DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
441 G STREET, NW
WASHINGTON, DC 20314-1000

CECG

DEC 14 2018

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY (CIVIL WORKS)

SUBJECT: Little Colorado River at Winslow, Navajo County, Arizona, Flood Risk Management 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) 1165-2-214, 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 (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 1165-2-214.

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

TODD T. SEMONITE
Lieutenant General, USA
Commanding

Little Colorado River at Winslow
Navajo County, Arizona
Flood Risk Management Project
Integrated Feasibility Report and Environmental Impact Statement

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

Independent External Peer Review (IEPR) was conducted for the Little Colorado River at Winslow, Arizona, Flood Risk Management Project in accordance with Section 2034 of the Water Resources Development Act of 2007, the USACE peer review policy (currently, 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 always provide scientifically sound, sustainable water resources solutions for the nation. The USACE review processes are essential to ensuring 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 the USACE, was engaged to conduct the IEPR for the Little Colorado River at Winslow, Arizona, Flood Risk Management Project, and its supporting documentation. Battelle identified potential candidates for the Panel in the following key technical areas: Civil Works planning/economics, biological resources and environmental law compliance, hydrology and hydraulic engineering, geotechnical engineering, and civil/cost engineering. Battelle made the final selection of the five-person Panel.

Battelle issued its Final Independent External Peer Review Report on April 25, 2017. Overall, nine Final Panel Comments were identified and documented. Of these, three were identified as having high significance, one was identified as having medium/high significance, two had a medium significance, one had medium/low significance, and two had low significance.

The USACE concurred with five comments and non-concurred with four comments. As a result of the Panel Backcheck and subsequent USACE responses, there were suggested 29 recommendations. Of these 29 recommendations, 14 were adopted and 15 were not adopted. The following discussions present the Final Response to the nine comments.

1. **IEPR Comment - *Significance – High.* The hydrologic analysis does not use all available streamflow and anecdotal data to verify the accuracy of the calculated 1% annual chance exceedance flood.**

   This comments includes five recommendations. The first recommendation was adopted. The remaining four recommendations were not adopted.

   1. Explain why the January 8, 1993 high flow observed at the LCR at Winslow was not captured in upstream or downstream gauged flows, and therefore not used in calculating the 1% ACE flow for the Winslow location.

   USACE Response: Adopted
   Actions Taken/Actions to be Taken: An Errata Sheet has been added to Appendix A-Hydrology that explains why the January 8, 1993 high flow event was not captured in the upstream gaged flow at Joseph City.

   2. Demonstrate the impact of including the January 8, 1993 high flow observed at Winslow on the computed 1% ACE flow by inserting drainage-area adjusted flows into the Grand Falls and Holbrook/Joseph City datasets.

   USACE Response: Not Adopted
   Actions Taken/Actions to be Taken: There are recorded/published peak flow rates in 1993 at LCR Grand Falls and LCR Holbrook/Joseph City. Replacing published flows, available at the Grand Falls and Holbrook/Joseph City datasets, with preliminary estimated and manipulated data is not deemed appropriate per professional judgment, especially since the January 8, 1993 event was a localized storm event that would not have affected flows at LCR Holbrook/Joseph City.

   3. Create a synthetic dataset of streamflows for the LCR at Winslow, based on Winslow gauged data and locally sourced information.
      a. Develop regression/correlation equations between the LCR gauge at Winslow and the gauges upstream and downstream (including gauges at Carmen, Grand Falls, Joseph City, and Holbrook).
      b. Use gauged data at Winslow when possible, including the estimated flow on January 8, 1993. When gauged data at Winslow are not available, use values derived from the regression/correlation equations. For periods during which no data are available, use available literature or locally sourced anecdotes to approximate flows.

   USACE Response: Not Adopted
   Actions Taken/Actions to be Taken: Generating a synthetic data set at LCR Winslow based mostly on interpolated annual data and running a discharge-frequency analysis on that data is less appropriate than running discharge-frequency analyses on actual recorded data at LCR Grand Falls and LCR Holbrook/Joseph City and then interpolating the discharge-frequency curves to the Winslow location. Often times the annual peak flow rates at Grand

Falls and Holbrook/Joseph City are not a result of the same storm event and there are years that there is a peak flow recorded at one gage location and not the other. This would make it extremely difficult to interpolate annual peak flow rates at the LCR Winslow location. Running a discharge-frequency analysis on the actual data at the upstream and downstream gages and then interpolating to the Winslow location eliminates the need to have peak flows at both gages each year and to have those peak flows be from the same storm event.

