DEPARTMENT OF THE ARMY
SOUTH PACIFIC DIVISION, CORPS OF ENGINEERS
1455 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94103-1399

REPLY TO
ATTENTION OF

10 June 2011

CESPD-PDC

MEMORANDUM FOR Commander, Los Angeles District, ATTN: CESPL-PM-C, Mr. Thomas Bucklew

SUBJECT: Review Plan Approval for the Santa Ana River Mainstem, including Santiago Creek, California

1. The enclosed Review Plan for Santa Ana River Mainstem, including Santiago Creek, California was prepared in accordance with EC 1165-2-209, dated 31 January 2010. The Review Plan will require Independent External Peer Review Type II Safety Assurance Review (SAR).

2. The Review Plan will be made available for public comment, and the comments received will be incorporated into the Review Plan.

3. I hereby approve this Review Plan, which is subject to change as study circumstances require, consistent with study development under the Project Management Business Process. Subsequent revisions to this Review Plan or its execution will require new written approval from this office.

4. The point of contact for this memorandum is Mr. Paul Bowers, 415-503-6556, paul.w.bowers@usace.army.mil.

Building Strong on the Cornerstone of the Southwest!

Andrew Constantaras

Encl

Andrew Constantaras, P.E.
Director, Regional Business Directorate

REVIEW PLAN

SANTA ANA RIVER MAINSTEM, INCLUDING SANTIAGO CREEK, CALIFORNIA

Lower Santa Ana River
Weir Canyon Road to Prado Dam
Reach 9 - Phase 2A, 2B and Phase 3

Prepared by:

U.S. Army Corps of Engineers Los Angeles District

June 3, 2011

US Army Corps of Engineers ®
Los Angeles District

ENCL

SANTA ANA RIVER MAINSTEM, INCLUDING SANTIAGO CREEK, CALIFORNIA

Lower Santa Ana River
Weir Canyon Road to Prado Dam
Reach 9 - Phase 2A, 2B and Phase 3

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REVIEW PLAN

SANTA ANA RIVER MAINSTEM, INCLUDING SANTIAGO CREEK, CALIFORNIA
Lower Santa Ana River
Weir Canyon Road to Prado Dam
Reach 9 - Phase 2A, 2B and Phase 3

June 3, 2011

1. INTRODUCTION.

a. Purpose. This Review Plan (RP) defines the scope and level of quality management activities for the plans and specifications (P&S) of the following features of the SANTA ANA RIVER MAINSTEM (SARM), Project: Reach 9 - Phase 2A and Phase 3. The RP also defines the scope and level of quality management activities for the design documentation report (DDR) that includes the entire Reach 9 segment of the SARM Project. The Reach 9 segment includes the following features of the SARM Projects: Phase 1, Phase 2A, Phase 2B and Phase 3.

b. References.

1. EC 1165-2-209, Civil Works Review Policy, 31 Jan 2010
2. ER 1110-2-1150, Engineering and Design for Civil Works Projects, 31 Aug 1999
3. ER 1110-1-12, Engineering and Design Quality Management, 21 Jul 2006
4. EC 1105-2-410 Water Resources Policies and Authorities: Review of Decision Documents, 22 Aug 08
5. WRDA 2007 H. R. 1495 Public Law 110-114, 8 Nov 2007
6. Army Regulation 15–1, Committee Management, 27 November 1992 (Federal Advisory Committee Act Requirements)
7. National Academy of Sciences, Background Information and Confidential Conflict Of Interest Disclosure, BI/COI FORM 3, May 2003

c. Review Requirements. This RP was developed in accordance with EC 1165-2-209, which establishes the procedures for ensuring the quality and credibility of U.S. Army Corps of Engineers (USACE/Corps) decision documents, implementation documents, and construction oversight through independent review. This RP describes the scope of review for the current implementation phase of the project. The implementation phase requires the following three levels of review: District Quality Control (DQC), Agency Technical Review (ATR), and Type II Independent External Peer Review (IEPR). The RP identifies the most important skill sets needed in the reviews, the objective of the review, and the specific advice sought, thus setting the appropriate scale and scope of review for the individual project.

2. PROJECT DESCRIPTION.

a. Project Authority. The construction of the Prado Dam, a feature of the Santa Ana River Mainstem, including the Santiago Creek, California Project (hereinafter referred to as “the SARM Project”) was authorized by the Water Resources Development Act of 1986, P.L. 99-662 (hereinafter referred to as “the Act”) substantially in accordance with the plans and recommendations of the Chief of Engineers contained in his reports dated 15 January 1982 and 9 July 1987.

The full authorization language is presented in the Main Report of DM No. 1 entitled “Phase II GDM on the Santa Ana River Mainstem, including Santiago Creek” Volume 3, dated August 1988, provides that the 1986 authorized estimated of the first cost was $809,000,000 in Federal funds for the SARM Project. Furthermore, the recent 2012 cost estimate is $1,251,000,000 in Federal funds for the SARM Project.

b. Project Location. The Lower Santa Ana River Reach 9 is located between Prado Dam and Weir Canyon road, where all features of work are along the Santa Ana River within Riverside County and Orange County, California. Prado Dam is approximately 30.5 miles away from the Pacific Ocean; whereas, Reach 9 is approximately 7.5 miles long from the mouth of Prado Dam to Weir Canyon Road, Refer to Appendix A. The remaining features of work to complete the system, Phase 2A and Phase 3, begin at the mouth of Prado Dam; Phase 2A is approximately 1.2 miles within Reach 9. Phase 3 is further downstream from Prado Dam approximately 5.7 miles away from Prado Dam, which Phase 3 itself is approximately 1400 linear feet. Phase 2B, under construction, is approximately 5,800 linear feet located along the SR91 with optional 400 linear feet located along the upstream end of the mobile home park.

c. Project History. Major flood control improvements, including raising Prado Dam, have been approved as part of the U.S. Army Corps of Engineers (USACE) Santa Ana River Mainstem Flood Control Project (SARP or SARM). The purpose of the SARM is to provide flood protection to areas susceptible to floods ranging from 100-year to 190-year frequencies. The SARM project area ranges over the counties of San Bernardino, Riverside, and Orange Counties and includes millions of people and numerous business and structures.

