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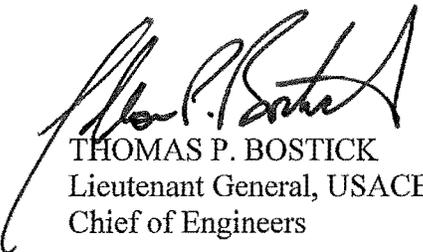
11 APR 2014

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY (CIVIL WORKS) 108
ARMY PENTAGON, WASHINGTON DC 20310-0108

SUBJECT: Truckee Meadows Flood Control Project, Reno and Sparks, Nevada – Final USACE
Response to Independent External Peer Review

1. Independent External Peer Review (IEPR) was conducted for the subject project in accordance with Section 2034 of the Water Resources Development Act of 2007, EC 1165-2-214, 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. The IEPR panel consists of five members with technical expertise in Civil Works economics, biology/economics, hydraulics/hydrologic engineering, civil/construction engineering, and geotechnical engineering.
3. The final written responses to the IEPR are hereby approved. The enclosed document contains the 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 in EC 1165-2-214.
4. If you have any questions on this matter, please contact me or have a member of your staff contact Mr. Bradd Schwichtenberg, Deputy of Chief, South Pacific Division Regional Integration Team, at 202-761-1367.

Encl


THOMAS P. BOSTICK
Lieutenant General, USACE
Chief of Engineers

FINAL Truckee Meadows General Reevaluation Report

U.S. Army Corps of Engineers Response to

Independent External Peer Review

10 March 2013

Independent External Peer Review (IEPR) was conducted for the subject project in accordance with Section 2034 of the Water Resources Development Act of 2007, EC 1165-2-214, 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 always provide the most scientifically sound, sustainable water resource solutions for the nation. The USACE review processes are essential to ensuring project safety and quality of 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 for the Truckee Meadows General Reevaluation Report. The Battelle IEPR panel reviewed the Draft General Reevaluation Report as well as the supporting documentation. The Final IEPR Battelle Report was issued on 22 August 2013.

Overall, ten comments were identified and documented. Of the ten comments, three were identified as economics, two as environmental, two as plan formulation, one as geotechnical, and one as other. Three comments were identified as having high significance, six comments had medium significance, and one comment had low significance.

- 'High': Describes a fundamental problem with the project that could affect the recommendation, success, or justification of the project.
- 'Medium': Affects the completeness of the report in describing the project, but will not affect the recommendation or justification of the project.
- 'Low': Affects the understanding or accuracy of the project as described in the report, but will not affect the recommendation or justification of the project.

The following discussions present the USACE Final Response to the Comments.

1. **IEPR Comment 1 – *High Significance* – The economic benefits of the Truckee Meadows project cannot be validated due to incomplete economic risk and uncertainty analysis**

This comment includes five recommendations for resolution, all of which have been adopted, as discussed below.

Recommendation 1: Quantify or qualify the risk and uncertainty associated with the small sample size used to develop the Industrial-Distribution Center CSVRs.

USACE Response: Adopted.

Action Taken: Content values for the industrial warehouses have been found to be higher for the Truckee Meadows area than on most studies due to the nature and type of distribution along I-80 in the Sparks area. The proximity to I-80 and the benefit of no inventory tax within the state of Nevada make this a unique industrial sector regionally and nationally. Further discussion regarding how content-to-structure value ratios and the risk and uncertainty associated with the small sample size used to develop the Industrial-Distribution Center content-to-structure value ratios (CSVr) has been added to Section 2.2.2.3 of the Final Economic Appendix.

Recommendation 2: Quantify or qualify the risk and uncertainty associated with the discrepancy between observed residential values and the values predicted by the regression model (R^2 values) associated with estimating the factors to be used in the 2007 structure value update.

USACE Response: Adopted.

