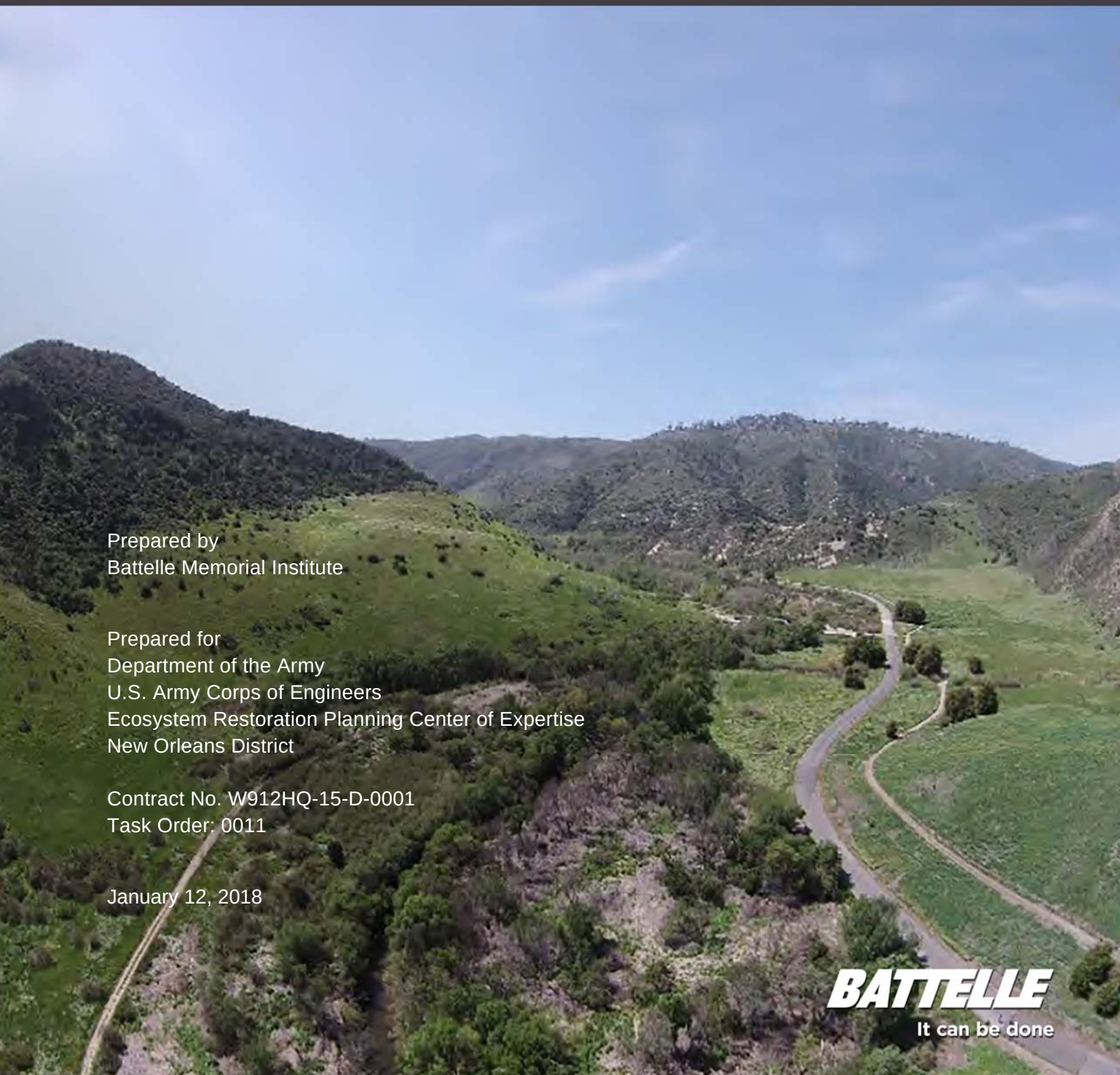
Final Independent External Peer Review Report Aliso Creek Mainstem, Orange County, California



Prepared by
Battelle Memorial Institute

Prepared for
Department of the Army
U.S. Army Corps of Engineers
Ecosystem Restoration Planning Center of Expertise
New Orleans District

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BATTELLE
It can be done

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Prepared by

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Executive Summary

PROJECT BACKGROUND AND PURPOSE

The Aliso Creek watershed is located in southern Orange County, California and encompasses an area of approximately 35 square miles. The creek flows nearly 19.5 miles from its headwaters at approximately 2,400 feet above sea level in the Santiago Hills (foothills of the Santa Ana Mountains and within the boundaries of the Cleveland National Forest) to its outlet at the Pacific Ocean in south Laguna Beach. The Aliso Creek outlet is approximately 50 miles south of Los Angeles and approximately 65 miles north of San Diego.

The Aliso Creek watershed is largely urbanized, with highly improved drainage systems that convey storm flows by concrete pipes and improved channels. The creek, however, is largely in a natural condition within the Aliso and Wood Canyons Wilderness Park, which occupies a significant portion of the lower watershed. The project area focuses on the lower reach of the Aliso Creek Watershed from Pacific Park Drive to the Pacific Ocean. This reach covers approximately 6.5 miles of lower Aliso Creek mainstem and 1,000 feet of the Wood Canyon Creek tributary from its confluence to Aliso Creek. The lower reach of the watershed was identified in the Aliso Creek Watershed Management Feasibility Study as having the most significant issues associated with ecosystem and stream degradation, infrastructure threat, and water quality impairment.

The majority of the project area is within the Aliso and Wood Canyons Wilderness Park (hereinafter: “Wilderness Park”), which is owned, operated, and managed by the County of Orange. The Wilderness Park, created by the purchase of 40 land parcels and dedicated to Orange County in 1979, is an area of significant resource value that supports many of the limited and scarce unique landscapes of California, such as coastal sage scrub, chaparral, native grassland, oak woodland, riparian woodland/forest, and freshwater marsh, and provides important habitat for native species. A total of 28 plant and animal species with designations of endangered, threatened, and California Species of Special Concern are identified to occur, or to potentially occur, within the study area. Approximately 4,200 acres of natural open space including hills, canyons, and floodplain are encompassed within the Wilderness Park. The park has scenic, wildlife, ecologic, archeological, and paleontological resources, and offers trails for hiking, jogging, biking, and equestrian use. Conservation efforts by the County and others have helped ensure that the open space remains undeveloped and its natural resources remain intact. The Wilderness Park is bordered at its southern (downstream) end by the Aliso Creek Golf Course, a privately-owned entity.

Within the Wilderness Park, an area associated with a former mitigation site of the Mission Viejo Company (MVC) and Orange County, referred to as the Aliso Creek Wildlife Habitat Enhancement Project (ACWHEP), is a key area for ecosystem restoration opportunities. Initiated in 1990, the ACWHEP used a constructed headworks structure to divert Aliso Creek low flows through irrigation lines to downstream planted riparian terraces. The intent of the design was to improve riparian habitat along a 4,000-foot long segment of the historical floodplain associated with Aliso Creek, starting downstream of the constructed

headworks structure where erosion from runoff and urbanization had caused at least 10 feet of incision within the streambed. As a result of severe storm damage in the winter of 1997-1998, major channel slope failures had ruptured the irrigation system.

The ACWHEP no longer functions as intended and severe streambank and streambed erosion (current incision totaling 25 feet) continues downstream of the headworks structure, which now acts as a large drop structure. The structure and its downstream flanks must be periodically maintained by the County with the addition of grouted stone to prevent a loss in structural integrity and failure. Failure of the structure and the resulting headcut moving upstream would jeopardize existing upstream infrastructure along Aliso Creek. This would include abutments at numerous bridge locations, underground utilities, and the Alicia Parkway embankment. As of October 2012, the ACWHEP mitigation site agreement has been terminated. With termination of the ACWHEP agreement, the Wilderness Park is part of a larger 17,000-acre regional coastal canyon ecosystem consisting of Laguna Coast Wilderness Park, Crystal Cove State Park, and the City of Irvine Open Space and is a significant component of the Nature Reserve of Orange County. This nature reserve ecosystem forms a large island of habitat almost entirely surrounded by urban development.

A public utility, the South Orange County Wastewater Authority (SOCWA) Coastal Treatment Plant, is situated in Aliso Canyon within an isolated parcel surrounded by the Wilderness Park. The facility is located on the east side of Aliso Creek and is approximately 1.2 miles upstream from the Pacific Ocean. The wastewater treatment plant has a design capacity of 6.7 million gallons per day and serves the City of Laguna Beach, Emerald Bay Services District, South Coast Water District, and Moulton Niguel Water District. An easement for effluent and sludge conveyance pipelines runs along the east side of Aliso Creek. Treated effluent is used for recycled water or discharged to the Pacific Ocean through the Aliso Creek Ocean Outfall. The facility is accessible by way of the SOCWA bridge via a private access road (AWMA Road) that parallels to the west of Aliso Creek through the Wilderness Park. County staff and the public share a portion of the west access road for Wilderness Park operations, and access to the Wood Canyon trail. SOCWA also has an unimproved (dirt) service road on the east side of Aliso Creek. The on-going erosion of the Aliso Creek channel poses a threat to the SOCWA infrastructure. Past storms have resulted in erosion that has caused failure of the Moulton Niguel Water District 18-inch sewer line within the Wilderness Park reach. SOCWA has spent millions of dollars repairing erosion damages along Aliso Creek. SOCWA considers all repairs along Aliso Creek temporary due to instability of the channel.

Study Objectives:

- Restore degraded riverine (aquatic and associated terrestrial) habitat function and structure in the lower Aliso Creek watershed by year 2025 to benefit a vast array of vertebrate and invertebrate fauna, including 28 special-status species that are known or have the potential to occur in the lower Aliso Creek watershed
- Restore a more natural flow, floodplain connectivity (hydrologic), and channel stability along the lower Aliso Creek system by year 2020
- Reduce flood risk damage to critical infrastructure in lower Aliso Creek by year 2020
- Improve water quality in lower Aliso Creek mainstem, via increased biological function, by year 2025
- Enhance passive recreational experience for the lower Aliso Creek watershed by year 2025.

Tentatively Selected Plan Description

The following describes the Tentatively Selected Plan (TSP). There are some additional features that may be added to the TSP pending the completion of the cost effectiveness/incremental cost analysis.

Alternative 3 – Raise Streambed Elevation to Reconnect to Historic Floodplain. This alternative will raise the existing streambed to approach the pre-incised stream elevation to allow hydrologic reconnection with the historic floodplain. Raising of the streambed will be transitioned, starting from the SOCWA bridge and continuing upstream to AWMA Road Bridge. The channel will be widened (to its dominant discharge width) and will include in-channel benches (to act as a 2-year event floodplain). Side slopes will be graded to 1v:3h. The ACWHEP structure would be demolished. Grade control stabilizers ("riffle structures"), consisting of large riprap boulders set at and below streambed grade, will be placed in a series transverse to the channel to provide stability to the raised streambed. A total of 34 riffle structures will be necessary. Spacing will be between 500 and 800 feet apart to promote the formation of pool-riffle sequences. The riparian corridor along the creek banks will be restored with appropriate riverine vegetation types. Raising of the stream will reduce the significant elevation discontinuity (currently about 25 feet) at the Wood Canyon Creek confluence. Buried riprap stone bank protection will be placed to protect infrastructure (AWMA Rd and SOCWA wastewater pipelines) at key locations where lateral erosion is considered a threat.

Other features to be considered for Alternative 3 include reconnection of the abandoned oxbow (active channel would be filled in); lowering the perched terrace at the abandoned oxbow to create a 10-year floodplain for the active channel with an associated adjacent backwater area; stream lengthening; off-line turtle refugia; Sulphur Creek reconnection; channel widening/riparian corridor addition for 2,200 feet in vicinity of Aliso Creek bridge; removal of two 10-foot high concrete drop structures; channel widening, including in-channel benches downstream of Pacific Park Drive; raising of the channel where necessary between AWMA Bridge and Pacific Park Drive; Pacific Park Drive bypass; repurposing of west road downstream of Wood Canyon confluence to a trail; and east bank paved SOCWA road construction.

Independent External Peer Review Process

Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analysis. The U.S. Army Corps of Engineers (USACE) is conducting an Independent External Peer Review (IEPR) of the Aliso Creek Mainstem Project (hereinafter: Aliso Creek 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, hydrology and hydraulics engineering, geotechnical engineering, biological resources and environmental law compliance, and economics. 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 (2,457 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, 17 Final Panel Comments were identified and documented. Of these, 3 were identified as having medium/high significance, 9 had a medium significance, 3 had medium/low significance, and 2 had low significance.

Battelle received public comments from USACE on the Aliso Creek project (21 letters, totaling 296 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 Aliso Creek project review documents. After completing its review, the Panel identified two new issues and subsequently generated two Final Panel Comments that summarized the concerns.

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 Aliso Creek project 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, clear, and provided a good roadmap to the TSP recommendation; however, the Panel identified several elements of the report that should be clarified or revised and elements of the project where additional analysis are warranted.

Environmental: The environmental panel member found a number of issues, the primary one being that the DIFR-EIS did not evaluate any alternatives to the TSP that might reduce urban runoff, which has been identified as the underlying cause of the Aliso Creek channel geomorphic problems. The panel member noted that there are several examples where NEPA and CEQA requirements are not necessarily being met, including areas where biologic impacts have not been fully defined, evaluation of impacts has been deferred until a later date, and the TSP may conflict with the Aliso Creek Resource Management Plan. In addition, the DIFR-EIS assumption that the TSP will lead to 0-10% invasive species in the project area is unsupported by evidence. The DIFR-EIS did not provide monitoring data or progress reports on the

current invasive species control program. The environmental panel member also believes that the Combined Habitat Assessment Protocols (CHAP) analysis is based on data that are outdated and assumptions that are uncertain, with implications for the accuracy of the baseline analysis and all subsequent forecasted future conditions. USACE could resolve this issue by conducting new vegetation surveys to clarify existing condition of native vegetation and spatial coverage of invasive species. The public comment review led to a concern that the project need is in question, based on some evidence that the stream is reaching equilibrium on its own and developing a new floodplain. To resolve this issue, it is recommended that USACE conduct a new geomorphic assessment and reassess floodplain connectivity. There was some concern on the part of the environmental panel member that the DIFR-EIS does not prioritize the avoidance and preservation of Native American cultural resources, and it is suggested that alternative disposal sites and mitigation measures be identified to minimize the impact on these resources. The post-construction monitoring period is not long enough to evaluate project success and specific success thresholds and decision-making triggers need to be defined in the DIFR-EIS. The environmental panel member also advises that language be added to the DIFR-EIS that discusses the historic presence of the Southern California steelhead salmon and California red legged frogs and that opportunities to restore habitat for these Federally listed species be evaluated.

Engineering: The Panel thought that the documents have been well integrated and any potential conflicting information between different portions of the document was minimal, an impressive task given the timeline of this project. However, the Panel noted that the DIFR-EIS does not discuss how climate change affects the values of future hydrologic parameters (e.g., increased precipitation and runoff intensity). The DIFR-EIS would benefit from adding a hydrologic and hydraulic assessment of future climate change impacts and a discussion of how climate change could affect future climate patterns in the project area. In addition, the alternatives that were provided by the U.S. Fish and Wildlife Service (USFWS) underwent a qualitative (but not a quantitative) evaluation of hydrologic and hydraulic impacts. The DIFR-EIS should include more information on this qualitative assessment to assess its appropriateness, which is important for the identification of the alternatives and the eventual selection of the TSP. The Panel also observed that a full array of possible cross-section opportunities within Aliso Creek were not evaluated in the areas where lateral width was not limited. Consideration should be given to widening the cross-section template and creating a low flow stream south of the Aliso Water Management Agency (AWMA) bridge. The panel members also recommend that field data be collected along the project reach to determine design and model properties for accurate estimates of groundwater and channel interflow. The Panel believes that the long-term costs of the operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) requirements may not be fully captured, which has implications for the total costs of the TSP. Finally, the Panel suggests that the costs and risks associated with reconnecting the abandoned oxbow be reevaluated to demonstrate that the costs do not outweigh the benefits.

