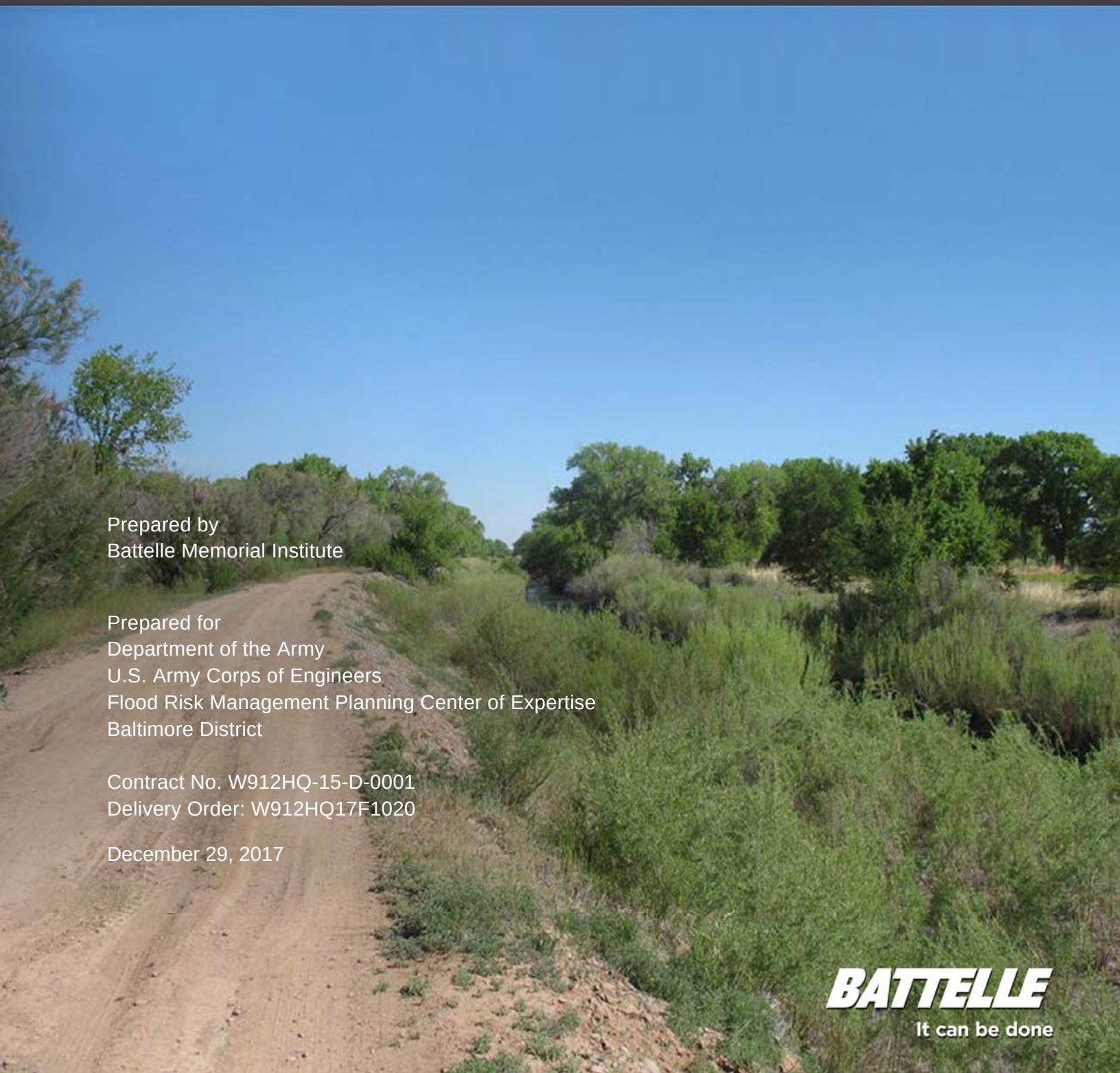
Final Independent External Peer Review Report Middle Rio Grande Flood Protection Project, Bernalillo to Belen, New Mexico, General Reevaluation Report and Supplemental Environmental Impact Statement (GRR/SEIS)



Prepared by
Battelle Memorial Institute

Prepared for
Department of the Army
U.S. Army Corps of Engineers
Flood Risk Management Planning Center of Expertise
Baltimore District

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BATTELLE
It can be done

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Columbus, Ohio 43201

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Executive Summary

PROJECT BACKGROUND AND PURPOSE

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 have been no significant flooding events in the project area since those listed in the 1979 report.

During the course of a limited reevaluation study for two of the levee units (the Belen East and West units), several events occurred that impacted the study and resulted in expanding the scope of the Belen limited reevaluation study into the current general reevaluation study for all remaining levee units:

- 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 U.S. Army Corps of Engineers (USACE) 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 all occur within the study area, including critical habitat).

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

The study area of the general reevaluation 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 20 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.

Independent External Peer Review Process

Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analysis. USACE is conducting an Independent External Peer Review (IEPR) of the Middle Rio Grande Flood Protection Project, Bernalillo to Belen, New Mexico, General Reevaluation Report and Supplemental Environmental Impact Statement (GRR/SEIS) (hereinafter: MRG Bernalillo to Belen IEPR). As a 501(c)(3) non-profit science and technology organization, Battelle is independent, free from conflicts of interest (COIs), and meets the requirements for an Outside Eligible Organization (OEO) per guidance described in USACE (2012). Battelle has experience in establishing and administering peer review panels for USACE and was engaged to coordinate this IEPR. The IEPR was external to the agency and conducted following USACE and Office of Management and Budget (OMB) guidance described in USACE (2012) and OMB (2004). This final report presents the Final Panel Comments of the IEPR Panel (the Panel). Details regarding the IEPR (including the process for selecting panel members, the panel members' biographical information and expertise, and the charge submitted to the Panel to guide its review) are presented in appendices.

Based on the technical content of the decision documents and the overall scope of the project, Battelle identified potential candidates for the Panel in the following key technical areas: Civil Works planning, economics, environmental law compliance and biological resources, civil engineering, geotechnical engineering, and hydrology and hydraulic engineering. Battelle screened the candidates to identify those most closely meeting the selection criteria and evaluated them for COIs and availability. USACE was given the list of all the final candidates to independently confirm that they had no COIs, and Battelle made the final selection of the four-person Panel from this list.

The Panel received electronic versions of the decision documents (1,645 pages in total), along with a charge that solicited comments on specific sections of the documents to be reviewed. Following guidance provided in USACE (2012) and OMB (2004), USACE prepared the charge questions, which were included in the draft and final Work Plans.

The USACE Project Delivery Team (PDT) briefed the Panel and Battelle during a kick-off meeting held via teleconference at the start of the review to provide the Panel an opportunity to ask questions of USACE and clarify uncertainties. Other than Battelle-facilitated teleconferences, there was no direct communication between the Panel and USACE during the peer review process.

IEPR panel members reviewed the decision documents individually and produced individual comments in response to the charge questions. The panel members then met via teleconference with Battelle to review key technical comments and reach agreement on the Final Panel Comments to be provided to USACE. Each Final Panel Comment was documented using a four-part format consisting of (1) a comment statement; (2) the basis for the comment; (3) the significance of the comment (high, medium/high, medium, medium/low, or low); and (4) recommendations on how to resolve the comment. Overall, 22 Final Panel Comments were identified and documented. Of these, 1 was identified as having

medium/high significance, 4 had a medium significance, 14 had medium/low significance, and 3 had low significance.

Battelle received public comments from USACE on the MRG Bernalillo to Belen project (approximately 10 written comments and letters, totaling 23 pages of comments) and provided them to the IEPR panel members. The panel members were charged with determining if any information or concerns presented in the public comments raised any additional discipline-specific technical concerns with regard to the MRG Bernalillo to Belen review documents. After completing its review, the Panel confirmed that no new issues or concerns were identified other than those already covered in the Final Panel Comments.

Results of the Independent External Peer Review

The panel members agreed on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE, 2012; p. D-4) in the MRG Bernalillo to Belen review documents. Table ES-1 lists the Final Panel Comment statements by level of significance. The full text of the Final Panel Comments is presented in Section 4.2 of this report. The following summarizes the Panel's findings.

Based on the Panel's review, the report is well-written and provides good supporting documentation on engineering, environmental, economic, and plan formulation issues. The report provided a balanced assessment of the economic, engineering, and environmental issues of the overall project; however, the Panel identified several elements of the project where additional analysis are warranted and places where project findings and objectives need to be clarified or revised.

Plan Formulation and Economics: One of the primary concerns of the Panel was that a more recent version of the HEC-FDA model was not used in the economic analysis, even though a USACE memorandum requires it; there could be implications for computing uncertainty and flood damages could be misrepresented. The Panel recommends that the PDT rerun the economic analysis using the more recent HEC-FDA version to see if the results are significantly different. The Panel also found that the GRR/SEIS should clearly explain why the different levee units can be treated as separable elements, not affecting each other's flows or water levels. Without this information, it is difficult to determine whether the recommended plan maximizes net benefits. The Panel also believes that the GRR/SEIS would benefit from a clear description of how the existing flood problems relate to the estimated flood damages as well as a description of how combined probabilities of a given flow from all sources are calculated. The Panel found that the economic analysis does not appear to have accounted for the time required to drain floodwaters and the associated costs of emergency activities, agricultural damages, or transportation costs. It was also unclear how the alternative levee alignments were selected, combined, compared, and discarded, including why Isleta East was eliminated even though the damages there were far greater than in Isleta West.

Engineering: From an engineering perspective, the analysis and evaluations followed a consistent process, and the data, analyses, and evaluation were quite extensive. The Panel believes that the GRR/SEIS would benefit from an explanation of how the FLO-2D model's grid scale was selected for the hydrology and hydraulic analysis. In addition, the Panel recommends that the PDT add more detail to the GRR/SEIS on why the FLO-2D model did not use levee heights to estimate the extent of residual inundation. The GRR/SEIS should also have a more in-depth discussion on how climate change might affect certain hydrological parameters, including runoff intensity and precipitation frequency. Finally, the

Panel points out that there appear to be inconsistencies in the GRR/SEIS regarding levee side slope dimensions.

Environmental: In terms of environmental issues, the Panel noted that the GRR/SEIS could more fully identify the environmental impacts and mitigation activities by construction phase. In addition, a number of environmental issues are not discussed in enough detail in the GRR/SEIS, including wetlands and climate change, and a qualitative evaluation of environmental cumulative impacts has not been included. The Panel found that the demographic data used in the GRR/SEIS was conflicting and, at times, out of date, which could have implications on project justification. A better explanation is needed in the GRR/SEIS of why the Isleta West levee heights were lowered based on visual sightline concerns. Life safety hazards and loss-of-life risks were also not described in enough detail, and the GRR/SEIS would be improved by a better explanation of the Flood Forecast and Warning System and how it will be implemented, maintained, and funded.

Table ES-1. Overview of 22 Final Panel Comments Identified by the MRG Bernalillo to Belen IEPR Panel

No.	Final Panel Comment
Significance – Medium/High	
1	It is not clear why HEC-FDA 1.2.5 was used for the economic analysis when a more recent version that includes a new method for computing uncertainty is available.
Significance – Medium	
2	The impacts to environmental resources are not identified by phase in the GRR/SEIS, despite the 20-year length of the construction phase and the 50-year life of the project.
3	The GRR/SEIS does not clearly explain why the different levee units can be treated as separable elements with separate benefits and costs.
4	The flood risk and the method used to estimate flood damages for the future without-project condition are not adequately described in the GRR/SEIS or Appendix D.
5	The GRR/SEIS does not discuss the wetlands present in the study area and how the wetlands will be affected by the recommended plan and borrow needs.
Significance – Medium/Low	
6	The demographic data used in the GRR/SEIS are out of date, and, in some places, conflicting data are presented, which could have implications on the justification for the project.
7	The GRR/SEIS discussion on the lowering of the Isleta West levee height in response to visual sightline concerns expressed by the Pueblo of Isleta does not clearly explain impacts to the project under the recommended plan, including potential risks.
8	Climate change impacts to environmental resources are not consistently presented in the GRR/SEIS.
9	The GRR/SEIS does not present a qualitative discussion of how the Middle Rio Grande project and other projects in the study area may have cumulative impacts on environmental resources.
10	It is not clear in the main GRR/SEIS how the combined probability of a given flow from all sources was computed.
11	Time required to drain floodwaters does not appear to have been accounted for in the economic analysis.
12	The GRR/SEIS does not explain how the FLO-2D grid scale was selected for hydrology and hydraulic analysis.
13	The Flood Forecast and Warning System is identified as an important element of all alternatives, but the GRR/SEIS does not explain how the system will be implemented, funded, or maintained and operated.

No.	Final Panel Comment
14	It is unclear how the alternative levee alignments were selected, combined, compared, and discarded.
15	Even though the damages in Isleta East are higher than those in Isleta West by between 100% and almost 400%, it is unclear why Isleta East was eliminated due to lack of potential benefits.
16	Life safety hazards and loss-of-life risks are not adequately addressed in the GRR/SEIS.
17	Evaluation of the alternatives using the four evaluation criteria specified in the Principles and Guidelines (P&G) was not properly performed.
18	The cost effectiveness/incremental cost analysis (CE/ICA) does not explain how avian density values for riparian habitats are being used to support the adaptive management cost discussion.
19	It is unclear why FLO-2D did not use levee heights in the recommended plan to estimate the extent of residual flooding for the with-project conditions.
Significance – Low	
20	The GRR/SEIS does not include a discussion on how climate change would affect the values for future hydrologic parameters, such as increased runoff intensity from direct precipitation runoff, within the project area.
21	The terminology used in the GRR/SEIS to refer to the selected alternative is inconsistent, and the discussion of one eliminated alternative is carried forward despite its elimination from consideration.
22	There are inconsistencies in the GRR/SEIS and appendices with regard to the levee side slope dimensions to be used.