A Value Engineering (VE) study for the Santa Ana River basin, which includes the Lower Santa Ana River, was the vehicle used to evaluate alternatives and the basis of selection of the preferred alternative. The VE study team proposed specific methods of improvements for the each of the various reaches of the Lower Santa Ana River. A full discussion of the VE study is available in the report titled Santa Ana River Basin, California, Phase I VE Study: Lower Santa Ana, Oak Street Drain, San Timoteo, Volume 1 dated February 1989.

There are various features of the SARM that remain to be constructed, primarily in the Prado Basin and the 7.5 mile Reach 9 of the Santa Ana River directly below the basin. All of the features were addressed in the Phase II General Design memorandum (GDM) and the 1988 Phase II GDM Supplemental Environmental Impact Statement (SEIS), which is presently being revised to the Supplemental Environmental Assessment report (SEA). However, since the GDM was written, several new flood protection features have been added, such as Phase 3, or the previously approved features have been modified, such as Phase 2A, based on changes to the baseline condition of the Santa Ana River Mainstem as well as subsequent value-engineering studies.

Another future project feature includes raising the Prado Dam Spillway, providing increased capacity. In conjunction with raising Prado Dam, the Orange County Flood Control District (OCFCD) is responsible for acquiring all property rights located between the 556-foot and the 566-ft elevation lines. This elevation band represents the added area that is susceptible to inundation during the Reservoir Design Flood (RDF). Directly upstream of Prado Basin, the 566-ft elevation line has been continually migrating due to erosion of the south bank of the Santa Ana River. The greatest amount of erosion has occurred during storm events when lateral migration of the Santa Ana River has caused erosion

undercutting of the toe of the bank, resulting in sloughing of the bank tops. The improvements for the Reach 9 component of the Santa Ana River project have resulted from further evaluations of the existing conditions that were identified in the Phase II GDM, which included raising Prado Dam and the potential releases of 30,000 cfs of water, which is the Prado Dam outflow design discharge for a 190 year event. It was determined that existing improvements along some sections of the river are not sufficient to protect adjacent homes, businesses, and infrastructure from such large releases of water. Now, in addition to the levee protecting the Green River Mobile Home Park, a part of Phase 2B (awarded 2009, see Appendix A on map), improvements in Reach 9 will include intermittent levee and bank protection along the approximately 7.5 miles of the Santa Ana River downstream from Prado Dam. The features are briefly described below:

1. SARM Project Reach 9 - Phase 1:

   Past storm flows have damaged the existing bank protection located along the north side of SR-91 approximately midway between Gypsum Canyon Road and Weir Canyon Road. Low flows were impinging on the bank of lower highway 91 and the existing bank protection would not be able to protect against high releases from Prado Dam. North of Weir Canyon Road, there is a mini-mall on top of the bluff, were the low flow channel impinging on the bank was causing slope-failure. The USACE improved the banks with rip-rap and grouted stone in 2006.

2. SARM Project Reach 9 - Phase 2B:

   The low-flow channel at Green River Golf Course was concrete lined with soil-cement on the slopes of the left bank. The existing soil cement embankment and toe protection were inadequate to protect the SR-91 Freeway from releases from Prado Dam. The improvement project included grouted stone, sheet pile, and derrick stone that were awarded in 2009 along with Green River Mobile Home Park and the Santa Ana River Interceptor Line (SARI Line) relocation.

3. SARM Project Reach 9 - Phase 2A:

   To complete the system of protecting SARM Reach 9 - Phase 2A, this consists of sheet pile bank protection to address environmental concerns, grouted stone, and derrick stone. Also, bank protection at Phase 3 is required to protect portions of the SR-91 further downstream of the Green River Golf Course.

4. SARM Project Reach 9 - Phase 3:

   The Orange County scour analysis of Reach 9 for the County's SARI Line relocation design concluded that 1,400 linear feet along the SR-91 freeway between Coal Canyon and Gypsum Canyon is also susceptible to high flows and releases from Prado Dam. USACE is currently designing bank protection for this area.

d. Project Description. The SARM Project Reach 9 - Phase 2A, Prado Dam to BNSF Railroad, which includes the Green River Housing Estates (GRHE/GRHOA) just upstream of the Burlington North Santa Fe (BNSF) railroad, Upper Highway 91 (SR-91), and the SARM Project Reach 9 - Phase 3. These areas

need to be protected from future high releases out of Prado Dam and the improvements will include grouted stone, derrick stone, and sheet pile.

(1) SARM Project Reach 9 - Phase 2A - Approximately 2,000 linear feet of grouted stone protection along SR-91 that includes two side drains and an access road. Also approximately 3,600 linear feet of grouted stone and derrick stone and 1,000 linear feet of sheet pile along the GRHOA and protection of the BNSF railroad abutment piers. This project will include side drains, utility relocations and an access road.