Economics and Plan Formulation: From an economic perspective, the study documents provide a thorough overview of the project objectives, analytical methods, and recommended actions. The Panel also believed that the project formulation followed a consistent process for each of the alternatives and the review documents provided the information necessary to evaluate the TSP. The Panel found that the cost estimates provided to support the estimated reductions in erosion damages require more detail on how they were calculated. The lack of supporting information on how these estimates were determined makes it difficult to determine the reliability of the estimates. In addition, the Panel noted that the DIFR-EIS did not address whether the presumed increase in recreational users in the restored project area might be a risk to the sensitive restored habitat. The DIFR-EIS would benefit from additional information

in the recreation plan on how the increased recreation will be prevented from degrading the restored areas.

Table ES-1. Overview of 17 Final Panel Comments Identified by the Aliso Creek IEPR Panel

No.	Final Panel Comment
Significance – Medium/High	
1	Potential solutions to reduce urban runoff in the alternatives analysis have not been fully considered and may impact the long-term success of the project.
2	The alternatives analysis does not present an option that minimizes environmental impacts, which is required by CEQA.
3	Many of the public comments noted that the Aliso Creek system may be reaching its own equilibrium, which has implications for project need.
Significance – Medium	
4	Results from monitoring efforts were not provided on current information on invasive species coverage, or on the success of eradication efforts and native vegetation recovery, and compliance with protocols is uncertain.
5	The conclusions of the CHAP analysis are based on assumptions that are inherently uncertain, which has implications for the robustness of the analysis.
6	The overall project approach does not convincingly prioritize avoidance and preservation of Native American cultural resources and the proposed mitigation may not be adequate.
7	The evaluation of alternatives does not include flow increases during periods of high wet conditions due to seasonal impacts and climate change.
8	The proposed monitoring plan does not appear to be of sufficient duration to evaluate project success, and the proposed success thresholds and decision-making triggers have not been defined.
9	The adaptive management and OMRR&R needs and costs are not well-defined.
10	The possible connections between surface water flows and groundwater flows in areas where groundwater will support the proposed environmental restoration have not been fully evaluated.
11	It is not clear that reconnecting the abandoned oxbow has benefits that outweigh the cost and long-term performance risks.

Table ES-1. Overview of 17 Final Panel Comments Identified by the Aliso Creek IEPR Panel, continued.

No.	Final Panel Comment
12	The DEIR may not meet requirements of both NEPA and CEQA due to inadequate impact assessment, deferral of required analyses, and conflicts with existing plans.
Significance – Medium/Low	
13	The cost estimates to support estimated reductions in erosion damages in the DIFR-EIS Main Report and Appendix C do not provide sufficient detail to evaluate the basis for these costs.
14	The alternatives evaluation does not discuss the full range of alternatives in areas of the stream where lateral width is not limited.
15	The DIFR-EIS has not evaluated whether the enhanced aesthetics of the study area to recreational users may unintentionally lead to degradation of the restored habitat.
Significance – Low	
16	There is no discussion of the potential opportunities to restore the Federally listed Southern California steelhead salmon or California red-legged frog, the history of the species in the project area, or potential project impacts on species habitat.
17	The alternatives developed by the USFWS have not gone through a quantitative evaluation for hydraulic and hydrologic impacts on the project.

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LIST OF ACRONYMS

AAHUs	average annual habitat units
ACWHEP	Aliso Creek Wildlife Habitat Enhancement Project
ADM	Agency Decision Milestone
ATR	Agency Technical Review
AWMA	Aliso Water Management Agency
CE/ICA	Cost Effectiveness/Incremental Cost Analysis
CEQA	California Environmental Quality Act
CHAP	Combined Habitat Assessment Protocols
CFR	Code of Federal Regulations
COI	Conflict of Interest
DEIS/R	Draft Environmental Impact Statement/Report
DIFR-EIS	Draft Integrated Feasibility Report and Environmental Impact Statement
DrChecks	Design Review and Checking System
EC	Engineer Circular
ER	Engineer Regulation
ERDC	Engineer Research and Development Center
ESA	Environmentally Sensitive Areas
IEPR	Independent External Peer Review
IWR	Institute for Water Resources
MVC	Mission Viejo Company
NED	National Economic Development
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration
NRHP	National Register of Historic Places
OCTA	Orange County Transportation Authority
OEO	Outside Eligible Organization
OMB	Office of Management and Budget
OMRR&R	operation, maintenance, repair, replacement, and rehabilitation
PAL	Planning Aid Letter
PCX	Planning Center of Expertise
PDT	Project Delivery Team
SHB	Shot Hole Boring Beetles
SLM	Senior Leader Meeting
SWPT	Southwestern Pond Turtle
SOCWA	South Orange County Wastewater Authority
TSP	Tentatively Selected Plan
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service

1. INTRODUCTION

The Aliso Creek watershed is located in southern Orange County, California and encompasses an area of approximately 35 square miles. The creek flows nearly 19.5 miles from its headwaters at approximately 2,400 feet above sea level in the Santiago Hills (foothills of the Santa Ana Mountains and within the boundaries of the Cleveland National Forest) to its outlet at the Pacific Ocean in south Laguna Beach. The Aliso Creek outlet is approximately 50 miles south of Los Angeles and approximately 65 miles north of San Diego.

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drop structure. The structure and its downstream flanks must be periodically maintained by the County with the addition of grouted stone to prevent a loss in structural integrity and failure. Failure of the structure and the resulting headcut moving upstream would jeopardize existing upstream infrastructure along Aliso Creek. This would include abutments at numerous bridge locations, underground utilities, and the Alicia Parkway embankment. As of October 2012, the ACWHEP mitigation site agreement has been terminated. With termination of the ACWHEP agreement, the Wilderness Park is part of a larger 17,000-acre regional coastal canyon ecosystem consisting of Laguna Coast Wilderness Park, Crystal Cove State Park, and the City of Irvine Open Space and is a significant component of the Nature Reserve of Orange County. This nature reserve ecosystem forms a large island of habitat almost entirely surrounded by urban development.

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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 Aliso Creek 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 conflict of interest form that Battelle completed and submitted to the Institute for Water Resources (IWR) prior to the award of the Aliso Creek 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 Aliso Creek 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, hydrology and hydraulics engineering, geotechnical engineering, biological resources and environmental law compliance, and economics[1]. The Panel reviewed the Aliso Creek project documents and produced 17 Final Panel Comments in response to 38 charge questions provided by USACE for the review. The charge included two overview questions and one public comment question added by Battelle for a total of 41 charge questions. 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. Recommendation(s) 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.

[1] One panel member held a dual role serving as both the economics and Civil Works planning expert.

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 Aliso Creek IEPR review documents. The following summarizes the Panel's findings.

Based on the Panel's review, the report is well-written, clear, and provided a good roadmap to the TSP recommendation; however, the Panel identified several elements of the report that should be clarified or revised and elements of the project where additional analysis are warranted.

Environmental: The environmental panel member found a number of issues, the primary one being that the DIFR-EIS did not evaluate any alternatives to the TSP that might reduce urban runoff, which has been identified as the underlying cause of the Aliso Creek channel geomorphic problems. Among other suggestions, the environmental panel member recommends that the alternatives analysis be revised to include potential solutions for urban runoff reduction. The panel member noted that there are several examples where NEPA and CEQA requirements are not necessarily being met, including areas where biologic impacts have not been fully defined, evaluation of impacts has been deferred until a later date, and the TSP may conflict with the Aliso Creek Resource Management Plan. In addition, the DIFR-EIS assumption that the TSP will lead to 0-10% invasive species in the project area is unsupported by evidence. The DIFR-EIS did not provide monitoring data or progress reports on the current invasive species control program. The environmental panel member also believes that the Combined Habitat Assessment Protocols (CHAP) analysis is based on data that are outdated and assumptions that are uncertain, with implications for the accuracy of the baseline analysis and all subsequent forecasted future conditions. USACE could resolve this issue by conducting new vegetation surveys to clarify existing condition of native vegetation and spatial coverage of invasive species. The public comment review led to a concern that the project need is in question, based on some evidence that the stream is reaching equilibrium on its own and developing a new floodplain. To resolve this issue, it is recommended that USACE conduct a new geomorphic assessment and reassess floodplain connectivity. There was some concern on the part of the environmental panel member that the DIFR-EIS does not prioritize the avoidance and preservation of Native American cultural resources, and it is suggested that alternative disposal sites and mitigation measures be identified to minimize the impact on these resources. The post-construction monitoring period is not long enough to evaluate project success and specific success thresholds and decision-making triggers need to be defined in the DIFR-EIS. The environmental panel member also advises that language be added to the DIFR-EIS that discusses the historic presence of the Southern California steelhead salmon and California red legged frogs and that opportunities to restore habitat for these Federally listed species be evaluated.

Engineering: The Panel thought that the documents have been well integrated and any potential conflicting information between different portions of the document was minimal, an impressive task given the timeline of this project. However, the Panel noted that the DIFR-EIS does not discuss how climate change affects the values of future hydrologic parameters (e.g., increased precipitation and runoff intensity). The DIFR-EIS would benefit from adding a hydrologic and hydraulic assessment of future climate change impacts and a discussion of how climate change could affect future climate patterns in the

project area. In addition, the alternatives that were provided by the U.S. Fish and Wildlife Service (USFWS) underwent a qualitative (but not a quantitative) evaluation of hydrologic and hydraulic impacts. The DIFR-EIS should include more information on this qualitative assessment to assess its appropriateness, which is important for the identification of the alternatives and the eventual selection of the TSP. The Panel also observed that a full array of possible cross-section opportunities within Aliso Creek were not evaluated in the areas where lateral width was not limited. Consideration should be given to widening the cross-section template and creating a low flow stream south of the Aliso Water Management Agency (AWMA) bridge. The panel members also recommend that field data be collected along the project reach to determine design and model properties for accurate estimates of groundwater and channel interflow. The Panel believes that the long-term costs of the operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) requirements may not be fully captured, which has implications for the total costs of the TSP. Finally, the Panel suggests that the costs and risks associated with reconnecting the abandoned oxbow be reevaluated to demonstrate that the costs do not outweigh the benefits.

Economics and Plan Formulation: From an economic perspective, the study documents provide a thorough overview of the project objectives, analytical methods, and recommended actions. The Panel also believed that the project formulation followed a consistent process for each of the alternatives and the review documents provided the information necessary to evaluate the TSP. The Panel found that the cost estimates provided to support the estimated reductions in erosion damages require more detail on how they were calculated. The lack of supporting information on how these estimates were determined makes it difficult to determine the reliability of the estimates. In addition, the Panel noted that the DIFR-EIS did not address whether the presumed increase in recreational users in the restored project area might be a risk to the sensitive restored habitat. The DIFR-EIS would benefit from additional information in the recreation plan on how the increased recreation will be prevented from degrading the restored areas.

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

Potential solutions to reduce urban runoff in the alternatives analysis have not been fully considered and may impact the long-term success of the project.

Basis for Comment

The increased urbanization of the Aliso Creek watershed has been defined as a major cause of the present stream incision and resulting channel geomorphic problems, yet no alternatives to address this issue are considered in the analysis. The urban runoff issue remains unresolved in the tentatively selected plan (TSP), resulting in concerns that over time, similar incising actions may occur from a sediment-starved system, especially during high flow velocity storm events. These threats may increase, given the potential effects of climate change on storm events and forecast peak flows (Appendix B-3, p. 16). To increase the success rate of riparian ecosystem restoration, both the hydrologic regime and the geomorphology are central to the success of the ecosystem restoration. It is unclear if the projected conditions will create a stable hydrologic and geomorphic equilibrium when the urban runoff source has not been addressed.

Appendix B-2 presents a model that provides the basis for a comparative analysis to consider runoff reduction measures, but the model has no values assessed for hydrology (defined on p.13 as “transport of water from watershed to the channel”). Targeting urban runoff reduction is warranted to protect long-term sustainability of the restored areas.

The increased urbanization of the Aliso Creek watershed has not been considered when predicting cumulative impacts from future peak stormflow events. Given the expectation of climate change conditions, urbanization has important implications for the project design (floodplain elevations) and long-term sustainability of the project. For example, Appendix B-3 (p. 15) states:

> “The flood frequency data used as the basis of engineering had a period of record of 1932 to present, a period of time when the Aliso Creek watershed was much less urbanized than it is now. This could be a limiting factor in accurately predicting peak streamflow events for the current and future hydrology of Aliso Creek. Based on a general understanding of how urbanized watersheds affect hydrological regimes, it can be expected that the actual magnitude of peak streamflow events (e.g., the 10-year and 100-year floods) will be higher than predicted based upon the historical data. The low flow magnitudes will likely be higher as well.”

Further, the issue of dry season runoff causing perennial flow is challenged and contradicted in the document. Appendix B-1 (p. B-122) states that “up to 50% baseflow is the natural regime, and this baseflow is not runoff driven (nuisance flows).” However, the opposite view is presented later (p. B-132): “Marine life and critical habitat in locally protected coastal receiving waters and Environmentally Sensitive Areas (ESA) remain degraded by elevated flows of abandoned imported water which constitutes the primary source of dry weather polluted urban runoff.” Historical hydrologic data can resolve the baseflow source during natural dry season baseflow. Understanding the natural flow regime is critical to designing a sustainable future hydrologic regime that mimics natural conditions.

Significance – Medium/High

Without resolving the issue of increased urban runoff that is partially causing the stream incision, the long-term success of the project may be threatened.

Recommendation for Resolution

1. Address the ongoing threat of urbanized runoff in terms of potential impacts on the TSP.
2. Investigate and revise the section on dry season baseflow to clarify the historical basis of stream flow.
3. Revise flood frequency data analysis to provide more conservative estimates for alternatives analysis and project design.

Final Panel Comment 2

The alternatives analysis does not present an option that minimizes environmental impacts, which is required by CEQA.

Basis for Comment

All the alternatives evaluated for this project include extensive habitat destruction; they go from “no action” to “heavily engineered.” The DIFR-EIS does not consider more natural, less engineered project alternatives or take into account conditions over the last 20 years. The DIFR-EIS does not offer a project alternative that captures stream preservation and existing habitat protection, combined with infrastructure protection. Alternative 2 comes close, but still presents a highly modified creek needing ongoing maintenance. The alternatives presented involve removing all existing habitat and regrading the entire stream. They do not consider restoring riparian and aquatic habitat and protecting critical infrastructure without removing significant portions of the existing creek.

Environmentally sensitive natural grade controls are not addressed, though they would help maintain a more natural stream and incorporate functional habitat into the design to optimize ecological benefits. Opportunities for natural-style slope stabilization to reduce the riprap side bank armoring, such as planted revetment using buried rock or reinforcing with jute netting, are not discussed.

As per California Environmental Quality Act (CEQA) Guidelines (§ 15126.6(e)(2)), a lead agency must identify an environmentally superior alternative among the options considered. The Draft Environmental Impact Statement/Report (DEIS/R) does not do this. Notably, these screening criteria do not include comparison of potential significant environmental impacts of alternatives. CEQA requires that every EIR analyze a reasonable range of potentially feasible alternatives to a proposed project (Pub. Res. Code § 21100(b)(4); CEQA Guidelines § 15126.6(a)).

The USFWS-provided Alternative C is an example of a more natural alternative. The DIFR-EIS states that “Alternative C will be carried forward for further evaluation and comparison with other developed alternatives of the focused array.” (p.3-48). However, Alternative C does not appear in the focused array analysis. The DIFR-EIS does not consider the USFWS recommendations and other alternative designs submitted by private firms on behalf of the County, options that offer less invasive methods based on existing site conditions.

One of the stated goals of the project is for SOCWA infrastructure protection, yet no alternatives in the analysis consider pipe relocation or alternative scenarios beyond in-place protection.

Significance – Medium/High

Since the alternatives analysis does not provide an option that minimizes impacts or provides any alternative to habitat destruction, it may not comply with NEPA and CEQA requirements.

Recommendation for Resolution

1. Develop and evaluate alternatives that minimize the impact footprint in the creek corridor and maximize preservation of existing channel and floodplain habitats.