The 2007 structure value update was validated by the high R^2 values found in the more recent 2011 update and show that there is limited risk associated with the resulting updated structure values. The 2011 update is summarized in Enclosure 2 of the Final Economic Appendix. A standard deviation of 12% (as summarized in section 3.2 of the Final Economic Appendix) was still used within HEC-FDA for residential structure values to appropriately incorporate the uncertain nature of field data collection and sampling in general.

Recommendation 3: Describe the population at risk of flooding under with- and without-project conditions for each alternative.

USACE Response: Adopted.

Action Taken: A table has been added to section 4.5.2 of the Final Economic Appendix that shows the population at risk of flooding under with-and without- project conditions. The population at risk with and without the project is relatively similar because the project focuses on flooding within primarily non-residential areas.

Further discussion has been added to demonstrate the study area does not pose a significant life safety risk as most of the deep flooding occurs within primarily non-residential areas.

Recommendation 4: Present the results of the risk-based analysis in accordance with ER 1105-2-101.

USACE Response: Adopted.

Action Taken: A range of benefit cost ratios and net benefits using and 25%, 50%, and 75% confidence has been added to the Final Economic Appendix as Tables 5-5 and 5-6. Confidence intervals pertaining to benefits are from HEC-FDA and those pertaining to costs come from the Cost and Schedule Risk Analysis. Discussion on risk and uncertainty associated with probability distribution of benefits has been included in section 6.6 of the Final General Reevaluation Report and in section 5.1.1 of the Final Economic Appendix.

Recommendation 5: Describe the risk and uncertainty in the findings of the analysis as illustrated by the distribution of net benefits and BC ratios for each alternative.

USACE Response: Adopted.

Action Taken: A range of benefit cost ratios and net benefits using and 25%, 50%, and 75% confidence has been added to the Final Economic Appendix as Tables 5-5 and 5-6. Confidence intervals pertaining to benefits are from HEC-FDA and those pertaining to costs come from the Cost and Schedule Risk Analysis. Discussion on risk and uncertainty associated with probability distribution of benefits has been included in section 6.6 of the Final General Reevaluation Report and in section 5.1.1 of the Final Economic Appendix.

2. **IEPR Comment 2 – *High Significance* – Truckee Meadows Reach Alternatives 1 and 2 were not evaluated using the same criteria as Alternative 3 and may have been eliminated prematurely.**

This comment includes six recommendations for resolution, four of which have been adopted, and two of which have not been adopted, as discussed below.

Recommendation 1: Describe the nature and extent of the problems in the hydraulic and economic modeling.

USACE Response: Adopted.

Action Taken: During peer review a modeling error was discovered that caused an underestimation of residual damages to all alternatives. Adjustments were made to the models to ensure a greater level of confidence in the resulting floodplains. Discussion

regarding the nature and extent of problems with the hydraulic and economic models has been added to section 5.5 of the Final General Reevaluation Report.

Recommendation 2: Describe the results of the revised economic modeling and compare them to the results that were used during the initial screening.

USACE Response: Adopted.

Action Taken: The initial screening results were compared to the revised economic modeling for without project and for alternatives 3a, 3b, and 3d. Since adjustments to the models affected all alternatives in a relatively consistent manner, previous rankings of alternatives remained the same. Discussion of the results of revised modeling compared to the initial modeling has been added to section 5.5 of the Final General Reevaluation Report.

Recommendation 3: Evaluate the impact of incorporating the additional FRM measure (capping the outlets of the People's Drain) on the performance of Alternatives 1 and 2.

USACE Response: Adopted.

Action Taken: Capping of People's Drain was added as an increment during a reformulation workshop. It was determined that this increment would have similar economic effects for all three alternatives; thus, this measure was not evaluated for Alternative 1 and 2 since Alternative 3 clearly dominated all scales of Alternatives 1 and 2 in the prior evaluation. Additional discussion has been added to section 5.6 of the Final General Reevaluation Report regarding how this additional measure was considered during the plan formulation process.

Recommendation 4: Evaluate Alternatives 1 and 2 using the revised economic and hydraulic models; or explain why the modeling corrections did not impact the screening of Alternatives 1 and 2.