Table of Contents

Page

Executive Summary v

1. INTRODUCTION 1

2. PURPOSE OF THE IEPR 2

3. METHODS FOR CONDUCTING THE IEPR 2

4. RESULTS OF THE IEPR 3

   4.1 Summary of Final Panel Comments 3

   4.2 Final Panel Comments 3

5. REFERENCES 28

Appendix A. IEPR Process for the MRG Bernalillo to Belen Project

Appendix B. Identification and Selection of IEPR Panel Members for the MRG Bernalillo to Belen Project

Appendix C. Final Charge for the MRG Bernalillo to Belen IEPR

Appendix D. Conflict of Interest Form

List of Tables

Page

Table ES-1. Overview of 22 Final Panel Comments Identified by the MRG Bernalillo to Belen IEPR Panel ix

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LIST OF ACRONYMS

AEP	annual exceedance probability
ATR	Agency Technical Review
CAA	Clean Air Act
CDOT	Colorado Department of Transportation
CE	Categorical Exclusion
CE/ICA	Cost Effectiveness/Incremental Cost Analysis
COI	Conflict of Interest
CWA	Clean Water Act
DFIRM	Digital Flood Insurance Rate Maps
DrChecks	Design Review and Checking System
EA	Environmental Assessment
EC	Engineer Circular
EIS	Environmental Impact Statement
EO	Executive Order
ER	Engineer Regulation
ERDC	Engineer Research and Development Center
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FWCA	Fish and Wildlife Coordination Act
GRR/SEIS	General Reevaluation Report/Supplemental Environmental Impact Statement
HART	Honolulu, Hawai'i, Authority for Rapid Transportation
HEC-FDA	Hydrologic Engineering Center Flood Damage Reduction Analysis
HEC-RAS	Hydrologic Engineering Center River Analysis System
HRTP	Honolulu Rail Transit Project
HTRW	hazardous, toxic, and radioactive waste
IEPR	Independent External Peer Review
IWR	Institute for Water Resources
LRR	Limited Reevaluation Report
MRG	Middle Rio Grande
NED	National Economic Development

NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
OEO	Outside Eligible Organization
OMB	Office of Management and Budget
PCX	Planning Center of Expertise
PDT	Project Delivery Team
P&G	Principles and Guidelines
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Services
TSP	Tentatively Selected Plan

1. INTRODUCTION

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 have been no significant flooding events in the project area since those listed in the 1979 report.

During the course of a limited reevaluation study for two of the levee units (the Belen East and West units), several events occurred that impacted the study and resulted in expanding the scope of the Belen limited reevaluation study into the current general reevaluation study for all remaining levee units:

- 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 U.S. Army Corps of Engineers (USACE) 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 all occur within the study area, including critical habitat).

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

The study area of the general reevaluation 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 20 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.

Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analysis. The objective of the work described here was to conduct an Independent External Peer Review (IEPR) of the Middle Rio Grande Flood Protection Project, Bernalillo to Belen, New Mexico, General Reevaluation Report and Supplemental Environmental Impact Statement (GRR/SEIS) (hereinafter: MRG

Bernalillo to Belen IEPR) in accordance with procedures described in the Department of the Army, USACE, Engineer Circular (EC) *Civil Works Review* (EC 1165-2-214) (USACE, 2012) and the Office of Management and Budget (OMB), *Final Information Quality Bulletin for Peer Review* (OMB, 2004). Supplemental guidance on evaluation for conflicts of interest (COIs) was obtained from the *Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports* (The National Academies, 2003).

This final report presents the Final Panel Comments of the IEPR Panel (the Panel) on the existing engineering, economic, environmental, and plan formulation analyses contained in the MRG Bernalillo to Belen IEPR documents (Section 4). Appendix A describes in detail how the IEPR was planned and conducted, including the schedule followed in executing the IEPR. Appendix B provides biographical information on the IEPR panel members and describes the method Battelle followed to select them. Appendix C presents the final charge to the IEPR panel members for their use during the review; the final charge was submitted to USACE in the final Work Plan according to the schedule listed in Table A-1. Appendix D presents the organizational COI form that Battelle completed and submitted to the Institute for Water Resources (IWR) prior to the award of the MRG Bernalillo to Belen IEPR.

2. PURPOSE OF THE IEPR

To ensure that USACE documents are supported by the best scientific and technical information, USACE has implemented a peer review process that uses IEPR to complement the Agency Technical Review (ATR), as described in USACE (2012).

In general, the purpose of peer review is to strengthen the quality and credibility of the USACE decision documents in support of its Civil Works program. IEPR provides an independent assessment of the engineering, economic, environmental, and plan formulation analyses of the project study. In particular, the IEPR addresses the technical soundness of the project study's assumptions, methods, analyses, and calculations and identifies the need for additional data or analyses to make a good decision regarding implementation of alternatives and recommendations.

In this case, the IEPR of the MRG Bernalillo to Belen project was conducted and managed using contract support from Battelle, which is an Outside Eligible Organization (OEO) (as defined by EC 1165-2-214). Battelle, a 501(c)(3) organization under the U.S. Internal Revenue Code, has experience conducting IEPRs for USACE.

3. METHODS FOR CONDUCTING THE IEPR

The methods used to conduct the IEPR are briefly described in this section; a detailed description can be found in Appendix A. The IEPR was completed in accordance with established due dates for milestones and deliverables as part of the final Work Plan, and are based on the award/effective date and the receipt of review documents.

Battelle identified, screened, and selected four panel members to participate in the IEPR based on their expertise in the following disciplines: Civil Works planning, economics, environmental law compliance and biological resources, civil engineering, geotechnical engineering, and hydrology and hydraulic engineering. The Panel reviewed the MRG Bernalillo to Belen documents and produced 22 Final Panel Comments in response to 19 charge questions. This charge included 16 charge questions provided by USACE and two overview questions and one public comment question added by Battelle for the review.

Battelle instructed the Panel to develop the Final Panel Comments using a standardized four-part structure:

1. Comment Statement (succinct summary statement of concern)
2. Basis for Comment (details regarding the concern)
3. Significance (high, medium/high, medium, medium/low, or low; in accordance with specific criteria for determining level of significance)
4. Recommendations for Resolution (at least one implementable action that could be taken to address the Final Panel Comment).

Battelle reviewed all Final Panel Comments for accuracy, adherence to USACE guidance (EC 1165-2-214, Appendix D), and completeness prior to determining that they were final and suitable for inclusion in the Final IEPR Report. There was no direct communication between the Panel and USACE during the preparation of the Final Panel Comments. The Panel's findings are summarized in Section 4.1; the Final Panel Comments are presented in full in Section 4.2.

4. RESULTS OF THE IEPR

This section presents the results of the IEPR. A summary of the Panel's findings and the full text of the Final Panel Comments are provided.

4.1 Summary of Final Panel Comments

The panel members agreed on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE, 2012; p. D-4) in the MRG Bernalillo to Belen review documents. Table ES-1 lists the Final Panel Comment statements by level of significance. The full text of the Final Panel Comments is presented in Section 4.2 of this report. The following summarizes the Panel's findings.

Based on the Panel's review, the report is well-written and provides good supporting documentation on engineering, environmental, economic, and plan formulation issues. The report provided a balanced assessment of the economic, engineering, and environmental issues of the overall project; however, the Panel identified several elements of the project where additional analysis are warranted and places where project findings and objectives need to be clarified or revised.

Plan Formulation and Economics: One of the primary concerns of the Panel was that a more recent version of the HEC-FDA model was not used in the economic analysis, even though a USACE memorandum requires it; there could be implications for computing uncertainty and flood damages could be misrepresented. The Panel recommends that the PDT rerun the economic analysis using the more recent HEC-FDA version to see if the results are significantly different. The Panel also found that the GRR/SEIS should clearly explain why the different levee units can be treated as separable elements, not affecting each other's flows or water levels. Without this information, it is difficult to determine whether the recommended plan maximizes net benefits. The Panel also believes that the GRR/SEIS would benefit from a clear description of how the existing flood problems relate to the estimated flood damages as well as a description of how combined probabilities of a given flow from all sources are calculated. The Panel found that the economic analysis does not appear to have accounted for the time required to drain floodwaters and the associated costs of emergency activities, agricultural damages, or transportation

costs. It was also unclear how the alternative levee alignments were selected, combined, compared, and discarded, including why Isleta East was eliminated even though the damages there were far greater than in Isleta West.

Engineering: From an engineering perspective, the analysis and evaluations followed a consistent process, and the data, analyses, and evaluation were quite extensive. The Panel believes that the GRR/SEIS would benefit from an explanation of how the FLO-2D model's grid scale was selected for the hydrology and hydraulic analysis. In addition, the Panel recommends that the PDT add more detail to the GRR/SEIS on why the FLO-2D model did not use levee heights to estimate the extent of residual inundation. The GRR/SEIS should also have a more in-depth discussion on how climate change might affect certain hydrological parameters, including runoff intensity and precipitation frequency. Finally, the Panel points out that there appear to be inconsistencies in the GRR/SEIS regarding levee side slope dimensions.

Environmental: In terms of environmental issues, the Panel noted that the GRR/SEIS could more fully identify the environmental impacts and mitigation activities by construction phase. In addition, a number of environmental issues are not discussed in enough detail in the GRR/SEIS, including wetlands and climate change, and a qualitative evaluation of environmental cumulative impacts has not been included. The Panel found that the demographic data used in the GRR/SEIS was conflicting and, at times, out-of-date, which could have implications on project justification. A better explanation is needed in the GRR/SEIS of why the Isleta West levee heights were lowered based on visual sightline concerns. Life safety hazards and loss-of-life risks were also not described in enough detail and the GRR/SEIS would be improved by a better explanation of the Flood Forecast and Warning System and how it will be implemented, maintained, and funded.

4.2 Final Panel Comments

This section presents the full text of the Final Panel Comments prepared by the IEPR panel members.

Final Panel Comment 1

It is not clear why HEC-FDA 1.2.5 was used for the economic analysis when a more recent version that includes a new method for computing uncertainty is available.

Basis for Comment

Corps of Engineers South Pacific Division, Sacramento District, Flood Risk Management Center of Expertise (CESPD-PDP, FRM-PCX) memorandum, Flood Damage Reduction Analysis (HEC-FDA) Certification, dated 26 August 2015, states: "Migration to HEC-FDA 1.4 is required for all ongoing Flood Risk Management (FRM) studies that have not held a Tentatively Selected Plan (TSP) milestone, or equivalent milestone, as of 30 November 2015." The TSP milestone meeting for this study was held October 18, 2016. The newer version of HEC-FDA (1.4) introduces a new method for computing uncertainty about graphical probability curves, which can affect results. This change was needed because the order statistics methodology used in the older version gave inconsistent results when comparing changes in output parameters as a function of the equivalent length of record.

Significance – Medium/High

Using HEC-FDA 1.2.5 for this study is not consistent with CESPD-PDP guidance and risks misrepresenting flood damages.

Recommendations for Resolution

1. Test the use of HEC-FDA 1.4 to determine whether it yields significantly different results. If so, apply version 1.4 to the entire economics analysis.

Literature Cited

USACE (2015a). Flood Damage Reduction Analysis (HEC-FDA) Certification. CESPD-PDP (FRM-PCX). August 26, 2015.

Final Panel Comment 2

The impacts to environmental resources are not identified by phase in the GRR/SEIS, despite the 20-year length of the construction phase and the 50-year life of the project.

Basis for Comment

The length of project construction (more than 20 years) will require numerous environmental resource updates. To some extent, these updates will be accommodated in phased mitigation plans created during the various unit design activities; however, that commitment is not clearly presented in the GRR/SEIS.

Section 4.1.10 of the GRR/SEIS identified ongoing consultation with the U.S. Fish and Wildlife Service (USFWS) regarding the draft mitigation plan for the Vegetation Management Zone. Appendix E, Section 3.4.1, notes that consultation with the USFWS was initiated on January 6, 2017, and Appendix E, Section 3.4.2, notes that a draft Biological Opinion, which will include habitat restoration commitments, is expected before January 1, 2018. Although USACE commits to identifying mitigation sites during the project design phase (Appendix E, Section 5.6), the level of detail the USFWS may request regarding mitigation by project phase and schedule is not clearly defined. Also needed is a correlation between the Habitat Mitigation Monitoring and Adaptive Management Plan (referenced in Section 3.13.2) and project phasing.

Section 5.2.1 notes that additional survey of the proposed construction area for hazardous, toxic, and radioactive waste (HTRW) contamination will be conducted during preconstruction engineering and design and prior to construction as required. The protocols that will be followed as each levee unit goes into construction over a 20-year period is not discussed. Section 6.2 notes that a material management plan will be prepared but again does not clarify how phased construction will address the HTRW concerns.

Significance – Medium

Without a clear description of the environmental impacts and mitigation activities by construction phase, and with uncertainty about how the USFWS will respond, the recommended plan could be affected.