2. Add text to the discussion regarding alternative methods for restoring riparian and aquatic habitat and protecting critical infrastructure without removing significant portions of the existing creek.
3. Provide more detail about the proposed USFWS alternatives or discuss why they were not considered and if it was because they were deemed less engineered solutions.
4. Include environmentally sensitive materials and natural grade controls as part of the design to the greatest extent feasible.
5. Define alternatives that consider alternative scenarios for infrastructure placement and protection for SOCWA pending pipe replacement.

Final Panel Comment 3

Many of the public comments noted that the Aliso Creek system may be reaching its own equilibrium, which has implications for project need.

Basis for Comment

A number of the public comment letters have provided evidence that the system is reaching its own equilibrium, which may warrant a less invasive approach:

- The City of Laguna Beach public comment letter and accompanying memorandum (dated November 28, 2017) states "The floodplain is covered with recently deposited sand and is vegetated by trees that appear to be up to around 10 years old, indicating that the current channel bed has not incised for at least 10 years." (p. 31 of the public comment PDF file).
- Attorneys representing for the Laguna Canyon Foundation commented (dated November 28, 2017) that some of USACE's own analyses [e.g., the Geomorphic Baseline Assessment and its Incised Channel Evolution Model] have established that the hydrogeological system is already in or close to dynamic equilibrium and that of the 12 reaches, only two are classified as having localized geotechnical instability and that these two will reach stability within one to 10 years (p. 152 of the public comment PDF file). The letter also states that "Observations made in October 2009 and February 2010 confirmed the abundance of sand splays (relatively recent, localized deposits of sand on surfaces of bars and floodplains) on the inset floodplain, indicating the aggradation process has already started in most reaches downstream of the ACWHEP structure" (p. 206 of the public comment PDF file). This letter goes on to say that USACE's Geomorphic Baseline Assessment suggests that "widespread manipulation of the creek is not necessary to achieve a dynamic equilibrium in all stretches. Instead…these documents recognize that there are focused, nuanced solutions that can remedy the most severe habitat and ecosystem impacts, protect critical infrastructure, *and* leave intact the existing riparian habitat" (p. 162 of the PDF public comment file). The same letter points out that the Geomorphic Baseline Assessment presented in Appendix A-1f of the DIFR-EIS contradicts the assertion in the main DIFR-EIS that the stream is continuing to incise and provides supporting data (p. 191 of the PDF public comment file).
- The Department of the Interior comment letter makes similar points: "In contrast to the findings of the Corps in the Feasibility Report DEIS/DEIR, our field geomorphic reconnaissance, report review, and a preliminary assessment of the channel profile suggest that much of the channel through the Park may be close to equilibrium gradient and is starting to form a new floodplain through sediment deposition." (p. 96 of the PDF public comment file).
- The Ocean County Transportation Authority (OCTA) letter states that, with regard to the raising of the streambed elevation, the project area within the OCTA restoration project site is currently achieving the required goals without streambed elevation (p. 82 of the public comment PDF file).
- The TSP targets changing the streambed elevation in an effort to restore the floodplain connection. However, "the creek is now progressing to a naturally re-widening of the channel, with development of a new floodplain area along the existing channel." (p. 95 of the public comment PDF file). The California Department of Fish and Wildlife public comment letter (dated November 28, 2017) states that the "reconnection of floodplain to groundwater is

speculative, and channel designs are not conducive to surface and groundwater interactions...” (p. 109 of the PDF public comment document).

Significance – Medium/High

Determining and communicating project need is an important part of a feasibility study and environmental impact evaluation and, if new evidence suggests that the project is unnecessary, this needs to be disclosed and discussed in the document.

Recommendation for Resolution

1. Conduct a geomorphic survey of existing conditions and investigate current groundwater levels to determine if the stream is approaching equilibrium and developing a new floodplain.
2. Re-evaluate the project need based on the results of the existing condition survey.
3. If it is determined that the project is needed, redefine the project based on the current baseline and designate some areas for preservation that have already met project objectives.
4. Add text to the DIFR-EIS, including new groundwater elevation data, to better correlate groundwater levels to riparian vegetation and demonstrate feasibility of approach to raising groundwater level and ensuring adequate water to new plantings.

Final Panel Comment 4

Results from monitoring efforts were not provided on current information on invasive species coverage, or on the success of eradication efforts and native vegetation recovery, and compliance with protocols is uncertain.

Basis for Comment

Eradicating invasive species like Arundo and restoring native riparian vegetation requires constant diligence and a large investment of time and resources. Protecting the restored Aliso Creek Ecosystem Restoration Project with an aggressive invasive species monitoring and removal program is critical over the long term to ensure success. The Combined Habitat Assessment Protocols (CHAP) analysis uses estimates of Arundo spreading rate as part of the with- and without-project analysis. According to CHAP, in the with-project scenario, there will be few or no invasive species (0-10% invasives) present in the study. Given the vast efforts already undertaken, the clear challenge of removing these invasive species, and the lack of evidence presented to the Panel from monitoring reporting, it is uncertain if this assumption can be truly sustained over the long term, especially based on the lack of specified monitoring and action triggers (Appendix B-2, p. 20). The Panel is concerned with the following issues:

- *The annual project work plans and progress reports on plant control and revegetation efforts could not be located* (Appendix B-3, p. 21), making it impossible for the Panel to evaluate the likelihood of success of the invasive species control program or the current condition, given the numerous recent invasive species removal programs. Further, the fact that these documents that were required to be submitted annually have not been located suggest that there is a potential gap between the specified long-term monitoring protocol and its implementation and subsequent reporting. This indicates potential problems with ensuring that monitoring is occurring and defined action triggers are identified and acted upon, which could have implications for long-term invasive species eradication.
- *It is unclear if the project is meeting its goals*. Appendix B-3 (p. 17) states: “The methodology outlined will be effective at eradicating giant reed in the project area ONLY if a few minor adjustments are made, and the following items are added to the current treatment scope.” It then identifies:
  (1) Full eradication: “regrowth is aggressively treated for several years until no regrowth is sustained for several consecutive years.” This is not occurring (Appendix B-2, p. 18). While most of the giant reed in the project area had been cleared as of May 2015, “the remaining stands are still available to supply seeds to the restored site.”
  (2) Replanting: “native vegetation is successfully established in treatment areas thereby prohibiting opportunities for the same or other invasive species to occupy the vacant space.” This is not occurring. “[N]o active restoration (container planting) appears to have been initiated within the treatment areas and therefore recovery to a native habitat seems unlikely given the site conditions and presence of other untreated invasive exotic weeds” (Appendix B-3, p. 22).
  (3) Source control: “sources of infestations for reinvasion are controlled and/or eliminated (e.g., upstream populations).” Arundo source areas still remain after the removal effort (Appendix B-3, p. 22).
- *The removal methodology protocols are not being followed* (Appendix B-3, p. 18). (This was disputed in a public comment.)

- *All invasive species at the site are not being targeted*. Untreated invasive exotic weeds such as salt cedar (Tamarix sp.), pampas grass (Cortaderia sp.), castor bean (Ricinus communis), fennel (Foeniculum vulgare), tree tobacco (Nicotiana glauca), and several species of palm were found throughout the treatment areas (Appendix B-3, p. 19).
- *It is unclear if the operating and maintenance budget reflects the potential need for irrigation in newly planted native vegetation areas*. "Newly installed plants will not have a root system mature enough to access groundwater and will therefore be temporarily reliant upon supplemental watering… the project should be prepared to supply as needed water to all newly installed plants for one to two years following installation" (Appendix B-3, p. 20).
- *The planned planting density (300 to 400 plants per acre) and diversity may be too low for a riparian area*. In addition, "the planting palette should focus on integration of species with a diversity of height classes to provide physical structure (i.e., tree canopy with understory of herbs and shrubs)." (Appendix B-3, p. 20)

Significance – Medium

Without strict adherence to the recommended methods for eradication and the native planting plan, the invasive species may not be eradicated and may reinvade the restored habitat over the long term.

Recommendation for Resolution

1. Clearly define the long-term strategy to maintain target invasive species control and maintain invasive species composition at 0-10%, given a 5-year monitoring program.
2. Designate one conservation manager (botanist, ecologist) to survey sites after removal actions and (a) identify any remaining seed sources to the restored site; (b) ensure replanting has been done; (c) confirm that protocol was followed, and (d) review and submit reports on schedule.
3. Provide a comprehensive list of all species targeted for invasive species removal.
4. Define watering contingency plans for restored planted areas and define triggers for this action (i.e., new plantings, mortality rates, drought conditions).
5. Revise the planting plan to increase proposed planting density and increase diversity of the species targeted for restoration.
6. Include native grass plantings, not just coastal sage, as part of grassland restoration.
7. Provide monitoring reports to present accurate existing conditions data and demonstrate compliance with required monitoring and protocols.

Final Panel Comment 5

The conclusions of the CHAP analysis are based on assumptions that are inherently uncertain, which has implications for the robustness of the analysis.

Basis for Comment

In the DIFR-EIS, the habitat classification is based on "a field inventory of these habitat components" (Appendix B-2, p. 2). Biological Assessments generally evaluate the list of potential species based upon field surveys and the likelihood of the occurrence at the project site. However, the site-specific list of wildlife species in the DIFR-EIS appears to have been compiled using habitat maps and databases, rather than on field assessments, observations on site, or on visible evidence of habitat use by species. Therefore, there is uncertainty in which species are actually there and linked to these habitats, which affects the basis of the CHAP analysis results.

While CHAP analysis is reasonable for analyzing existing conditions, using it to project future with- and without-project scenarios has inherent uncertainty. For example:

- Habitat shifts are estimated in CHAP based on 25- and 50-year time steps, which seems too long to make accurate jumps with so many variables to consider. The model tries to capture habitat transitions that may take decades to shift and may support transitional habitats for periods of time.
- Threats to the survival of the restored vegetation vary and the response of the system under future potential climate change conditions may also vary.
- CHAP-forecasted habitats in future with- and without-project scenarios assume that in 50 years there will be either 0% invasive species in future with-project or >90% invasive species in future without-project. This estimate does not capture the natural heterogeneity found in ecosystems, or the uncertainty of vegetation dynamics in a natural landscape.
- Linking species to habitat under future conditions is uncertain because it is unclear how species will adapt to changing conditions to survive. Species that are opportunistic may adapt to changing habitat and still use the project site.
- Rooting depth was based on a literature review, and may not account for future rooting depth, which may change as a survival mechanism under a changing hydrologic regime. Defining impacts based on targeting rooting depths does not fully capture the range of ecosystem responses; it is unclear whether changes in the hydrologic regime were accounted for in the predicted groundwater elevations and CHAP rooting depth analysis.
- The future without-project CHAP assessment is partially based on invasive species spread rate, with the estimated habitat changes apparently being based only on Arundo spread rate. Arundo is only one of the invasive species with the potential to spread at the site, and the spread rate was calculated based on a limited and outdated data set (2006 and 2009 data), extrapolated to predict future habitat conditions in 25 and 50 years. Including more recent data (which are available, and which were used in other components of the CHAP) would strengthen the trend analysis and improve the defensibility of the assessment.

Project monitoring over a long period of time would enable validation of the forecasts predicted by the CHAP methodology.

Significance – Medium
Due to inherent uncertainty, the CHAP analysis estimates for habitat conditions in the future with- and without-project do not capture the diversity possible in alternative scenarios, and therefore may incorrectly forecast future conditions.

Recommendation for Resolution
1. Conduct on-site wildlife surveys and reanalyze the final list used in the CHAP analysis with observations and visible evidence to validate the method of establishing species to habitat linkages. 2. Analyze potential habitat transitions over shorter time steps (every 10 years) to better represent temporal changes in habitat and capture inherent vegetation heterogeneity. 3. Analyze habitat shifts under a range of hydrologic scenarios such as consecutive extreme storm events, or consecutive years of high intensity events, vs. consecutive years of drought. This would provide a range of outcomes with high, medium, and low forecasts, as is done with climate change estimates, acknowledging the uncertainty of this type of forecasting. 4. Assess potential changes in a future hydrologic regime on the rooting depth and future without-project analysis. 5. Analyze Arundo spreading rate, including 2016 images, to improve trend analysis.

Final Panel Comment 6

The overall project approach does not convincingly prioritize avoidance and preservation of Native American cultural resources and the proposed mitigation may not be adequate.

Basis for Comment

DIFR-EIS, Appendix B-5 details the high likelihood of encountering Native American cultural resources during project construction, including in selected disposal sites. Although attempts to minimize impacts will be undertaken, Table ES-4 (p. 16) states that it is "probable" that cultural resources will be significantly adversely affected. The impacts on cultural resources in the river channel may be unavoidable, but it is unclear why the selected disposal sites include areas with known cultural resources, and why no alternative disposal sites were identified.

The DIFR-EIS (p. 5-115) states:

> "[the National Environmental Policy Act] NEPA and [the California Environmental Quality Act] CEQA require consideration of mitigation for significant cultural impacts. Based on the current designs and the assumption that some of the sites have retained enough integrity to be eligible for that NRHP [National Register of Historic Places], the Proposed Project alternatives would result in an adverse effect under the NHPA [National Historic Preservation Act] and a significant impact under NEPA. The alternatives would involve the partial to complete destruction of up to 12 archaeological sites and the potential for impacting human burials is present."

In addition, the DIFR-EIS states that "data recovery in the form of archaeological excavation is a likely form of resource mitigation" for those cultural resources that may be adversely affected by construction and disposal (p. 5-70). However, under the 2004 amendments to 36 Code of Federal Regulations (CFR) 800 (Protection of Historic Properties), data recovery excavation was removed as a means of reducing adverse effects on Native American burial sites and other cultural resources. Therefore, the proposed mitigation for Native American cultural resources may not be adequate under the CFR. There is an opportunity to include natural history and cultural resources in the education component of the TSP, by designating kiosks to the topic.

Significance – Medium

Identification of alternative disposal sites without cultural resources and determining the proper mitigation process for Native American cultural resources would reduce potential project impacts.

Recommendation for Resolution

1. Reanalyze the study site and identify additional disposable sites that would avoid or further minimize impacts on known locations of cultural resources, even if potentially higher transportation costs are involved.
2. Re-evaluate potential mitigation measures for Native American cultural resources.
3. State clearly in the project approach that avoidance and preservation is the primary goal with respect to cultural resources.
4. Consider adding cultural resources to the kiosks being planned, as defined in the TSP.

Final Panel Comment 7

The evaluation of alternatives does not include flow increases during periods of high wet conditions due to seasonal impacts and climate change.

Basis for Comment

DIFR-EIS, Section 2.5 summarizes the effects of climate change within the project area and southern California in general, stating that average temperatures are increasing and, although expected to remain consistent with past trends, snowmelt runoff will decrease while direct runoff from precipitation will increase. The DIFR-EIS does not discuss how climate change affects the values of future hydrologic parameters, such as increased intensity from direct precipitation runoff within the project area. Appendix A-2 also does not evaluate the future conditions hydrological model out to year 50 or describe the impacts of changed hydrology for each of the project alternatives.

The potential hydrologic and hydraulic impacts from changes of periods and extent of wet conditions and dry conditions could have an impact on the final design of the TSP. Precipitation runoff could potentially affect the project by shorter increased flows, velocities, and groundwater variations. Sediment transport and scour could increase at locations, leading to structural failure of existing facilities, such as water mains and the SOCWA facility.

Significance – Medium

Analyzing the effects of climate change is critical to the alternatives analysis to accurately determine and understand future hydrological impacts.

Recommendation for Resolution

1. Provide a detailed hydrological and hydraulic assessment of future climate change impacts in the context of the future conditions out to year 50.
2. Provide a more thorough discussion of how climate change could affect precipitation and future hydraulics for each of the alternatives.
3. Reevaluate channel slope protection design to account for future flow changes or provide timelines for interim protection measures in future scenarios.

Final Panel Comment 8

The proposed monitoring plan does not appear to be of sufficient duration to evaluate project success, and the proposed success thresholds and decision-making triggers have not been defined.