4. Re-compute the 1% ACE flow using the synthetic dataset.

USACE Response: Not Adopted
Actions Taken/Actions to be Taken: Since the USACE did not adopt recommendation #3, this recommendation is not implementable.

5. Revise Appendices A and B as needed to include a re-assessment of the 1% ACE flood and associated floodplain.

   a. Re-assess the number of structures within the 1% ACE floodplain for which Federal Emergency Management Agency flood insurance would be required.

USACE Response: Not Adopted
Actions Taken/Actions to be Taken: Since the USACE did not adopt recommendations #3 & #4, this recommendation is not implementable.

2. **IEPR Comment - *Significance – High*. The modeled "baseline conditions" may not be capable of containing the 1% ACE flood because the models used are not calibrated to actual LCR flood events, low and high flow periods, or average flow conditions.**

This comment includes two recommendations which were not adopted.

1. Calibrate the baseline HEC-RAS model against measured flow and water surface elevation pairs collected by the U.S. Geological Survey (USGS) when they perform rating-curve measurements at the LCR at Winslow gauge. Based on USGS records, they have flow and stage measurements over a range of flow levels, from 10 cfs to 18,600 cfs (from 12/30/2004). Even though these potential calibration flows are all below the computed 1% ACE flow, matching observed and computed water levels over this low flow range would provide confidence in the model's ability to reproduce observed conditions.

USACE Response: Not Adopted
Actions Taken/Actions to be Taken: Calibration of the model results was not adopted based on the reasons provided in the non-concur explanation above. However, the comparison of model results to the highest recorded/measured flow discussed in the explanation above was added to the report. Refer to Appendix B-Hydraulics, Section 5.3.8 *Calibration*, paragraph 2 of 3 for this discussion. Furthermore, the previous statement in Section 5.3.8, paragraph 1 stating that "observed flow data was not available" was revised to

say that the model was compared to the highest flow on record but that this data point was not used to calibrate the model. The comparison showed the model to closely match the recorded flow.

2. As part of re-calibration efforts, consider the use of standard goodness-of-fit statistics (e.g., coefficient of determination, Nash-Sutcliffe efficiency) to gauge degree of model calibration.

USACE Response: Not Adopted
Actions Taken/Actions to be Taken: Since the USACE does not concur with the model calibration, the USACE will not adopt the recommendation to consider the use of goodness to fit statistics which gauge model calibration.

Although neither IEPR panel comment 2 recommendation was adopted, Appendix B–Hydraulics was edited to further support the PDT decision to not adopt either recommendation. The revised discussion concerning hydraulic model calibration can be found at Section 5.3.8 of the Hydraulics Appendix.

3. **IEPR Comment 3 - *Significance – High*. The IFR/EIS provides the costs of using three feet of freeboard, but does not consider the benefits that the height over the recommended plan would provide, which has implications for the project benefit-cost analysis.**

This comment includes six recommendations which were not adopted.

1. Integrate more of the guidance recommended in ER 1105-2-100, ER 1105-2-101 and EM 1110-2-1619 to substantiate the use of freeboard.

USACE Response: Not Adopted
Actions Taken/Actions to be Taken: Freeboard was not applied in the analysis. Extensive edits were made throughout the IFR/EIS to clearly state that the risk-based analysis of benefits was based upon the actual top of levee heights, consistent with the basis for alternative costs. An example of the type of global edit made while discussing levee height is replacing "as measured by the ACE of 1% plus 3 feet to account for uncertainty" with "as measured by an approximately 90% assurance of containing the 1% ACE event." Edits were made to Appendix C-Economics in the *Executive Summary*, Section 8.2 *Optimization*, and *Addendum D: Other Social Effects Analysis*. Additional edits were made to Chapters 3, 5 and 8 of the Final IFR/EIS. Appendix F-Geotechnical, Appendix D-Design and Appendix J-Clean Water Act 404(b)(1) Evaluation were also edited to clarify that levee freeboard was not applied to the analysis. Aside from the Economics Appendix and the plan formulation discussion in Chapter 3 of the Final IFR/EIS, most of these edits consisted of revisions to alternative descriptions and figures.