Recommendations for Resolution

1. Update the GRR/SEIS with information on phasing, including:
    a. Information on construction phasing clarifying that the project could take 20+ years (Executive Summary).
    b. An explanation of the relationship of phasing to the 50-year life of the project (Section 2.2.3, Planning Objectives).
    c. Additional detail in the main GRR/SEIS on the project schedule (perhaps in Section 4.3).
    d. Additional specific information about how HTRW will be addressed as the levee units enter the construction phase (Section 5.2.1 and Section 6.2).
    e. Information on appropriate phasing input and monitoring and adaptive management approaches after consultation with USFWS is complete (Sections 5.3, 5.4, and 5.5).

Final Panel Comment 3

The GRR/SEIS does not clearly explain why the different levee units can be treated as separable elements with separate benefits and costs.

Basis for Comment

The analysis performed to identify the levee heights that maximize the net National Economic Development (NED) benefits (GRR/SEIS, Section 3.8) for each levee unit was based on the assumption that the levee units can be treated as separable elements. This assumption meant that changes in levee heights or alignments in one unit would not impact flows or water levels in adjacent units and, therefore, that levee heights in each unit could be optimized independently. Engineer Regulation (ER) 1105-2-100 (USACE, 2000) defines a separable element as "…any part of a project which has separately assigned benefits and costs, and which can be implemented as a separate action…." In the study area, the Middle Rio Grande has no inlets or outlets that might cause the levee units to function as separable units. The main report does not describe the specific physical characteristics of the Mountain View, Isleta, and Belen Levee Units that justify treating them as separable units.

Significance – Medium

Without a clear justification for why the levee units can be treated as separable elements, it is not possible to verify that the recommended plan maximizes net NED benefits.

Recommendations for Resolution

1. Add a justification for why each levee unit can be treated as a separable element. The justification should explain the physical characteristics of the river system.
2. Compare the water level profile for the without-project condition for each unit with water level profiles that result from simulations of varying levee heights in the upstream and downstream units. This would demonstrate that changes in one unit do not impact water levels in the adjacent units, thus keeping them separable units.

Literature Cited

USACE (2000). Planning Guidance Notebook, Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. Engineer Regulation (ER) No. 1105-2-100. April 22, 2000.

Final Panel Comment 4

The flood risk and the method used to estimate flood damages for the future without-project condition are not adequately described in the GRR/SEIS or Appendix D.

Basis for Comment

The level of flood protection for the without-project condition is a critical factor in estimating potential benefits. However, the GRR/SEIS and Appendix D contain a number of conflicting descriptions of when flooding might occur.

Section 2.1, Problems and Opportunities, describes historical flooding but only identifies storm events that occurred in the 1940s or earlier. There is no description of flooding that occurs under the current without-project conditions. The PDT indicated in the mid-review conference call that minor flooding of agricultural areas has been observed but that flood-fighting has successfully prevented significant flooding of residential or commercial areas.

The GRR/SEIS and Appendix D contain conflicting assumptions regarding when flooding begins. The following statements in the GRR/SEIS describing assumptions used in the engineering analyses indicate that flooding would be frequent.

- Section 5.1.3.1 (p. 92) states: “It is assumed that the spoil banks, which are not engineered levees, will uniformly fail throughout the area.”
- Section 5.1.3.4 (p. 95) states: “The spoil banks were removed from the model, to reflect the USACE assumption that the spoil banks, as non-engineered levees, would not remain viable in a flooding situation.”
- Section 5.1.4 (p. 103) states: “Although the Rio Grande has a well-defined channel throughout the action area, flows in portions of the area frequently exceed the bank elevation and inundate the overbank area.”

Applying the above assumptions to the economics analysis resulted in estimated annual flood damages that were deemed to be unreasonably high (GRR/SEIS, Section 3.7.1). In order to reduce estimated flood damages to a more reasonable level, the economics analysis assumed that damages do not occur for storms less severe than the 20% annual exceedance probability (AEP).

It appears that one purpose of the sensitivity analysis performed as part of the economics analysis was to assess whether the point where damages begin was critical to determining whether estimated annual damages would be sufficient to justify a project. The sensitivity analysis found (using the Begin_Dmg_Depth assumption) that even if damages are assumed not to begin until a 10% AEP storm event is exceeded (rather than 20%, as was assumed in the economics analysis), estimated annual damages do not significantly diminish (Appendix D, Section D-10).

Neither the GRR/SEIS nor Appendix D explain the discrepancy between present-day, observed flood damages and flood damages estimated using the assumptions of the engineering analysis. Furthermore, the GRR/SEIS and Appendix D do not clearly explain how the sensitivity analysis was used to address the discrepancy.

Significance – Medium

Without a clear understanding of the discrepancy between observed flood damages and estimated flood damages, it is not possible to assess the justification of the recommended plan.

Recommendations for Resolution
1. Add a detailed description of the existing flood problems to Section 2.1. Describe flood-fighting efforts that are undertaken, state how often these efforts are required, and describe observed damages to agricultural infrastructure. 2. Clearly disclose the discrepancy between observed flooding and flood damages estimated based on the engineering assumptions. 3. Discuss the sensitivity analysis iterations performed specifically to test whether the Begin_Dmg_Depth assumption was critical to estimating damages that were sufficient for project justification. It would be helpful to display the applicable sensitivity iterations in a single section and show the combined results in a single table.

Final Panel Comment 5

The GRR/SEIS does not discuss the wetlands present in the study area and how the wetlands will be affected by the recommended plan and borrow needs.

Basis for Comment

Section 401 of the Clean Water Act (CWA) provides for protection of "waters of the United States", including wetlands as defined under Section 404(b)(1)). Project activities that would occur below the ordinary high-water mark (and therefore may affect wetlands) include levee construction, riprap placement, partial fill of two freshwater ponds, and borrow activities. Executive Order (EO) 11990, Protection of Wetlands, requires the minimization of impacts to wetlands and the preservation/enhancement of wetlands, mandating that wetlands should be delineated, impacts and avoidance techniques described, and mitigation proposed.

The GRR/SEIS generally does not describe wetlands resources in the area, even though, according to Table 1 in Appendix E, the Isleta Reach floodway encompasses 459 acres of emergent wetlands, including wet meadows, marshes, sloughs, ponds, and small lakes. Section 5.4.3 acknowledges the 459 acres of emergent wetlands in the study area in the without-project discussion. However, the discussion of the future with-project condition in Section 6.3.2 includes only the "two ponds" and suggests that the remainder of the impacts will be addressed in the mitigation plan (Appendix E). There is little discussion on wetlands present or the potential for impacts related to the TSP, especially with regard to borrow needs. It is also unclear in the GRR/SEIS where the wetlands may be located relative to the various levee units/reaches.

Significance – Medium

The lack of a detailed discussion on existing wetlands and their relationship to the recommended plan conflicts with the requirements of the CWA and EO 11990.

Recommendations for Resolution

1. Update the GRR/SEIS and Appendix E to provide a balanced and consistent discussion of wetland locations (in the study area, including borrow areas and in levee units/reaches), impacts (or the avoidance of impacts), and mitigation. It is acceptable to note that final detailed mitigation will be identified during the various design phases once the wetland discussion is consistent and clear.

Literature Cited

EO 11990 (1977). Protection of Wetlands. Executive Office of the President, Office of the Federal Register, Washington, D.C. Executive Order (EO) 11990, May 24, 1977.

Final Panel Comment 6

The demographic data used in the GRR/SEIS are out of date, and, in some places, conflicting data are presented, which could have implications on the justification for the project.

Basis for Comment

In Section 1.2 of the GRR/SEIS, demographic data from the 2000 census are cited (p. 5). Later, in the socioeconomic section of the document, 2010 census data are used in some places (p. 111), and 2015 census data in other places (p. 116-117). The conflicting use of varied census data information makes it difficult to determine if project decisions were made using the most recently available census data. In addition, it appears that some model runs may have already been conducted using census data predating 2015. Updating the information in the GRR/SEIS to the most recently available census numbers (and ensuring consistent use throughout the document) may improve the justification of the project.

Other population-related inconsistencies are found in the GRR/SEIS, including two different estimates of how many people would benefit from reduced flood risk under the recommended plan. Section 3.12 (p. 61) states that 12,400 people would benefit, while the Executive Summary (no page numbers provided), Section 1.1 (p. 1), Section 3.9.1 (p. 57), and Section 4 (p. 66) all cite 16,300 as the number of people who would benefit.

Significance – Medium/Low

Using current and consistent demographic data will strengthen the justification for the TSP.

Recommendations for Resolution

1. Update the GRR/SEIS with consistent and current population data.
2. If some model runs were already conducted using census data predating 2015, a note disclosing this information should be added to the GRR/SEIS.

Final Panel Comment 7

The GRR/SEIS discussion on the lowering of the Isleta West levee height in response to visual sightline concerns expressed by the Pueblo of Isleta does not clearly explain impacts to the project under the recommended plan, including potential risks.

Basis for Comment

Section 3.8 (p. 51) includes the following statement: "...the Pueblo of Isleta expressed concerns related to obscuring visual sightlines to the river along that reach. As a result, a levee height of Base Levee +4 feet was supported and provides reasonably maximized benefits to the Unit." No additional information is provided on how that reduced levee height was "supported". In addition, Section 6.6 (Aesthetics) of the GRR/SEIS does not reference this potentially significant project change, which was apparently based on aesthetics. Without further information on this change in the Isleta West Unit, it is difficult to determine whether this reduced levee height will affect the recommended plan, nor is it clear to the Panel that the Pueblo of Isleta was fully apprised of the possible risks associated with lower levee heights.

Section 3.9, Alternatives Considered in Detail, does not include this discussion element. Section 3.9.3 notes that "Performance, and therefore benefits, are optimized" for the various levee units. If this is the case, then, even though the Pueblo of Isleta visual concerns were included, the levee performance was still optimized at that height. The decision to go with a levee height of Base +4 feet as presented in Section 3.8 does not explain a complete set of factors considered in arriving at that levee height in Section 3.8.

Significance – Medium/Low

Without additional discussion on the change to the levee heights in the Isleta West Unit based on visual sightline concerns, it is unclear if the selection or justification of the recommended plan would be affected.

Recommendations for Resolution

1. Include a more detailed explanation in Section 3.8 on the levee height changes that (it is assumed) were agreed to by the Pueblo of Isleta.
2. Update Section 6.6 (Aesthetics) with a description of the aesthetic concerns expressed by the Pueblo of Isleta.
3. Consider including the Pueblo of Isleta concerns in the Alternatives analyses in Section 3.9.

Final Panel Comment 8

Climate change impacts to environmental resources are not consistently presented in the GRR/SEIS.

Basis for Comment

Information regarding climate change impacts is inconsistently presented in the GRR/SEIS and the appendices.

For example, the southwestern willow flycatcher and the yellow-billed cuckoo are considered the most vulnerable bird species in the project area. Appendix J (Climate Change) states in Section 1.6 (p. 22): "Both the flycatcher and cuckoo depend on riparian habitat, are sensitive to high temperatures, and [are] vulnerable to changes in phenology that may produce mismatches between food availability and need during nesting or migration". However, this finding is not discussed in Section 5 (Without-Project Conditions) in the main GRR/SEIS, and Section 5.3.4.5 suggests that there would be no changes to special status species and their critical habitat without the project.

In addition, while Section 6.1.1 of the GRR/SEIS correctly states that there is no difference with respect to climate change between the future with-project and future without-project, the introduction of "greenhouse gas sources and sinks" in this two-sentence discussion (Section 6.1.1) does not follow the discussion logically and seems out of place. The summary of climate change information that is provided in Appendix J, Section 1.7, Table 3, has not been brought into the main GRR/SEIS.

Significance – Medium/Low

While this issue will be unlikely to change the TSP, the need for the project can be strengthened by ensuring that climate change impacts are consistently discussed throughout the document.

Recommendations for Resolution

1. Ensure that discussions of climate change impacts are consistent throughout the document, particularly between the main GRR/SEIS and the appendices.
2. In Section 6.1.1, include the relevant information summarized in Appendix J, Section 1.7, Table 3.

Final Panel Comment 9

The GRR/SEIS does not present a qualitative discussion of how the Middle Rio Grande project and other projects in the study area may have cumulative impacts on environmental resources.

Basis for Comment

Cumulative impacts are defined by the Council on Environmental Quality regulations in 40 Code of Federal Regulations 1508.7 as “the impact on the environment which results from the incremental impact of the [proposed] action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time.” Cumulative impacts include the direct and indirect impacts of a project together with the past, present, and reasonably foreseeable future actions of other projects.

Section 6.7 (Cumulative Effects) of the GRR/SEIS consists of only three brief paragraphs which do not discuss the impacts as relevant to the study area or project. Section 6.7 states that it will discuss "the project relative to other activities which have affected Rio Grande hydrology and channel morphology” (p. 137). However, except for a couple of report references and a mention of direct effects to safety and well-being, no discussion is found. Section 6.7 also mentions the conversion of acreages of vegetation and flow discharge, which do not appear to relate to cumulative impacts.

For a project of this magnitude, the potential for cumulative effects warrants a more in-depth discussion, even if there are relatively few projects in the area and the prospect for future projects is projected to be low. If there are indeed few projects in the area, which led to an abbreviated Cumulative Effects section, this fact is not explained in Section 6.7.