Basis for Comment

Appendix B-8 (p. 7) explains that no more than five years of monitoring and adaptive habitat management are planned. Given the project duration of 50 years and the threat of climate change impacts, the proposed plan to end monitoring after five years may threaten the success of the project. It is critical to the long-term success of the project that the floodplain remains connected (based on the new stream elevation), riparian vegetation is sufficiently watered (maintains access to the water table even during potential drought conditions), invasive species are not reestablishing and spreading, and that channel side slopes remain stable and do not incise due to ongoing stress of urban runoff. The ability of the project to be self-sustaining has not been demonstrated; without monitoring, one component of the project may fail, with cascading impacts.

Given the vast efforts already undertaken to eradicate invasive species, the clear challenge of removing invasive species, and the limited duration of monitoring, it is uncertain if the assumption that invasive species will be controlled and maintained in the 0-10% composition range can be truly achieved (Appendix B-2, p. 20). Long-term monitoring is needed to ensure this objective is met. For example, the DIFR-EIS predicts that there will be at least one occurrence of fire within the study area in the next 50 years, which increases the likelihood that the invasive Arundo will re-establish at the site and threaten project success. With monitoring limited to five years, there is no mechanism to evaluate the status of invasive species over the long term.

The monitoring of restoration plantings as well as the success of the hydrological connectivity will also be necessary for longer than five years. Appendix B-8 (p. 8) states “Some plant species take significantly longer than five years to mature. Therefore, full maturation of certain plants established as part of the Proposed Project will not be achieved by the end of the monitoring period.” In addition, Appendix B-8 (p. 7) also explains that “The hydrologic regime will be monitored by implementation of monitoring wells in various parts of the ecosystem restoration project to determine groundwater levels, and other associated in-stream aquatic measurements.” While this will be an important measure to confirm that the work to invert the stream and improve vertical connectivity has succeeded, a longer monitoring period is warranted due to the uncertainty of the climate conditions, potential impacts on the water table from droughts, and future stream incising.

The Panel is also concerned that the DIFR-EIS has not clearly defined what success will look like from a restoration standpoint. The DIFR-EIS states that “Ecological success of a project feature will be confirmed when desired outcomes have been achieved, measured by meeting or exceeding the five-year achievement thresholds identified” (p. 5-48), and “The O&M and monitoring activities will be assessed in comparison to project objectives and decision-making triggers to evaluate whether the project is functioning as planned and whether adaptive management actions are needed to achieve project objectives” (p. 5-48). These “achievement thresholds” and “decision-making triggers” have not been defined. Success criteria must be defined; triggers for action can be refined based on results, but

targets should be set. Appendix B-8 describes the parameters to evaluate the monitoring results, but does not give a milestone or trigger for action or describe a clear timeframe to guide the protocol.

Significance – Medium

Failure to include long-term monitoring may lead to potential issues being undetected and unaddressed in a timely manner, resulting in impacts that threaten the overall success of the project.

Recommendation for Resolution

1. Revise monitoring plan to include long-term monitoring of both vegetation and hydrology.
2. Define long-term monitoring frequency.
3. Define criteria to determine project success.
4. Define decision-making triggers based on monitoring to evaluate project effectiveness and to determine if adaptive management actions are needed.

Final Panel Comment 9

The adaptive management and OMRR&R needs and costs are not well-defined.

Basis for Comment

The DIFR-EIS does not include enough discussion of the OMRR&R requirements of the proposed project elements. The percent-of-original-cost method used to determine OMRR&R costs may not fully capture the likely long-term costs associated with this project. For example:

- The rock ripples only extend up the side slopes to the 10-year flood elevation, whereas the rocks are designed to withstand a 100-year event. This may result in significant maintenance following more frequent storm events. Although the use of sheet piles on the sides is discussed, it is unclear how much this will reduce damage to the rock ripples.
- The planned 5-year monitoring period is likely too short to fully determine project success and the included adaptive management costs may be low.
- The costs associated with continual removal of invasive species are not included.
- The severity of flood events may increase due to climate change.
- The potential for wild fires in the basin are discussed, but it is unclear if the costs of this risk were fully captured.

Significance – Medium

The total OMRR&R costs associated with the TSP are not fully accounted for in the DIFR-EIS, leaving the actual total costs of the TSP unclear.

Recommendation for Resolution

1. Consider extending the riprap at the ripples further up the side slopes to reduce the frequency of maintenance and the potential for the stream to migrate around the ripples.
2. Evaluate the OMRR&R needs and costs for potential damage to the rock ripples.
3. Base the monitoring and adaptive management costs of the project on a longer term, rather than the currently planned 5 years.
4. Include information on ongoing invasive species removal in OMRR&R.
5. Evaluate the OMRR&R needs and costs for potential damage to the rock ripples due to changes in flood flow frequency caused by climate change and wildfire.

Final Panel Comment 10

The possible connections between surface water flows and groundwater flows in areas where groundwater will support the proposed environmental restoration have not been fully evaluated.

Basis for Comment

The success of an environmental restoration project relies on reasonable and accurate forecasts of surface and groundwater availability. It is important to understand and document the possible connections between surface water flows from Aliso Creek and groundwater, especially for areas that would rely on groundwater availability to maintain environmental restoration activities.

DIFR-EIS Appendix A-2, Section 4.5.4 discusses the groundwater and channel interflow and states that due to a “lack of field data pertaining to groundwater return flow, channel seepage and floodplain recharge, the groundwater interflow methodology” presented in the HEC-RAS methodology was adopted to evaluate the groundwater return flow component. The use of the HEC-RAS methodology for the groundwater component is reasonable; however, because of the lack of available field data, the projection of groundwater return flow and estimation of groundwater table depth shifts are approximate based on available data. The Panel suggests considering the feasibility of collecting additional field data for model update and verification of groundwater availability in selected environmental restoration locations during development of the recommended plan.

Significance – Medium

Both field data and model projections of groundwater levels and the connection with surface water flows from Aliso Creek are necessary to fully understand and evaluate the potential impacts on environmental restoration.

Recommendation for Resolution

1. Evaluate the surface water and groundwater components using collected field data for model analysis and document the evaluations in DIFR-EIS Appendix A-2. If not feasible, document the approach that will be taken to ensure accurate groundwater and channel interflow estimates.
2. Discuss and evaluate the projections of groundwater elevations in the TSP to document the capacity to support the proposed environmental restoration activities.

Final Panel Comment 11

It is not clear that reconnecting the abandoned oxbow has benefits that outweigh the cost and long-term performance risks.

Basis for Comment

As described in Alternative 3.6 (the TSP), reconnecting the abandoned oxbow significantly increases the risk of reactivating an ancient landslide as compared to Alternative 3.3, which does not include oxbow reconnection. The costs associated with controlling a reactivated ancient landslide would be very high. Additionally, reconnecting the oxbow increases by 2.3 times the amount of excess material to be disposed of as compared to Alternative 3.3. Lastly, the difference in average annual habitat units (AAHUs) between Alternative 3.6 and Alternative 3.3 is apparently just 3.2 percent. The DIFR-EIS has not sufficiently explained how it was determined that the benefits of Alternative 3.6 outweigh the costs and risks of reconnecting the oxbow.

Significance – Medium

If the costs and risks associated with oxbow reconnection need to be reevaluated and the results show that the benefits do not outweigh the costs, there is the potential that Alternative 3.6 would no longer be the TSP.

Recommendation for Resolution

1. Verify that the difference in AAHU between Alternative 3.6 and 3.3 is only 3.2 percent.
2. Verify that the costs that were used in the evaluation for disposal of excess material include all associated costs (e.g., excavation, transport, placement, and restoration) and use a range of probable disposal costs to determine the cost risk to the project associated with disposal costs.
3. Evaluate more completely during the next project phase the risks associated with the identified ancient landslide near the oxbow.

Final Panel Comment 12

The DEIR may not meet requirements of both NEPA and CEQA due to inadequate impact assessment, deferral of required analyses, and conflicts with existing plans.

Basis for Comment

Some important requirements of CEQA and NEPA have not been addressed in the DIFR-EIS, including a number of examples where impacts have not been fully assessed, analyses that have been deferred to a later date, and conflicts with existing plans. The list of bullets and sub-bullets below address these three issues. In addition, there are some general CEQA guidelines that have not been met.

- The DFIR-EIS (p. 1-1) states that the document was prepared to comply with the Economic and Environmental Principles and Guidelines for Water and Related Land Resources (May 1983). However, this policy has been revised at least twice since 1983 (2013 and 2014).
- The County cannot make financial commitments to the project (DEIS/R at 4-23), until it has demonstrated CEQA compliance (Pub. Res. Code § 21080).
- The DIFR-EIS (p. 1-1) states that "the non-Federal Sponsor, Orange County Public Works (OCPW), Environmental Resources, is the lead agency under CEQA.". However, a lead agency under CEQA must be the decision-making body. (CEQA Guidelines § 15050). In this case, the Orange County Board of Supervisors is the decision-making body that must review and consider the DIFR-EIS and should be considered the non-Federal Sponsor (p.176 of public comment PDF file).

(1) Temporary and permanent project impacts have not been fully defined and impacts on species of concern have not been clearly discussed. CEQA requires the DIFR-EIS not only identify a project's significant effects, but also ways to avoid or minimize them (Pub. Res. Code § 21002.1). These include:

a. The Habitat Unit projections in the CHAP analysis do not include TSP impacts over the decade-long project construction.
b. Permanent impacts resulting from the addition of TSP engineered features (armoring) are not adequately discussed in terms of potential biologic impacts and risks of failure
c. Impacts on existing mature riparian native habitat are dismissed as short term (DIFR-EIS, p. 5-49), even though the recovery is expected to take 10 years and full recovery is not certain.
d. Habitat impacts per construction phase were not calculated and presented.
e. The impacts of dewatering during the construction of the riffle structures and the toedown on species of concern have not been clearly discussed.
f. Sensitive plant species impacts are not defined and quantified, as required by CEQA, and no surveys have been conducted, including in selected disposal sites.
g. Potential impacts from the TSP downstream on the Laguna Ocean Foundation's final plan for restoring the Aliso Creek Estuary have not been defined
h. The DIFR-EIS has not fully discussed the potential impacts on vireo habitat (p. 295 of public comment PDF file) and it does not provide sufficient discussion regarding temporary habitat maintenance and whether the temporary habitat would be monitored to confirm vireo use prior to destruction of existing vireo habitat

i. The project site was not surveyed for southwestern pond turtles and a “plan of action” was not developed to relocate them and the risk of potential extirpation in the project area has not been analyzed.

j. Impacts on white-tailed kite foraging habitat have not been discussed, given the proposed use of nearby grasslands for soil disposal.

k. The widespread impact of shot hole boring beetles (SHBs) has not been discussed, which are affecting trees and shrubs throughout the project area (p. 102 of public comment PDF file). SHBs threaten the riparian vegetation and may be a cause of the riparian vegetation dying, rather than insufficient groundwater access and their impacts on the vegetation may have resulted in artificially inflating the Habitat Unit gain.

l. The Mexican elderberry is not discussed in the biological resources section, although it may play an important role in supporting migrating and nesting birds in the project area. Impacts on Mexican elderberry were not discussed or how this species fits into restoration plans

m. Sediment impacts are unclear due to contradictions within the DIFR-EIS. The amount of channel degradation will decrease and the respective contribution of channel supply to sand delivery downstream will decrease under future without-project conditions (DIFR-EIS, p. 2-25). The Proposed Action would result in an increase of average annual sediment delivery to the ocean over current conditions; however, the increase to the littoral zone is not considered to be significant. Therefore, no significant adverse cumulative impacts are expected (DIFR-EIS, p. 5-113).

n. The cumulative impact section does not consider the many current, on-going restoration projects within the same project area, explain clearly the status, and if the TSP conflicts with mitigation or management plans.

o. Potential impacts on existing mitigation sites within the project area are not defined. The document does not discuss if modifications to existing long-term management plans are legal or appropriate.

p. Recreational Impacts are deemed Less than Significant, although the TSP will involve four years of construction immediately adjacent to this trail, and will involve trail closures throughout this period (DFIR-EIS, p. 5-99).

q. Hazardous materials were not evaluated and impacts were not adequately assessed. The DEIR assumes “Given the previous land uses of the Proposed Project area, it is unlikely that any hazardous material sites would be discovered during construction of any of the Proposed Project alternatives. (p. 5-77). Although the site is inside a Wilderness Park, the significant upstream urbanization of the watershed creates the potential for the creek to carry toxics, metals, and other hazardous materials to the site, especially warranted given the Agencies’ proposal to store 300,000 cubic yards of dredged soils on site, directly adjacent to recreational amenities and crucial habitat resources

(2) Many issues within the DEIR lack comprehensive analysis. The DEIR deferred for later many important analyses, therefore the potential impacts are not defined, resulting in a lack of full disclosure. Environmental Commitment ER-1 requires the development of an Erosion and Sedimentation Control Plan (DIFR-EIS, p. 5-14). The DEIR states that an “Erosion and Sedimentation Control Plan would be prepared during PED. The Plan shall identify measures to be implemented to minimize the erosion effects of grading and excavation.” (5-14). An EIR may not defer evaluation of mitigation to a later date (CEQA Guidelines 1 § 15126.4(a)(1)(B)).

a. A Traffic Safety Management Plan is required, but has not been completed and performance standards are not defined.
b. Cultural impacts have not been fully analyzed, with review deferred, as is the preparation of the programmatic agreement (PA). The DIFR-EIS states (p. 2-83) that "the Corps has hired a consultant to revisit five of the 12 sites and provide additional details about their current condition. The results of this analysis will be available by late 2017 and will help inform future designs." This report was not provided and the results were not included in this analysis.
c. Wetland surveys were not yet conducted and therefore potential impacts on wetlands have not been defined (DIFR-EIS, p. 5-16).

(3) Both CEQA and NEPA require the DIFR-EIS to evaluate the project's consistency with all applicable land use plans (40 C.F.R. § 1502.16(c)). The TSP conflicts with the Aliso Creek Resource Management Plan (p. 172 of public comments).
a. Strategy BIO-1 requires the protection and maintenance of native plant and wildlife habitat. The TSP will *remove* native plant and wildlife habitat, in direct conflict with this requirement.
b. Strategy BIO-2 requires that "protection, enhancement, and restoration activities [be] consistent with the adaptive management strategy of the Habitat Conservation Plan." The DIFR-EIS provides no indication that the TSP has been designed in accordance with this strategy.
c. Strategy BIO-4 requires that data collected through monitoring be analyzed and used as the basis for guiding park management…It does not appear that the current monitoring has been "used as the basis for evaluating and guiding park management," in contravention of the Resource Management Plan.
d. Recreation Element establishes that the wilderness park must "generally appear to have been affected primarily by forces of nature, with the imprint of man's work substantially unnoticeable." (Recreation Element at VII-39 to -40). The proposed project is inconsistent with this requirement.

Significance – Medium

Defining all potential impacts and conducting all necessary analyses to evaluate impacts, especially on species of concern or their habitat, is required by NEPA and CEQA and is important to presenting a complete decision document.

Recommendation for Resolution

1. Include TSP impacts over 10 year timesteps on Habitat Unit projections in the CHAP analysis.
2. Analyze permanent impacts resulting from the addition of TSP engineered features (armoring), including risk of failure (i.e., armoring).
3. Calculate Habitat impacts per construction phase.
4. Evaluate impacts of dewatering.
5. Add text to report regarding uncertainty of reestablishing all habitats and overall uncertainty of success.
6. Quantify existing sensitive plant species habitats and potential impacts, including in disposal sites.

