1994 (the Rio Grande silvery minnow, the Southwestern Willow Flycatcher, and the Pecos sunflower, each occurring within the study area, two with critical habitat).

The Middle Rio Grande Flood Protection, Bernalillo to Belen, New Mexico, Corrales Unit, Limited Reevaluation Report, dated August 1994 was to establish the Corrales Unit as a separable element of the original 1979 study, to reaffirm the appropriate plan formulation, plan selection and to identify the National Economic Development (NED) plan. The LRR and accompanying Environmental Assessment (EA) were approved in April 1995 and the 10.6-mile Corrales Unit levee was completed in 1997.

The study area of the GRR investigations includes the three southern river reaches and five units (Mountain View, Isleta East and West, and Belen East and West) located in Bernalillo and Valencia counties, New Mexico and extends approximately twenty river miles from the southern border of Albuquerque to just past the southern border of Belen. The study area encompasses approximately 110 square miles of drainage area and includes several small rural communities on both sides of the Rio Grande between Albuquerque and Belen, most of which are unincorporated. See map following page.

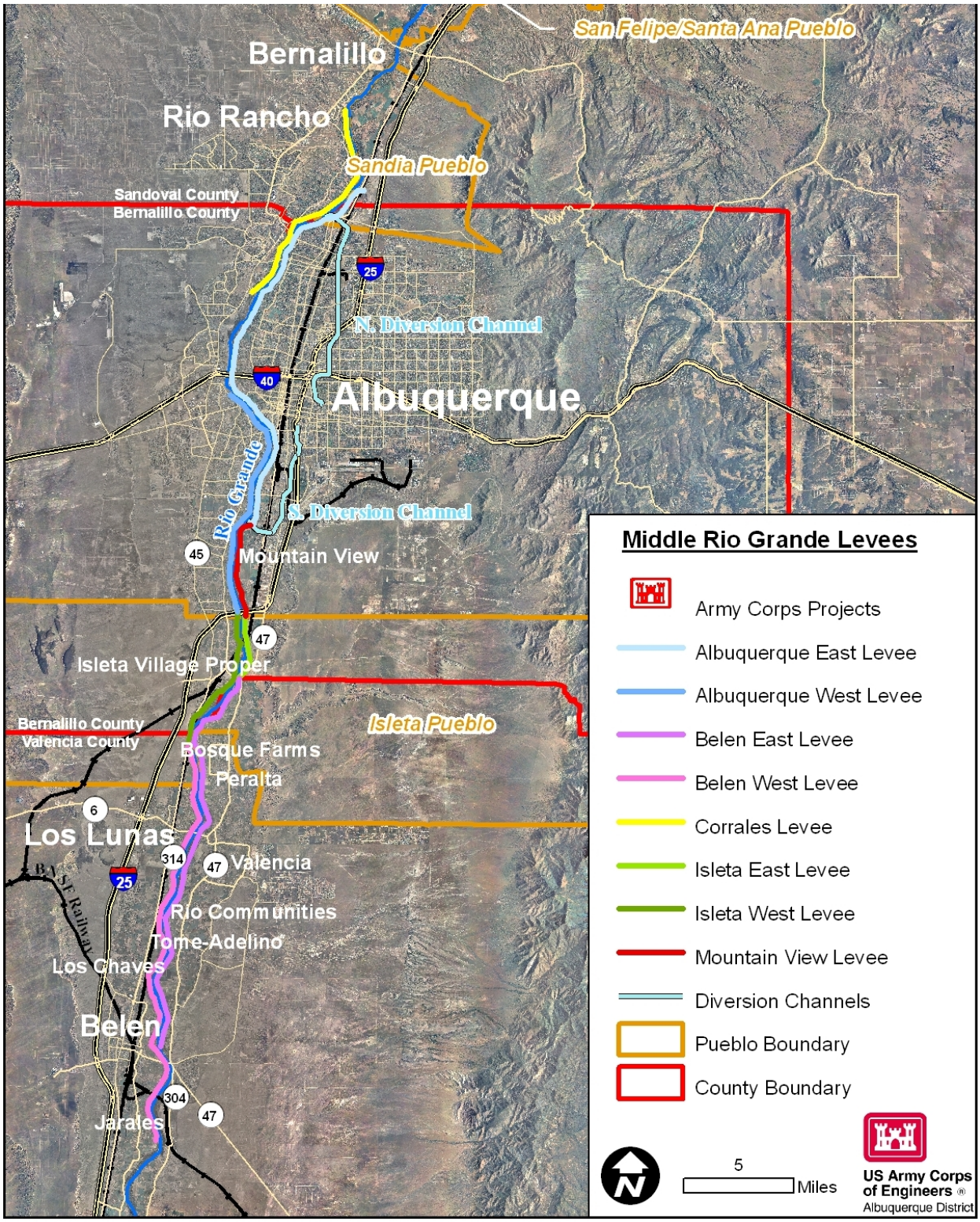

Figure Error! No text of specified style in document.**-1 Vicinity Map Showing Authorized Study Area**

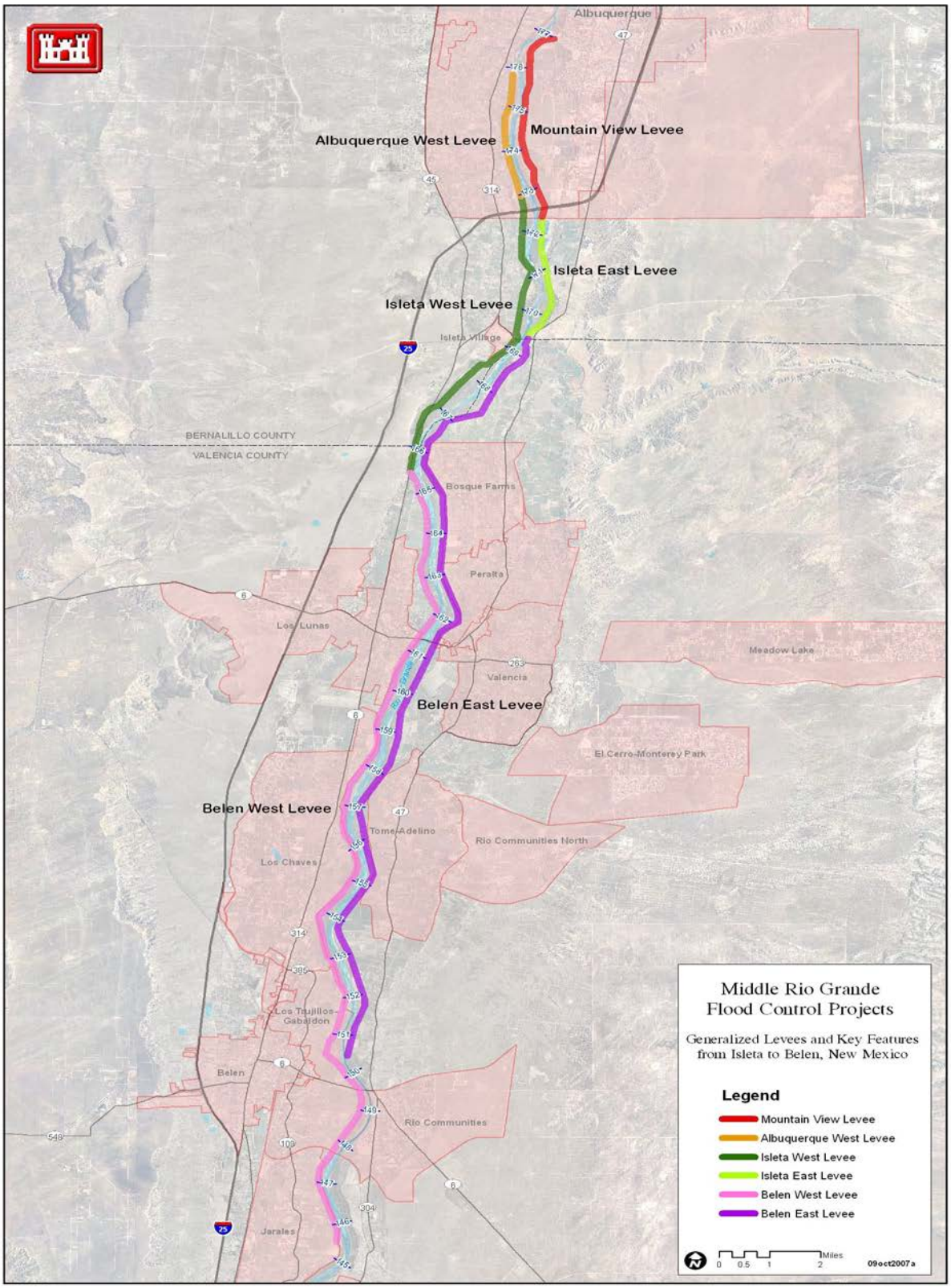

Figure Error! No text of specified style in document.**-2Vicinity Map Showing Current GRR Study Area**