Significance – Medium/Low

Without a complete discussion of cumulative effects in the GRR/SEIS, it is difficult to assess whether the selection or justification of the recommended plan may be affected.

Recommendations for Resolution

1. Update Section 6.7 to include (at a minimum) an overview of existing and future projects, an identification of actions included in the cumulative impact analysis, and a discussion of the cumulative effects on the environment by resource, including biological and cultural resources.

Final Panel Comment 10

It is not clear in the main GRR/SEIS how the combined probability of a given flow from all sources was computed.

Basis for Comment

There is no description in the GRR/SEIS of how the combined probability of flooding was calculated. The economic damage estimates must be based on the combined probability of flooding from all sources, but there is no indication of what probabilities were used in the economic analyses. The three sources of flooding are described in Section 5.1.3 of the GRR/SEIS, and the AEPs of each are provided in Tables 29 through 31. There is also discussion of the combined probability, or the probability of a given flow occurring from any of the three sources.

Significance – Medium/Low

Without a clear understanding of how the combined probability was calculated and used, it is not possible to evaluate whether the AEPs are calculated accurately.

Recommendations for Resolution

1. Add a description of how combined probabilities of a given flow from all sources are calculated to the GRR/SEIS.

Final Panel Comment 11

Time required to drain floodwaters does not appear to have been accounted for in the economic analysis.

Basis for Comment

Following a flood event when water has overtopped or breached the levees, the floodwaters will be trapped between the perched river and the adjacent floodplain that slopes toward the river. In most areas, there is no way to return the water to the river other than pumping. As a result, draining the flooded area will take a significant amount of time. It is not clear that the time required to drain floodwaters was accounted for in Appendix D where the estimates of emergency costs, agricultural damages, or transportation costs are presented.

Significance – Medium/Low

Underestimating the duration of flooding and the resulting drainage time will result in underestimating the expected annual damages associated with emergency costs, agricultural damages, and transportation costs.

Recommendations for Resolution

1. Update the economic analysis of potential expected annual damages related to emergency, agricultural, and transportation costs in Appendix D and the GRR/SEIS.

Final Panel Comment 12

The GRR/SEIS does not explain how the FLO-2D grid scale was selected for hydrology and hydraulic analysis.

Basis for Comment

Appendix H, Section 7.0, references the inundation mapping for the future without-project condition and the TSP as Attachment 7 (7a and 7b). Review of the inundation mapping for the TSP mapping appears to indicate that large grid cells were used for modeling. The inundation mapping is showing flooding on both the riverine and the landward side of the levee, which is indicative when models use large cells for analysis. During the November 20, 2017, mid-review teleconference, the use of the large grid scale was discussed, and the PDT explained that the inundation mapping shown in Attachments 7a and 7b was based on a preliminary model analysis at a feasibility or conceptual scale using a 500-foot FLO-2D model grid. It was further explained that the hydrology and hydraulic model will be run at a denser scale for final analysis and design at a later date.

Appendix H, Section 4.1, provides an overview of the hydraulic models used and states that the model used the necessary sections from the previous “Upper Rio Grande Water Operations Planning Study” (URGWOPS) model for the hydrology and hydraulic analysis. Section 4.1 further notes that the URGWOPS model utilized a 250-foot grid for the FLO-2D model evaluation; however, there is no discussion of the 500-foot grid scale selection process for the Middle Rio Grande Bernalillo to Belen GRR conceptual model. Additionally, Section 4.1 indicates that Mussetter Engineering evaluated the URGWOP model scale and determined that the 250-foot grid scale was adequate for the project. The Mussetter Engineering evaluation is referenced as Attachment 3; however, this attachment was not included in the review and reference documents made available to the Panel.

Significance – Medium/Low

Using an appropriate FLO-2D model grid scale is a key factor in the development of reasonable feasibility-scale analysis that will lead to identifying optimal solutions for final hydrology and hydraulic analysis and design.

Recommendations for Resolution

1. In Appendix H, provide a discussion of the model grid scale selection process for the feasibility-scale analysis.

Final Panel Comment 13

The Flood Forecast and Warning System is identified as an important element of all alternatives, but the GRR/SEIS does not explain how the system will be implemented, funded, or maintained and operated.

Basis for Comment

The Flood Forecast and Warning System, identified as a non-structural measure, is identified as an important element of all project alternatives and is carried forward as a part of the recommended plan. However, there is no detailed discussion on the implementation of the system, responsibility for the system, or funding for the system. The Bernalillo County Office of Homeland Security and Emergency Management, the Valencia County Office of Emergency Management, and the New Mexico Department of Homeland Security and Emergency Management are identified in Section 3.3.3.1 as being involved in emergency preparedness. These departments might also be involved in the Flood Forecast and Warning System, but that is unclear. To include this element as a part of the recommended plan, sufficient discussion is needed to ensure that it can be implemented and funded ahead of phased construction or project completion.

Significance – Medium/Low

Without more information on this important element of the recommended plan, it is difficult to determine how the selection and implementation of the plan will be affected.

Recommendations for Resolution

1. Include a discussion on the Flood Forecast and Warning System that describes how it will be implemented, funded, and operated and maintained.

Final Panel Comment 14

It is unclear how the alternative levee alignments were selected, combined, compared, and discarded.

Basis for Comment

There are a number of conflicting and confusing statements about alternative levee alignments and how they were evaluated.

- Table 3 of the GRR/SEIS lists alternative levee alignments. It appears that some of the alignments for each unit might be combined to address the northern and southern segments of a unit, while others might be alternative alignments for the same segment. A clear description of the proposed alignment for each unit would provide a better understanding of the analysis of the alternatives.
- Section 3.9, p. 56, states: “Alternative levee alignments that were considered during plan formulation were not evaluated.” The meaning of this statement and its significance are not clear.
- Appendix D, Section D-11, states: “Each height uses the same real estate footprint and will substantially replace existing spoilbank levees so alternative alignments were not considered for this analysis.”

It is unclear what alternative levee alignments were evaluated and why alternative alignments were discarded.

Significance – Medium/Low

The adequacy of plan formulation relative to levee alignments cannot be assessed without a clear description of which alignments were considered and how they were evaluated.

Recommendations for Resolution

1. Clearly describe the plan formulation process used to identify the recommended levee alignment, including explanations of what levee alignments were evaluated and how they were screened.

Final Panel Comment 15

Even though the damages in Isleta East are higher than those in Isleta West by between 100% and almost 400%, it is unclear why Isleta East was eliminated due to lack of potential benefits.

Basis for Comment

Tables D-29 through D-32 in Appendix D show single-event damages for Isleta East and West for present and future conditions. In both cases, the tables show much higher damages for Isleta East than for Isleta West. Based on these findings, it is not clear why Isleta East was dropped from consideration in Section 3.9 of the GRR/SEIS due to lack of potential benefits. It is possible that this was a typographic error; however, if it is not, this may have implications on selection of the recommended plan.

Significance – Medium/Low

If this issue is not the result of incorrect captions for Tables D-29 through D-32, the information presented does not support retaining Isleta West in the recommended plan.

Recommendations for Resolution

1. Either correct the labels for Tables D-29 through D-32 or include Isleta East in the recommended plan rather than Isleta West.

Final Panel Comment 16

Life safety hazards and loss-of-life risks are not adequately addressed in the GRR/SEIS.

Basis for Comment

When assessing the quality and quantity of the surveys, investigations, and engineering to substantiate a concept design that considers life safety hazards and to support the models and assumptions, no discussion on life safety hazards is found in the GRR/SEIS.

The only references to life safety are identified below:

- In the Executive Summary to the GRR/SEIS (no page numbers provided): "Spoil bank failure during a flood would now result in considerable non-agricultural damages and pose a significant life-safety hazard." This same statement is also found in Section 2.1.1 (p. 15).
- Section 3.7.2 (p. 43) notes "loss of life" as an intangible damage.
- Section 6.7 notes that the potential for "loss of life" would be significantly reduced as a direct effect of the project.

No other references to life safety hazards or loss of life were found in the GRR/SEIS.

Significance – Medium/Low

Without information on life safety hazards and loss-of-life risks, the completeness of the GRR/SEIS is affected, and it is uncertain whether this missing information would have an effect on the recommended plan.

Recommendations for Resolution

1. Add a discussion to the GRR/SEIS about life safety hazards and loss of life risks, even if qualitative.

Final Panel Comment 17

Evaluation of the alternatives using the four evaluation criteria specified in the Principles and Guidelines (P&G) was not properly performed.

Basis for Comment

Section 3.5 and Table 3 of the main GRR/SEIS compare alternative levee alignments using the four criteria from the P&G. There are two concerns with this evaluation:

- The four evaluation criteria are intended to be performed for alternative plans. However, the GRR/SEIS compares individual levee units, which are management measures. An alternative plan consists of one or more management measures.
- The definitions of the four evaluation criteria in Section 3.5 came from the P&G and provide general descriptions of each criterion. However, these definitions are not specific enough to be applied to a planning study.

Significance – Medium/Low

Without the proper application of the P&G evaluation criteria to the evaluation of alternative plans, it is not clear how it was determined whether an alternative plan met the criteria.

Recommendations for Resolution

1. In Section 3.5, describe how the four evaluation criteria were used to evaluate the alternatives and explain why each alternative was deemed to have met or not met each criterion.
2. Apply the four P&G evaluation criteria to the final set of alternative plans.

Final Panel Comment 18

The cost effectiveness/incremental cost analysis (CE/ICA) does not explain how avian density values for riparian habitats are being used to support the adaptive management cost discussion.

Basis for Comment

Although avian density values are described in Section 4.1.10(b) (p. 71) as relevant for USACE projects and riparian habitats in the Middle Rio Grande Valley, it is unclear how these values were applied to the cost effectiveness/incremental cost analysis (CE/ICA). The disclaimer in that same discussion regarding different bird species being found in grassland and shrub habitats is confusing. Additional discussion is needed to clarify why the riparian avian density values apply. For example, riparian woodland represents the highest habitat value in the project area (see Appendix E, p. 33, USFWS letter, Alcon, 05-25-2016). The presence of grassland and shrub habitats that support different birds than those described needs to be put into perspective.

Significance – Medium/Low

The information presented is incomplete and may be useful to the project if additional discussion is provided.

Recommendations for Resolution

1. Update Section 4.1.10(b) to explain the connection between avian density and the various plant communities and to describe how avian density values are useful to the project even if they only apply to riparian communities.
2. Use Table 2, Appendix E, to clarify the relationship of riparian floodplain vegetation to mixed gallery forest/shrubs.

Final Panel Comment 19

It is unclear why FLO-2D did not use levee heights in the recommended plan to estimate the extent of residual flooding for the with-project conditions.

Basis for Comment

Section 6.1.3.6 of the GRR/SEIS states that the extent of residual flooding for the with-project conditions was estimated using FLO-2D by setting the levee heights at the 0.5% AEP water level and running a 0.2% event for snowmelt, South Diversion Channel, and rainfall flooding sources. Residual flooding inundation maps (Attachment 13) were created by superimposing the flooded areas associated with each source onto a combined map. It is unclear: 1) why the extent of residual flooding for the TSP was not based on the recommended levee heights; and 2) why a 0.2% AEP event was selected.

Significance – Medium/Low

By not accurately simulating the features of the recommended plan for a range of storm events, there is a risk of mischaracterizing residual flooding.

Recommendations for Resolution

1. Provide more detailed discussion in the GRR/SEIS to justify using the 500-year event with levee height set at the 200-year AEP water level for establishing residual inundation mapping.
2. Create residual flooding maps based on simulations that utilize the levee heights recommended in the TSP for a series of AEP storm events based on combined probability.

Final Panel Comment 20

The GRR/SEIS does not include a discussion on how climate change would affect the values for future hydrologic parameters, such as increased runoff intensity from direct precipitation runoff, within the project area.

Basis for Comment

Section 5.1.1.2 of the GRR/SEIS discusses climate model projections of rising temperatures having effects on the regional hydrology, with earlier spring runoff and with altered base flows during the monsoon season. In Section 6.1.1, a general description of climate change for the future with-project conditions foresees no change to future climate conditions. During the November 20, 2017, mid-review teleconference, the PDT did indicate that future hydrological impacts would be less than present conditions; however, this finding for decreasing precipitation and reduced flows is not reflected in the report documents.

The USACE report titled "Recent US Climate Change and Hydrology Literature Applicable to US Army Corps of Engineers Missions – Rio Grande Region 13" (USACE 2015b) states that future climate projections for precipitation will remain unchanged; however, more of the overall total precipitation will fall as rainfall, with less snowfall. These projections establish that rainfall is predicted to fall earlier with increased frequency, intensity, and duration during drought and flooding conditions. These possible changes in the frequency, duration, and intensity of rainfall and runoff may have the potential to affect the project, with shorter-duration events resulting in increased flows and velocities.

Significance – Low

Analyzing the effects of climate change is an important element for evaluating the alternatives leading to selection of the recommended plan, and ultimately for evaluating future hydrologic and hydraulic impacts of the project.

Recommendations for Resolution

1. Provide a more detailed discussion in Section 6.1.1 on how climate change could affect future precipitation and hydraulics under the with-project conditions.

Literature Cited

USACE (2015b). Recent US Climate Change and Hydrology Literature Applicable to US Army Corps of Engineers Missions – Rio Grande Region 13. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. May 20, 2015.