7. Define potential impacts from the TSP downstream on the Laguna Ocean Foundation's final plan for restoring the Aliso Creek Estuary.
8. Define potential impacts on vireo habitat, specify plan for maintain habitat (watering container plants), and add statement that the temporary habitat will be monitored to confirm vireo use prior to destruction of existing vireo habitat.
9. Discuss risk of potential extirpation of southwestern pond turtle (SWPT) in the project area
10. Evaluate impacts on white-tailed kite foraging habitat from disposal of materials.
11. Add text that describes the widespread impact of shot hole boring beetles (SHBs) and evaluate its role the riparian vegetation dying, and reanalyze Habitat Unit gain for CHAP analysis.
12. Evaluate the ecological role of the Mexican elderberry in the project area and include in the biological resources section of report.
13. Add Mexican elderberry to the list of plants targeted for restoration in the TSP, if warranted.
14. Clarify sediment impacts within the DIFR-EIS.
15. Analyze the many current, on-going restoration projects, clarify which are within the same project area, current status and if there are conflicts with existing mitigation or management plants.
16. Discuss conflicts with Land Use Plans for Aliso and Wood Canyons Wilderness Park and contingencies if existing mitigation sites and Long-Term Management Plans cannot be changed.
17. Prepare Erosion and Sedimentation Control Plan with performance standards
18. Prepare turbidity monitoring plan with defined standards and action triggers.
19. Prepare Traffic Safety Management Plan with performance standards defined.
20. Prepare programmatic agreement for Cultural impacts.
21. Reevaluate Recreational Impacts.
22. Conduct a Phase I Site Assessment and evaluate risks dredged soils placement on site, directly adjacent to recreational amenities and crucial habitat resources.
23. Conduct an adequate survey of the site for wetlands, an assessment of the possibility that such wetlands may shift over time, a determination of how the proposed project may impact these wetlands, and proposed mitigation or alternatives to address any significant impacts.
24. Resolve the TSP conflicts with the Aliso Creek Resource Management Plan, include monitoring data in analysis and ensure consistency with NCCP/HCP.
25. Ensure that the Draft IFR complies with the revised *Economic and Environmental Principles and Guidelines for Water and Related Land Resources* (2013 and 2014).
26. Remove statements in DEIS/R (4-23) regarding the County's financial commitments to the Project.
27. Correct the statement in the DEIS/R that "the non-Federal Sponsor, Orange County Public Works (OCPW), Environmental Resources, is the lead agency under CEQA." (DEIS/R at 1-1) and replace with Orange County Board of Supervisors.

Final Panel Comment 13

The cost estimates to support estimated reductions in erosion damages in the DIFR-EIS Main Report and Appendix C do not provide sufficient detail to evaluate the basis for these costs.

Basis for Comment

Estimated reductions in erosion damages from the project are reported in Table 3.8-15 of the DIFR-EIS Main Report and Tables C9 and C10 of Appendix C. Table C7 of Appendix C lists lower, upper, and most likely costs for different erosion damages and protective measures. The schematic on p. 23 of Appendix C illustrates how these costs are integrated into the @Risk erosion damages model; Appendix C-1 provides further documentation for the erosion model.

Appendix C-1 is the only section of the DIFR-EIS where the cost estimates are discussed in any detail. Several of the cost estimates are based only on "best professional judgement" (Appendix C-1, p. 7-8) or refer to a prior report (Sulphur and Aliso Creek Stabilization Project, dated February 2013) that is not included in the DIFR-EIS. The level of detail provided in Appendix C-1 is not sufficient to judge the reliability of the cost estimates used in the erosion model. For example, damages attributed to closures at Aliso Creek Beach are estimated at 14% of annual attendance (Appendix C-1, p. 15), but the recreation plan analysis states that, "...recurring sewage spills have resulted in beach closures and contributed to a reputation associated with poor water quality and safety risks" (Appendix C, p. 39). Also, the Main Report does not include a reference to Appendix C-1, which would assist in evaluating the estimated reductions in erosion damages.

Significance – Medium/Low

Without supporting information on the cost estimates, it is difficult to determine the reliability of these estimates.

Recommendation for Resolution

1. Provide more information and documentation in Appendix C-1 to support the range of cost estimates used in the erosion model.
2. Improve the integration between the Main Report, Appendix C, and Appendix C-1 to explain the estimation of erosion damage reductions.

Final Panel Comment 14

The alternatives evaluation does not discuss the full range of alternatives in areas of the stream where lateral width is not limited.

Basis for Comment

The DIFR-EIS evaluates in detail each alternative leading to the TSP and discusses the development of channel design parameters for each alternative following the "natural channel design" principles. The DIFR-EIS further describes the evaluation and selection of the dominant design flows of the 2-year and 10-year peak discharges to be used for the design of the channel geometry template for each alternative.
The selection of channel templates for each alternative was constrained by the existing terrain features along the project limits. The section of Aliso Creek from Pacific Park Drive to the AWMA Road Bridge is limited in available channel width expansion opportunities due to existing residential development and utility facilities on each side of the proposed channel improvements. South of AWMA Road Bridge to the SOCWA facility, the proposed channel width is not confined by existing facilities. However, the evaluations for each of the alternatives and selection of the TSP considered a consistent channel cross-section template for the entire project limits.

The section of Aliso Creek south of the AWMA Road Bridge to the SOCWA facility provides an opportunity to consider varying the channel template to expand the cross-section width for the 2-year and 10-year flow rates. This would allow the possibility of incorporating a meandering low flow channel within the channel template.

Significance – Medium/Low

Analyzing a wide array of possible cross-section opportunities within Aliso Creek is an important step in the process to completely assess alternative impacts that will lead to development of the TSP.

Recommendation for Resolution

1. Provide an evaluation and discussion in the DIFR-EIS of an alternative that considers expanding the width of the cross-section template and incorporating a low flow stream south of the AWMA Road Bridge.

Final Panel Comment 15

The DIFR-EIS has not evaluated whether the enhanced aesthetics of the study area to recreational users may unintentionally lead to degradation of the restored habitat.

Basis for Comment

The recreation plan described in DIFR-EIS Appendix C (pp. 30-40) anticipates a significant increase in recreational visits after project completion. It is not clear whether the possibility has been considered that increased recreational usage could lead to riverine habitat degradation. While the Main Report (p. 3-108) notes that the recreation plan was developed "...in a manner that does not impair the restoration outputs," it is not clear what specific provisions of the recreation plan would ensure these results. It is noted (p. 3-108) that "Public access is not authorized with the riverine system," but the recreation plan does not describe any actions to enforce this restriction on access or to mitigate recreational user damages to the restored habitat.

Significance – Medium/Low

Without a description of how the anticipated increased recreational visits will be controlled, it is difficult to determine how they might affect the restored habitat.

Recommendation for Resolution

1. Provide specific information in the recreation plan on actions that would be implemented to prevent increased recreational activity from degrading the restored habitat.

Final Panel Comment 16

There is no discussion of the potential opportunities to restore the Federally listed Southern California steelhead salmon or California red-legged frog, the history of the species in the project area, or potential project impacts on species habitat.

Basis for Comment

The primary stated goal of this project is ecosystem restoration. Although suitable habitat exists, several important Federally listed species are not targeted in this project, specifically, Southern California steelhead salmon and California red-legged frogs. Regarding steelhead salmon, the DIFR-EIS (p. 2-66) states that "While the habitat may be suitable under favorable conditions, the structures above the lagoon would preclude steelhead migration under most flows. The steelhead have not been recorded in the Proposed Project area since 1972, and currently have no potential to be in the Proposed Project area." This decision that steelhead salmon restoration should not be considered for this project was not sufficiently discussed. Based on the recent National Oceanic and Atmospheric Administration (NOAA) determination that Aliso Creek is a historical Steelhead Habitat, the DIFR-EIS has not evaluated or described what is needed to restore steelhead habitat.

In Appendix B-3 (p. 2), the following statement is made: "…successful restoration will include habitat for the southwestern pond turtle (*Actinemys marmorata pallida*) and potentially the California red-legged frog (*Rana aurora draytonii*)." The only other mention of the California red-legged frog in the DIFR-EIS is a note on p. 3-100 that the species would benefit from the greater prevalence of moist soils. Given that the primary project goal is restoring suitable habitat, there is insufficient discussion of the history of California red-legged frog onsite, what is involved in restoring this species to the project area, and potential project impacts on species habitat. This is a Federally listed species with appropriate habitat onsite, yet a brief discussion of this species has not been included in listed biological resources (even if no longer present) and evaluated under the potential project alternative impacts. Restoration does not have to target all Federally listed species, but, considering the status of the salmon and the frog and the presence of potential habitat, these species warrant a more extensive discussion.

Significance – Low

Opportunities exist to restore habitat for Federally listed species that have not been discussed and may be able to be incorporated into project design at low additional costs.

Recommendation for Resolution

1. Add text to the biological resources sections of the DIFR-EIS that discusses the historic presence onsite of the Southern California steelhead salmon and California red legged frogs.
2. Evaluate potential opportunities to restore habitat for these species in the alternatives analysis.
3. Define potential project impacts (if any) on the habitats of Southern California steelhead salmon and California red legged frogs.

Final Panel Comment 17

The alternatives developed by the USFWS have not gone through a quantitative evaluation for hydraulic and hydrologic impacts on the project.

Basis for Comment

DIFR-EIS, Section 3.2 describes the plan formulation process for the quantitative evaluation of base alternatives 1 through 5 as prescribed by ER 1105-2-100 (USACE, 2000).

In a Planning Aid Letter (PAL) to USACE dated August 28, 2015, the USFWS provided three suggested alternatives for consideration. However, as stated in the DIFR-EIS, Section 3.8.5, the timing of the submittal of the proposed alternatives allowed only for a qualitative and not a quantitative evaluation. Although ER 1105-2-101, paragraph 6 does allow for qualitative assessments when appropriate, the DIFR-EIS provides little information to justify the qualitative assessment. The Panel highly encourages USACE to follow through with their statement to further review the three suggested alternatives in more detail as warranted during the development of the recommended plan.

Significance – Low

A quantitative evaluation from a large array of possible solutions for hydraulic and hydrologic impacts is important for the identification of alternatives leading to the selection of the TSP.

Recommendation for Resolution

1. Provide more detailed information in the DIFR-EIS to justify the qualitative evaluation of the USFWS proposed alternatives.

Literature Cited:

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.

5. REFERENCES

OMB (2004). Final Information Quality Bulletin for Peer Review. Executive Office of the President, Office of Management and Budget, Washington, D.C. Memorandum M-05-03. December 16.

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.

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.

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.

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APPENDIX A

IEPR Process for the Aliso Creek 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 Aliso Creek 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 October 3, 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 15, 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 Aliso Creek IPER

Task	Action	Due Date
1	Award/Effective Date	5/26/2016
	Review documents available	10/3/2017
	Public comments received from USACE	12/12/2017
	Battelle submits draft Work Plan*	10/4/2017
	USACE provides comments on draft Work Plan	10/6/2017
	Battelle submits final Work Plan*	10/12/2017
2	Battelle requests input from USACE on the conflict of interest (COI) questionnaire	9/18/2017
	USACE provides comments on COI questionnaire	9/22/2017
	Battelle submits list of selected panel members*	10/10/2017
	USACE confirms the panel members have no COI	10/13/2017
	Battelle completes subcontracts for panel members	10/18/2017
	Subcontractors complete mandatory Operations Security (OPSEC) training	11/17/2017
3	Battelle convenes kick-off meeting with USACE	10/2/2017
	Battelle sends review documents to panel members	10/19/2017
	Battelle convenes kick-off meeting with USACE and panel members	10/19/2017
	Battelle convenes mid-review teleconference for panel members to ask clarifying questions of USACE	Not held
	Battelle participates in the Agency Decision Milestone (ADM) Meeting	1/31/2018
	Battelle participates in the Senior Leader Meeting (SLM)	10/1/2018
4	Panel members complete their review of the documents	11/16/2017
	Battelle provides talking points to panel members for Panel Review Teleconference	11/20/2017
	Battelle convenes Panel Review Teleconference	11/29/2017
	Battelle provides Final Panel Comment templates and instructions to panel members	11/30/2017
	Panel members provide draft Final Panel Comments to Battelle	12/7/2017

Table A-1. Major Milestones and Deliverables of the Aliso Creek IPER, continued

Task	Action	Due Date
4	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	12/08/2017 - 12/14/2017
	Panel finalizes Final Panel Comments	12/15/2017
	Battelle receives public comments from USACE	12/12/2017
	Battelle sends public comments to Panel	12/14/2017
	Panel members complete their review of the public comments	12/27/2017
	Battelle and Panel review Panel's responses to public comments	12/28/2017
	Panel drafts Final Panel Comment on public comments, if necessary	1/2/2018
	Panel finalizes Final Panel Comment regarding public comments, if necessary	1/4/2018
5	Battelle provides Final IEPR Report to panel members for review	1/8/2018
	Panel members provide comments on Final IEPR Report	1/10/2018
	Battelle submits Final IEPR Report to USACE*	**1/12/2018**
	USACE Planning Center of Expertise (PCX) provides decision on Final IEPR Report acceptance	1/22/2018
6**	Battelle inputs Final Panel Comments to Design Review and Checking System (DrChecks) and provides Final Panel Comment response template to USACE	1/24/2018
	Battelle convenes teleconference with USACE to review Comment Response process	1/24/2018
	Battelle convenes teleconference with Panel to review Comment Response process	1/24/2018
	USACE Project Delivery Team (PDT) provides draft Evaluator Responses to USACE PCX for review	2/7/2018
	USACE PCX reviews draft Evaluator Responses and works with USACE PDT regarding clarifications to responses, if needed	2/13/2018
	USACE PCX provides draft PDT Evaluator Responses to Battelle	2/14/2018
	Battelle provides draft PDT Evaluator Responses to panel members	2/16/2018
	Panel members provide draft BackCheck Responses to Battelle	2/22/2018
	Battelle convenes teleconference with panel members to discuss draft BackCheck Responses	2/23/2018
	Battelle convenes Comment Response Teleconference with panel members and USACE	2/26/2018
	USACE inputs final PDT Evaluator Responses to DrChecks	3/5/2018
	Battelle provides final PDT Evaluator Responses to panel members	3/6/2018
	Panel members provide final BackCheck Responses to Battelle	3/9/2018
	Battelle inputs the panel members' final BackCheck Responses to DrChecks	3/14/2018
	Battelle submits pdf printout of DrChecks project file*	3/15/2018
	Contract End/Delivery Date	12/31/2018

* *Deliverable.*

** *Task 6 occurs after the submission of this report.*

At the beginning of the Period of Performance for the Aliso Creek 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 38 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 Document	Approx. No. of pages
Integrated Feasibility Report/EIS	516
Appendix A: Design Report	68
Appendix A: Design Report – List of Attachments	2
Appendix A: Design Report – Attachment A Part 1	38
Appendix A: Design Report – Attachment A Part 2	22
Appendix A: Design Report – Attachment A Part 3	22
Appendix A: Design Report – Attachment B Field Photos	18
Appendix A: Design Report – Attachment C Alternative Designs	38
Appendix A: Design Report – Design Report Addendum	16
Appendix A: Design Report – Geotechnical Considerations	9
Appendix A: Design Report – Geologic Evaluation	36
Appendix A: Design Report – Geomorphology	166
Appendix A: Design Report – Cost Engineering*	80
Appendix A: Design Report – H&H	450
Appendix B: Environmental Part 1 – EIS	432
Appendix B: Environmental Part 2 – Cultural Resources	247
Appendix B: Environmental Part 3 – Planning Aid Letter	114
Appendix C: Economics	118

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

Review Document	Approx. No. of pages
Appendix D: Real Estate	45
Public Comments**	296
Risk Register*	10
Report total number of pages to be reviewed	2,653

* 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.

** Page count for public comments is approximate. USACE submitted public comments to Battelle, who in turn submitted the comments to the IEPR Panel.

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.

The Panel provided Battelle four questions regarding the project. USACE answered the questions via email. Because of this, Battelle determined and USACE confirmed that a mid-review teleconference with USACE was not necessary.

In addition, USACE provided a document at the request of panel members. This document was provided to Battelle and then sent to the Panel as additional information only and was not part of the official review. The following additional document was requested by the Panel:

- Aliso Creek Mainstem Ecosystem Restoration Study, Hydrology and Hydraulics Appendix (October 2009).

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 Aliso Creek 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, 17 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 a PDF file containing 296 pages of public comments on the Aliso Creek project (approximately 21 letters) 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. The panel members confirmed that two new Final Panel Comments would be developed to summarize the additional issues raised by the IEPR Panel. One panel member was identified by Battelle as the lead author responsible for coordinating the development of the Final Panel Comments and submitting it to the other panel members and Battelle. The Final Panel Comments were developed as part of a four-part structure following guidance previously described in Section A.4.