(2) SARM Project Reach 9 - Phase 3- Approximately 1,400 linear feet of grouted stone and/or soil cement along SR-91 between Coal Canyon Road and Gypsum Canyon.

3. PROJECT WORK PRODUCTS.

a. Description of Work Products. The work products for this project include a Design Documentation Report (DDR), Plans and Specifications, and O&M manuals upon completion.

(1) Design Documentation Report (DDR). The DDR for the entire SARM Project Reach 9 will serve as a summary of the design to be used by the Project Delivery Team (PDT) during the development of the Plans & Specifications. An A-E Contractor, Tetra Tech, will incorporate the respective design disciplines technical appendices within SPL-ED. The A-E shall prepare a DDR for the entire Santa Ana River Reach 9 including Phase 1, (Weir Canyon Road to Gypsum Canyon Road), Phase 2B (Coal Canyon Road to Mobile Home Park), Phase 2A (Mobile Home Park to Prado Outlet), and Phase 3 (Gypsum Canyon Road to Coal Canyon Road). It shall contain a full record of design decisions, assumptions, and methods, subsequent to the GDM. Reference Tetra-Tech's Quality Control Plan, attachment 1.

(2) Plans & Specification- The P&S for the SARM Project Reach 9 – 2A will be prepared by SPL-ED by 31 May 2011, which will include grouted stone, derrick stone, and sheet pile features of work. The P&S for the SARM Project Reach 9 – Phase 3 will be designed by an A-E Consultant, Tetra Tech, by September 2011. The A-E shall prepare Phase 3 final plans and specifications for solicitation of bids, including pre-construction contract services, and engineering during construction (EDC) services in accordance with this scope of work. The design work will consist of approximately 1400 linear feet of scour protection along the California State Route 91 and the Santa Ana Regional Interceptor (SARI) sewer line. The A-E shall determine all required geotechnical investigations and perform all investigations and laboratory testing. Additionally, the A-E URS is providing supplemental design to protect an existing 109" waterline and geotechnical investigation data. Reference URS Quality Control Plan, attachment 2.

(3) Operation & Maintenance manual- SPL will prepare the O&M manual after each phase of construction for the SARM Project Reach 9 – Phase 2A, 2B, and Phase 3 completion.

b. Required Level of Review.

- The DDR for the SARM Project Reach 9 will undergo DQC and ATR. Per EC 1165-2-209,

external review of the DDR is also required because failure of the project would pose a significant threat to human life. The DDR is an implementation document and will therefore undergo a Type II IEPR (SAR).

- The P&S for the SARM Project Reach 9 - Phase 2A and Phase 3 will undergo DQC and ATR. Per EC 1165-2-209, external review of the P&S is also required because failure of the project would pose a significant threat to human life. The P&S are implementation documents and will therefore undergo a Type II IEPR (SAR). The Type II IEPR (SAR) will continue through the end of construction.
- The O&M manual for the SARM Project Reach 9 will undergo DQC and ATR. Per EC 1165-2-209, external review of the O&M manual is also required because failure to adequately maintain critical features in the project would potentially pose a significant threat to human life. The O&M manual is an implementation document and will therefore undergo a Type II IEPR (SAR).

c. Authorization & Reference Materials. Electronic versions of all pertinent documents, including, Design Documentation Report, Phase 2A and Phase 3 Plans & Specs, O&M manual, and all relevant information available shall be posted in Adobe Acrobat PDF format for both the ATR Reviewers and the IEPR panel to review at the appropriate time.

4. SCOPE OF REVIEW**.**

a. District Quality Control Activities (DQC). DQC activities for the DDR, P&S, and O&M manual will consist of Quality Checks and Reviews, supervisory reviews, project Delivery Team (PDT) reviews, including input from the Local Sponsor, and biddibility, constructability, operability, and environmental (BCOE) reviews, as required by the District's Quality Manual.

b. Agency Technical Review (ATR). The ATR team will review the DDR, the SARM Project Reach 9 – Phase 2A and Phase 3 Plans & Specs, and O&M. A description of the points of emphasis for each document is below, followed by general review guidelines for the ATR team.

1. <u>Emphasis of Review for Work Products</u>:

When reviewing the DDR, the ATR team should verify that it is sufficiently detailed for each technical specialty. In this way, the criteria that were used, the critical assumptions which were made, and the analytical methods that were used will be evident for purposed review and historical documentation. Verify that it contains summaries of important calculation results and selected example calculations for all critical elements of the design.

When reviewing the P&S, the ATR team should verify that are prepared in accordance with ER 1110-2-1200 and the Architect/Engineering/Construction CADD Standards along with Tri-Service Spatial Data Standards. The team should verify that the P&S contains all necessary information required to bid and construct the plan detailed in the engineering appendix and documented in the DDR. Review the design for biddibility, constructability, operability, and environmental (BCOE) aspects of the design.

When reviewing the O&M manual, the ATR team should verify all features of work within each phase are included to maintain, repair, monitor, inspect, and how to acquire

proper permits to complete work in accordance to ER 1110-2-401.