2. Explain why 3 feet of freeboard is justified in terms of overall performance.

USACE Response: Not Adopted
Actions Taken/Actions to be Taken: As indicated in response to Recommendation #1, freeboard was not applied in the analysis. Report text was revised to clearly state that the risk based analysis of benefits was based upon the actual top of levee heights, consistent with the basis for alternative costs.

3. Provide documentation of the analyses used to demonstrate performance with and without freeboard of varying heights.

USACE Response: Not Adopted
Actions Taken/Actions to be Taken: Project performance statistics included in the report are based upon top of levee heights, not based upon freeboard. Report text was revised to clearly state that the risk based analysis of benefits was based upon the actual top of levee heights, consistent with the basis for alternative costs.

4. Analyze the additional height in terms of expected benefits vs. expected costs, add it as a non-Federal expense, or remove it as a feature altogether.

USACE Response: Not Adopted
Actions Taken/Actions to be Taken: Benefits quantified were based upon top of levee heights – freeboard not applied to the analysis.

5. Include any additional protection provided by the freeboard in the benefit analysis.

USACE Response: Not Adopted
Actions Taken/Actions to be Taken: As noted, project performance statistics were based upon the top of levee height, not based upon application of freeboard.

6. Show the costs of freeboard as a non-Federal expense if the freeboard is unnecessary for the recommended plan.

USACE Response: Not Adopted
Actions Taken/Actions to be Taken: Report text has been revised to clearly state that the risk based analysis of benefits was based upon the actual top of levee heights, consistent with the basis for alternative costs.

4. **IEPR Comment 4 - *Significance – Medium/High*. It is unclear how the identified "increased project risk and cost contingencies" associated with the lack of geotechnical subsurface information has been accounted for in Appendix E Cost Engineering.**

This comment includes one recommendation, which was adopted.

1. Clarify and confirm how the contingencies associated with the elevated geotechnical uncertainty in Appendix E were developed.

USACE Response: Adopted
Actions Taken/Actions to be Taken: The PDT conducted a detailed Cost Schedule Risk Analysis (CSRA) in coordination with the Chicago District and Walla-Walla MCX the week of March 5, 2018. The risks associated with geotechnical uncertainty received extensive consideration during the CSRA. Refer to Appendix E-Cost Engineering, Attachment 2, *Cost and Schedule Risk Analysis* and Appendix A, *Risk Register* for a discussion of these risks, and the rating level for each risk upon the project cost and schedule. More specifically, the geotechnical risks are captured at risks TL3, TL6, TL7, TL8, TL9, TL10, CO9 and ET2 in the CSRA at Attachment 2. Development of cost contingencies is discussed in Sections 4, 5 and 6 of Attachment 2.

5. **IEPR Comment 5 - *Significance – Medium*. Geotechnical analyses of the preferred alternative have not been completed and incorporated into Appendix F.**

This comment includes three recommendations. The first recommendation was adopted. The remaining two recommendations were not adopted.

1. Prepare a site plan that presents the preferred alternative alignment along with all available subsurface data (for example, similar to Plates 3-8 in the 2009 Kleinfelder report (PDF pp. 481-486).

USACE Response: Adopted
Actions Taken/Actions to be Taken: The USACE updated Appendix F-Geotechnical to address the geotechnical conditions and constraints as they affect the Recommended Plan. The composite illustration (site plan) showing the location of all available explorations on one diagram is provided in Appendix F-Geotechnical at Fig. 2 on page 11. Schedule and cost risks to the project are addressed in Appendix E-Cost Engineering (refer to response to IEPR panel comment 4 above). See also statements in Sections 4.9 and 7.2 of the Geotechnical Appendix.

2. Provide a summary table in Appendix F of the soil units and associated engineering properties, noting which properties are assumed and which are based on site-specific geotechnical laboratory and/or in situ testing.

