



DEPARTMENT OF THE ARMY  
U.S. ARMY CORPS OF ENGINEERS  
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WASHINGTON, DC 20314-1000

CECW-SPD

MEMORANDUM FOR Assistant Secretary of the Army (Civil Works)

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SUBJECT: Middle Rio Grande Flood Protection, Bernalillo to Belen, New Mexico, Feasibility Study – Final U. S. Army Corps of Engineers (USACE) Response to Independent External Peer Review

1. An Independent External Peer Review (IEPR) was conducted for the subject project in accordance with Section 2034 of the Water Resources Development Act of 2007, Engineering Circular (EC) 1165-2-217, and the Office of Management and Budget's Final Information Quality Bulletin for Peer Review (2004).
2. The IEPR was conducted by Battelle Memorial Institute (Battelle). Battelle consulted with the Flood Risk Management Planning Center of Expertise to select panel members. The IEPR panel consisted of five panel members with technical expertise in civil works planning/economics, biological resources and environmental law compliance, hydrology and hydraulics, and geotechnical engineering, and civil/cost engineering.
3. The enclosed document contains the approved final written responses of the Chief of Engineers to the issues raised and the recommendations contained in the IEPR Report. The IEPR Report and the USACE responses have been coordinated with the vertical team and will be posted on the internet, as required by EC 1165-2-217.
4. If your staff have any questions on this matter, please contact me or have a member of your staff contact Bradd Schwichtenberg, Deputy Chief, South Pacific Division Regional Integration Team, at 202-761-1367.

Encl

*Great PROTECT THAT  
Benefit the ENTIRE  
Middle Rio Grande  
Valley in New Mexico - !!  
OUTSTANDING BCR!!*

TODD T. SEMONITE  
Lieutenant General, USA  
Commanding

**Middle Rio Grande Flood Control  
Bernalillo to Belen General Reevaluation Study, New Mexico**

**U. S. Army Corps of Engineers Response to  
Independent External Peer Review  
September 2018**

Independent External Peer Review (IEPR) was conducted for the Middle Rio Grande Flood Control Bernalillo to Belen General Reevaluation Report in accordance with Section 2034 of WRDA 2007, EC 1165-2-217, and the Office of Management and Budget's Final Information Quality Bulletin for Peer Review (2004).

The goal of the U.S. Army Corps of Engineers (USACE) Civil Works program is to provide scientifically sound, sustainable water resource solutions for the nation. The USACE review processes are essential to ensure project safety and quality of the products USACE provides to the American people. Battelle Memorial Institute (Battelle), a non-profit science and technology organization with experience in establishing and administering peer review panels for USACE, was engaged to conduct the IEPR of the Middle Rio Grande Flood Control Bernalillo to Belen General Reevaluation Report.

Based on the technical content of the study documents and the overall scope of the project, Battelle identified candidates for the panel in the fields of Civil Works planning, economics, environmental law compliance and biological resources, civil engineering, geotechnical engineering, and hydrology and hydraulic engineering. Four panel members were selected for the IEPR.

The Battelle IEPR Panel reviewed the draft general reevaluation report and supporting documentation. The Final IEPR Battelle Report was issued on December 29, 2017. According to the Battelle report, the documentation in the General Reevaluation Report/Supplemental Environmental Impact Statement (GRR/SEIS), supporting appendices, and background information provide considerable analysis and effectively summarized the work conducted for the project. However, the Panel did identify elements of the project that require further documentation and sections of the GRR/SEIS that should be clarified or revised. Overall, 22 comments were identified and documented; one with medium/high significance, four with medium significance, fourteen with medium/low significance, and three with low significance. The following discussions present the Final Agency Response to the comments:

**1. IEPR Comment #1: *Medium/High Significance*: 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.**

The comment includes one recommendation, which was adopted.

**USACE Response (#1): Adopted**

**1. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS test the use of HEC-FDA 1.4 to determine whether it would significantly different results. A sensitivity analysis was performed indicating that a model upgrade to HEC-FDA 1.4 would have no impact on NED identification.

**2. IEPR Comment #2: *Medium Significance*: 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.**

The comment includes one recommendation, which was adopted.

**USACE Response (#1): Adopted**

**1. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS be updated with additional information on construction phasing. As a result of the recommendation, additional discussion of construction phasing has been added to the Executive Summary, Section 2, Section 5 and Section 6 of the main report.

**3. IEPR Comment #3: *Medium Significance*: The GRR/SEIS does not clearly explain why the different levee units can be treated as separable elements with separate benefits and costs.**

The comment includes two recommendations for resolution, both of which were adopted.

**USACE Response (#1): Adopted**

**1. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS include discussion and justification as to why each levee unit can be treated as a separate element. Section 3 of the main report has been modified to clarify the definition of separable elements.

**USACE Response (#2): Adopted**

**2. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS include a comparison of the water level profile for the without-project condition for each unit with water level profiles that result from varying levee heights in the upstream and downstream units. Section 7.3 of the Hydrology and Hydraulics Appendix was revised to clarify analysis to support separability of the levee units.