Final Panel Comment 21

The terminology used in the GRR/SEIS to refer to the selected alternative is inconsistent, and the discussion of one eliminated alternative is carried forward despite its elimination from consideration.

Basis for Comment

The GRR/SEIS uses inconsistent terminology to refer to the selected alternative, using “recommended alternative”, “recommended plan”, “Tentatively Selected Plan”, and “Alternative C” interchangeably. In addition, in Section 3.9.3, Alternative D was eliminated in favor of Alternative C, yet Alternative D continues to be discussed in the document (for example, Sections 3.10 and 3.11 discuss Alternative D, as do Sections 6.3.1 and 6.3.4).

Significance – Low

The inconsistent terminology in the GRR/SEIS and the continued discussion of Alternative D after its elimination lead to clarity issues.

Recommendations for Resolution

1. Revise the document so that all terminology regarding the selected alternative is consistent.
2. Revise the document so that, once Alternative D is eliminated, it is not discussed further as if it were still under consideration.

Final Panel Comment 22

There are inconsistencies in the GRR/SEIS and appendices with regard to the levee side slope dimensions to be used.

Basis for Comment

The main GRR/SEIS and the appendices contain inconsistencies pertaining to the slide slopes to be used in the various levee sections. The Executive Summary and Appendix A, Civil Engineering, state that the levee will have 1V-on-3H slide slopes. Appendix F, Geotechnical Engineering, states that levee heights of 12 feet or less will have 1V-on-2.5H side slopes, while anything higher than 12 feet will have 1V-on-3H slide slopes.

Significance – Low

The inconsistency in the side slope dimensions affects the clarity of the GRR/SEIS.

Recommendations for Resolution

1. Ensure that the GRR/SEIS and appendices are consistent in the information presented relating to levee side slope measurements.

5. REFERENCES

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The National Academies (2003). Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports. The National Academies (National Academy of Science, National Academy of Engineering, Institute of Medicine, National Research Council). May 12, 2003.

USACE (2015a). Flood Damage Reduction Analysis (HEC-FDA) Certification. CESPD-PDP (FRM-PCX). August 26, 2015.

USACE (2015b). Recent US Climate Change and Hydrology Literature Applicable to US Army Corps of Engineers Missions – Rio Grande Region 13. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. May 20, 2015.

USACE (2012). Water Resources Policies and Authorities: Civil Works Review. Engineer Circular (EC) 1165-2-214. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. December 15, 2012.

USACE (2000). Planning – Planning Guidance Notebook. Engineer Regulation (ER) 1105-2-100. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. April 22, 2000.

APPENDIX A

IEPR Process for the MRG Bernalillo to Belen Project

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A.1 Planning and Conduct of the Independent External Peer Review (IEPR)

Table A-1 presents the major milestones and deliverables of the MRG Bernalillo to Belen IEPR. Due dates for milestones and deliverables are based on the award/effective date listed in Table A-1. The review documents were provided by U.S. Army Corps of Engineers (USACE) on September 20, 2017. Note that the actions listed under Task 6 occur after the submission of this report. Battelle anticipates submitting the pdf printout of the USACE's Design Review and Checking System (DrChecks) project file (the final deliverable) on March 1, 2018. The actual date for contract end will depend on the date that all activities for this IEPR are conducted and subsequently completed.

Table A-1. Major Milestones and Deliverables of the MRG Bernalillo to Belen IPER

Task	Action	Due Date
1	Award/Effective Date	7/14/2017
	Review documents available	9/20/2017
	Public comments received from USACE	11/17/2017
	Battelle submits draft Work Plan[a]	9/29/2017
	USACE provides comments on draft Work Plan	10/11/2017
	Battelle submits final Work Plan[a]	10/13/2017
2	Battelle submits list of selected panel members[a]	10/10/2017
	USACE confirms the panel members have no COI	10/12/2017
3	Battelle convenes kick-off meeting with USACE	10/2/2017
	Battelle convenes kick-off meeting with panel members	10/25/2017
	Battelle convenes kick-off meeting with USACE and panel members	10/25/2017
4	Panel members complete their review of the documents	11/22/2017
	Panel members provide draft Final Panel Comments to Battelle	12/11/2017
	Battelle sends public comments to Panel	11/27/2017
	Panel confirms no additional Final Panel Comment is necessary with regard to the public comments	12/14/2017
	Panel finalizes Final Panel Comments	12/19/2017
5	**Battelle submits Final IEPR Report to USACE[a]**	**12/29/2017**
6[b]	Battelle convenes Comment Response Teleconference with panel members and USACE	2/12/2018
	Battelle submits pdf printout of DrChecks project file[a]	3/1/2018
	Contract End/Delivery Date	11/30/2018

[a] *Deliverable.*
[b] *Task 6 occurs after the submission of this report.*

At the beginning of the Period of Performance for the MRG Bernalillo to Belen IEPR, Battelle held a kick-off meeting with USACE to review the preliminary/suggested schedule, discuss the IEPR process, and address any questions regarding the scope (e.g., terminology to use, access to DrChecks, etc.). Any revisions to the schedule were submitted as part of the final Work Plan. The final charge consisted of

16 charge questions provided by USACE, two overview questions, and one public comment question added by Battelle (all questions were included in the draft and final Work Plans), and general guidance for the Panel on the conduct of the peer review (provided in Appendix C of this final report).

Prior to beginning their review and after their subcontracts were finalized, all the members of the Panel attended a kick-off meeting via teleconference planned and facilitated by Battelle in order to review the IEPR process, the schedule, communication procedures, and other pertinent information for the Panel. Battelle planned and facilitated a second kick-off meeting via teleconference during which USACE presented project details to the Panel. Before the meetings, the IEPR Panel received an electronic version of the final charge, as well as the review documents and reference/supplemental materials listed in Table A-2.

Table A-2. Documents to Be Reviewed and Provided as Reference/Supplemental Information

Review Documents	No. of Review Pages
Draft MRG GRR/SEIS	183
Appendix A - Civil Design	9
Appendix B - Cost	52
Appendix C - Cultural Resources	254
Appendix D - Economics	169
Appendix E - Environmental	185
Appendix F - Geotech	48
Appendix G - HTRW	506
Appendix H - H&H	82
Appendix I - Real Estate	27
Appendix J - Climate Change	30
Public Comments	100
Total Number of Review Pages	**1,645**
Supplemental Documents[a]	**No. of Review Pages**
Interim Feasibility Report Vol. I – Main Report/EIS	506
Interim Feasibility Report Vol. II – Appendices A-C	344
Interim Feasibility Report Vol. III – Appendices D-F	422
H&H Appendix Attachments 5, 7-10, 13 and 14	426
Total Number of Reference Pages	**1,698**

[a] *Supporting documentation only. These documents are not for Panel review and should be used as information sources only. They are not included in the total page count.*

In addition to the materials provided in Table A-2, the panel members were provided the following USACE guidance documents.

- USACE guidance, *Civil Works Review* (EC 1165-2-214), December 15, 2012
- Office of Management and Budget, *Final Information Quality Bulletin for Peer Review,* December 16, 2004.

- Foundations of SMART Planning
- SMART Planning Bulletin (PB 2013-03)
- SMART – Planning Overview
- USACE Planning Modernization Summary

About halfway through the review, a teleconference was held with USACE, Battelle, and the Panel so that USACE could answer any questions the Panel had concerning either the review documents or the project. Prior to this teleconference, Battelle submitted 19 panel member questions to USACE. USACE was able to provide responses to some of the questions during the teleconference, and provided written responses to the balance of the questions after the teleconference.

A.2 Review of Individual Comments

The Panel was instructed to address the charge questions/discussion points within a charge question response form provided by Battelle. At the end of the review period, the Panel produced individual comments in response to the charge questions/discussion points. Battelle reviewed the comments to identify overall recurring themes, areas of potential conflict, and other overall impressions. At the end of the review, Battelle summarized the individual comments into a preliminary list of overall comments and discussion points. Each panel member's individual comments were shared with the full Panel.

A.3 IEPR Panel Teleconference

Battelle facilitated a teleconference with the Panel so that the panel members could exchange technical information. The main goal of the teleconference was to identify which issues should be carried forward as Final Panel Comments in the Final IEPR Report and decide which panel member should serve as the lead author for the development of each Final Panel Comment. This information exchange ensured that the Final IEPR Report would accurately represent the Panel's assessment of the project, including any conflicting opinions. The Panel engaged in a thorough discussion of the overall positive and negative comments, added any missing issues of significant importance to the findings, and merged any related individual comments. At the conclusion of the teleconference, Battelle reviewed each Final Panel Comment with the Panel, including the associated level of significance, and confirmed the lead author for each comment.

A.4 Preparation of Final Panel Comments

Following the teleconference, Battelle distributed a summary memorandum for the Panel documenting each Final Panel Comment (organized by level of significance). The memorandum provided the following detailed guidance on the approach and format to be used to develop the Final Panel Comments for the MRG Bernalillo to Belen IEPR:

- Lead Responsibility: For each Final Panel Comment, one Panel member was identified as the lead author responsible for coordinating the development of the Final Panel Comment and submitting it to Battelle. Battelle modified lead assignments at the direction of the Panel. To assist each lead in the development of the Final Panel Comments, Battelle distributed a summary email detailing each draft final comment statement, an example Final Panel Comment following the four-part structure described below, and templates for the preparation of each Final Panel Comment.

- Directive to the Lead: Each lead was encouraged to communicate directly with the other panel member as needed and to contribute to a particular Final Panel Comment. If a significant comment was identified that was not covered by one of the original Final Panel Comments, the appropriate lead was instructed to draft a new Final Panel Comment.

- Format for Final Panel Comments: Each Final Panel Comment was presented as part of a four-part structure:

  1. Comment Statement (succinct summary statement of concern)
  2. Basis for Comment (details regarding the concern)
  3. Significance (high, medium/high, medium, medium/low, and low; see description below)
  4. Recommendation(s) for Resolution (see description below).

- Criteria for Significance: The following were used as criteria for assigning a significance level to each Final Panel Comment:

  1. **High:** There is a fundamental issue within study documents or data that will influence the technical or scientific basis for selection of, justification of, or ability to implement the recommended plan.

  2. **Medium/High:** There is a fundamental issue within study documents or data that has a strong probability of influencing the technical or scientific basis for selection of, justification of, or ability to implement the recommended plan.

  3. **Medium:** There is a fundamental issue within study documents or data that has a low probability of influencing the technical or scientific basis for selection of, justification of, or ability to implement the recommended plan.

  4. **Medium/Low:** There is missing, incomplete, or inconsistent technical or scientific information that affects the clarity, understanding, or completeness of the study documents, and there is uncertainty whether the missing information will affect the selection of, justification of, or ability to implement the recommended plan.

  5. **Low:** There is a minor technical or scientific discrepancy or inconsistency that affects the clarity, understanding, or completeness of the study documents but does not influence the selection of, justification of, or ability to implement the recommended plan.

- Guidelines for Developing Recommendations: The recommendation section was to include specific actions that USACE should consider to resolve the Final Panel Comment (e.g., suggestions on how and where to incorporate data into the analysis, how and where to address insufficiencies, areas where additional documentation is needed).

Battelle reviewed and edited the Final Panel Comments for clarity, consistency with the comment statement, and adherence to guidance on the Panel's overall charge, which included ensuring that there were no comments regarding either the appropriateness of the selected alternative or USACE policy. At the end of this process, 22 Final Panel Comments were prepared and assembled. There was no direct

communication between the Panel and USACE during the preparation of the Final Panel Comments. The full text of the Final Panel Comments is presented in Section 4.2 of the main report.

A.5 Conduct of the Public Comment Review

Following the schedule in Table A-1, Battelle received 10 PDF files, totaling 23 pages of public comments on the MRG Bernalillo to Belen from USACE. Battelle then sent the public comments to the panel members in addition to the following charge question:

1. **Do the public comments raise any additional discipline-specific technical concerns with regard to the overall report?**

The Panel produced individual comments in response to the charge question. Each panel member's individual comments for the public comment review were shared with the full Panel. Battelle reviewed the comments to identify any new technical concerns that had not been previously identified during the initial IEPR. Upon review, Battelle determined and the Panel confirmed that no new issues or concerns were identified other than those already covered in the Final Panel Comments.

A.6 Final IEPR Report

After concluding the review and preparation of the Final Panel Comments, Battelle prepared a final IEPR report (this document) on the overall IEPR process and the IEPR panel members' findings. Each panel member and Battelle technical and editorial reviewers reviewed the IEPR report prior to submission to USACE for acceptance.

A.7 Comment Response Process

As part of Task 6, Battelle will enter the 22 Final Panel Comments developed by the Panel into DrChecks, a Web-based software system for documenting and sharing comments on reports and design documents, so that USACE can review and respond to them. USACE will provide responses (Evaluator Responses) to the Final Panel Comments, and the Panel will respond (BackCheck Responses) to the Evaluator Responses. All USACE and Panel responses will be documented by Battelle. Battelle will provide USACE and the Panel a pdf printout of all DrChecks entries, through comment closeout, as a final deliverable and record of the IEPR results.

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APPENDIX B

Identification and Selection of IEPR Panel Members for the MRG Bernalillo to Belen Project

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B.1 Panel Identification

The candidates for the Middle Rio Grande Flood Protection Project, Bernalillo to Belen, New Mexico, General Reevaluation Report and Supplemental Environmental Impact Statement (GRR/SEIS) (hereinafter: MRG Bernalillo to Belen IEPR) Panel were evaluated based on their technical expertise in the following key areas: Civil Works planning, economics, environmental law compliance and biological resources, civil engineering, geotechnical engineering, and hydrology and hydraulic engineering. These areas correspond to the technical content of the review documents and overall scope of the MRG Bernalillo to Belen project.