USACE Response: Not Adopted
Actions Taken/Actions to be Taken: The soil properties utilized in the fragility report were assumed based on experience with levees, the general vicinity, and the general engineering properties of soils. The study to develop the fragility curves utilized uncertainty to account for the lack of available data. Since all soil properties are being assumed, the USACE will not have the information needed to populate the summary table requested by the panel during the feasibility phase. However, the USACE will implement a comprehensive geotechnical exploration and testing plan to investigate the underlying soils and their engineering properties during the PED phase.

3. Re-analyze seepage, slope stability, and erosion to reflect the configuration of the preferred alternative and present in Appendix F.

USACE Response: Not Adopted
Actions Taken/Actions to be Taken: It is agreed that the geotechnical study report does not directly address the TSP. The USACE will conduct the analysis requested by the panel during the PED phase of the study, following a field exploration and laboratory testing program. Therefore, the panel recommendation will be adopted in the future.

6. **IEPR Comment 6 - *Significance – Medium*. It is not clear how the control of saltcedar trees will be part of the operations and maintenance of the levees and channel.**

This comment includes three recommendations, all of which were adopted.

1. Provide a more detailed discussion for the control of saltcedar in the levees and channels critical to project function in the IFR/EIS.

USACE Response: Adopted
Actions Taken/Actions to be Taken: The USACE has provided a more detailed discussion regarding saltcedar control in the Final IFR/EIS at Chapter 3, Section 3.5.2. *Operation and Maintenance Requirements for all Alternatives, a. Vegetation Control*. This updated discussion more accurately and thoroughly describes the level and frequency of effort needed to remove saltcedar and control saltcedar resprouts post-construction. The saltcedar control strategy will support the OMRR&R program and manual that will also be part of the local sponsor's Flood Plain Management Plan. To prepare the revised discussion, the USACE referenced other civil works projects involving saltcedar removal, materials/BMPs developed by the Tamarisk Coalition, Navajo County/Federal Agency experience with saltcedar removal and control, peer-reviewed technical publications, etc.

2. As part of the additional narrative added to the IFR/EIS, provide further details regarding the O&M frequency necessary for saltcedar control activities in order to maintain the projected TSP flood mitigation benefits.

USACE Response: Adopted
Actions Taken/Actions to be Taken: The USACE has included details regarding the O&M frequency necessary for saltcedar control activities in the revised discussion that addresses Recommendation 1 above (Final IFR/EIS, Chapter 3, Section 3.5.2. *Operation and Maintenance Requirements for all Alternatives*, a. *Vegetation Control*.)

3. Revise the O&M costs as required to ensure that sufficient saltcedar control is accounted for in the budget.

USACE Response: Adopted
Actions Taken/Actions to be Taken: The USACE has revised the O&M costs for vegetation removal and control (including saltcedar) on the levee, in the channel, and in and around the BNSF Railroad Bridge for the Recommended Plan. Revisions were made to more realistically represent the level of effort anticipated for vegetation control. The updated O&M costs for the Recommended Plan have been revised). Refer to Appendix D-Civil

Design, Section 11.2.1. *Vegetation Control*, Section 11.5.1., *Salt Cedar Control*, and Table 16 for a description of the updated O&M requirements and annual O&M costs for the Recommended Plan.

7. **IEPR Comment 7 - *Significance – Medium/Low*. The potential for the occurrence of some special-status species in the project area is not described and little evidence is presented for the conclusion that project activity would not affect the species.**

   This comment included three recommendations, all of which were adopted.

   1. Clarify or describe the potential for all SGCN and Federally listed species to occur within the project area.

   USACE Response: Adopted
   Actions Taken/Actions to be Taken: The USACE has clarified in the Final IFR/EIS report that the 2014 AZGFD fish and bird surveys are formal surveys (Chapter 4, Section 4.5 *Biological Resources* and Chapter 5, Section 5.5 *Biological Resources*). The potential for all SGCN and Federally listed species, including plant species, to occur within the project area is described in Chapter 4, Section 4.5.4.a. – h. and Table 4-4.

   2. Provide evidence to support a conclusion that the species is not likely to occur in the project area.

   USACE Response: Adopted
   Actions Taken/Actions to be Taken: The USACE has added discussion to the Final IFR/EIS to note that some of the species surveyed (2014 AZGFD surveys) used formal methodology/ protocol as evidence to support a conclusion that species are not likely to occur in the project area. This discussion is provided in the Final IFR/EIS, Chapter 4, Section 4.5.4.a. – h.).