2. General Review Guidelines:

ATR is undertaken to "ensure the quality and credibility of the government's scientific information" in accordance with ER 1110-1-12. In order to ensure incorporation of Corps national experience for Flood Risk Management Projects (as updated per post-Katrina investigation), and in addition to the DQC, an ATR will also be performed. Moreover, all provisions and checklists for SAR contained in EC 1165-2-209 will be incorporated into the charge to the ATR team.

a. ATR Team Responsibilities

i. Reviewers shall review project authorization material, design documents and NEPA documents to confirm that work was done in accordance with established professional principles, practices, codes, and criteria and for compliance with laws and policy. Comments on the design documents shall be submitted into Document Review and Checking System (DrChecks).

ii. Reviewers shall pay particular attention to one's discipline, but may also comment on other aspects as appropriate. Reviewers that do not have any significant comments pertaining to their assigned discipline shall provide a comment stating this.

iii. Grammatical and editorial comments shall not be submitted into DrChecks. Comments should be submitted to the ATR manager via electronic mail using tracked changes feature in the Word document or as a hard copy mark-up. The ATR manager shall provide these comments to the Study Manager.

iv. Structure of Review comments is described in the charge.

v. The "Critical" comments flag in DrChecks shall not be used unless the comment is discussed with the ATR manager and/or the Technical Project Leader first.

b. PDT Responsibilities

i. The team shall review comments provided by the ATR Team in DrChecks and provide responses to each comment using "Concur," "Non-Concur," or "For Information Only." Concur responses shall state what action was taken and provide revised text from the report if applicable. Non-Concur responses shall state the basis for the disagreement or clarification of the concern and suggest actions to negotiate the closure of the comment.

ii. Team members shall contact the PDT and ATR managers to discuss any "Non-Concur" responses prior to submission.

c. Type II, Independent External Peer Review (Safety Assurance Review). The DDR, SARM Project Reach 9 – Phase 2A and Phase 3 P&S, along with the O&M manual shall undergo a Type II IEPR, SAR during the Design and Construction Phases. A brief identification of the points of emphasis for each phase of work is below; followed by general review guidelines for the Type II IEPR, SAR team.

1. Charges
   The Review Management Organization (RMO) will develop the charges for the review, per EC 1165-2-209. The charges will contain the instructions regarding the objective of the peer review and the specific advice sought. Reviewers shall be charged with reviewing scientific and technical matters, leaving policy determination for USACE and the Army. The charge should specify the structure of the review comments to fully communicate the reviewer's intent by including: the comments, why it is important, any potential consequences of failure to address, and suggestions on how to address the comment. It should include specific technical questions while also directing reviewers to offer a broad evaluation of the overall document. The charge should be determined in advance of the selection of the reviewers.

2. Emphasis of Review for Work Product: During the Design Phase, key features and components to be evaluated and reviewed are the soil material/characteristics, scour analysis, and the structural design of the sheet pile. When reviewing the DDR and P&S, the IEPR team should verify that the assumptions made are sound.

   During the construction phase, the panel should verify assumptions made during the design are still valid through construction. Verifying sheet piling/tie-backs are constructed properly and checked and protection of utilities.

   When reviewing the O&M manual, the IEPR team should verify that the requirements specified maintain the conditions anticipated for the project to function properly in the future.

3. General Review Guidelines

   Panel members will address all underlying planning, safety assurance, engineering, economic, and environmental analyses, not just one aspect of the project.

   During the Design Phase, panel members shall evaluate and review the design submittals and provide their comments in DrChecks. The design submittals will be at various stages of completion, as defined in the Section 7 of this RP. Panel member will address key features and components to validate the state of the art approach being used to design and construct the system.

   During the Construction Phase, a 2-day site visit shall be scheduled for the panel to evaluate and review construction activities. During the visit; the appropriate peer reviewers will monitor the progress of construction and review critical construction operations. The visit should coincide with the mid-point of construction operations and shall terminate with an exit briefing, which

will be scheduled by the Project Manager and will be conducted at the Prado Dam Field Office. Each reviewer shall document each site visit with a Field Visit report. The Field Visit reports will include a check list, photographs and text summarizing observations and information noted during each site visit. The Field Visit Reports shall be included in the Construction Final Report as an appendix.

d. Policy and Legal Compliance Reviews. All decision documents will be reviewed throughout the study process for their compliance with law and policy. Guidance for policy and legal compliance reviews is addressed in Appendix H, ER 1105-2-100. These reviews culminate in determinations that the recommendations in the reports and the supporting analyses and coordination to higher authority.

5. REVIEW TEAM**.** In addition to the A-E's, Tetra Tech, own independent reviewers for the DDR, the PDT team and in-house DQC's that had reviewed the design and P&S for the SARM Project Reach 9 – Phase 2A project deliverables are also reviewed by Riverside County Flood Control District, utilities companies (Edison, Metropolitan Water District (MWD), City of Corona, Green River Home Owners Association (HOA)), Coordination's with Stakeholders (State Parks, BNSF railroad, Orange County Flood Control District, State of California Department of Transportation District 8 and 12), maintenance departments, and SPL staff from Engineering, Planning, and Construction divisions (BCOE). Phase 2A underwent several Independent Technical Reviews (ITR) in 2006, 2007, and 2010; current team will be listed due to members have retired, passing away, or no longer working for SPL. Phase 3 is currently being designed. The following is a list of the current review team members:

A. Project Delivery Team.

Name	Discipline	Agency/Office	Phone No.
Thomas Bucklew	Project Manager	CESPL-PM-C	213-280-9511
Robert Kwan	Lead Engineer	CESPL-ED-DA	213-452-3639
Wilson Diep	Civil Engineer	CESPL-ED-DA	213-452-3640
Shawn Murphy	Civil Engineer	CESPL-ED-DA	213-452-3616
Robert Castle	Hydraulics	CESPL-ED-HH	213-452-3557
Francis Omoregie	Materials	CESPL-ED-GI	213-452-3599
Jeff Devine	Geology and Investigations	CESPL-ED-GG	213-452-3579
Tony Wong	Structural	CESPL-ED-DS	213-452-3700
Rafiqul Talukder	Cost Engineer	CESPL-ED-DS	213-452-3745
Steve Chickey	Geotechnical	CESPL-ED-G	213-452-3590
Hayley Lovan	Environmental	CESPL-PD-RQ	213-452-3863
Pete Garcia	Real Estate	CESPL-RE-P	213-452-3131

B. Tetra Tech Design Team (A-E Team).

Name	Discipline	Phone No.
Bob Hall	PM	213-327-0800
Patti Sexton	Design Lead	949-809-5099

C. Los Angeles District Quality Control (DQC) Review Team

Name	Discipline	Agency/Office	Phone No.
Paul Underwood	Project Manager	CESPL-PM-C	213-452-4004
Juan Martinez	Civil	CESPL-ED-DA	213-452-3649
Gonzalo Galvan	Structural	CESPL-ED-DS	213-452-3697
Van Crisostomo	Hydraulics	CESPL-ED-HH	213-452-3558
Robert Mrse	Hydraulics	CESPL-ED-HH	213-452-3570
David Lukesh	Geotechnical/Materials	CECO-C-RAO	202-761-8548
Juan Dominguez	Cost Engineer	CESPL-ED-DD	213-452-3737
Joseph Flynn	Construction	CESPL-CD-SR	951-898-6151
Hugh Brown	Construction	CESPL-CD-SR	951-898-6142
Thomas Pagiegal	Construction	CESPL-CD-SR	951-898-6144
David Garcia	Civil	RCFCWCD, Sponsor	951-955-1299
Lawrence Smith	Environmental	CESPL-PD-RN	213-452-3846
Huma Nisar	DQC Manager	CESPL-ED-DB	213-452-3665

a. Review Management. The DQC review is managed within SPL. The RMC will be the RMO for this project, and will be in close coordination with the SPD MSC and FRM PCX, for all work products.

b. District Quality Control. Reference is made to the Quality Management Plan that identifies the activities, roles and responsibilities for the DQC of the SARM Project Reach 9 – the Phase 2A, Phase 2B and Phase 3 embankment protection.

c. Agency Technical Review. The ATR team will be established per ER 1110-1-12 and EC 1165-2-209. The Corps will manage the ATR internally and it will be conducted by individuals and organizations that are separate and independent from those that accomplished the work, in accordance with policy. As stipulated in EC 1165-2-209, the RMC serves as the RMO for Dam and Levee Safety Modification projects, and will be responsible for selecting the ATR Lead and identifying the other ATR Team members. ATR members will be sought from the following sources: regional technical specialists (RTS); appointed subject matter experts (SME) from other districts; senior level experts from other districts; Center of Expertise staff; appointed SME or senior level experts from the responsible district; experts from other Corps commands; contractors; academic or other technical experts; or a combination of the above. The ATR Team Leader will be a Corps of Engineers employee outside the South Pacific Division.

d. Type II IEPR Panels and Members. An RMC contract will be utilized to acquire the services of an OEO to manage the IEPR. Colin Krumdieck is the RMC POC. The disciplines required for the Type II IEPR SAR, and the expertise required within each disciplines, is included in Appendix B.

6. PUBLIC COMMENT**.** To ensure that the peer review approach is responsive to the wide array of stakeholders and customers, both within and outside the Federal Government, SPL will provide an opportunity for public comment by posting the approved RP on its public website,

http://spl.usace.army.mil/review_plans, for 30 calendar days. This is not a formal comment period; however, if and when comments are received, the PDT will consider them and decide if revisions to the review plan are necessary. If significant and relevant comments are made, the comments will be provided to the reviewers before they conduct their review.

7. REVIEW SCHEDULE**.**

a. General: Based on SPL's commitment to executing the SARM Project Reach 9 – Phase 2A, Phase 2B and Phase 3 embankment protection projects schedule for DDR, P&S and construction, milestones for the DQC, ATR, and IEPR, (SAR) process have been determined and are documented in the below.

SARM Project Reach 9 Design Documentation Report Milestones

Review Plan Approval by SPD	**20 May 2011**
Submit Draft DDR for DQC	2 May 2011
PDT Review Completed	16 May 2011
Submit Final Draft DDR for DQC	7 June 2011
Submit Final Draft DDR for ATR and SAR	7 June 2011
ATR Certification	29 July 2011
SAR Report Approval by SPD	29 July 2011
DDR Approval	1 Aug 2011

SARM Project Reach 9 - Phase 2A Plans and Specifications Milestones

Submit Final Draft P&S for DQC	**2 May 2011**
Submit Final Draft P&S for ATR and SAR	31 May 2011
ATR Certification	29 July 2011
SAR Report Approval by SPD	29 July 2011
BCOE Review Certification	29 July 2011
P&S Approval	3 Aug 2011

SARM Project Reach 9 - Phase 3 Plans and Specifications Milestones

Submit Final Draft P&S for DQC	**30 June 2011**
Submit Final Draft P&S for ATR and SAR	27 July 2011
ATR Certification	22 Sept 2011
SAR Report Approval by SPD	22 Sept 2011
BCOE Review Certification	22 Sept 2011
P&S Approval	26Sept2011