**4. IEPR Comment #4: *Medium Significance*: 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.**

The comment includes three recommendations for resolution, one of which was adopted.

**USACE Response (#1): Adopted**

**1. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS include detailed information on existing flood problems including current flood-fighting effort timing, costs and damages to agricultural infrastructure. Additional detail has been added to Section 2.1 to document current flood-fighting efforts and damages to agricultural infrastructure.

**USACE Response (#2): Not Adopted**

**2. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS discuss the apparent discrepancy between observed flooding and estimated flood damages based on engineering assumptions. Section 2.1 has been revised to discuss interpretation of observed versus estimated flood damages.

### **USACE Response (#3): Not Adopted**

**3. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS include discussion of the sensitivity analysis iterations performed specifically to test whether the depth of beginning damages assumption was critical to estimating damages that were sufficient for project justification. The discussion of start of damages is fully documented in the Economics Appendix in Section D-05.

**5. IEPR Comment #5: *Medium Significance*: 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.**

The comment includes one recommendation, which was adopted.

### **USACE Response (#1): Adopted**

**1. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS include a balanced and consistent discussion of wetlands. As a result of the recommendation, the wetland Sections 5.3.2 and 6.3.2 of the main report and Environmental Appendix Section 3.2.2 have been updated to clarify extent of wetlands in the study area and impact avoidance measures.

**6. IEPR Comment #6: *Medium/Low Significance*: 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.**

The comment includes two recommendations for resolution, both of which were adopted.

### **USACE Response (#1): Adopted**

**1. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS include consistent and current population data. Population information in Sections 1, 2, and 3 was updated to reflect the latest data available. The main report and Economics Appendix have been updated with recent demographic data and appropriate source citations.

### **USACE Response (#2): Adopted**

**2. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS include appropriate citation of data sources for population data. Population information in Sections 1, 2, and 3 was updated to reflect the latest data available. The main report and Economics Appendix have been updated with recent demographic data and appropriate source citations.

**7. IEPR Comment #7: *Medium/Low Significance*: 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.**

The comment includes three recommendations for resolution, two of which were adopted.

### **USACE Response (#1): Adopted**

**1. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS include additional discussion of levee height changes agreed to by the Pueblo of Isleta. Section 3.8 of the report has been updated to clarify the concerns of the Pueblo related to levee height.

### **USACE Response (#2): Adopted**

**2. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS be updated to discuss the aesthetics concerns of the Pueblo related to levee heights. Section 6.6 of the report has been revised to further discuss the concerns of the Pueblo of Isleta related to levee height and traditional requirements for unimpeded views and access to the Rio Grande.

### **USACE Response (#3): Not Adopted**

**3. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS give consideration of Pueblo of Isleta concerns during alternative analysis. The report adequately documents all factors considered during alternative analysis leading to selection of the recommended plan. See Section 3.8 of the main report.

**8. IEPR Comment #8: *Medium/Low Significance: Climate change impacts to environmental resources are not consistently presented in the GRR/SEIS.***

The comment includes two recommendations for resolution, one of which was adopted.

### **USACE Response (#1): Adopted**

**1. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS include consistent discussion of climate change impacts. The report (Sections 5.1.1 and 6.1.1) and appendices (Appendix I – Climate Change) have been modified to insure consistency in the climate change discussions.

### **USACE Response (#2): Not Adopted**

**2. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS include discussion of potential effects of climate change on the proposed project. The report contains adequate analysis of potential effects on resources due to project implementation.

**9. IEPR Comment #9: *Medium/Low Significance: 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.***

The comment includes one recommendation, which was adopted.

### **USACE Response (#1): Adopted**

**1. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS contain an overview of existing and future projects, identification of actions included in the cumulative impact analysis and discussion of cumulative effects on resources. Section 7

of the report has been revised to provide more extensive discussion of cumulative effects in the study area.

**10. IEPR Comment #10: *Medium/Low Significance*: It is not clear in the main GRR/SEIS how the combined probability of a given flow from all sources was computed.**

The comment includes one recommendation, which was adopted.

**USACE Response (#1): Adopted**

**1. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS include a description of combined probability calculations for flows from all sources. Section 5 has been revised to discuss the probabilities of combined flows from the potential flooding sources.

**11. IEPR Comment #11: *Medium/Low Significance*: Time required to drain floodwaters does not appear to have been accounted for in the economic analysis.**

The comment includes one recommendation, which was not adopted.

**USACE Response (#1): Not Adopted**

**1. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS update the economic analysis related to emergency, agricultural and transportation costs for presentation of expected annual damages. The report and Economics Appendix appropriately analyze damages from expected flood events.

**12. IEPR Comment #12: *Medium/Low Significance*: The GRR/SEIS does not explain how the FLO-2D grid scale was selected for hydrology and hydraulic analysis.**

The comment includes one recommendation, which was adopted.