Battelle reviewed and edited the Final Panel Comments for clarity, consistency with the comment statements, and adherence to guidance on the Panel's overall charge, which included ensuring that the comments did not make any observations regarding either the appropriateness of the selected alternative or USACE policy. There was no direct communication between the Panel and USACE during the preparation of 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 (this document). 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 17 Final Panel Comments developed by the Panel into USACE's Design Review and Checking System (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 Aliso Creek Project

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B.1 Panel Identification

The candidates for the Aliso Creek Mainstem, Orange County, California (hereinafter: Aliso Creek IEPR) Panel were evaluated based on their technical expertise in the following key areas: Civil Works planning, hydrology and hydraulics engineering, geotechnical engineering, biological resources and environmental law compliance, and economics[2]. These areas correspond to the technical content of the review documents and overall scope of the Aliso Creek 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 conflicts of interest (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 Aliso Creek Mainstem, Orange County, California	
1. Previous and/or current involvement by you or your firm in the Aliso Creek Mainstem Integrated Feasibility Report/Environmental Impact Statement (IFR/EIS) and related projects.	
2. Previous and/or current involvement by you or your firm in ecosystem restoration studies in southern Orange County, Los Angeles, California.	

[2] One panel member held a dual role serving as both the economics and Civil Works planning expert.

Panel Conflict of Interest (COI) Screening Statements for the IEPR of the Aliso Creek Mainstem, Orange County, California	
3. Previous and/or current involvement by you or your firm in the conceptual or actual design, construction, or operation and maintenance (O&M) of any projects associated with the Aliso Creek Mainstem IFR/EIS.	
4. Current employment by the U.S. Army Corps of Engineers (USACE).	
5. Previous and/or current involvement with paid or unpaid expert testimony related to the Aliso Creek Mainstem IFR/EIS.	
6. Previous and/or current employment or affiliation with members of the cooperating agencies or local sponsors: Orange County Public Works (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 southern Orange County, Los Angeles, California.	
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, ERDC, etc.), and position/role. Please highlight and discuss in greater detail any projects that are specifically with the Los Angeles District.	
9. Previous or current involvement with the development or testing of models that will be used for, or in support of the Aliso Creek Mainstem IFR/EIS project.	
10. Current firm involvement with other USACE projects, specifically those projects/contracts that are with the Los Angeles 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 Los Angeles District. Please explain.	
11. Any previous employment by USACE as a direct employee, notably if employment was with the Los Angeles 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 Los Angeles District. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.	

Panel Conflict of Interest (COI) Screening Statements for the IEPR of the Aliso Creek Mainstem, Orange County, California	
13. Previous experience conducting technical peer reviews. If yes, please highlight and discuss any technical reviews concerning ecosystem restoration studies and include the client/agency and duration of review (approximate dates).	
14. Pending, current, or future financial interests in Aliso Creek Mainstem IFR/EIS-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 Orange County Public Works contracts.	
17. Any publicly documented statement (including, for example, advocating for or discouraging against) related to Aliso Creek Mainstem IFR/EIS.	
18. Participation in relevant prior and/or current Federal studies relevant to this project and/or Aliso Creek Mainstem IFR/EIS.	
19. Previous and/or current participation in prior non-Federal studies relevant to this project and/or Aliso Creek Mainstem IFR/EIS.	
20. Has your research or analysis been evaluated as part of the Aliso Creek Mainstem IFR/EIS?	
21. 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. 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. Aliso Creek IEPR Panel: Summary of Panel Members

Name	Affiliation	Location	Education	P.E.	Exp. (yrs)
Civil Works Planning / Economics (Dual Role)					
J. Walter Milon	University of Central Florida	Orlando, FL	Ph.D., Economics	No	38
Biological Resources and Environmental Law Compliance					
Felicia Orah Rein	Florida Atlantic University	Boca Raton, FL	Ph.D., Ecosystem Science and Water Resources	No	29
Geotechnical Engineering					
Michael Lambert	Shannon & Wilson, Inc.	Pulaski, TN	M.E., Civil Engineering	Yes	29
Hydrology and Hydraulics (H&H) Engineering					
Larry Fluty	Independent Consultant	Brooksville, Florida	Ph.D., 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. Aliso Creek IEPR Panel: Technical Criteria and Areas of Expertise

Technical Criterion	Milon	Rein	Lambert	Fluty
Civil Works Planning/Economist (Dual Role)				
Minimum 10 years of demonstrated experience in public works planning	X			
Very familiar with USACE plan formulation process, procedures, and standards	X			
Familiar with evaluation of alternative plans for ecosystem restoration and flood risk management	X			
Familiar with USACE standards and procedures	X			
Experience related to evaluating traditional Civil Works plan benefits associated with ecosystem restoration and flood risk management, to include experience in USACE methodologies for performing cost effectiveness/incremental cost analysis (CE/ICA), and experience in determining the cost effectiveness of alternatives evaluations	X			
Has 15 years demonstrated experience or combined equivalent of education and experience in economics	X			

Table B-2. Aliso Creek IEPR Panel: Technical Criteria and Areas of Expertise, continued

Technical Criterion	Milon	Rein	Lambert	Fluty
Minimum M.S. degree or higher in economics and be recognized in applied economics related to water resource economic evaluation (ecosystem restoration and flood risk management analyses) or review	X			
Experience working with risk-informed approaches to decision making, risk models, and evaluation scenarios with regard to economic impact	X			
At least two years of experience reviewing Federal water resources economics documents justifying construction efforts	X			
Able to evaluate the appropriateness of CE/ICA, as applied to dollar costs and ecosystem restoration benefits, and preferably be familiar with the Corps of Engineers tool for CE/ICA called Institute for Water Resources (IWR) Planning Suite	X			
Has familiarity with “At-Risk” software, and able to evaluate an erosion model based on its methodology	X			
At least 5 years of experience directly working for or with USACE is highly recommended	X			
Biological Resources and Environmental Law Compliance				
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 this study area		X		
Familiar with coastal Southern California ecology, specifically with wetlands and riparian habitats, and has knowledge of riverine systems and restoration		X		
An expert in compliance with additional environmental laws, policies, and regulations, including compliance with Fish and Wildlife Coordination Act and Endangered Species Act		X		
Familiar with Standardized Assessment Methodology		X		
Familiar with the habitat evaluation method: Combined Habitat Assessment Protocols (CHAP) model		X		
Geotechnical Engineering				
Registered professional engineer			X	
Minimum of 15 years of experience in geotechnical engineering with a minimum M.S. degree or higher in engineering			X	

Table B-2. Aliso Creek IEPR Panel: Technical Criteria and Areas of Expertise, continued

Technical Criterion	Milon	Rein	Lambert	Fluty
Demonstrated experience in performing geotechnical evaluation and geo-civil design for all phases of flood risk management and ecosystem restoration projects			X	
Experience in levees, culverts, channel stability, design, and construction, bridge design and construction, as well as design and construction for detention/retention basins, utility relocations, positive closure requirements, interior drainage requirements, and application of non-structural flood risk management measures			X	
Knowledge of bedrock landslides, and their geologic interpretation and evaluation			X	
Familiar with and has demonstrated experience related to USACE geotechnical practices associated with flood management channels, construction, and soil engineering			X	
Experience in geotechnical risk and fragility analysis			X	
Capable of addressing the USACE Safety Assurance Review (SAR) aspects of this project due to the potential for landslides in the area			X	
Active participation in related professional engineering and scientific societies is encouraged			X	
Hydrology and Hydraulics Engineer				
Registered professional engineer				X
Minimum of 15 years of experience in hydrology and hydraulics (H&H) engineering				X
Experienced with all aspects of H&H engineering, including Southwest hydrology, urban H&H, open-channel systems, effects of management practices and low-impact development on hydrology, use of non-structural systems as they apply to floodproofing, warning systems, and evacuation				X
Familiar with Hydrologic Engineering Center (HEC) modeling computer software, including HEC River Analysis System (RAS) and HEC Hydrologic Modeling System (HMS), FLO-2D				X
Specialized experience in river engineering and sediment transport and in fluvial geomorphology				X

B.3 Panel Member Qualifications

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

Name	J. Walter Milon, Ph.D.
Role	Civil Works Planning/Economics (Dual Role)
Affiliation	Independent Consultant

Dr. Milon is the Provost's Distinguished Research Professor in the Department of Economics at the University of Central Florida's College of Business Administration, where he has taught graduate-level courses in benefit-cost and social impact analyses, economic theory, and natural resource and environmental economics. He earned his Ph.D. in economics from Florida State University in 1978 and has 38 years of experience in natural resource and environmental economics and water resource economic evaluation. He is a member of the Association of Environmental and Resource Economists and the American Economics Association.

Dr. Milon is familiar with large, complex Civil Works projects with high public and interagency interests, having served as a consultant for the planning and technical advisory on the USACE Florida Everglades Restudy (1995-1999). He has taught graduate courses and conducted research in benefit-cost analysis, risk management, and flood damage assessment modeling, which includes the use of the Hydrologic Engineering Center Flood Damage Reduction Analysis (HEC-FDA) modeling software. He was the principal investigator on the Socioeconomic Evaluation of Hurricane Evacuation Response project for the Florida Hurricane Research Alliance, and co-principal investigator on Florida's Coastal Environmental Resources: Economic Valuation and Analysis project.

Dr. Milon is experienced in evaluating National Economic Development (NED) for flood risk management projects, as well as National Ecosystem Restoration (NER) plan benefits. He is also experienced in Civil Works real estate laws, policies, and coastal property rights, and has conducted research on coastal property valuation. Dr. Milon has served as the lead economist on recent USACE IEPRs involving flood risk management, ecosystem restoration, and coastal storm damage reduction—namely, the White Oak Bayou, Texas, Federal Flood Damage Reduction Plan; the Caño Martín Peña Ecosystem Restoration Project, San Juan, Puerto Rico; and the Walton County, Florida, Hurricane and Storm Damage Reduction Project.

Dr. Milon has more than 10 years of experience reviewing Federal water resource economic documents justifying construction efforts. He has participated in the planning and technical advisory for the USACE Florida Everglades Restudy (1995 to 1999) and was lead economist on five USACE IEPRs, including the Everglades C-111 construction project (2009), the Louisiana Coastal Areas Restoration Project (2009 to 2011), the White Oak Bayou, Texas, flood control plan (2011), and the Caño Martin Peña Ecosystem Restoration Project, San Juan, Puerto Rico (2013).

Dr. Milon has worked directly for or with USACE in applying Principles and Guidelines (P&G) to Civil Works projects, including flood risk management projects, and as such has over five years of experience working with the USACE six-step planning formulation process. He also teaches graduate courses and conducts research in benefit-cost and cost effectiveness and incremental cost analysis (CE/ICA) methods. Dr. Milon is familiar with "At-Risk" software, and is capable of utilizing/evaluating an erosion model based on its methodology.

Dr. Milon is experienced in the evaluation of traditional National Ecosystem Restoration plan benefits associated with ecosystem restoration. In addition to more than 30 years of experience in teaching and

research related to estimation of ecosystem benefits and ecosystem restoration, he has been a member of the National Research Council Committee with USACE Water Resources Science, Engineering, and Planning. He is experienced in USACE methodologies for performing CE/ICA and has over 30 years of experience in teaching and research related to cost-benefit and CE/ICA analysis. He is also experienced in determining the CE of fish passages, as demonstrated by his 20 years of experience in research and economic analysis associated with fisheries economics and recreational fishing. Additionally, he has supervised several fisheries research projects for the National Marine Fisheries Service and served as technical expert for Federal fishery management councils and journals.

Dr. Milon is a former member of the National Research Council Committee on USACE Water Resources Science, Engineering, and Planning; the Committee on Water Resources Science, Engineering and Policy; the Association of Environmental and Resource Economists; the American Economic Association; and the Southern Economics Association. Through his research and teaching experiences, Dr. Milon has authored an economics book and more than 15 book chapters, 45 reports, and 40 journal articles. He has been involved with more than 25 university contracts and grants and serves as a private economic consultant to both government and private clients. He has also served on prior peer reviews, including the IEPR of the Lower Yellowstone Intake Diversion Dam Fish Passage Project, Montana Draft EIS.

Name	Felicia Orah Rein, Ph.D.
Role	Biological Resources and Environmental Law Compliance
Affiliation	Florida Atlantic University/Watershed Solutions

Dr. Rein has 29 years of professional environmental management experience implementing large-scale multidisciplinary research and evaluation projects. Currently a researcher and Affiliate Professor of geosciences for Florida Atlantic University, she earned her Ph.D. in Ecosystem Science and Water Resource Management from the University of California, Santa Cruz, in 2000 and her B.S. in Biology, Environmental Science, and English from Tufts University in 1988. Dr. Rein's areas of expertise include water quality, wetland science, watershed management, ecological monitoring, impact assessment, and ecological restoration, with a focus on ecological and biological sciences and National Environmental Policy Act (NEPA) assessment. Additional strengths include technical science, communication, and project management.

Dr. Rein's experience relates directly to water resource environmental evaluation, including doctoral research. Her primary expertise is in ecosystem science, but her interdisciplinary graduate program targeted environmental policy and economics. She has prepared and reviewed NEPA documents for two environmental planning firms and has served on past IEPR panels as biology and environmental compliance analyst. She has experience with flood risk assessment and flood management projects (the Pine Creek Dam, Oklahoma, Dam Safety Modification Report; the Delta Islands & Levees Feasibility Study, Sacramento, California; and the Carmel River, Carmel, California).

Dr. Rein is familiar with the habitat, fish and wildlife species, and tribal cultures and archeology that may be affected by the project alternatives in this study area. She conducted a mining lands restoration project in northern San Diego County on tribal lands that involved riparian and native plant restoration. Dr. Rein has over 25 years of experience managing projects, many along the Pacific coast. She has experience

with coastal Southern California ecology, including wetlands and riparian habitats, and she has knowledge of riverine systems, stream hydrogeomorphology and riparian restoration. As a specialist on the land-water interface, Dr. Rein has managed projects all along the Pacific coast. Her doctoral research was conducted in Elkhorn Slough, which drains into the Monterey Bay, where she investigated grass buffer strips as a best management practice (BMP) to reduce agricultural non-point-source pollution and improve water quality from conventional agricultural activities.

Working as a senior project manager for Denise Duffy & Associates, Dr. Rein was based in Monterey, California, and worked on developing environmental impact assessments, analyzing impacts of dozens of projects on the Pacific Coast. These projects involved analyzing environmental trade-offs for threatened species, water resources, and other land uses; developing mitigation plans; conducting wetland delineations; and monitoring construction sites for erosion control compliance.

Dr. Rein has worked for the Port Authority of New York and New Jersey, assessing impacts potentially resulting from dredging activities on both habitat and specific species similar to this project. She has also managed a project on the Carmel River in California at the California State Water Resource Control Board dealing with a complex environmental study balancing water rights and endangered steelhead salmon around Carmel Valley, central Pacific Coast.

Dr. Rein is experienced with the IEPR process and has participated in project reviews that included technical models estimating fluvial delivery into the system and optimizing the hydrodynamics to rehabilitate jetties. Dr. Rein has extensive experience preparing planning documents such as environmental impact reports (EIRs) and environmental impact statements (EISs) and has experience with all National Environmental Policy Act (NEPA) EIS requirements. She also has experience with the Endangered Species Act, essential fish habitat, and the Marine Mammals Protection Act. Dr. Rein is a member of Sigma Xi National Scientific Research Society.

During her career, Dr. Rein has written or reviewed NEPA documents that have analyzed existing archeology and potential impacts and also has specific experience with tribal culture. At the Site One Impoundment project in Florida, human remains potentially from a tribe member were found, and a protocol to communicate with the tribe regarding the remains was initiated. Under the terms of the protocol, the area was protected and kept dewatered to ensure that no impacts occurred. In addition, as project manager of a mine reclamation study mentioned above for the Pala band of Mission Indians on tribal lands in northern San Diego County, she developed a familiarity with the area's tribal culture.