USACE Response: Adopted.

Action Taken: It was determined that the revisions to the economic and hydraulic models would have had the same effect on each of the three alternatives. Since Alternative 3 clearly dominated all scales of Alternatives 1 and 2 in the prior evaluation, it was determined that while net benefits would be reduced for all alternatives and scales, the ranking would remain unchanged. Therefore, it was prudent to screen them at that time. This information has been added to section 5.5 of the Final General Reevaluation Report.

Recommendation 5: Describe induced inundation and damages for Alternatives 1a and 2a and estimate mitigation or National Flood Insurance Program compliance costs for each alternative.

USACE Response: Not Adopted.

Action Taken: All alternatives were designed to avoid and minimize major induced damages. USACE policy is to identify the National Economic Development (NED) Plan and then to cost share in mitigating induced damages where they are either 1/ economically justified, 2/ a fifth amendment taking, or there are overriding social concerns. If further mitigation beyond USCAE cost share is required for regulatory compliance with the National Flood Insurance Program (NFIP), then those costs are to be borne by non-federal sponsor. The Truckee Meadows analysis followed this process and identified the NED Plan, showed that any mitigation for induced damage exceed USACE cost share ability, and coordinated with FEMA and the non-federal sponsor with respect to the sponsor's regulatory requirement costs.

Recommendation 6: Consider National Flood Insurance Program compliance cost when identifying the National Economic Development plan, or provide USACE guidance for excluding its consideration.

USACE Response: Not Adopted.

All alternatives were designed to avoid and minimize major induced damages. USACE policy is to identify the National Economic Development (NED) Plan and then to cost share in mitigating induced damages where they are either 1/ economically justified, 2/ a fifth amendment taking, or there are overriding social concerns. If further mitigation beyond USCAE cost share is required for regulatory compliance with the National Flood Insurance Program (NFIP), then those costs are to be borne by non-federal sponsor. The Truckee Meadows analysis followed this process and identified the NED Plan, showed that any mitigation for induced damage exceed USACE cost share ability, and coordinated with FEMA and the non-federal sponsor with respect to the sponsor's regulatory requirement costs.

3. **IEPR Comment 3 – *High Significance* – The estimated annual costs of operating and maintaining project components seem very low given the scope of the National Economic Development (NED) plan.**

This comment includes two recommendations for resolution, both of which have been adopted, as discussed below.

Recommendation 1: Provide the documented basis for OMRR&R costs.

USACE Response: Adopted.

Action Taken: A table showing the Operation and Maintenance, Repair, Replacement, and Rehabilitation (OMRR&R) costs has been added to the Final Engineering Appendix. OMRR&R costs were reviewed and revised based on IEPR concerns and the resulting increase in cost has been updated throughout the Final General Reevaluation Report and appendices.

Recommendation 2: Provide OMRR&R costs associated with NFIP compliance.

USACE Response: Adopted.

Action Taken: The minimum costs for compliance with the National Flood Insurance Program were estimated to determine whether the recommended plan is economically justified. These costs have been added to the Final General Reevaluation Report and appendices.

4. **IEPR Comment 4 - *Medium Significance* – The net benefits for the National Economic Development (NED) plan cannot be validated due to inconsistencies in construction cost contingency rates for the project confidence level in the General Reevaluation Report (Final GRR) and the Project Cost and Schedule Risk Analysis Report.**

This comment includes two recommendations for resolution, both of which have been adopted, as discussed below.

Recommendation 1: Review the Revised GRR and the Project Cost and Schedule Risk Analysis Report and reconcile inconsistencies in the stated level of confidence and construction cost contingency rates.

USACE Response: Adopted.

Action Taken: Inconsistencies in the Final General Reevaluation Report have been revised. The Final General Reevaluation Report is now consistent with the Project Cost and Schedule Risk Analysis Report

Recommendation 2: Adjust the Total Project Cost for the Sacramento District's recommended contingency rate and change the project reports to eliminate any ambiguity.

USACE Response: Adopted.