**USACE Response (#1): Adopted**

**1. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS provide discussion of the model grid scale used for analysis. The Hydraulics Appendix Section 4.2.1 has been revised to clarify the process of grid scale selection.

**13. IEPR Comment #13: *Medium/Low Significance*: 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.**

The comment includes one recommendation, which was adopted.

**USACE Response (#1): Adopted**

**1. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS include discussion of implementation, funding and operation and maintenance of the proposed flood forecast and warning system. Section 3 of the report has been revised to clarify implementation of the proposed flood forecast and warning system.

**14. IEPR Comment #14: *Medium/Low Significance*: It is unclear how the alternative levee alignments were selected, combined, compared, and discarded.**

The comment includes one recommendation, which was adopted.

**USACE Response (#1): Adopted**

**1. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS include clear description of identification of levee alignments during plan formulation. Section 3 of the report contains additional discussion of selection of levee alignments and screening.

**15. IEPR Comment #15: *Medium/Low Significance*: 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.**

The comment includes one recommendation, which was adopted.

**USACE Response (#1): Adopted**

**1. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS revise labeling of tables in the economics appendix for clarity related to the Isleta East Unit. Clarification related to the extent of the Belen East levee has been added to Section 3.8 of the report and Section D-12 of the Economics Appendix.

**16. IEPR Comment #16: *Medium/Low Significance*: Life safety hazards and loss-of-life risks are not adequately addressed in the GRR/SEIS.**

The comment includes one recommendation, which was adopted.

**USACE Response (#1): Adopted**

**1. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS include discussion of life safety hazards and loss of life risks. Section 2 of the report has been revised to include discussion of life safety risk in the study area.

**17. IEPR Comment #17: *Medium/Low Significance*: Evaluation of the alternatives using the four evaluation criteria specified in the Principles and Guidelines (P&G) was not properly performed.**

The comment includes two recommendations for resolution, both of which were adopted.

**USACE Response (#1): Adopted**

**1. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS include a description of application of the evaluation criteria to evaluate alternatives. Section 3 of the report includes discussion of the evaluation criteria and their use for alternative analysis.

### **USACE Response (#2): Adopted**

**2. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS demonstrate application of P&G evaluation criteria to the final alternative plans. Section 3 of the report has been revised to demonstrate application of the criteria to the final alternatives.

**18. IEPR Comment #18: *Medium/Low Significance*: 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.**

The comment includes two recommendations for resolution, both of which were adopted.

### **USACE Response (#1): Adopted**

**1. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS explain the connection between avian density and plant communities, and describe how avian density values are useful to the project. Section 4.1.9(b) of the report and table 1.2 of the Environmental Appendix have been updated to describe and clarify the relationship between avian densities and riparian vegetation types.

### **USACE Response (#2): Adopted**

**2. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS utilize table 1.2 of the Environmental Appendix to clarify the relationship of riparian floodplain vegetation to mixed gallery forest/shrubs. Section 5.3.1 of the report has been revised to clarify the relationships and habitat value of native versus mixed-invasive gallery forest.

**19. IEPR Comment #19: *Medium/Low Significance*: 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.**

The comment includes two recommendations for resolution, one of which was adopted.

### **USACE Response (#1): Not Adopted**

**1. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS provide discussion to justify use of 500-year event with levee height set at the 200-year water level for residual flooding mapping. The Hydraulics Appendix has correct residual flooding mapping for the recommended plan.

### **USACE Response (#2): Adopted**

**2. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS include residual flooding maps based on levee heights recommended in the final plan. The residual flooding maps have been revised for the levee heights in the recommended plan, as shown in Section 4.1.15 and Appendix H, Attachment 8.

**20. IEPR Comment #20: *Low Significance*: 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.**

The comment includes one recommendation, which was not adopted.

**USACE Response (#1): Not Adopted**

**1. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS include detailed discussion of climate change effects on future precipitation and hydraulics under with-project conditions. The report has discussion of plan selection and climate change.

**21. IEPR Comment #21: *Low Significance*: 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.**

The comment includes two recommendations for resolution, both of which were adopted.

**USACE Response (#1): Adopted**

**1. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS contain consistent terminology for description of the selected alternative. Section 4 of the report has been revised to present the recommended plan consistently throughout.

**USACE Response (#2): Adopted**

**2. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS be revised to not discuss alternatives once removed from consideration. Section 3.8 of the report has been revised to clarify the plan selection discussion to not carry discarded alternatives forward.

**22. IEPR Comment #22: *Low Significance*: There are inconsistencies in the GRR/SEIS and appendices with regard to the levee side slope dimensions to be used.**

The comment includes one recommendation, which was adopted.

**USACE Response (#1): Adopted**

**1. Action Taken:** The IEPR Panel recommended that the Middle Rio Grande Flood Control Bernalillo to Belen Final GRR/SEIS present consistent information on levee side slopes. Section 4.1 of the report has been revised to provide appropriate side slope information in levee design discussions.