SARM Project Reach 9 - Phase 2A Construction Contract Milestones

Pre-Advertise notice published (15 days before RTA	**19 July 2011**
Contract Ready to Advertise	3 Aug 2011
Construction Contract Advertise	4 Aug 2011

BID Opening	6 Sept 2011
Construction Contract Awarded	16 Sept 2011

SARM Project Reach 9 - Phase 3 Construction Contract Milestones

Pre-Advertise notice published (15 days before RTA	**14 Sept 2011**
Contract Ready to Advertise	29 Sept 2011
Construction Contract Advertise	3 Oct 2011
BID Opening	4 Nov 2011
Construction Contract Awarded	18 Nov 2011

b. Funding ATR. It is anticipated that the total cost for the ATR efforts described in this plan will be approximately $200,000. The Los Angeles District will provide labor funding by cross charge labor codes. Funding for travel, if needed, will be provided by way of a government order. The Project Manager will work with the ATR team leader to ensure that adequate funding is available and is commensurate with the level of review needed. Any funding shortages will be negotiated on a case by case basis and in advance of a negative charge occurring.

The ATR team leader shall provide organization codes for each team member and a responsible financial point of contact (CEFMS responsible employee) for creation of labor codes. Reviewers shall monitor individual labor code balances and alert the ATR team leader to any possible funding shortages.

c. Funding IEPR. It is anticipated that the total cost for the IEPRs identified within this plan will be approximately $400,000. The cost of panels for Type II IEPR, will be shared in accordance with the project purpose(s). RMC will transfer SAR contract capacity to the MSC/District for completion of the SAR

8. DOCUMENTATION OF REVIEW.

a. ATR Communication and Documentation. The communication and documentation plan for the ATR is as follows:

(1) The team will use DrChecks to document the ATR process. The Technical Project Leader will facilitate the creation of a project portfolio in the system to allow access by all PDT and ATR team members. An electronic version of the documents, appendices, and any significant and relevant public comments shall be posted in Adobe Acrobat PDF format at: ftp://ftp.usace.army.mil/pub/ at least one business day prior to the start of the comment period.

(2) The PDT shall host an ATR kick-off meeting virtually to orient the ATR team during the first week of the comment period. If funds are not available for an on-site meeting, the PDT shall provide a presentation about the project, including photos of the site, for the team.

(3) The Technical Project Leader shall inform the ATR team leader when all responses have been entered into DrChecks and conduct a briefing to summarize comment responses to highlight any areas of disagreement.

(4) A revised electronic version of the documents with comments incorporated shall be posted at ftp://ftp.usace.army.mil/pub/ for use during back checking of the comments.

(5) PDT members shall contact ATR team members or leader as appropriate to seek clarification of a comment's intent or provide clarification of information in the report. Discussions shall occur outside of DrChecks but a summary of discussions may be provided in the system.

(6) Reviewers will be encouraged to contact PDT members directly via email or phone to clarify any confusion. DrChecks shall not be used to post questions needed for clarification.

b. ATR Resolution.

(1) Reviewers shall back check PDT responses to the review comments and either close the comment or attempt to resolve any disagreements. Conference calls shall be used to resolve any conflicting comments and responses.

(2) Reviewers may "agree to disagree" with any comment response and close the comment with a detailed explanation. If reviewer and responder cannot resolve a comment, it should be brought to the attention of the ATR team leader. If the ATR team leader is unable the resolve the issue, the ATR team leader will implement the guidelines as described below in the paragraph on Dispute Resolution.

(3) The ATR team will identify significant issues that they believe are not satisfactorily resolved and will note these concerns in the Technical Review Certification documentation. The ATR team will prepare a Review Report which includes a summary of each unresolved issue. Review Reports will be considered an integral part of the ATR documentation. Annotated ATR comments will be provided to the RMC and the RMC will notify the District of closure of each phase of ATR or identify issues remaining for resolution.

(4) Significant unresolved ATR concerns that are documented by the RMC will be forwarded through the MSC to the HQ USACE RIT, including basic research of Corps guidance and an expression of desired outcome, for further resolution in accordance with the policy issue resolution process described in ER 1110-2-12 or Appendix H, ER 1105-2-100, as appropriate. HQ USACE may choose to defer the issue to the policy compliance review process or address it directly. At this point the ATR documentation for the concern may be closed with a notation that the concern has been elevated for resolution by HQ USACE. Subsequent submittals of reports for MSC and/or HQ USACE review and approval shall include documentation of the issue resolution process.

c. ATR Certification. To fully document the ATR process, a statement of technical review will

be prepared for each product reviewed. The ATR documentation will include the text of each ATR comment, the PDT response, a brief summary of the pertinent points in the ensuing discussion, including any vertical coordination, and the agreed upon resolution. Certification by the ATR team leader and the Technical Project Leader will occur once issues raised by the reviewers have been addressed to the review team's satisfaction. Indication of this concurrence will be documented by the signing of a certification statement (Appendix C).

d. IEPR Communication and Documentation. The communication and documentation plan for the IEPR is as follows:

(1) The panel will use DrChecks to document the IEPR process. The Technical Project Leader will facilitate the creation of a project portfolio in the system to allow access by all PDT and the outside eligible organization (OEO). An electronic version of the documents, appendices, and any significant and relevant public comments shall be posted at: ftp://ftp.usace.army.mil/pub/ at least one business day prior to the start of the comment period.