Dr. Rein's expertise includes compliance with environmental laws, policies, and regulations. As a consultant, she has been awarded many projects dealing with environmental compliance monitoring. Her firm is responsible for all aspects of conducting monitoring and maintaining compliance with permits, regulations, and laws. As a reviewer, she has extensive experience evaluating documents for NEPA compliance. Dr. Rein has had specific experience with the U.S. Fish and Wildlife Service (USFWS) on interagency coordination for several projects in compliance with the Fish and Wildlife Coordination Act. She also has managed projects that required expert knowledge of the Clean Water Act; these projects focused on wetland restoration or protection, wastewater discharge, and water quality protection. In addition, she has managed projects involving compliance with the Endangered Species Act, both in field monitoring and report preparation and review. For example, the project in Carmel, California, required an assessment of two species with conflicting habitat needs (the threatened red-legged frog and the endangered steelhead salmon) for compliance with the Endangered Species Act. Dr. Rein is also familiar with the USFWS Habitat Evaluation Procedure (HEP), having served on other IEPR panels and having

reviewed other projects requiring habitat evaluation expertise. For the Delaware River IEPR, her analysis of the mitigation plan was based on the use of HEP methodology. Dr. Rein is familiar with the Standardized Assessment Methodology (SAM) and the Combined Habitat Assessment Protocols (CHAP) habitat evaluation model.

Name	Michael Lambert, P.E.
Role	Geotechnical Engineering
Affiliation	Shannon & Wilson, Inc.

Mr. Lambert is a geotechnical engineer with Shannon & Wilson, Inc. and has 29 years of experience working on levees, floodwalls, bridges, earth and rock fill dams, and concrete locks and dams. He oversees site investigations, developing geotechnical-related design and construction recommendations, developing and reviewing project plans and specifications, and monitoring compliance with project plans and specifications. His experience in geomorphology includes reviewing work by others and determining how projects such as dams and levees will be impacted by stream/river changes. He earned his M.E. in civil engineering from the University of Louisville in 1988, has more than 29 years direct engineering experience, and is a registered professional engineer in Missouri, Arkansas, Oregon, Tennessee, and California.

Mr. Lambert has been involved with pre-construction flood risk management and ecosystem restoration projects such as the Howard Bend Levee, Missouri; the Yakima River Levee, Washington; and the Missouri Bottom Levee System, Missouri. Post-construction flood risk management projects include the St. Louis City Flood Wall Evaluation; the Stockton, California, Levee Evaluation/Design for the Department of Water Resources; the Lewiston, Idaho, Levee; and the Chesterfield Levee, Missouri. For each of these projects, design activities were conducted in accordance with USACE methods and criteria. In addition, risk and fragility analysis concepts were considered as part of each project.

Mr. Lambert is experienced with the geotechnical aspects of floodwalls, earthen levees, culverts, closure structures, and pumping stations. Relevant projects have included support for the Howard Bend Levee System in Maryland Heights, Missouri, and the Harrah's Casino, Relief Well Rehabilitation and Testing in Maryland Heights, Missouri. He has also performed inspections for more than 408 miles of USACE levees and over 56 miles of U.S. Bureau of Reclamation irrigation canals. His experience with floodwall design and construction is demonstrated by the Howard Bend Levee System in Maryland Heights. As senior geotechnical engineer and project manager, he was responsible for reconstruction and upgrading to provide protection from a 500-year flood event. The flood protection system included earthen levee floodwalls, closure structures, and a pump station. Engineering and design evaluations of channel structures conducted by Mr. Lambert include several locks and dams (L&D) along the Mississippi River (L&D 25 and Mel Price), and Ohio River (Olmsted, L&D 52, L&D 53, Cannelton Lock, and Markland Lock).

All of these projects, including the non-USACE projects, were completed in accordance with USACE guidance, including USACE's safety assurance policy and guidance, and applicable risk assessment methodology. All of the levee and dam projects included either explicit or implicit consideration of risk

analysis determining a likely range of values and the impact of different values in each project. For example, the Center Hill IEPR included a detailed review of the risk analyses performed for both the main and saddle dams. Additionally, Mr. Lambert has served on the Type I IEPR for the Phase II Post-Authorization Decision Documents for the Sacramento River Bank Protection Project, California, and multiple Type II IEPR teams for levee projects, including two projects for the Chesterfield-Monarch Levee, three projects for the Wood River Levee System, and one project for the mainline Mississippi River Levee in Tunica, Mississippi.

Mr. Lambert also has geotechnical design and construction experience for detention/retention basins, utility relocations, positive closure requirements, interior drainage requirements, and application of non-structural flood risk management measures. Specific projects include the Howard Bend Levee, the Reedsport Levee, and Chesterfield Central Park.

Geotechnical bridge design projects include numerous rail bridges across the Midwest and southeast, and interstate highway and small local bridges in the St. Louis metropolitan area. Specific examples include CSX rail bridges in Kentucky and Tennessee, Union Pacific Railroad (UPRR) rail bridges in Missouri, Arkansas, Texas, and Illinois, BNSF rail bridges in Missouri and Arkansas, and I-270/I-170 interchange bridges in the St. Louis metropolitan area.

Mr. Lambert also has extensive experience with landslides associated with railroads, highways, dams, channels/rivers, and other manmade improvements. These landslides most typically have occurred near the soil bedrock interface; however, some have occurred completely in soil and others predominately in bedrock. Specific projects include the UPRR railroad along the Missouri River in Hermann, Missouri, the BNSF Lindenwood Yard along the River des Peres, St. Louis, Missouri, and the Lac Shayne Dam, Bonne Terre, Missouri.

Mr. Lambert has experience modifying stream channels, including his work as the senior geotechnical engineer on the Blue River Channel Modifications in Kansas City, Missouri. The Blue River had an extensive history of bank instability and landslides along its full length, which required careful geological interpretation, analysis, and design. In addition to other services, he conducted extensive stability analyses using UTEXAS2, stability software written by the USACE Waterways Experiment Program Station, and designed to analyze slopes by Spencer's Method, Simplified Bishop procedures, Modified Swedish procedures with USACE side force assumptions, and Modified Swedish procedures with Lowe and Karafiath's side force assumptions. Slope stability drawings for the report and a graphical hand check of the UTEXAS2 program were prepared.

Mr. Lambert is also familiar with USACE geotechnical practices associated with levee and floodwall design, construction, and soil engineering through his work on numerous USACE projects, including: Melvin Price Lock and Dam Fish Passage Structure, Wood River Levee Flood Wall, Mississippi River Lock and Dam 25, Lake Wappapello Dam, McAlpine Lock Replacement, Ste. Genevieve Levee, Lewiston Levee, Olmsted Locks and Dam, Howard Bend Levee, Missouri Bottom Levee, and Chesterfield Agricultural Levee. All of these levee and dam projects included either explicit or implicit consideration of geotechnical risk analysis. He has planned and executed numerous site investigations consisting of one to more than 100 borings/test pits/cone penetrometer tests. Each of these investigations was planned and executed with consideration of environmental impacts. Specific investigations for flood risk projects include Howard Bend Levee, Missouri Bottom Levee, and California Department of Water Resources Levee Evaluation Stockton and Alder Creek.

Mr. Lambert is experienced in performing cost engineering and construction management for flood risk management-related projects. He has prepared ad reviewed construction cost estimates for the geotechnical portions of construction projects such as the U.S. Bureau of Reclamation Scoggins Dan/Henry Hagg Lake project, for which he coordinated the efforts of consulting engineering firms, contractors, and stakeholders to validate project costs and schedules.

Mr. Lambert has demonstrated experience in evaluating, designing, and constructing large embankment dams (more than 100 feet high). He served as the Project Manager and Lead Geotechnical Engineer for the design of a 200-foot earth and rock fill dam constructed as a raise to an existing 50-foot earth dam for Lake Fort Smith Dam, Arkansas. He was the Project Manager and Lead Geotechnical Engineer for a project to add hydroelectric power to the existing USACE Jennings Randolph Dam, Maryland, and served as the Senior Geotechnical Engineer for a review of a U.S. Bureau of Reclamation design to raise the existing Scoggins Dam, Washington, by 20 to 40 feet. Mr. Lambert has experience in failure mode analysis and risk assessment of large complex systems with emphasis on dam safety issues. As part of the review for the Scoggins Dam, an evaluation of risks associated with the proposed raise and possible failure modes was conducted.

As design engineer on over a dozen USACE projects, Mr. Lambert has a thorough understanding of USACE design methodologies associated with water-retaining structures and is capable of addressing USACE Safety Assurance Review (SAR) aspects of projects. He has published technical papers in his field of expertise and remains involved with related professional organizations, including the Society of American Military Engineers, American Society of Civil Engineers, and Association of State Dam Officials.

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 an Association of State Floodplain Managers Certified Floodplain Manager. Dr. Fluty has extensive H&H 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 (H&H) 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.

He has also completed watershed projects involving Low Impact Development Analysis and Design, evaluation of structural and non-structural alternatives, flood warning systems including evacuation alternatives, and development of advanced and automated geographic information systems (GIS) for water resources. He has used these models on such studies as SH-130 Design and Drainage Improvements, Texas Department of Transportation, where he evaluated variable storm durations and critical storm determination for several watersheds along the entire project limits to ensure no impacts upstream and downstream of all conveyance crossings; Redwood Master Drainage Plan, Josephine County, Oregon, where he evaluated locations, source, extent, and depth of flooding and provided alternative flood protection measures utilizing FLO-2D; and Broadway & Rural Drainage Master Plan, Tempe, Arizona, in support of the project's goals to develop protection measures, use structural and non-structural alternatives, and develop comprehensive alternatives to prevent flooding in the urban watershed.

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 (FIS). 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 (CTPs), he produced more than 1,000 FEMA Map Panels and completed six county-wide DFIRM studies and the H&H modeling and mapping of more than 25,000 miles of streams.

Specific project experience includes serving as project manager for the Southwest Florida Water Management District's (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 has specialized experience in river engineering and sediment transport as well as in fluvial geomorphology. Example projects he has worked on include the Trinity River Restoration Project, Trinity, California, where the project restored the river's natural complexity by modeling and engineering log jam technology to deflect river flow into reconstructed side channels and restore the river's natural complexity; Portalis Master Drainage Plan, Apache Junction, Arizona, where an urbanized watershed was evaluated for alternatives following Low-Impact Design criteria to minimize area flooding and add controls and development guidelines for future development to minimize surface water pollution; and Albany Stormwater Master Plan, Albany, Oregon, which required stream assessments with respect to hydro-modifications and development of a FLO-2D model to address hydro-modifications, sediment transport, and development of watershed-specific standards. Dr. Fluty also completed several geomorphology assessments such as the Curlew Creek Channel A Fluvial Geomorphology Assessment and Natural Channel Design Conceptualization, Pinellas County, Florida.

Dr. Fluty is highly capable and experienced in addressing the requirements necessary for performing USACE SARs, and in completing and presenting risk management requirements per Engineer Regulation (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 H&H 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 H&H engineering IEPR panel member on the Leon Creek Watershed Feasibility Study, San Antonio, in Bexar County, Texas.

APPENDIX C

Final Charge for the Aliso Creek IEPR

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Charge Questions and Guidance to the Panel Members for the Independent External Peer Review (IEPR) of the Aliso Creek Mainstem Project, Orange County, California

This is the final Charge to the Panel for the Aliso Creek IEPR. This final Charge was submitted to USACE as part of the final Work Plan, originally submitted on October 12, 2017.

The Aliso Creek watershed is located in southern Orange County, California and encompasses an area of approximately 35 square miles. The creek flows nearly 19.5 miles from its headwaters at approximately 2,400 feet above sea level in the Santiago Hills (foothills of the Santa Ana Mountains and within the boundaries of the Cleveland National Forest) to its outlet at the Pacific Ocean in south Laguna Beach. The Aliso Creek outlet is approximately 50 miles south of Los Angeles and approximately 65 miles north of San Diego.

The Aliso Creek watershed is largely urbanized, with highly improved drainage systems that convey storm flows by concrete pipes and improved channels. The creek, however, is largely in a natural condition within the Aliso and Wood Canyons Wilderness Park, which occupies a significant portion of the lower watershed. The project area focuses on the lower reach of the Aliso Creek Watershed from Pacific Park Drive to the Pacific Ocean. This reach covers approximately 6.5 miles of lower Aliso Creek mainstem and 1,000 feet of the Wood Canyon Creek tributary from its confluence to Aliso Creek. The lower reach of the watershed was identified in the Aliso Creek Watershed Management Feasibility Study as having the most significant issues associated with ecosystem and stream degradation, infrastructure threat, and water quality impairment.

The majority of the project area is within the Aliso and Wood Canyons Wilderness Park (hereinafter: “Wilderness Park”), which is owned, operated, and managed by the County of Orange. The Wilderness Park, created by the purchase of 40 land parcels and dedicated to Orange County in 1979, is an area of significant resource value that supports many of the limited and scarce unique landscapes of California, such as coastal sage scrub, chaparral, native grassland, oak woodland, riparian woodland/forest, and freshwater marsh, and provides important habitat for native species. A total of 28 plant and animal species with designations of endangered, threatened, and California Species of Special Concern are identified to occur, or to potentially occur, within the study area. Approximately 4,200 acres of natural open space including hills, canyons, and floodplain are encompassed within the Wilderness Park. The park has scenic, wildlife, ecologic, archeological, and paleontological resources, and offers trails for hiking, jogging, biking, and equestrian use. Conservation efforts by the County and others have helped ensure that the open space remains undeveloped and its natural resources remain intact. The Wilderness Park is bordered at its southern (downstream) end by the Aliso Creek Golf Course, a privately owned entity.

Within the Wilderness Park, an area associated with a former mitigation site of the Mission Viejo Company (MVC) and Orange County, referred to as the Aliso Creek Wildlife Habitat Enhancement Project (ACWHEP), is a key area for ecosystem restoration opportunities. Initiated in 1990, the ACWHEP used a constructed headworks structure to divert Aliso Creek low flows through irrigation lines to downstream planted riparian terraces. The intent of the design was to improve riparian habitat along a 4,000-foot long segment of the historical floodplain associated with Aliso Creek, starting downstream of the constructed headworks structure where erosion from runoff and urbanization had caused at least 10 feet of incision within the streambed. As a result of severe storm damage in the winter of 1997-1998, major channel slope failures had ruptured the irrigation system.

The ACWHEP no longer functions as intended and severe streambank and streambed erosion (current incision totaling 25 feet) continues downstream of the headworks structure, which now acts as a large drop structure. The structure and its downstream flanks must be periodically maintained by the County with the addition of grouted stone to prevent a loss in structural integrity and failure. Failure of the structure and the resulting headcut moving upstream would jeopardize existing upstream infrastructure along Aliso Creek. This would include abutments at numerous bridge locations, underground utilities, and the Alicia Parkway embankment. As of October 2012, the ACWHEP mitigation site agreement has been terminated. With termination of the ACWHEP agreement, the Wilderness Park is part of a larger 17,000-acre regional coastal canyon ecosystem consisting of Laguna Coast Wilderness Park, Crystal Cove State Park, and the City of Irvine Open Space and is a significant component of the Nature Reserve of Orange County. This nature reserve ecosystem forms a large island of habitat almost entirely surrounded by urban development.

A public utility, the South Orange County Wastewater Authority (SOCWA) Coastal Treatment Plant, is situated in Aliso Canyon within an isolated parcel surrounded by the Wilderness Park. The facility is located on the east side of Aliso Creek and is approximately 1.2 miles upstream from the Pacific Ocean. The wastewater treatment plant has a design capacity of 6.7 million gallons per day and serves the City of Laguna Beach, Emerald Bay Services District, South Coast Water District, and Moulton Niguel Water District. An easement for effluent and sludge conveyance pipelines runs along the east side of Aliso Creek. Treated effluent is used for recycled water or discharged to the Pacific Ocean through the Aliso Creek Ocean Outfall. The facility is accessible by way of the SOCWA bridge via a private access road (AWMA Road) that parallels to the west of Aliso Creek through the Wilderness Park. County staff and the public share a portion of the west access road for Wilderness Park operations, and access to the Wood Canyon trail. SOCWA also has an unimproved (dirt) service road on the east side of Aliso Creek. The on-going erosion of the Aliso Creek channel poses a threat to the SOCWA infrastructure. Past storms have resulted in erosion that has caused failure of the Moulton Niguel Water District 18-inch sewer line within the Wilderness Park reach. SOCWA has spent millions of dollars repairing erosion damages along Aliso Creek. SOCWA considers all repairs along Aliso Creek temporary due to instability of the channel.