To identify candidate panel members, Battelle reviewed the credentials of the experts in Battelle's Peer Reviewer Database, sought recommendations from colleagues, contacted former panel members, and conducted targeted Internet searches. Battelle evaluated these candidate panel members in terms of their technical expertise and potential conflicts of interest (COIs). Of these candidates, Battelle chose the most qualified individuals, confirmed their interest and availability, and ultimately selected four experts for the final Panel. The remaining candidates were not proposed for a variety of reasons, including lack of availability, disclosed COIs, or lack of the precise technical expertise required.

Candidates were screened for the following potential exclusion criteria or COIs. These COI questions were intended to serve as a means of disclosure in order to better characterize a candidate's employment history and background. Battelle evaluated whether scientists in universities and consulting firms that are receiving USACE-funding have sufficient independence from USACE to be appropriate peer reviewers. Guidance in OMB (2004, p. 18) states,

> "…when a scientist is awarded a government research grant through an investigator-initiated, peer-reviewed competition, there generally should be no question as to that scientist's ability to offer independent scientific advice to the agency on other projects. This contrasts, for example, to a situation in which a scientist has a consulting or contractual arrangement with the agency or office sponsoring a peer review. Likewise, when the agency and a researcher work together (e.g., through a cooperative agreement) to design or implement a study, there is less independence from the agency. Furthermore, if a scientist has repeatedly served as a reviewer for the same agency, some may question whether that scientist is sufficiently independent from the agency to be employed as a peer reviewer on agency-sponsored projects."

Panel Conflict of Interest (COI) Screening Statements for the IEPR of the Middle Rio Grande Flood Protection Project, Bernalillo to Belen, New Mexico, General Reevaluation Report and Supplemental Environmental Impact Statement (GRR/SEIS)
1. Previous and/or current involvement by you or your firm in the Middle Rio Grande Flood Protection Project (FPP), Bernalillo to Belen, New Mexico, General Reevaluation Report and Supplemental Environmental Impact Statement (GRR/SEIS) (hereinafter: the MRG GRR/SEIS)
2. Previous and/or current involvement by you or your firm in flood risk management projects in the general Middle Rio Grande area.
3. Previous and/or current involvement by you or your firm in U.S. Army Corps of Engineers (USACE) flood risk management projects in the Middle Rio Grande study area.
4. Current employment by the U.S. Army Corps of Engineers (USACE).

Panel Conflict of Interest (COI) Screening Statements for the IEPR of the Middle Rio Grande Flood Protection Project, Bernalillo to Belen, New Mexico, General Reevaluation Report and Supplemental Environmental Impact Statement (GRR/SEIS)
5. Previous and/or current involvement with paid or unpaid expert testimony related to the MRG GRR/SEIS.
6. Previous and/or current employment or affiliation with members of the cooperating agencies or local sponsors: Middle Rio Grande Conservancy District, the Bureau of Reclamation, the U.S. Fish and Wildlife Service, the Bureau of Land Management, and/or the New Mexico Office of State Engineer (for pay or *pro bono*).
7. Past, current, or future interests or involvements (financial or otherwise) by you, your spouse, or your children related to the general Middle Rio Grande area (i.e., interests within river basins, tributaries, or wetlands associated with the Middle Rio Grande study area).
8. Current personal involvement with other USACE projects, including whether involvement was to author any manuals or guidance documents for USACE. If yes, provide titles of documents or description of project, dates, and location (USACE district, division, Headquarters, Engineer Research and Development Center [ERDC], etc.), and position/role. Please highlight and discuss in greater detail any projects that are *specifically* with the Albuquerque District.
9. Previous or current involvement with the development or testing of models that will be used for or in support of the project.
10. Current firm involvement with other USACE projects, *specifically* those projects/contracts that are with the Albuquerque District. If yes, provide title/description, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role. Please also clearly delineate the percentage of work you personally are currently conducting for the Albuquerque District. Please explain.
11. ***Any*** previous employment by USACE as a direct employee, *notably* if employment was with the Albuquerque District. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.
12. ***Any*** previous employment by USACE as a contractor (either as an individual or through your firm) within the last 10 years, *notably* if those projects/contracts are with the Albuquerque District. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.
13. Previous experience conducting technical peer reviews. If yes, please highlight and discuss any technical reviews concerning flood risk management studies and include the client/agency and duration of review (approximate dates).
14. Pending, current, or future financial interests in the MRG GRR/SEIS-related contracts/awards from USACE.
15. Significant portion of your personal or office's revenues within the last three years came from USACE contracts.
16. Significant portion of your personal or office's revenues within the last three years came from Middle Rio Grande Conservancy District contracts.

Panel Conflict of Interest (COI) Screening Statements for the IEPR of the Middle Rio Grande Flood Protection Project, Bernalillo to Belen, New Mexico, General Reevaluation Report and Supplemental Environmental Impact Statement (GRR/SEIS)
17. Any publicly documented statement (including, for example, advocating for or discouraging against) related to the MRG GRR/SEIS.
18. Participation in relevant prior and/or current Federal studies relevant to the MRG GRR/SEIS.
19. Previous and/or current participation in prior non-Federal studies relevant to the MRG GRR/SEIS.
20. Is there any past, present, or future activity, relationship, or interest (financial or otherwise) that could make it appear that you would be unable to provide unbiased services on this project? If so, please describe.

Providing a positive response to a COI screening question did not automatically preclude a candidate from serving on the Panel. For example, participation in previous USACE technical peer review committees and other technical review panel experience was included as a COI screening question. A positive response to this question could be considered a benefit. The term “firm” in a screening question referred to any joint venture in which a firm was involved. It applied to whether that firm serves as a prime or as a subcontractor to a prime. Candidates were asked to clarify the relationship in the screening questions.

B.2 Panel Selection

In selecting the final members of the Panel, Battelle chose experts who best fit the expertise areas and had no COIs. Table B-1 provides information on each panel member’s affiliation, location, education, and overall years of experience. One panel member held a dual role serving as both the economics and Civil Works planning expert, while another served as both the civil and geotechnical engineering expert. Battelle established subcontracts with the panel members when they indicated their willingness to participate and confirmed the absence of COIs through a signed COI form. USACE was given the list of candidate panel members, but Battelle selected the final Panel.

Table B-1. MRG Bernalillo to Belen IEPR Panel: Summary of Panel Members

Name	Affiliation	Location	Education	P.E.	Exp. (yrs)
Civil Works Planning / Economics (Dual Role)					
Lewis Hornung	DR Reed & Associates, Inc.	Jupiter, FL	B.S. in civil engineering	N/A	40
Environmental Law Compliance and Biological Resources					
Joanna Morsicato	Independent consultant	Morrison, CO	M.S. in geography and urban planning	N/A	41
Civil Engineering / Geotechnical Engineering (Dual Role)					
Robert Fleming, Jr.	Independent consultant	Vicksburg, MS	M.S. in geotechnical engineering	Yes	51
Hydrology and Hydraulic (H&H) Engineering					
Larry Fluty	Independent consultant	Brooksville, Florida	Ph.D. in civil engineering/water resources	Yes	39

Table B-2 presents an overview of the credentials of the four members of the Panel and their qualifications in relation to the technical evaluation criteria. More detailed biographical information on the panel members and their areas of technical expertise is given in Section B.3.

Table B-2. MRG Bernalillo to Belen IEPR Panel: Technical Criteria and Areas of Expertise

Technical Criterion	Hornung	Morsicato	Fleming	Fluty
Civil Works Planner / Economist (Dual Role)				
Minimum of five years of experience working in integrated water resources planning and in evaluating whether adequate information was available and appropriate technical analyses were completed to support selection of a tentatively selected plan (TSP) within the context of the risk-informed decision-making process	X			
Have experience related to the identification and evaluation of structural flood risk management alternatives for projects located in the southwestern United States	X			
Minimum M.S. degree or higher	W[1]			
Minimum of 15 years demonstrated experience in economics, with a minimum Bachelor's degree or higher in economics	X			

Technical Criterion	Hornung	Morsicato	Fleming	Fluty
Minimum of 15 years of expertise in flood risk management analysis and benefit calculations, including experience evaluating both structural and non-structural measures and the use of standard USACE computer programs	X			
Experience with National Economic Development analysis procedures, particularly as they relate to flood risk management.	X			
Familiar with the use of standard USACE computer programs, including the Hydrologic Engineering Center (HEC) Flood Damage Reduction Analysis (FDA) modeling software	X			
Environmental Law Compliance and Biological Resources				
At least 15 years of experience directly related to water resource environmental evaluation or review and National Environmental Policy Act (NEPA) compliance		X		
Minimum M.S. degree or higher in a related field		X		
Familiar with the habitat, fish and wildlife species, and tribal cultures and archeology that may be affected by the project alternatives in the study area, and have a solid understanding of the principles of flood protection		X		
Preferred to have a solid background in the habitat types to be found in the arid southwestern United States, and understand the factors that influence the re-establishment of native species of plants and animals		X		
An expert in all applicable environmental laws, cultural resource compliance, Endangered Species Act, and Fish and Wildlife Coordination Act requirements		X		
Civil Engineering / Geotechnical Engineering (Dual Role)				
Registered professional engineer having a minimum of 10 years of experience in civil engineering and design			X	
Minimum M.S. degree in engineering			X	
Demonstrated experience in the development of design plans and specifications for levees, to include tie-in to natural features			X	
Registered professional engineer having a minimum of 15 years of experience in geotechnical engineering with M.S. degree or higher in engineering from a college accredited by the Accreditation Board for Engineering and Technology, Inc.			X	
Geotechnical engineering experience must demonstrate direct responsibility for all geotechnical components for the design and construction of levees, levee tie-ins to natural features, and appurtenant features typically associated with levee projects			X	
Experience must include designing and implementing site investigation and laboratory testing plans; executing and interpreting data and risk analyses, including seepage, stability, and seismically induced liquefaction using GeoStudio software; signing and			X	

Technical Criterion	Hornung	Morsicato	Fleming	Fluty
stamping reports, designs, drawings, and specifications; and providing construction oversight and support				
Working knowledge of geomorphology of alluvial rivers			X	
H&H Engineering				
Registered professional engineer with a minimum of 15 years of experience in H&H engineering				X
Experienced with all aspects of H&H engineering				X
Familiarity within the Rio Grande Basin or similar and a solid understanding of the geomorphology of alluvial rivers is highly preferred				X
Familiar with HEC River Analysis System (RAS) modeling to include the use of GIS (ARC-INFO) as well as familiarity with FLO-2D modeling				X

W[1] - See Section 4.0, Panel Member Waiver Statement, in the MRG Bernalillo to Belen Task 2 deliverable

B.3 Panel Member Qualifications

Detailed biographical information on each panel member's credentials and qualifications and areas of technical expertise are summarized in the following paragraphs.

Name	Lewis Hornung
Role	Civil Works Planner/Economist
Affiliation	DR Reed & Associates, Inc.

Mr. Hornung is a planning expert with DR Reed & Associates in Jupiter, Florida, specializing in the planning, economics, design phase, and operation of integrated water resources and public works projects. He earned his B.S. in civil engineering from the University of Houston. His 40-year career includes 19 years with USACE, 7 years with the South Florida Water Management District (SFWMD), and 14 years with architectural/engineering firms. Mr. Hornung has worked on dozens of USACE Civil Works projects since 1977, applying Principles and Guidelines (P&G). He has taken part in previous IEPR panels for Battelle as an economist/Civil Works planning expert.

Mr. Hornung has direct experience in USACE plan formulation processes, procedures, and standards. He spent more than 12 years in the Planning Divisions of the Galveston and Jacksonville Districts. He applied the USACE six-step planning process, governed by Engineer Regulation (ER) 1105-2-100 (Planning Guidance Notebook), for dredged material management plans, reconnaissance studies, feasibility studies, limited re-evaluation reports, GRRs, major rehabilitation reports, and continuing authority studies. He has experience evaluating whether adequate information was available and

appropriate technical analyses were completed to support selection of a tentatively selected plan (TSP) within the context of the risk-informed decision-making process for these studies.

Mr. Hornung's experience includes structural and non-structural flood risk management projects; water quality; inland, deep- and shallow-draft navigation; and water supply studies. Relevant studies include the C-111 GRR, Jacksonville District; the C-51 West GRR; the Lake Okeechobee Watershed Feasibility Study; the Herbert Hoover Dike Major Rehabilitation Report; and the Alexandria to the Gulf of Mexico Flood Control Feasibility Study, New Orleans District. He also has experience related to the identification and evaluation of structural flood risk management alternatives and benefit calculations for projects located in the southwestern United States as part of his work for a USACE flood risk management project, the Northwest El Paso, Texas, feasibility study.

Mr. Hornung has direct experience with mitigation planning procedures and standards. He has led efforts for many projects to avoid and minimize environmental impacts and, when necessary, to identify cost-effective mitigation measures. Such projects include the Calcasieu Lock Feasibility Study and the Pajaro River Flood Risk Management Feasibility Study. Mr. Hornung also has more than 30 years of experience conducting traditional National Economic Development (NED) plan benefits analyses associated with flood risk management and inland navigation projects. This experience includes economic analyses for the Alexandria to the Gulf Flood Risk Management Feasibility Study, the C-111 GRR (flood risk management), the Houma Navigation Canal Feasibility Report, and the Redwood City Navigation Improvement Feasibility Study.