The original, authorized plan was for levee replacement. Spoil bank levees are now located in the project area which engineered levees would replace. Any future levees would follow the same footprints reducing possible impacts. Non-structural flood risk management measures will also be considered and evaluated and the PDT will determine if levees remain the best plan.

The vertical team was engaged during the Feasibility Scoping Meeting phase through this Review Plan, and will continue to be engaged through the draft GRR/SEIS report approval, and Design.

c. Factors Affecting the Scope and Level of Review. Challenges Include:

1. New Corps policy and procedures for performing feasibility studies including:
    a. SMART Planning
2. Coordination with the independent government of the Pueblo of Isleta;
3. No Corps certified models for calculating ecosystem benefits in the study area;
4. Properly incorporating a decade's long project history through many personnel changes;
5. Rigorous schedules.

This project is considered to have some overall risk because:

1. While the Albuquerque District (SPA) has completed studies and projects of this nature recently and successfully (Corrales and Albuquerque West Levees);
2. The PDT believes that there are some health and human safety factors;
    a. Flood depths in some portions of the populated floodplain can reach 4-6 feet; and,
    b. The semi-rural population centers of the Mountain View, Los Lunas and Belen Units are immediately adjacent to proposed levee alignments; and,
    c. Inundation in the event of a breach or overtopping is about five feet;

    However.
    a. Several evacuation routes exist for populated areas at risk of flooding; and,
    b. Width of floodplain results in low flow velocities.
    c. Properly formulated and engineered levees will provide high a much higher level of performance than the existing spoil banks. However, a levee failure, such as a breach or overtopping, would result in similar life safety risk as the without project condition but only in a much smaller localized area.

This project study will require Type I and Type II IEPRs as it will include a Supplemental Environmental Impact Statement (SEIS) and because the total project cost is expected to be in excess of $45 million. The PDT has determined that this study would result in similar life safty risk as the without project condition but only in a much smaller localized area.

1. Is not expected to be controversial;
    a. The proposed engineered levees will follow the footprint of the existing, spoil bank and will not result in significant changes in land use or ownership;
    b. Public meetings have not shown there to be any public dispute as to the size, nature or effects of the project;
    c. Public meetings have not shown there to be any public dispute as to the economic or environmental cost or benefit of the project.
2. Is not expected to be based on novel methods, does not present complex challenges for interpretation, does not contain precedent-setting methods or models, and will not present conclusion that are likely to change prevailing practices.
3. Does not involve the rehabilitation or replacement of existing hydropower turbines, lock structures, or flood control gates.
4. Is not likely to contain influential scientific information, nor is it likely to be a highly influential scientific assessment.

    a. Methods to achieve FRM used in the proposed alternative are similar to other FRM projects within the district.
5. Is not expected to have adverse impacts on scarce or unique cultural, historic, or tribal resources;
    a. Cultural surveys have not identified cultural resources in the proposed footprint of FRM alternatives;
    b. Tribal coordination with the Pueblo of Isleta is continuous and the tribe has provided SPA with maps showing areas to avoid;
    c. Proposed engineered levees will be constructed in previously disturbed locations.
6. Is not expected to have adverse impacts on any fish or wildlife species or their habitat whether or not they are listed as endangered or threatened under the Endangered Species Act of 1973;
    a. The proposed engineered levees will follow the footprint of the existing spoil bank, therefore, impacts to critical or important habitats will likely be minimal;
    b. There is a potential to increase the amount of floodway available for riparian habitat and aquatic resources.
7. Has some life safety risk.
   While SPA has completed studies and projects of this nature recently and successfully (Corrales and Albuquerque West Levees);
    a. The semi-rural population centers of the Mountain View, Los Lunas and Belen Units are immediately adjacent to proposed levee alignments.
    b. Flood depths in some portions of the populated floodplain can reach 4-6 feet;
    c. Inundation in the event of a breach or overtopping is about five feet;
    d. Structural alternatives provide high assurance of levee performance. However, levee failure would result in similar life safety risk as the without project condition in localized areas.