Study Objectives:

- Restore degraded riverine (aquatic and associated terrestrial) habitat function and structure in the lower Aliso Creek watershed by year 2025 to benefit a vast array of vertebrate and invertebrate fauna, including 28 special-status species that are known or have the potential to occur in the lower Aliso Creek watershed
- Restore a more natural flow, floodplain connectivity (hydrologic), and channel stability along the lower Aliso Creek system by year 2020
- Reduce flood risk damage to critical infrastructure in lower Aliso Creek by year 2020
- Improve water quality in lower Aliso Creek mainstem, via increased biological function, by year 2025
- Enhance passive recreational experience for the lower Aliso Creek watershed by year 2025.

Tentatively Selected Plan Description

The following describes the Tentatively Selected Plan (TSP). There are some additional features that may be added to the TSP pending the completion of the cost effectiveness/incremental cost analysis.

Alternative 3 – Raise Streambed Elevation to Reconnect to Historic Floodplain. This alternative will raise the existing streambed to approach the pre-incised stream elevation to allow hydrologic

reconnection with the historic floodplain. Raising of the streambed will be transitioned, starting from the SOCWA bridge and continuing upstream to AWMA Road Bridge. The channel will be widened (to its dominant discharge width) and will include in-channel benches (to act as a 2-year event floodplain). Side slopes will be graded to 1v:3h. The ACWHEP structure would be demolished. Grade control stabilizers ("riffle structures"), consisting of large riprap boulders set at and below streambed grade, will be placed in a series transverse to the channel to provide stability to the raised streambed. A total of 34 riffle structures will be necessary. Spacing will be between 500 and 800 feet apart to promote the formation of pool-riffle sequences. The riparian corridor along the creek banks will be restored with appropriate riverine vegetation types. Raising of the stream will reduce the significant elevation discontinuity (currently about 25 feet) at the Wood Canyon Creek confluence. Buried riprap stone bank protection will be placed to protect infrastructure (AWMA Rd and SOCWA wastewater pipelines) at key locations where lateral erosion is considered a threat.

Other features to be considered for Alternative 3 include reconnection of the abandoned oxbow (active channel would be filled in); lowering the perched terrace at the abandoned oxbow to create a 10-year floodplain for the active channel with an associated adjacent backwater area; stream lengthening; off-line turtle refugia; Sulphur Creek reconnection; channel widening/riparian corridor addition for 2,200 feet in vicinity of Aliso Creek bridge; removal of two 10-foot high concrete drop structures; channel widening, including in-channel benches downstream of Pacific Park Drive; raising of the channel where necessary between AWMA Bridge and Pacific Park Drive; Pacific Park Drive bypass; repurposing of west road downstream of Wood Canyon confluence to a trail; and east bank paved SOCWA road construction.

OBJECTIVES

The objective of this work is to conduct an independent external peer review (IEPR) of the Aliso Creek Mainstem Ecosystem Restoration Study (hereinafter: Aliso Creek Mainstem 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. Per 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. The review assignments per panel member may vary slightly according to discipline.

Review Document	Approx. Number of pages
Integrated Feasibility Report/EIS	516
Appendix A: Design Report	68
Appendix A: Design Report – List of Attachments	2
Appendix A: Design Report – Attachment A Part 1	38
Appendix A: Design Report – Attachment A Part 2	22
Appendix A: Design Report – Attachment A Part 3	22
Appendix A: Design Report – Attachment B Field Photos	18
Appendix A: Design Report – Attachment C Alternative Designs	38
Appendix A: Design Report – Design Report Addendum	16
Appendix A: Design Report – Geotechnical Considerations	9
Appendix A: Design Report – Geologic Evaluation	36
Appendix A: Design Report – Geomorphology	166
Appendix A: Design Report – Cost Engineering*	80
Appendix A: Design Report – H&H	450
Appendix B: Environmental Part 1 – EIS	432
Appendix B: Environmental Part 2 – Cultural Resources	247
Appendix B: Environmental Part 3 – Planning Aid Letter	114
Appendix C: Economics	118
Appendix D: Real Estate	45
Public Comments**	100
Risk Register*	10
Report total number of pages to be reviewed	2,457

* *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.*

** *Page count for public comments is approximate. USACE will submit public comments to Battelle, who will in turn submit the comments to the IEPR Panel.*

Documents for Reference

- USACE guidance *Civil Works Review,* (EC 1165-2-214, December 15, 2012)
- Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* (December 16, 2004)
- Foundations of SMART Planning
- SMART Planning Bulletin (PB 2013-03)
- SMART – Planning Overview
- Planning Modernization Fact Sheet.

SCHEDULE & DELIVERABLES

This schedule is based on the receipt date of the final review documents and may be revised if review document availability changes. This schedule may also change due to circumstances out of Battelle's control such as changes to USACE's project schedule and unforeseen changes to panel member and USACE availability. As part of each task, the panel member will prepare deliverables by the dates indicated in the table (or as directed by Battelle). All deliverables will be submitted in an electronic format compatible with MS Word (Office 2003).

Task	Action	Due Date
Attend Meetings and Begin Peer Review	Battelle convenes kick-off meeting with USACE	10/2/2017
	Battelle sends review documents to panel members	10/19/2017
	Battelle convenes kick-off meeting with panel members	10/19/2017
	Battelle convenes kick-off meeting with USACE and panel members	10/19/2017
	Battelle convenes mid-review teleconference for panel members to ask clarifying questions of USACE	Not held
Prepare Final Panel Comments and Review Public Comments	Panel members complete their review of the documents	11/16/2017
	Battelle provides talking points to panel members for Panel Review Teleconference	11/20/2017
	Battelle convenes Panel Review Teleconference	11/29/2017
	Battelle provides Final Panel Comment templates and instructions to panel members	11/30/2017
	Panel members provide draft Final Panel Comments to Battelle	12/7/2017
	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	12/08/2017 - 12/14/2017
	Panel finalizes Final Panel Comments	12/15/2017
	Battelle receives public comments from USACE	12/12/2017
	Battelle sends public comments to Panel**	12/14/2017
	Panel members complete their review of the public comments	12/27/2017
	Battelle and Panel review Panel's responses to public comments	12/28/2017
	Panel drafts Final Panel Comment on public comments, if necessary	1/2/2018
	Panel finalizes Final Panel Comment regarding public comments, if necessary	1/4/2018

Task	Action	Due Date
Review Final IEPR Report	Battelle provides Final IEPR Report to panel members for review	1/8/2018
	Panel members provide comments on Final IEPR Report	1/10/2018
	Battelle submits Final IEPR Report to USACE*	1/12/2018
	USACE Planning Center of Expertise (PCX) provides decision on Final IEPR Report acceptance	1/22/2018
Comment-Response Process	Battelle inputs Final Panel Comments to Design Review and Checking System (DrChecks) and provides Final Panel Comment response template to USACE	1/24/2018
	Battelle convenes teleconference with Panel to review Comment Response process	1/24/2018
	USACE Project Delivery Team (PDT) provides draft Evaluator Responses to USACE PCX for review	2/7/2018
	USACE PCX reviews draft Evaluator Responses and works with USACE PDT regarding clarifications to responses, if needed	2/13/2018
	USACE PCX provides draft PDT Evaluator Responses to Battelle	2/14/2018
	Battelle provides draft PDT Evaluator Responses to panel members	2/16/2018
	Panel members provide draft BackCheck Responses to Battelle	2/22/2018
	Battelle convenes teleconference with panel members to discuss draft BackCheck Responses	2/23/2018
	Battelle convenes Comment Response Teleconference with panel members and USACE	2/26/2018
	USACE inputs final PDT Evaluator Responses to DrChecks	3/5/2018
	Battelle provides final PDT Evaluator Responses to panel members	3/6/2018
	Panel members provide final BackCheck Responses to Battelle	3/9/2018
	Battelle inputs the panel members' final BackCheck Responses to DrChecks	3/14/2018
	Battelle submits pdf printout of DrChecks project file*	3/15/2018
	Contract End/Delivery Date	12/31/2018

***** *Deliverables*

****** *Battelle will provide public comments to the Panel after they have completed their individual reviews of the project documents to ensure that the public comment review does not bias the Panel's review of the project documents.*

CHARGE FOR PEER REVIEW

Members of this IEPR Panel are asked to determine whether the technical approach and scientific rationale presented in the decision documents are credible and whether the conclusions are valid. The Panel is asked to determine whether the technical work is adequate, competently performed, and properly documented; satisfies established quality requirements; and yields scientifically credible conclusions. The Panel is being asked to provide feedback on the economic, engineering, environmental resources, and plan formulation. The panel members are not being asked whether they would have conducted the work in a similar manner.

Specific questions for the Panel (by report section or appendix) are included in the general charge guidance, which is provided below.

General Charge Guidance

Please answer the scientific and technical questions listed below and conduct a broad overview of the decision documents. Please focus your review on the review materials assigned to your discipline/area of expertise and technical knowledge. Even though there are some sections with no questions associated with them, that does not mean that you cannot comment on them. Please feel free to make any relevant and appropriate comment on any of the sections and appendices you were asked to review. In addition, please note that the Panel will be asked to provide an overall statement related to 2 and 3 below per USACE guidance (EC 1165-2-214; Appendix D).

1. Your response to the charge questions should not be limited to a “yes” or “no.” Please provide complete answers to fully explain your response.
2. Assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, and any biological opinions of the project study.
3. Assess the adequacy and acceptability of the economic analyses, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, and models used in evaluating economic or environmental impacts of the proposed project.
4. If appropriate, offer opinions as to whether there are sufficient analyses upon which to base a recommendation.
5. Identify, explain, and comment upon assumptions that underlie all the analyses, as well as evaluate the soundness of models, surveys, investigations, and methods.
6. Evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable.
7. Please focus the review on assumptions, data, methods, and models.

Please **do not** make recommendations on whether a particular alternative should be implemented, or whether you would have conducted the work in a similar manner. Also, please **do not** comment on or make recommendations on policy issues and decision making. Comments should be provided based on your professional judgment, **not** the legality of the document.

1. If desired, panel members can contact one another. However, panel members **should not** contact anyone who is or was involved in the project, prepared the subject documents, or was part of the USACE Agency Technical Review (ATR).

2. Please contact the Battelle Project Manager (Project Manager; wisneskic@battelle.org) or Program Manager (Rachel Sell; sellr@battelle.org) for requests or additional information.

3. In case of media contact, notify the Battelle Program Manager, Rachel Sell (sellr@battelle.org) immediately.

4. Your name will appear as one of the panel members in the peer review. Your comments will be included in the Final IEPR Report, but will remain anonymous.

Please submit your comments in electronic form to the Project Manager, wisneskic@battelle.org no later than 10 pm ET by the date listed in the schedule above.

Independent External Peer Review of the Aliso Creek Mainstem Ecosystem Restoration Study

Charge Questions and Relevant Sections as Supplied by USACE

Broad Evaluation Charge Questions

1. Is the need for and intent of the decision document clear?
2. Does the decision document adequately address the stated need and intent relative to scientific and technical issues?

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 preliminary design of alternative plans
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
12. Assess the considered and tentatively selected alternatives from the perspective of systems, including systemic aspects being considered from a temporal perspective, including the potential effects of climate change.

For the Tentatively Selected Plan, assess whether:

13. From a public safety perspective, the proposed alternative is reasonably appropriate or are there other alternatives that should be considered.

Specific Technical and Scientific Charge Questions

Existing and Future Without-Project Resources

14. Has the character and scope of the study area been adequately described and is the identified study area appropriate in terms of undertaking a systems/watershed/ecosystem based investigation?
15. Was the hydrology discussion sufficient to characterize current baseline conditions and to allow for evaluation of how forecasted conditions (with and without proposed actions) are likely to affect

hydrologic conditions? Please comment on the completeness of the discussion on the relationship between subsurface hydrology and the hydrodynamics of the project area.

16. Given your area of expertise, are current baseline and forecasted conditions (without proposed actions) adequately characterized to allow for evaluation of pertinent with-project conditions?
17. Are the future conditions expected to exist in the absence of a Federal project logical and adequately described and documented?
18. Is the qualitative assessment addressing the impact of the alternatives on landslide risk sufficient for completing the feasibility study?

Plan Formulation / Evaluation

19. Was a reasonably complete array of possible measures that address ecosystem restoration *and* flood risk management considered in the development of alternatives?
20. Did the formulation process follow the requirement to avoid, minimize, and then mitigate adverse impacts on resources?
21. Does each alternative meet the formulation criteria of being effective, efficient, complete, and acceptable?
22. Were the assumptions made for use in developing the future with-project conditions for each alternative reasonable? Were adequate scenarios considered? Were the assumptions reasonably consistent across the range of alternatives and/or adequately justified where different?
23. Are the changes between the without- and with-project conditions adequately described for each alternative?
24. Are future Operation, Maintenance, Repair, Replacement, and Rehabilitation efforts adequately described and are the estimated cost of those efforts reasonable for each alternative?
25. Please comment on the screening of the proposed measures and alternatives. Are the screening criteria appropriate? In your professional opinion, are the results of the screening acceptable? Were any measures or alternatives screened out too early?
26. Do the CE/ICA results support the screening and refinement of the initial and final array of alternatives as well as the selection of the NER and/or the Recommended Plan?

Tentatively Selected Plan

27. Comment on whether you agree or disagree with how the selected alternative was formulated and selected. Comment on the plan formulation. Does it meet the study purposes and objectives and avoid violating the study constraints?
28. Are there any unmitigated environmental impacts not identified and if so could they impact plan selection?
29. Please comment on the likelihood of the recommended plan to achieve the expected outputs.
30. Please comment on the completeness of the recommended plan; i.e., will any additional efforts, measures, or projects be needed to realize the expected benefits?
31. Please comment on the appropriateness of location, sizing, and design of plan features.

Ecosystem Restoration – Specific Questions

32. Are the expected changes in the quality and abundance of desired ecological resources clearly and precisely specified in justifying the ecosystem restoration and protection investment?

33. Is it clear that restoration of the desired ecological resource quality is a function of improvements in habitat quality or quantity? Do planning models and procedures clearly link habitat improvement to the needs of the targeted ecological resources?
34. Is it clear that the restored ecological resource quality will be sustainable over the long run?
35. Are the required long-term commitments (both Federal and non-Federal) to sustaining the restored ecological resource quality adequately described and adequately demonstrated?

Flood Risk Management – Specific Questions

36. Do formulated alternatives actively address the problems of continued streambank erosion, continued vulnerability of utility infrastructure, and the threat to human health such as through exposure of pipelines and wastewater infrastructure?
37. Have structural flood risk management measures been considered in conjunction with ecosystem restoration measures to ensure a synergistic effect whereby one measure will not undermine the other?
38. Have future-with project conditions been appropriately applied regarding the long-term sustainability and resilience of flood risk management measures?

Battelle Summary Charge Questions to the Panel Members[3]

Summary Questions

39. 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.

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

Public Comment Questions

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

[3] Questions 39 through 41 are Battelle supplied questions and should not be construed or considered part of the list of USACE-supplied questions. These questions were delineated in a separate appendix in the final Work Plan submitted to USACE.

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APPENDIX D

Conflict of Interest Form

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Conflicts of Interest Questionnaire
Independent External Peer Review

Aliso Creek Mainstem, Orange County, California, Feasibility Study IEPR

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 Corporation Operations**
REPRESENTATIVE'S NAME: **Jason M. Jenkins**
TELEPHONE: **614-424-4873**
ADDRESS: **505 King Avenue, Columbus, OH 43201**
EMAIL ADDRESS: **jenkinsj@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.

5/5/2016

YOUR SIGNATURE DATE

Use or disclosure of data contained on this sheet is subject to the restriction on the title page of this proposal

BATTELLE

It can be done