   3. Evaluate impacts on all special-status species that may occur in the project area, including upland species that could occur in the borrow and disposal areas or staging, stockpiling, or access sites.

   USACE Response: Adopted
   Actions Taken/Actions to be Taken: The USACE has add discussion in the final report to note that some of the special-status species surveyed (2014 AZGFD surveys) used formal methodology/protocol to evaluate impacts on these special-status species surveyed. Impacts are evaluated for those special-status-species that could occur in the project area, including upland species that could occur in the borrow and disposal areas or staging, stockpiling, or access areas. These impacts are discussed in the Final IFR/EIS, Chapter 5, Sections 5.5.15 – 5.5.20. Environmental Commitments that would reduce potential impacts to special status species are listed in Chapter 5, Section 5.5.14 (*Wildlife BMPs*) and Section 5.5.21 (*Special Status Species BMPs*).

8. **IEPR Comment 6 - *Significance – Low*. The timing of channel work activities and their concurrence with monsoon and dry seasons and their potential impact on flannel mouth sucker and other special-status fish species are not clearly described in the IFR/EIS.**

This comment included three recommendations, all of which were adopted.

1. Provide definitions of dry season, low flow, or minimal flow condition in the IFR/EIS.

USACE Response: Adopted
Actions Taken/Actions to be Taken: Appendix A-Hydrology presents the results of a low flow analyses that was completed for the study area in Section 8. Section 8.2 provides the background on the data used in the analysis and a "dry" season is defined as May to June. The text states that the rainy seasons extend from July to November (monsoons and dissipating tropical cyclones) and December to April (frontal storms) and that the rest of the months in a given year can be considered "dry". Furthermore, Section 8.3.1 presents the average number of days in a given month that the average daily flows exceed a given discharge. The hydrology appendix low flow analyses were completed on flows ranging from 0 to 500 cfs. Figures 6a to 6e show the monthly variations in average daily flow at 6 gages near the project area. Figures 14a to 14g present the average daily exceedance per month for the gages in the project area and show for example how many days an average daily flow of 100 cfs is exceeded in a given month over time. Figure 14 b shows the average daily exceedance per month low flow analysis and then number of days certain low flows (from 0 to 500 cfs) are exceeded. Based on Figure 14b, low flow conditions can occur throughout the year but are more frequent from September to January and May to July, with May and June being considered dry season.

2. Explain timing of channel work and the feasibility of completing channel work when minimal flows are present or during the dry season.

USACE Response: Adopted
Actions Taken/Actions to be Taken: Channel work may be completed from 15 April to 14 November. Based on Los Angeles District Draft Document Central Arizona Channel Design Capacity Requirements:

- From 15 April to 14 June, 10% of the original design channel capacity is required,
- From 15 June to 14 October, 75% of the original channel design capacity is required, and
- From 15 October to 14 November, 25% of the original channel design capacity is required.

There is a risk that in-channel construction may be impacted during the Arizona monsoon season from July through September. The PDT updated the Abbreviated Cost Risk Analysis (ACRA) for the Final IFR/EIS by conducting a detailed Cost Schedule Risk Analysis (CSRA) in coordination with the Chicago District and Walla-Walla MCX the week of March 5, 2018. The risks associated with possible weather delays on construction received

consideration during the CSRA. Refer to Appendix E-Cost Engineering, Attachment 2, *Cost and Schedule Risk Analysis* and Appendix A, *Risk Register* for a discussion of these risks.

The *Risk Register* provides a rating level for each risk upon the project cost and schedule. Construction schedule risk is captured at risk CO1 (Construction Schedule), and inclement weather risk is captured at risk CO8 (Weather Delays) in the CSRA at Attachment 2. As shown in the Risk Register for risk CO1, there is a moderate risk that the project cost will be affected by precipitation/high river flows, and a high risk that the project schedule will be affected by precipitation/high river flows.