   However,
    a. Several evacuation routes exist for populated areas at risk of flooding;
    b. Width of floodplain results in low flow velocities;
    c. Properly formulated and engineered levees will provide high a much higher level of performance than the existing spoil banks. However, a levee failure, such as a breach or overtopping, would result in similar life safety risk as the without project condition but only in a much smaller localized area.

The SPA Chief of Engineering has assessed the threat to human life and agrees with the PDT's life safety assessment in this review plan.

As a result, DQC, ATR and IEPR will focus on:
1. Completeness and compliance of H&H analysis;
2. Review of the planning process and criteria applied;
3. Review of the methods of preliminary analysis and design;
4. Compliance with sponsor, program, NEPA and ESA requirements;
5. Completeness of preliminary design and support documents;
6. Spot checks for interdisciplinary coordination.

In accordance with Section 2035 of WRDA 2007, EC 1165-2-217, a Type II IEPR (SAR shall be conducted on design and construction activities for any hurricane and storm risk management and flood risk management projects, as well as other projects, where existing and potential hazards pose a significant threat to human life. The Middle Rio Grande Flood Protection Project, Bernalillo to Belen, New Mexico GRR / SEIS is a flood risk management project that will include a supplemental environmental impact statement and will be projected to cost over $200M. Safety assurance factors must be considered in all reviews for those studies. Prior to preconstruction engineering and design (PED) of

the project identified for construction, a PMP will be developed that will include safety assurance review. Safety assurance review will also be accomplished during construction.

d. In-Kind Contributions. Products and analyses provided by non-Federal sponsors as in-kind services are subject to DQC, ATR, and IEPR. The in-kind products and analyses to be provided by the non-Federal sponsor include:

1. Existing reports and hard data that they contribute to the study / project;
2. Assistance during public involvement actions;
3. Assistance during the formulation of alternatives;
4. Attendance at meetings and briefings.

Existing reports or data provided as part of the study are subject to peer review requirements. The MRGCD will not be preparing their own products for this study that would require DQC or ATR.

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.

a. Documentation of DQC. Reviewers shall review the draft report to confirm that work will be done in accordance with established professional principles, practices, codes, and criteria and for compliance with laws and policy. Comments on the report shall be submitted into DrChecks software and provided as report in subsequent compliance packages.

Reviewers shall pay particular attention to one's discipline but may also comment on other aspects as appropriate. Reviewers that do not have any significant comments pertaining to their assigned discipline shall provide a comment stating this.

Review comments shall contain these principal elements:

1) A clear statement of the concern;
2) The basis for the concern, such as law, policy, or guidance;
3) Significance for the concern; and
4) Specific actions needed to resolve the comment.

DrChecks review software will be used to document all DQC comments, responses and associated resolutions accomplished throughout the review process. Comments should be limited to those that address content or policy compliance issues. Comments to grammar, style or spelling should be not added to Dr Checks but should be submitted to the PM who will compile these comments to be transmitted to the PM via email.

In some situations, especially addressing incomplete or unclear information, commenter's will seek clarification by coordinating directly with PDT member to assess whether further specific concerns may exist.

The DQC documentation in DrChecks will include each DQC comment and the PDT response.

A copy of the DQC comments will be submitted to the ATR Team.

b. Products to Undergo DQC. Products to undergo DQC include the GRR/SEIS, and all appendices including the engineering technical appendices.

c. Required DQC Expertise. This optional section could identify the required expertise needed to conduct DQC consistent with the District / MSC Quality Management Plans.