Action Taken: The Final General Reevaluation Report has been modified to eliminate ambiguity regarding the recommended contingency rate. No change to the Total Project Cost was required.

5. **IEPR Comment 5 – *Medium Significance* – A plan to communicate to the public the change in residual risks associated with the revised project from a 1% annual chance of exceedance (ACE) level of flood risk management (FRM) to a 2% ACE level of FRM has not been presented.**

This comment includes two recommendations for resolution, both of which have been adopted, as discussed below.

Recommendation 1: Develop an extensive public outreach program to ensure that the level of flood risk management (residual risk) provided by the project is communicated to local community leaders and their constituents.

USACE Response: Adopted.

Action Taken/Action To Be Taken: USACE has communicated with stakeholders and the public during this study, as presented in Chapter 7 of the Final General Reevaluation Report. This included public meetings and workshops, a study website, monthly newsletters, and stakeholder meetings. Post-construction public engagement is primarily a non-Federal requirement, as described in section 8.3.2 paragraphs e-h of the Final General Reevaluation Report. USACE will continue to communicate with the sponsor, community leaders, stakeholders, where appropriate. Also, USACE will review the non-Federal sponsor's Floodplain Management Plan to ensure that public outreach is included.

Recommendation 2: Develop a communication plan that involves the public in the process and provides up-to-date information on the progress during planning, design, and construction (public access website) to promote shared community responsibility.

USACE Response: Adopted.

Action Taken/Action To Be Taken: USACE developed and followed a project specific communication plan. Post-construction public engagement is primarily a non-Federal requirement, as described in section 8.3.2 of the Final General Reevaluation Report. USACE will review the non-Federal sponsor's Floodplain Management Plan to ensure that communication with the public (such as public access website, etc.) is included.

6. IEPR Comment 6 – *Medium Significance* – Potential chronic impacts to the aquatic ecosystem due to sedimentation over the extended period of project construction and bank stabilization have not been described.

This comment includes two recommendations for resolution, both of which have been adopted, as discussed below.

Recommendation 1: Briefly summarize the chronic (i.e., recurrence and duration) aspect of in-stream and near-stream construction and earthwork impacts regarding sedimentation and the significance of its potential impact, including the effects of an unusual and unpredictable storm.

USACE Response: Adopted.

Action Taken: Section 6.1.9 of the Final General Reevaluation Report has been updated to include discussion of potential construction-related erosion/sedimentation effects on the aquatic ecosystem, particularly from chronic and unusual storm standpoints. The Final Environmental Impact Statement has been revised to adequately capture the

consideration of chronic sedimentation/siltation conditions related to construction activities.

Recommendation 2: In the GRR, explicitly state the findings from the evaluation of chronic project related sedimentation and the plans to minimize it.

USACE Response: Adopted.

Action Taken: Section 6.1.9 of the Final General Reevaluation Report has been updated to include discussion of potential construction-related erosion/sedimentation effects on the aquatic ecosystem, particularly from chronic and unusual storm standpoints. Text in the Final Environmental Impact Statement has been revised to adequately capture the consideration of chronic sedimentation/siltation conditions related to construction activities.

7. IEPR Comment 7 – *Medium Significance* – The vegetation management requirements and maintenance of earthen structures in the project area are not presented in sufficient detail to adequately analyze impacts and assess costs.

This comment includes two recommendations for resolution, both of which have been adopted, as discussed below.

Recommendation 1: Provide more detail in the GRR on procedures, methods, and costs of near-stream vegetation management and anticipated maintenance needs for earthen structures.

USACE Response: Adopted.

Action Taken: Section 6.1.9 of the Final General Reevaluation Report has been updated to provide additional detail on the procedures, methods, and costs of near-stream vegetation management and anticipated maintenance needs for earthen structures.

Recommendation 2: In the GRR, explicitly state the findings from the evaluation of the proposed management and maintenance and the means that will be employed to avoid or minimize potential adverse impacts on the aquatic ecosystem, focusing on the use of chemicals. If “best management practices” will be employed, explain briefly what they are and why they are considered the best practices at this time.