The OEO will compile the comments of the IEPR panelists, enter them into DrChecks, and forwards the comments to the District. The District will consult the PDT and outside sources as necessary to develop a proposed response to each panel comment. The District will enter the proposed response to DrChecks, and then return the proposed response to the panel. The panel will reply to the proposed response through the OEO, again using DrChecks. This final panel reply may or may not concur with the District's proposed response and the panels final response will indicate concurrence or briefly explain what issue is blocking concurrence. There will be no final closeout iteration. The District will consult the vertical team and outside resources to prepare an agency response to each comment. The initial panel comments, the District's proposed response, the panels reply to the District's proposed response, and the final agency response will all be tracked and archived in DrChecks for the administrative record. However, only the initial panel comments and the final agency responses will be posted. This process will continue to be refined as experience shows need for changes.

(2) The Technical Project Leader shall inform the IEPR panel when all responses have been entered into DrChecks and conduct a briefing to summarize comment responses to highlight any areas of disagreement.

(3) A revised electronic version of the documents with comments incorporated shall be posted at ftp://ftp.usace.army.mil/pub/ for use during back checking of the comments.

(4) PDT members shall contact IEPR panel members as appropriate to seek clarification of a comment's intent or provide clarification of information in the report. Discussions shall occur outside of DrChecks but a summary of discussions may be provided in the system.

(5) The IEPR panel shall produce final Review Reports, including documentation of the peer review of the Project Design and field visit reports on construction activities.

(6) The SAR comments and recommendation letter must be provided to RMC as soon as they become available.

e. Dispute Resolution. The IEPR manager shall review the products and comments, PDT responses and back check of responses to reviewer's comments to identify any outstanding disagreements between members of the PDT and the review panel. Resolution meetings must be set when resolution is not readily achievable. The RMC must attend the SAR comment resolution meetings with the panel and the meeting must be scheduled with consideration of the RMC schedules and with enough notice to facilitate attendance. When resolutions are not readily achievable, the RMC should engage the PCX or MSC subject matter experts (SMEs) to help facilitate resolution, and they in turn may choose to engage HQ USACE SMEs. HQ USACE may choose to defer the issue to the policy compliance review process or address it directly. If a specific concern still remains unresolved, the district is to pursue resolution through the policy issue resolution processes described in Appendix H, ER 1105-2-100, ER 1110-1-12, or other applicable guidance.

f. IEPR Certification. The responses to the SAR comments must be provided to the RMC. RMC must concur with closure of the SAR

9, POINTS OF CONTACT**.** Questions about this Review Plan may be directed to the Los Angeles District Project Delivery Team, Design Lead Supervisor, Mrs. Emili Kolevski, P.E at (213) 452-3659, or to the Project Manager for The SARM Project Reach 9 – Phase 2A, Phase 2B and Phase 3, Mr. Thomas Bucklew at (213) 280-9511. The Chief, Engineering Division is Mr. Richard J. Leifield, P.E at (213) 452-3629. Inquiries to the MSC should be directed to Paul Bowers at (415) 503-6556.

10. REVIEW PLAN APPROVAL**.** The Review management Office (RMO) for all work products of SARM Project Reach 9 - Phase 2A, Phase 2B and Phase 3 is the RMC, with in close coordination with the SPD MSC and FMR-PCX.

In summary, the Los Angeles District proposes to fully comply with all existing guidance, and conduct DQC, ATR, and Type II IEPR (Safety Assurance Review) in accordance with EC 1165-2-209. Approval of this RP as outlined above will help facilitate the District's completion of the SARM Project Reach 9 - Phase 2A, Phase 2B and Phase 3 features to complete the within the authorized schedule. In order to ensure the RP is in compliance with the principles of EC 1165-2-209, the RP must be approved by the applicable MSC, in this case the Commander, South Pacific Division (SPD). Once the RP is approved, the District will post it to its district public website and notify SPD. If necessary, any changes to the review plan will be approved by following the process used for initially approving the plan.

The Los Angeles District requests that the South Pacific Division endorse the above recommendations and approve this RP as described in Appendix B of EC 1165-2-209.

ATTACHMENT 1

QUALITY CONTROL PLAN FOR THE PREPARATION OF DESIGN DOCUMENTATION REPORT and PLANS, SPECIFICATIONS, & COST ESTIMATE

LOWER SANTA ANA RIVER - REACH 9

Phase 1, 2A, 2B, AND 3

ORANGE COUNTY, CALIFORNIA

Prepared by:

TETRA TECH

17885 Von Karman Avenue, Suite 500
Irvine, CA 92614

June 2010

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LIST OF TABLES

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1. DESCRIPTION OF THE PROJECT

Lower Santa Ana River Reach 9 is located in Orange County downstream of Prado Dam. This task order pertains to Reach 1 Phase 1, (Weir Canyon Road to Gypsum Canyon Road), Phase 2A (Mobile Home Park to Prado Outlet), Phase 2B (Coal Canyon Road to Mobile Home Park), and Phase 3 (Gypsum Canyon Road to Coal Canyon Road).

Construction is complete on Phase 1 and is underway for Phase 2A. Design is nearing completion on Phase 2B. Phase 3 design and construction has not begun.

2. PRODUCTS TO BE DEVELOPED

Tetra Tech has been retained to prepare a Design Documentation Report (DDR) for the entire Santa Ana River Reach 9 including Phase 1, Phase 2B, Phase 2A, and Phase 3, and Phase 3 final plans and specifications for solicitation of bids, including pre-construction contract services, and engineering during construction (EDC) services. The design work includes approximately 1400 linear feet of scour protection along the California State Route 91 and the Santa Ana Regional Interceptor (SARI) sewer line.