In addition, Mr. Hornung served on the IEPR Panel to evaluate the NED analysis that was performed using the HEC River Analysis System (HEC-RAS) model for the West Sacramento Flood Risk Management GRR by the Sacramento District. His extensive experience conducting NED evaluations reflects his capability in evaluating traditional NED plan benefits associated with hurricane and coastal storm risk management projects.

Mr. Hornung has more than five years of experience working with HEC Flood Damage Reduction Analysis (FDA) modeling software for many USACE studies. His involvement in the Alexandria to the Gulf of Mexico Feasibility Study for the New Orleans District illustrates his experience with HEC-FDA. As a consultant to the New Orleans District, he served as study manager and utilized HEC-RAS to simulate the complex system of primary and secondary flood control canals in the town of Alexandria and downstream areas, and then applied an innovative application for automating data input to HEC-FDA, which was used to calculate flood damages for the without- and with-project alternatives. The application was so successful that he later managed a contract with HEC to modify the application for broader use.

Name	Joanna Morsicato
Role	Environmental Law Compliance and Biological Resources
Affiliation	Independent consultant

Ms. Morsicato has 41 years of experience working on environmental protection programs using applicable laws, regulations, and practices associated with the National Environmental Policy Act (NEPA), Clean Air Act (CAA), Clean Water Act (CWA), Fish and Wildlife Coordination Act (FWCA), Endangered

Species Act (ESA), and National Historic Preservation Act (NHPA) for public infrastructure and private projects. Most recently, she was the environmental and planning lead at Michael Baker International until she retired in mid-2017. While at that firm, she taught a webinar on NEPA compliance (and associated acts) for the water resources group company-wide, with close to 100 participants in February 2017. Ms. Morsicato earned a master's degree in geography and urban planning from the University of Colorado in 1976. She has also completed numerous additional coursework to support her NEPA and environmental compliance expertise.

Ms. Morsicato is familiar with the habitat, fish and wildlife species, and tribal cultures and archeology that may be affected by the project alternatives in the study area, and has a solid understanding of the principles of flood protection. Ms. Morsicato has a background in the study of habitat types found in the arid southwestern United States, including western and southern Colorado, northern New Mexico, and Texas, and she understands the factors that influence the re-establishment of native species of plants and animals. Her more recent work has been in larger urban areas (Honolulu and Denver); however, during her career, Ms. Morsicato has worked on, provided quality assurance reviews, and/or supervised staff for various projects in southern and western Colorado (including Delta, Colorado Springs, and Pueblo) and northern New Mexico (Los Alamos area). In her capacity as an environmental compliance manager for various large engineering firms, she has often reviewed projects for conformity with NEPA, CWA, ESA, NHPA, and other applicable regulations.

Ms. Morsicato is familiar with large complex Civil Works projects with high public and interagency interests. A recent example is her role as the Deputy Manager of Planning and Environment for the Honolulu, Hawai'i, Authority for Rapid Transportation (HART) working on the final design and construction phase of the Honolulu Rail Transit Project (HRTP), a $5.2-billion, 20-mile, elevated steel wheel-on-steel rail transit system with 21 transit stations, from 2011 through 2014. For this project, she participated in various Section 404 permitting activities for HRTP waterway crossings with the USACE Honolulu District, as well as U.S. Fish and Wildlife (USFWS) ESA Section 7 coordination for the project. She also wrote the project's Hawaii Coastal Zone Management Program Consistency Assessment for the agency. She provided management and oversight of the NHPA Section 106 Programmatic Agreement implementation and served as Archaeological Inventory Survey Manager for HART**.**

Ms. Morsicato also has extensive expertise in consistency reviews and environmental compliance for large and small projects, including the preparation of corridor studies, baseline surveys, categorical exclusions (CEs), environmental assessments (EAs), environmental impact statements (EISs), cultural resource assessments, and Section 106 PAs. She was involved with NEPA activities associated with the Beech Ridge Wind Energy EIS for the USFWS in Greenbrier and Nicholas Counties, West Virginia, and she worked on an EA and a Finding of No Significant Impact for the Denver Regional Transportation District environmental evaluations for extension of the Southeast and Southwest Light Rail Corridors and Colorado Department of Transportation (CDOT) projects. Examples of smaller projects in the state of Colorado include overseeing biological assessments for various roadway improvements between Cañon City and Colorado Springs for CDOT; overseeing wetlands impacts for bridge replacement for a county road in Rio Blanco County; obtaining approvals from the Bureau of Land Management for groundwater wells in Garfield County; and performing CE work for a bypass for the Town of Delta.

Over the past 41 years, Ms. Morsicato's projects have typically included elements of compliance and coordination with the CWA (including USACE) and ESA as well as consultation (informal and formal) with USFWS. She is familiar with the USFWS Habitat Evaluation Procedures. Ms. Morsicato has recent experience with quality assurance and IEPR reviews for USACE projects, including the Portland District

(2013, Mount St. Helens Sediment Retention Structure project) as well as the Honolulu District (2016, Ala Wai Canal IEPR).

Name	Robert Fleming Jr., P.E.
Role	Civil Engineering/Geotechnical Engineering
Affiliation	Independent consultant

Mr. Fleming is a geotechnical engineer specializing in project design and geotechnical and structural engineering for flood control projects. He earned his Master of Engineering (M.E.) in geotechnical engineering from Texas A&M University in 1971 and is a licensed professional engineer in Mississippi. He has 51 years of experience in geotechnical and structural engineering, including working for the USACE Vicksburg District for 35 years. In that capacity, he was actively involved in the design, construction, and evaluation of all types of hydraulic structures. At USACE, he served 10 years as the Chief of the Geotechnical Branch, 5 years as the Chief of the Design Branch, and 4 years as the Chief of Engineering. Mr. Fleming has had overall technical responsibility for all types of flood control, navigation, environmental restoration, and recreation projects, which have included locks and dams, pumping stations, levees, levee tie-ins to natural features, flood management channels, drainage structures, floodwalls, earth dams, channels, channel stabilizations, and earth slide remediation.

Major accomplishments while serving as the Chief of Engineering include the responsibility for the overall design, plans and specifications, and construction consultation of the Mississippi River Enlargement Program in Mississippi, Louisiana, and Arkansas. Enlargements included more than 40 miles of levee raises up to 8 feet on existing levees 25 to 35 feet in height. As the Dam Safety Officer for seven large high-hazard dams, he was responsible for ensuring the safe operation and maintenance of these structures, as well as the design and construction of numerous floodwater-retarding structures, riser pipes, low-drop grade control, and high-drop grade control structures as part of the Demonstration Erosion Control Program in North Mississippi.

Mr. Fleming has extensive expertise in the geotechnical evaluation of flood risk management structures, including static and dynamic slope stability evaluation. He has demonstrated experience related to USACE geotechnical practices associated with flood management channels, construction, and soil engineering, and he also has significant knowledge about dams and their stability. For example, from 1980 to 1993, he was involved in and responsible for the Sardis earthquake study and remediation of the large Sardis hydraulic fill dam in North Mississippi. Sardis Dam was founded on an alluvial foundation that contains recent-age liquefiable silt layers that were determined to be the primary risk for liquefaction in the dam foundation and cause for excessive deformation of the dam during the Design Earthquake. Mr. Fleming was also responsible for numerous geotechnical designs of levees, floodwalls, and hydraulic structures, such as the Lake Chicot Pumping Plant, the first structure built in the Lower Mississippi River mainline levees, and locks and dams on the Red River. As Chief of the Design Branch, he was involved in the mechanical stabilization of the historically significant bluffs overlooking the Mississippi River in Natchez, Mississippi. He is experienced in the evaluation of seepage through earth foundations of large urban levees, as evident in his work on numerous seepage studies evaluating alternatives such as seepage berms, relief wells, and slurry trench cutoffs to find the most cost-effective seepage control.

Relevant studies involved the Ouachita River in Monroe, Louisiana, and the Red River in Alexandria, Louisiana.

As the Chief of Engineering, he signed the Construction Plans & Specifications that were advertised for bids. He also signed the Official Cost Estimates for evaluating bids submitted. As Chief of the Design Branch, he signed individual drawings in the bid package. Both at USACE and as a geotechnical consultant, Mr. Fleming has worked on projects that have involved bridge design and construction, namely as part the appurtenant structures associated with the design and construction of Locks and Dams 3, 4, and 5 on the Red River Waterway. He has experience with the design and construction of detention/retention basins, utility relocations, positive closure requirements, and interior drainage requirements on the various recreation sites on the Red River Waterway and the seven high-hazard dams located within Vicksburg District, as well as the numerous floodwater-retarding and grade control structures that were part of the Demonstration Erosion Control Project located in the hills overlooking the Mississippi Delta in Mississippi. On several flood risk management projects in Vicksburg, he routinely applied and considered non-structural flood risk management measures as part of plan development.

Mr. Fleming has a working knowledge of the geomorphology of the primary rivers of the Vicksburg District. These rivers are all alluvial and includes the Mississippi River, the Red and Ouachita Rivers (in Louisiana), and the Yazoo and Tallahatchie Rivers (in Mississippi). A specific example of a levee project that included tie-ins to natural features is the Big Sand Creek, a tributary of the Yazoo River located in the Mississippi Delta. It included tie-ins to the hills and appurtenant structures such as grade controls in the channel and drainage structures through the levee.

Mr. Fleming has experience designing and implementing site investigation and laboratory testing plans; executing and interpreting data and risk analyses, including seepage, stability, and seismically induced liquefaction; and performing the majority of the individual analyses in GeoStudio software. Mr. Fleming also has experience in geotechnical risk and fragility analysis, as demonstrated by his work on the Sardis earthquake analysis and remediation project described above.

Mr. Fleming is knowledgeable in all phases of alternatives development and evaluation and was involved in numerous USACE planning studies investigating flood control alternatives. In addition, he has served on two IEPR panels: (1) as the geotechnical, structural, and cost engineering reviewer for the Jordan Creek-Springfield, Greene County, Missouri, Feasibility Study Report and Environmental Assessment (2013), and (2) as the geotechnical reviewer for the Manhattan Kansas Section 216, Feasibility Study (2014). He can address the USACE Safety Assurance Review (SAR) aspects of all projects due to his experience and background in the development and implementation of the Design Quality Management System and the Independent Technical Review Process for USACE, Vicksburg District. He also served as an independent consultant on the Interagency Performance and Evaluation Task Force for the New Orleans Hurricane Protection System.

Mr. Fleming actively participates in professional engineering and scientific societies. He is a fellow of the American Society of Civil Engineers and a member of the U.S. Society on Dams and the Society of American Military Engineers.

Name	Larry Fluty, Ph.D., P.E.
Role	H&H Engineering
Affiliation	Independent consultant

Dr. Fluty has 39 years of experience managing and designing civil engineering facilities involving solutions for water resources, flood control, stormwater drainage, reservoir design, and water supply surface water planning. He earned his Ph.D. in civil engineering/water resources from Grant University in 2012 and is a registered professional engineer in the states of Florida, Kentucky, Ohio, Virginia, and West Virginia. Additionally, he is a Certified Floodplain Manager through the Association of State Floodplain Managers. Dr. Fluty has an extensive hydrology and hydraulic engineering background in erosion control, environmental compliance and restoration, hydraulic studies, levee and water supply reservoir design, flood control, stream stabilization, waterway and wetland permitting, dam design and inspections, and hydraulic safety audits and studies.

In his previous role as the Director for Water Resources for Cardno, Dr. Fluty was responsible for all water resource and drainage discipline projects. He was also responsible for the planning, design, permitting, and construction administration for water resource projects, as well as all aspects of hydrology and hydraulics modeling. As such, he is experienced with the USACE HEC model series (including HEC (2D) RAS and HEC HMS). He is highly experienced with integrated 2D modeling using FLO-2D and other integrated 2D models. Dr. Fluty's experience includes Federal Emergency Management Agency (FEMA) floodplain analysis and mapping, master drainage plans, watershed management plans, and water quality improvement plans for large scale regional and urban watersheds.

Dr. Fluty has more than 30 years of experience supporting USACE flood risk management projects, preparing FEMA flood hazard maps, and preparing Digital Flood Insurance Rate Maps (DFIRM) and a Flood Insurance Rate Study. His experience with flood risk management and mapping has evolved into the development of automated GIS parameterization coupled with automated modeling and production of flood risk assessments and mapping. While working for various cooperating technical partners, he produced more than 1,000 FEMA Map Panels and completed six county-wide DFIRM studies and the hydrology and hydraulic modeling and mapping of more than 25,000 miles of streams.

Specific project experience includes serving as project manager for the SFWMD's Watershed Management Program. While working on this contract, Dr. Fluty was responsible for managing and conducting watershed flood modeling and flood risk management projects for the Blue Sink, Weeki Wachee Prairie, Chassahowitzka River, City of Dunedin, City of Bushnell, and City of Safety Harbor watersheds. Dr. Fluty has also served as the project manager for the Hernando County, Florida, FEMA Map Modernization Project, where he assisted Hernando County with the update of outdated flood maps to meet the requirements for Risk Map and DFIRM formats.