DQC Team Members/Disciplines	Expertise Required
Planning	The reviewer should have recent experience in reviewing Plan Formulation processes for multi-objective studies and be able to draw on "lessons learned" in advising the PDT of best practices.
Economics	The reviewer should be familiar with the processes used in evaluation of flood risk management projects and have recent experience in preparing economic analysis plans for flood risk management feasibility studies. HEC-FDA will be used for analysis. Analysis will address all four project accounts during the F4 phase.
Environmental Resources	The reviewer should have a solid background in the habitat types to be found in the arid southwestern United States, and understand the factors that influence the reestablishment of native species of plants and animals.
Cultural Resources	The reviewer should have extensive Corps' experience regarding cultural resources on public and tribal lands. They need to be familiar with Department of Defense as well as USACE policies and procedures as they pertain to Corps studies and projects. http://www.usace.army.mil/CECW/Pages/cultural.aspx
Hydrology	The reviewer should have extensive knowledge of hydrology of the Rio Grande basin or similar.
Hydraulic Engineering	The reviewer should have extensive knowledge of HEC-RAS modeling including the use of GIS (ARC-INFO) inputs to the model. The reviewer should also have a solid understanding of the geomorphology of alluvial rivers.
Geotechnical Engineering	The reviewer should carry a Professional Engineer's license and have recent experience in the Corps' design requirements for levee work. This person should also have experience in investigating existing subsurface conditions and materials; determining their physical/mechanical and chemical properties that are relevant to the project considered, assessing risks posed by site conditions; designing earthworks and structure foundations; and monitoring site conditions, earthwork and foundation construction.
Civil Engineering	The reviewer should have recent experience in the design and of plans and specifications for levees and river bridges, to include tie in to natural features.
Cost Engineering	The reviewer should have extensive Corps' experience in the application of scientific principles and techniques to problems of cost estimating, cost control, business planning and management science, profitability analysis, project management, and planning and scheduling. COST ESTIMATE REVIEW ONLY

5. AGENCY TECHNICAL REVIEW (ATR)

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

Once actual costs are determined, this Review Plan will be revised. Until then, ATR review and assistance is estimated to be between $60,000 and $75,000 for the study.

Products to Undergo ATR. The ATR will review and comment on the GRR/SEIS, appendices, planning models, the Engineering Technical Appendix and the MCACES. The ATR will also review any significant changes made to subject documents through the higher level and public review process. Technical appendices and other supporting documentation will be provided for additional reference.

a. Required ATR Team 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 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 reviewer should be a senior professional with extensive experience in reviewing Plan Formulation processes for multi-objective studies and be able to draw on “lessons learned” in advising the PDT of best practices.
Economics	The reviewer should be a senior professional with extensive experience and should be familiar with the processes used in evaluation of flood risk management projects and have recent experience in preparing economic analysis plans for flood risk management feasibility studies. HEC-FDA will be used for analysis. Analysis will address all four project accounts during the F4 phase.
Environmental Resources	The reviewer should be a senior professional with extensive experience in and should have a solid background in the habitat types to be found in the arid southwestern United States, and understand the factors that influence the reestablishment of native species of plants and animals.

Cultural Resources	The reviewer should be a senior professional with extensive experience in cultural resources on public and tribal lands. They need to be familiar with Department of Defense as well as USACE policies and procedures as they pertain to Corps studies and projects. http://www.usace.army.mil/CECW/Pages/cultural.aspx
Hydrology	The reviewer should be a senior professional with extensive experience in hydrology of the Rio Grande basin or similar.
Hydraulic Engineering	The should be a senior professional with extensive experience of HEC-RAS modeling including the use of GIS (ARC-INFO) inputs to the model. The reviewer should also have a solid understanding of the geomorphology of alluvial rivers.
Risk Reviewer	The risk analysis reviewer should be a senior professional with extensive experience in performing and presenting risk analysis in accordance with ER 1105-2-101, EM 1110-2-1619 and any other p[ertinent guidance, including experience with hydrologic, hydraulic and geotechnical uncertainties, the guidelines described in the FEMA / USACE memo on Levee Certification for the NFIP, annual exceedance probabilities, long-term risk rather than level-of-protection, and performance analyses such as: capacity exceedance at the least damaging or other planned location. This may include providing superiority at critical locations.
Geotechnical Engineering	The reviewer should be a senior professional with extensive experience in and should carry a Professional Engineer's license and have recent experience in the Corps' design requirements for levee work. This person should also have experience in investigating existing subsurface conditions and materials; determining their physical/mechanical and chemical properties that are relevant to the project considered, assessing risks posed by site conditions; designing earthworks and structure foundations; and monitoring site conditions, earthwork and foundation construction.
Civil Engineering	The reviewer should be a senior professional with extensive experience in the design and of plans and specifications for levees and river bridges, to include tie in to natural features.