USACE Response: Adopted.

Action Taken: Additional information has been added to the Final Environmental Impact Statement providing more detail on the best management practices to be implemented during weed control activities. Section 6.1.9 of the Final General Reevaluation Report has been updated to provide information on best management practices that will be employed.

8. **IEPR Comment 8 – *Medium Significance* – The effects of liquefaction on the design and performance of the flood wall and levee structures have not been considered.**

This comment includes three recommendations for resolution, all of which have been adopted.

Recommendation 1: Conduct a preliminary assessment of liquefaction potential and its consequences on the proposed flood containment structures.

USACE Response: Adopted.

Action Taken/Action To Be Taken: A preliminary assessment of liquefaction potential and consequences has been conducted to estimate the extent of potential damage to flood control structures and appropriate design/ response actions to mitigate potential consequences to liquefaction. The Final Geotechnical Summary has been modified to address and acknowledge this risk. During project design, an emergency response plan will be developed that identifies how to rapidly repair damage that might occur due to seismically induced liquefaction. The design team will develop best estimate characterizations and uncertainty ranges of potential liquefaction locations, extents, and magnitudes, as well as similar characterizations of potential resulting damage to the project flood control structures.

Recommendation 2: Clearly describe the seismic performance criteria for levees and the strategy for mitigating potential earthquake-related deformation.

USACE Response: Adopted.

Action Taken/Action To Be Taken: Seismic performance criteria have been considered in this plan to correspond to high-water performance criteria and discussion has been added to the Final Geotechnical Summary. An emergency response plan will be developed during design of the project that will address the strategy for mitigating potential earthquake-related deformation.

Recommendation 3: In the GRR, discuss the potential consequences of liquefaction and associated post-earthquake emergency response and remediation plans.

USACE Response: Adopted.

Action Taken/Action To Be Taken: There is a potential for liquefaction in the study area and this has been taken into consideration. Information regarding the potential consequence of liquefaction has been added to the Final Geotechnical Summary. An emergency response plan will be developed during design of the project and documentation regarding development of this emergency response plan has been added to the Final Geotechnical Summary.

9. **IEPR Comment 9 – *Medium Significance* – The basis for selecting alternative seepage control measures is not clearly defined, potentially affecting the extent and cost of the recommended features.**

This comment includes three recommendations for resolution, all of which have been adopted, as discussed below.

Recommendation 1: Provide additional information regarding the rationale associated with the selection of various seepage control features along the alignment. Include both technical and real estate acquisition considerations.

USACE Response: Adopted.

Action Taken/Action To Be Taken: The seepage control measures acceptable for use along the alignments and rationale associated with selection of these features have been added to section 6.2 and Table 10 of the Final Geotechnical Summary. During Pre-Construction Engineering & Design (PED) the seepage methods will be optimized with further refinements in the alignments and real estate costs/impacts.

Recommendation 2: Include the seepage analysis calculations supporting the recommendations summarized in Table 10 of the Geotechnical Summary.

USACE Response: Adopted.

Action Taken: Seepage analysis calculations have been added to the Appendix to the Geotechnical Summary.

Recommendation 3: Provide interpretative subsurface profiles along the alignment which support the selection of cross-sections used in seepage analyses.

USACE Response: Adopted.

Action Taken: Subsurface profiles have been added to the Appendix to the Geotechnical Summary.

10. **IEPR Comment 10 – *Low Significance* – Language regarding the 1% annual chance of exceedance (ACE) associated with the 2011 National Economic Development (NED) plan no longer applies under the 2% ACE associated with the 2013 NED plan.**

This comment includes one recommendation for resolution, which has been adopted, as discussed below.

Recommendation 1: Review the Revised GRR and eliminate language that no longer applies to the current NED plan.

USACE Response: Adopted.

Action Taken: USACE reviewed the Final General Reevaluation Report and removed language that no longer applies to the current National Economic Development plan.