Dr. Fluty is also familiar within the Rio Grande basin and has a solid understanding of the geomorphology of alluvial rivers. He has significant experience with complex integrated 2D models where interactions between groundwater and surface water play an important part to understanding the watershed of alluvial rivers. Dr. Fluty has experience with several alluvial river projects such as the Cave Creek Drainage Master Plan, Cave Creek Arizona; Maricopa Mountains Alluvial Fan #1 FEMA Stage Analysis, Arizona; and El Rio Watercourse, Arizona.

Dr. Fluty is highly capable and experienced in addressing the requirements necessary for performing USACE SARs, and in completing and presenting risk management requirements in accordance with ER 105-2-101 and related guidance. This experience includes performing SAR reviews for the Nolichucky River Watershed, Nashville District, and the L-40 Levee Conveyance Reconnaissance Study for SFWMD and USACE Jacksonville District.

Dr. Fluty is very familiar with the impact of other disciplines on the outcome on flood risk management and flood reduction projects. He has worked with environmental professionals on impacts on natural systems, and has collaborated with planners to evaluate future land use and with geotechnical engineers to evaluate potential constraints on hydraulic structures. Dr. Fluty has worked with interdisciplinary project teams, serving as project manager on the SFWMD Everglades Protection Area Bc87(3) Project, West Palm Beach, Florida, the Trinity River Restoration Project, Trinity County, California, and the Yatesville Reservoir, Huntington, West Virginia.

Dr. Fluty also has experience evaluating risk for flood, damages, and life/safety aspects. Working with the USACE Jacksonville District and the SFWMD, he participated in peer design conferences, evaluated the hydrology and hydraulic models developed by the project team, and reviewed and modified the proposed Operating Manuals to ensure consistent and compatible performance of the project components with the existing Central and Southern Florida Flood Control Project. Dr. Fluty also conducted risk management assessment of the alternatives and final project for flood risk impact, life and safety, and other criteria as specified by ER 105-2-101.

Dr. Fluty is a member of the American Water Resources Association, the American Society of Civil Engineers, the Association of State Floodplain Managers, and the Society of American Military Engineers. He served as the hydrology and hydraulic engineering IEPR panel member on the Leon Creek Watershed Feasibility Study, San Antonio, in Bexar County, Texas.

APPENDIX C

Final Charge for the MRG Bernalillo to Belen IEPR

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Charge Questions and Guidance to the Panel Members for the Independent External Peer Review (IEPR) of the Middle Rio Grande Flood Protection Project, Bernalillo to Belen, New Mexico, General Reevaluation Report and Supplemental Environmental Impact Statement (GRR/SEIS)

This is the final Charge to the Panel for the MRG Bernalillo to Belen IEPR. This final Charge was submitted to USACE as part of the final Work Plan, originally submitted on October 13, 2017.

BACKGROUND

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 have been no significant flooding events in the project area since those listed in the 1979 report.

During the course of a limited reevaluation study for two of the levee units (the Belen East and West units), several events occurred that impacted the study and resulted in expanding the scope of the Belen limited reevaluation study into the current general reevaluation study for all remaining levee units:

- 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 U.S. Army Corps of Engineers (USACE) 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 all occur within the study area, including critical habitat).

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

The study area of the general reevaluation 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 20 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.

OBJECTIVES

The objective of this work is to conduct an independent external peer review (IEPR) of the Middle Rio Grande Flood Protection Project, Bernalillo to Belen, New Mexico, General Reevaluation Report and Supplemental Environmental Impact Statement (GRR/SEIS) (hereinafter: MRG GRR/SEIS IEPR) in accordance with the Department of the Army, U.S. Army Corps of Engineers (USACE), Water Resources Policies and Authorities' *Civil Works Review* (Engineer Circular [EC] 1165-2-214, dated December 15, 2012), and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* (December 16, 2004). Peer review is one of the important procedures used to ensure that the quality of published information meets the standards of the scientific and technical community. Peer review typically evaluates the clarity of hypotheses, validity of the research design, quality of data collection procedures, robustness of the methods employed, appropriateness of the methods for the hypotheses being tested, extent to which the conclusions follow from the analysis, and strengths and limitations of the overall product.

The purpose of the IEPR is to assess the "adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (EC 1165-2-214; p. D-4) for the decision documents. The IEPR will be limited to technical review and will not involve policy review. The IEPR will be conducted by subject matter experts (i.e., IEPR panel members) who meet the technical criteria and areas of expertise required for and relevant to the project.

The Panel will be "charged" with responding to specific technical questions as well as providing a broad technical evaluation of the overall project. In accordance with EC 1165-2-214, Appendix D, review panels should identify, explain, and comment upon assumptions that underlie all the analyses, as well as evaluate the soundness of models, surveys, investigations, and methods. Review panels should be able to evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable. Reviews should focus on assumptions, data, methods, and models. The panel members may offer their opinions as to whether there are sufficient analyses upon which to base a recommendation.

DOCUMENTS PROVIDED

The following is a list of documents, supporting information, and reference materials that will be provided for the review.

Documents for Review

The following is a list of documents, supporting information, and reference materials that will be provided for the review.

Review Documents	No. of Review Pages
Draft MRG GRR/SEIS	183
Appendix A - Civil Design	9
Appendix B - Cost	52
Appendix C - Cultural Resources	254

Review Documents	No. of Review Pages
Appendix D - Economics	169
Appendix E - Environmental	185
Appendix F - Geotech	48
Appendix G - HTRW	506
Appendix H - H&H	82
Appendix I - Real Estate	27
Appendix J - Climate Change	30
Public Comments	100
Total Number of Review Pages	**1,645**
Supplemental Documents[a]	**No. of Review Pages**
Interim Feasibility Report Vol. I – Main Report/EIS	506
Interim Feasibility Report Vol. II – Appendices A-C	344
Interim Feasibility Report Vol. III – Appendices D-F	422
H&H Appendix Attachments 5, 7-10, 13 and 14	426
Total Number of Reference Pages	**1,698**

SCHEDULE

This schedule is based on the receipt of the final review documents. Note that dates presented in the schedule below also could change due to panel member and USACE availability.

Task	Action	Due Date
3	Battelle convenes kick-off meeting with USACE	10/2/2017
	Battelle sends review documents to panel members	10/25/2017
	Battelle convenes kick-off meeting with panel members	10/25/2017
	Battelle convenes kick-off meeting with USACE and panel members	10/25/2017
	Battelle convenes mid-review teleconference for panel members to ask clarifying questions of USACE	11/20/2017
	Battelle participates in the Agency Decision Milestone Meeting	TBD
	Battelle participates in the Senior Leaders' Meeting	9/7/2018
4	Panel members complete their review of the documents	11/22/2017
	Battelle provides talking points to panel members for Panel Review Teleconference	11/28/2017
	Battelle convenes Panel Review Teleconference	12/1/2017
	Battelle provides Final Panel Comment templates and instructions to panel members	12/4/2017
	Panel members provide draft Final Panel Comments to Battelle	12/11/2017

Task	Action	Due Date
	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	12/12/2017 - 12/18/2017
	Panel finalizes Final Panel Comments	12/19/2017
4	Battelle receives public comments from USACE	11/17/2017
	Battelle sends public comments to Panel	11/27/2017
	Panel members complete their review of the public comments	12/6/2017
	Battelle and Panel review Panel's responses to public comments	12/7/2017
	Panel drafts Final Panel Comment on public comments, if necessary	12/14/2017
	Panel finalizes Final Panel Comment regarding public comments, if necessary	12/18/2017
5	Battelle provides Final IEPR Report to panel members for review	12/21/2017
	Panel members provide comments on Final IEPR Report	12/27/2017
	Battelle submits Final IEPR Report to USACE*	**12/29/2017**
	USACE Planning Center of Expertise (PCX) provides decision on Final IEPR Report acceptance	1/8/2018
6	Battelle inputs Final Panel Comments to Design Review and Checking System (DrChecks) and provides Final Panel Comment response template to USACE	1/10/2018
	Battelle convenes teleconference with USACE to review Comment Response process	1/10/2018
	Battelle convenes teleconference with Panel to review Comment Response process	1/10/2018
	USACE Project Delivery Team (PDT) provides draft Evaluator Responses to USACE PCX for review	1/25/2018
	USACE PCX reviews draft Evaluator Responses and works with USACE PDT regarding clarifications to responses, if needed	1/31/2018
	USACE PCX provides draft PDT Evaluator Responses to Battelle	2/1/2018
	Battelle provides draft PDT Evaluator Responses to panel members	2/5/2018
	Panel members provide draft BackCheck Responses to Battelle	2/8/2018
	Battelle convenes teleconference with panel members to discuss draft BackCheck Responses	2/9/2018
	Battelle convenes Comment Response Teleconference with panel members and USACE	2/12/2018
	USACE inputs final PDT Evaluator Responses to DrChecks	2/20/2018
	Battelle provides final PDT Evaluator Responses to panel members	2/22/2018
	Panel members provide final BackCheck Responses to Battelle	2/27/2018
	Battelle inputs the panel members' final BackCheck Responses to DrChecks	2/28/2018
	Battelle submits pdf printout of DrChecks project file*	3/1/2018

Task	Action	Due Date
	Contract End/Delivery Date	11/30/2018

* Deliverables

CHARGE FOR PEER REVIEW

1. Are the need for and intent of the decision document clearly stated?
2. Does the decision document adequately address the stated need and intent relative to scientific and technical information?

Given the need for and intent of the decision document, assess the adequacy and acceptability of the following:

3. Project evaluation data used in the study analyses,
4. Economic, environmental, and engineering assumptions that underlie the study analyses,
5. Economic, environmental, and engineering methodologies, analyses, and projections,
6. Models used in the evaluation of existing and future without-project conditions and of economic or environmental impacts of alternatives,
7. Methods for integrating risk and uncertainty,
8. Formulation of alternative plans and the range of alternative plans considered,
9. Quality and quantity of the surveys, investigations, and engineering sufficient for conceptual design of alternative plans, and
10. Overall assessment of significant environmental impacts and any biological analyses.

Further,

11. Evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable, and
12. Assess the considered and tentatively selected alternatives from the perspective of systems. Include systemic aspects being considered from a temporal perspective, such as the potential effects of climate change.

For the tentatively selected plan, assess whether:

13. The models used to assess life safety hazards are appropriate,
14. The assumptions made for the life safety hazards are appropriate,
15. The quality and quantity of the surveys, investigations, and engineering are sufficient to substantiate a concept design that considers life safety hazards and to support the models and assumptions made for determining the hazards, and
16. The analysis adequately addresses the uncertainty and residual risk given the consequences associated with the potential for loss of life for this type of project.

Battelle Summary Charge Questions to the Panel Members[1]

Summary Questions

17. Please identify the most critical concerns (up to five) you have with the project and/or review documents. These concerns can be (but do not need to be) new ideas or issues that have not been raised previously.

18. Please provide positive feedback on the project and/or review documents.

Public Comment Questions

19. Do the public comments raise any additional discipline-specific technical concerns with regard to the overall report?

[1] Questions 17 through 19 are Battelle supplied questions and should not be construed as or considered to be part of the list of USACE-supplied questions. These questions were delineated in a separate appendix in the final Work Plan submitted to USACE.

APPENDIX D

Conflict of Interest Form

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Conflicts of Interest Questionnaire

Independent External Peer Review

MIDDLE RIO GRANDE FLOOD PROTECTION PROJECT
BERNALILLO TO BELEN, NEW MEXICO
GENERAL REEVALUATION REPORT

The purpose of this document is to help the U.S. Army Corps of Engineers identify potential organizational conflicts of interest on a task order basis as early in the acquisition process as possible. Complete the questionnaire with background information and fully disclose relevant potential conflicts of interest. Substantial details are not necessary; USACE will examine additional information if appropriate. Affirmative answers will not disqualify your firm from this or future procurements.

NAME OF FIRM: **Battelle Memorial Institute**
REPRESENTATIVE'S NAME: **Courtney M. Brooks**
TELEPHONE: **614-424-5623**
ADDRESS: **505 King Avenue, Columbus, OH 43201**
EMAIL ADDRESS: brooksc1@battelle.org

I. INDEPENDENCE FROM WORK PRODUCT. Has your firm been involved in any aspect of the preparation of the subject study report and associated analyses (field studies, report writing, supporting research etc.) **No** Yes (if yes, briefly describe):

II. INTEREST IN STUDY AREA OR OUTCOME. Does your firm have any interests or holdings in the study area, or any stake in the outcome or recommendations of the study, or any affiliation with the local sponsor? **No** Yes (if yes, briefly describe):

III. REVIEWERS. Do you anticipate that all expert reviewers on this task order will be selected from outside your firm? No **Yes** (if no, briefly describe the difficulty in identifying outside reviewers):

IV. AFFILIATION WITH PARTIES THAT MAY BE INVOLVED WITH PROJECT IMPLEMENTATION. Do you anticipate that your firm will have any association with parties that may be involved with or benefit from future activities associated with this study, such as project construction? **No** Yes (if yes, briefly describe):

V. ADDITIONAL INFORMATION. Report relevant aspects of your firm's background or present circumstances not addressed above that might reasonably be construed by others as affecting your firm's judgment. Please include any information that may reasonably: impair your firm's objectivity; skew the competition in favor of your firm; or allow your firm unequal access to nonpublic information.
No additional information to report.

Courtney M. Brooks

Courtney M. Brooks — June 28, 2017

BATTELLE

It can be done