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

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

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

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

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

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

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

6. INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

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 1165-2-217, 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 1165-2-217.

- 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. Based on the criteria in EC 1165-2-217 and the discussion in Section 3, "Factors Affecting the Scope and Level of Review", Type I IEPR will be conducted for this study. This project study will require Type I IEPR as it will include a Supplemental Environmental Impact Statement (SEIS) and the estimated total project cost is in excess of $200 million.

The IEPR will focus on the formulation of the tentatively selected flood risk management plan. The review panel will be composed of individuals with expertise in arid region riverine systems ecology, groundwater surface water interactions, geotechnical engineering, hydraulic, hydrologic and sediment modeling. The entire feasibility report with appendices will be provided to the IEPR team. It is not anticipated that the public, including scientific or professional societies, will be asked to nominate potential external peer reviewers. It is recommended that the panel conduct a site visit if possible.

The IEPR will be conducted by a contractor managed by the FRM-PCX. The FRM-PCX will follow the process established in EC 1165-2-217 in managing the IEPR.

b. Products to Undergo Type I IEPR. The IEPR panel will review and comment on the Environmental Assessment (EA), the entire decision document, planning model documentation, tech appendices, plans and specifications, operations and maintenance manuals, and other supporting documentation for the Type I IEPR. The planning models will be reviewed for how these were applied to alternative analysis and selection of the recommended alternative.

The Panel will review the following documents as part of the Type II IEPR:

- 100% Geotechnical Report
- Design 95%
- Plans and Specifications

c. Required IEPR Panel Expertise. Anticipated reviewers as well as number of reviewers will be determined by the PDT and ATR team after the ATR process. At a minimum, the IEPR panel will consist of engineering, environmental and economics disciplines.

Type I IEPR Panel Members/Disciplines	Expertise Required
Economics	The reviewer should be familiar with the processes used in evaluation of flood risk management projects and have recent experience in preparing economic analysis plans for flood risk management feasibility studies. HEC-FDA will be used for analysis. Analysis will address all four project accounts during the F4 phase.
Environmental	The reviewer should have a solid background in the habitat types to be found in the arid southwestern United States, and understand the factors that influence the reestablishment of native species of plants and animals.
Civil / Geotechnical / Hydraulic Engineering	The reviewer should have extensive knowledge of HEC-RAS modeling including the use of GIS (ARC-INFO) inputs to the model. The reviewer should also have a solid understanding of the geomorphology of alluvial rivers. The reviewer should also have recent experience in the design and of plans and specifications for levees and river bridges, to include tie in to natural features. Lastly, the reviewer should carry a Professional Engineer's license and have recent experience in the Corps' design requirements for levee work. This person should also have experience in investigating existing subsurface conditions and materials; determining their physical/mechanical and chemical properties that are relevant to the project considered, assessing risks posed by site conditions; designing earthworks and structure foundations; and monitoring site conditions, earthwork and foundation construction.

Type II IEPR Panel Members/Disciplines	Expertise Required
Natural Resources	The reviewer should have a solid background in the habitat types to be found in the arid southwestern United States, and understand the factors that influence the reestablishment of native species of plants and animals.
Civil / Geotechnical / Hydraulic Engineering	The reviewer(s) should have extensive knowledge of HEC-RAS modeling including the use of GIS (ARC-INFO) inputs to the model. The reviewer should also have a solid understanding of the geomorphology of alluvial rivers. The reviewer should also have recent experience in the design and of plans and specifications for levees and river bridges, to include tie in to natural features. Lastly, the reviewer should carry a Professional Engineer's license and have recent experience in the Corps' design requirements for levee work. This person should also have experience in investigating existing subsurface conditions and materials; determining their physical/mechanical and chemical properties that are relevant to the project considered, assessing risks posed by site conditions; designing earthworks and structure foundations; and monitoring site conditions, earthwork and foundation construction.

d. Documentation of Type I and Type II IEPR. The IEPR panel will be selected and managed by an Outside Eligible Organization (OEO) per EC 1165-2-217, 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:

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

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

7. POLICY AND LEGAL COMPLIANCE REVIEW

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

8. COST ENGINEERING 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

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).