The USACE has updated the contingencies per ER 1110-2-1302 based on the CSRA. The revised contingencies are similar to those developed using the ACRA. The contingences generated using the more detailed CSRA approach have been used to develop the Total Project Cost Summary (TPCS) for the Recommended Plan in the Final IFR/EIS. Development of cost contingencies is discussed in Sections 4, 5 and 6 of Attachment 2, *Cost and Schedule Risk Analysis*.

Construction schedule constraints or construction phasing will not be known until we are close to the construction contract. Coordination will occur among the District team to determine how the construction would occur and address any particulars in the plans and specifications.

3. If not feasible to complete channel work when minimal flows are present or during the dry season, describe measures to avoid adverse impacts on water quality and special-status fish species, including flannel mouth sucker.

USACE Response: Adopted
Actions Taken/Actions to be Taken: The USACE has addressed possible water quality/special status fish impacts associated with high flows that might occur during construction in the Final IFR/EIS. Refer to the revised text in Chapter 5 of the Final IFR/EIS at Section 5.3 *Water Quality* and Section 5.5 *Biological Resources*. Impacts to water quality and special status fish species are briefly discussed in the Final IFR/EIS, Table 5-1. Environmental commitments to reduce these impacts are addressed in Chapter 5 of the Final IFR/EIS at Section 5.3.7 (water quality BMPs) and Section 5.5.14. (wildlife BMPs).

Examples of proposed BMPs and environmental commitments that will reduce impacts caused by high flows during construction are as follows: storing construction materials and equipment on high ground outside of the river channel; minimizing ground/vegetation disturbance by establishing designated staging areas, ingress/egress corridors, spoils disposal areas, etc.; use of sediment barriers to prevent sediment from entering surface waters; routine water quality monitoring; and screening water pump intakes.

The Arizona Department of Environmental Quality issued a Clean Water Act Section 401 Water Quality Certification (§401 WQC) for the project on August 6, 2018. The §401 WQC requires compliance with special conditions that would minimize impacts to water quality during high flows. This §401 WQC is provided in Appendix I-Environmental. This project

would also require an Arizona Pollutant Discharge Elimination System (AZPDES) permit, AZPDES Stormwater Construction General Permit (CGP), and stormwater pollution prevention plan (SWPPP). Each of these permits should also include conditions that would minimize potential water quality impacts caused by heavy rain and high-river flows.

9. **IEPR Comment 9 - *Significance – Low*. The dates of floodplain inventory collection have not been identified, and it is not clear why these data are still representative of current conditions.**

This comment includes three recommendations. The first and third recommendations were adopted. The second recommendation was not adopted.

1. State the year in which floodplain data were collected.

USACE Response: Adopted
Actions Taken/Actions to be Taken: Appendix C-Economics, Section 3.0, notes that the benefits and costs for the plan comparison and evaluation are presented at FY 2014 price levels. Tables 25 and 26 of the Economics Appendix also note that the structure and content values are presented at FY 2014 price levels. Although not specified in the report, the structure inventory was originally completed in 2012, and therefore the inventory would be considered in excess of three years, which was the basis of the concern for the comment. However, a review of aerial photography was conducted several times subsequent to the original inventory, which determined that there had been minimal new development. This was most recently done prior to the Final Feasibility Report. Section 9.1 of the Final IFR/EIS notes that additional structures were not added to the inventory based upon the determination that there had been minimal new development since the one presented in the Draft IFR/EIS. The structure and content values were updated to current price levels through reviewing the floodplain inventory through Google Earth and applying updated Marshall & Swift multiplier indices (as noted in the Economic Appendix, Section 9.1).

2. Ensure that the data used in the 2014 report are no more than three years old.

USACE Response: Not Adopted
Actions Taken/Actions to be Taken: The USACE has acknowledged that the inventory was completed more than three years ago, while noting this does not substantially impact the results and conclusions of the economic analysis. Refer to our response to Recommendation 1 above.

3. If the data are over three years old, reevaluate floodplain conditions and update price levels.

USACE Response: Adopted
Actions Taken/Actions to be Taken: Appendix C-Economics, Section 9.1 *Benefits* notes that additional structures were not added to the inventory based upon the determination that there had been minimal new development since the structure inventory presented in the Draft

IFR/EIS. Section 9.1 also notes that FY 2018 price levels and the FY 2018 discount rate of 2.875% were used for the updated benefits analysis.