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).

c. 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
Hydrologic Engineering Center Flood Damage Analysis Version 1.2.4 (Economic Computation)	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 to aid in the selection of a recommended plan to manage flood risk.	Certified

d. 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 4.0 (River Analysis System)	HEC-RAS 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 Rio Grande and its tributaries. This model will be used for with project flood stages and levee design.	HH&C CoP Preferred Model
MCASES	This is a cost estimating model that was developed by Building Systems Design Inc. The Army Corps of Engineers began using this model in 1989. This will be used as a tool to determine cost estimates for project alternatives.	
FLO-2D	It is used by the Corps Flood Plain Management Group and includes graphics and reporting. This model will be used for hydrologic routing for with and without project floodplains and flood stages.	Approved for flood routing and floodplain mapping

10. REVIEW SCHEDULES AND COSTS

The attached P2 schedule is based upon several assumptions, such as complete funding for those tasks to be accomplished for completion of the study. The schedule also assumes provision of FY17 workplan funds to allow award of the IEPR contract and accomplishment of concurrent reviews of the Draft GRR/SEIS beginning in September 2017. Workplan funds were not available as planned in March,

therefore, the dates listed in the P2 schedule reflect that change; the schedule provides the reader information on the tasks still to be completed, the order of completion and the estimated duration of the tasks.

c. ATR Schedule and Cost. The ATR Peer Review process began in the spring of FY09 with the draft F3 report. ATR on the GRR/SEIS is planned for April 2017. The ATR is estimated to cost approximately $70,000. As additional information becomes available, this Review Plan will be updated.

d. Type I IEPR Schedule and Cost. The IEPR will follow the GRR/SEIS ATR. The IEPR is estimated to cost approximately $110,000. IEPR commenced with concurrent review in September 2017 and the panel's final report was received at the end of December 2017.

e. Type II IEPR Schedule and Cost. This IEPR will take place during PED. The IEPR is estimated to cost approximately $100,000. As additional information becomes available, this Review Plan will be updated.

f. Model Certification/Approval Schedule and Cost. All models are certified or approved for use without further model review. The hydrology and hydraulic models will be certified as part of the ATR by the Hydraulic Engineering Center. Cost/Schedule risk analysis and the MCACES will be certified by the Cost Center of Expertise also as part of the ATR. As additional information becomes available, this Review Plan will be updated.

g. In-Progress Reviews. To facilitate the study process and to access the vertical team, In-Progress Reviews (IPRs) have been incorporated into the PDTs detailed task schedule. These IPRs are currently scheduled to take place during Plan Formulation of Alternatives, at the Tentatively Selected Plan, at the NED Plan determination and at the draft GRR/SEIS. Additional IPRs may be added.

11. PUBLIC PARTICIPATION

Public coordination in this study has consisted of three public workshops hosted by SPA and the sponsor, MRGCD, in the summer of 2008. Public comments were received during those public meetings and were addressed as requested.

Tribal coordination has been performed and will continue for each public review document. There have also been numerous formal and informal discussions with the Bureau of Reclamation, the United States Fish and Wildlife Services (USFWS) Ecological Services, the Bureau of Land Management, and the New Mexico Office of the State Engineer regarding this project. The formal public review of the GRR/SEIS was conducted in September 2017 with three public meetings.

12. REVIEW PLAN APPROVAL AND UPDATES

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

Commanders' approval memorandum, should be posted on the Home District's webpage. The latest Review Plan should also be provided to the RMO and home MSC.

13. REVIEW PLAN POINTS OF CONTACT

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

SPA Contact: Chief, Planning Branch: (505) 342-3201;
SPA Project Manager: (505) 342-3361
PCX Deputy Director: (415) 503-6852
SPD Reviewer: District Support Team Lead (415) 503-6556

ATTACHMENT 1: REVIEW PLAN REVISIONS

Revision Date	Description of Change	Page / Paragraph Number
18 June 2009	Original MSC Approval	
7 November 2012	Update Peer Review Plan	All
6 June 2016	Update Regulation references and project schedule.	All
11 Jan 2017	Update Appendix A: Project Schedule	Appendix A
13-Jun-2017	Update DQC Reviewers	p. 8
16-Oct-2017	Revised ATR disciplines (deleted Cost Engineering)	p. 10
16-Oct-2017	Updated schedule	Appendix A
4-Jan-2018	Revised to reference EC 1165-2-217	All

APPENDIX A: PROJECT SCHEDULE

MRG Flood Protection Project, Bernalillo to Belen, New Mexico GRR/SEIS
Milestone and Review Schedule

Activity ID	Activity Name	Start	Finish	Milestones
399853 MRG Bernalillo to Belen Feasibility		10/1/12 A	5/15/2019	
399853.30D00 MRG Bernalillo to Belen Planning, Engineering, Design		10/1/12 A	11/30/2018	
399853.03.2 Division Engineer's Notice		4/16/18 A	1/25/2019	
END0106	Refine Selected Plan Cost Estimate including DQC - AFTER ADM	4/16/18 A	8/24/18 A	
GRR0020	ADM - Memorandum for Record	4/16/18 A	4/25/18 A	
PUB0104	Public Review #1 - Comment Incorporation	4/20/18 A	9/7/2018	
GRR0030	IEPR/ATR - Comment Incorporation	4/20/18 A	9/7/2018	
GRR0070	PDT write-ups and report prep for Belen WSEL +5 for Public Review #2	4/20/18 A	5/18/18 A	
PUB0210	OC/DQC Review of GRR/SEIS for Public Review #2	5/21/18 A	5/29/18 A	
PUB0220	EPA Submittal for Public Review #2	5/29/18 A	5/29/18 A	
PUB0200	Public Review #2 of GRR/SEIS - Belen WSEL +5	6/8/18 A	7/23/18 A	
GRR0010	Public Review #2 - Comment Incorporation and report finalization	7/24/18 A	9/7/18 A	
COST0300	ATR/CSRA/Certification of Cost for Recommended	8/27/18 A	9/21/2018	
GRR0011	Final BO - incorporate into Final Draft GRR/SEIS	9/4/18 A	9/13/18 A	
GRR0031	Economics Revisions to GRR/SEIS (due to change in TSP)	9/24/18*	9/28/2018	
GRR0005	PDT Review including incorp and backcheck	10/1/2018	10/15/2018	
GRR0035	IEPR - Finalize Agency Comment Responses	10/16/2018	10/29/2018	
GRR0050	ATR - Comment Response backcheck and final approval	10/16/2018	11/5/2018	
GRR0100	DQC #2 - Final Draft GRR (incl comment incorp and backcheck)	11/7/2018	12/4/2018	
GRR0110	OC Review and Certification - Final Draft GRR	12/5/2018	12/21/2018	
HQ0010	Prepare Final Draft GRR/SEIS and Briefing packet for SPD submittal	12/24/2018	1/8/2019	
HQ0010-MS	Submit Final Draft GRR to SPD		1/8/2019	CW160
HQ0020	SPD Review for transmittal to HQUSACE	1/9/2019	2/13/2019	
HQ0015	SPD Transmittal to HQUSACE		2/13/2019	CW260
HQ0022	SPD/HQ review and comment incorp for Senior Leaders Panel briefing	2/14/2019	3/14/2019	
HQ0026	Senior Leaders Panel Briefing or equivalent		3/20/2019	
HQ0027	Incorporate Senior Leaders Panel comments	3/21/2019	4/3/2019	
399853.04 Chief's Report Milestone		2/14/2019	7/22/2019	
HQ0040	Final GRR/SEIS Policy Compliance Certification	2/14/2019	4/4/2019	
PF0170	State & Agency Review including comment responses/edits	4/5/2019	5/4/2019	
HQ0050	Final GRR/SEIS Recommendation Package and Routing	5/6/2019	5/17/2019	
HQ0070	Chief of Engineers Approval (Chief's Report)		5/17/2019	CW270
HQ0110	Signed Record of Decision (Chief's Report)		5/17/2019	
HQ0030	ASA (CW) / OMB Review	5/28/2019	7/1/2019	
HQ0090	Incorporate ASA(CW) changes to Final Report Package	7/2/2019	7/15/2019	
HQ0080	ASA (CW) Approval		7/15/2019	CW280
HQ0100	Transmittal of Chief's Report to Congress	7/16/2019	7/22/2019	
HQ0120	Congressional Authorization		7/22/2019	