3. NAME AND LOCATION OF THE CLIENT

a. Tetra Tech's client for this project is:

U.S. Army Corps of Engineers
Design Branch
Engineering Division
911 Wilshire Street
Los Angeles, CA 90017

b. The Los Angeles District's client and end user of the project when construction is complete is:

Orange County Public Works

4. MANAGEMENT PHILOSOPHY

a. Reference Tetra Tech, Inc., *Quality Assurance and Quality Control Standard Operating Procedures.*

b. A primary objective and commitment of Tetra Tech is to produce high-quality products responsive to the client's needs. Systematic quality assurance and quality

control is a key aspect of the company's management system. The company builds into its cost proposals a requirement to conduct full independent technical reviews of all critical products, and all product deliverables to the Corps of Engineers.

c. Our quality control program is based upon a team approach to assure the most efficient use of staff resources and the highest levels of internal independent technical review. Our quality control manager assures the appropriate reviewers are assigned and they conduct thorough reviews.

5. MANAGEMENT APPROACH

a. This Quality Control Plan, prepared and approved in accordance with reference 4.a., is an important tool for achieving the quality objective. It defines the process to be used in the development of the project, with particular emphasis on reviews. The plan also identifies the members of the development and review teams and summarizes their qualifications.

b. The elements of this quality control plan will include the following:

1. Actively involve all elements of project management

2. Ensure that quality control is an integral part of the project and not just an "end of job" review

3. Consider quality objectives and standards as equal or superior to budget and schedule considerations in all project management decisions

4. Ensure that the scope of work is technically complete and workable in consideration of budgetary and scheduling constraints

5. Commit necessary resources to achieve the project objectives

6. Ensure frequent communication on progress of the work and problems and accomplishments

7. Provide periodic review of project performance related to the planned schedule and budget goals

6. INDEPENDENT TECHNICAL REVIEW (ITR) GUIDELINES

The ITR will be conducted as outlined in reference 4.a. Independent technical reviewers have been assigned who, collectively, have expertise in all of the same technical disciplines required on the Technical Development Team for the preparation of the products. The Project Manager, acting as the Technical Development Team Leader (TDTL), will be the principal coordinator between the development team and the reviewing team. As each product is completed, copies will be provided by the TDTL to the appropriate independent reviewers. The reviewers will review the product and provide comments. The TDT members will revise the product accordingly. The written comments and responses for all ITRs will be maintained until the project is completed. After the ITR is completed, the reviewers will sign a certification form indicating completion of their reviews and satisfactory resolution of their comments. The TDTL will maintain the originals of the certifications and provide copies to the Tetra Tech Quality Assurance Manager.

7. OTHER REVIEWS

a. Calculation Checking. Calculations performed by hand and calculator will be spot-checked. Formulas developed to perform calculations by spreadsheet or database will be checked, and the results from the spreadsheet or database will be spot-checked. Calculations performed by standard or routinely used computer programs will not be checked, but the checker will verify that the program used is appropriate (verification signified by no comment) and spot-check the input data and results for reasonableness.

b. Technical Oversight Reviews. Whenever a technical product is produced by an assistant under the technical direction of a senior technical specialist, the senior specialist will review the product prior to its submission for ITR.

c. Quality Assurance. Tetra Tech will perform the necessary quality assurance activities to insure that the appropriate quality control monitoring activities are carried out and documented, but Tetra Tech will not conduct quality assurance reviews. The Corps of Engineers (COE) will perform quality assurance reviews, as they deem necessary.

8. TECHNICAL DEVELOPMENT TEAM (TDT)

The TDT members, their areas of expertise, and their years of experience are listed in Table 1.

Table 1. Technical Development Team

Name	Expertise	Years of Experience
Patti Sexton, PE	Water Resources	18
Yen-Hsu Chen, PE	Civil Design	33
Thad Watkins, PE	Civil Design	8
Dave Pizzi, PE	Hydraulics, Sediment	10
Chitta Gangopadhyay, PE	Structural	20
Joe Roe, CEG	Geotechnical	10

9. INDEPENDENT TECHNICAL REVIEWERS

The independent technical reviewers assigned to the project, their areas of expertise, and their years of experience are listed in Table 2.

Table 2. Independent Technical Review Team

Functional Responsibility	Name	Experience in Function
Civil	Bob Hall, P.E.	40 years
Hydraulics / Scour	Bill Fullerton, P.E.	30 years
Geotechnical	Tom Chapel, CPG, P.E.	32 years

10. DESIGN TOOLS

The design will be prepared using three-dimensional Microstation V8-XM. Plots are produced on an HP DesignHet 4000PS. The cost estimates will be prepared using Microcomputer Aided Cost Estimating System, 2nd Generation (MCACES-Mii). We also use Microsoft Word, Excel, PowerPoint, and Project.

11. MAJOR MILESTONES

Submit Intermediate (50%) DDR and Design Material to COE	24 Nov 10
Submit Final (100%) DDR and Design Material to COE	24 Mar 11

12. CONSTRUCTION COST ESTIMATE CONTROL

An MCACES (Mii) cost estimate will be provided with the Intermediate and Final Plans and Specifications. At each stage the contingencies will be adjusted to reflect the degree

of accuracy of the data supporting the estimate. As details are finalized, the MCACES estimates will more closely reflect the actual construction costs. The final cost estimate will have a contingency of 5%. The final engineer's estimate will require confidentiality. The costs will be presented in MCACES (Mii) format and will be summarized in a spreadsheet for the bid schedule.

13. COMMUNICATIONS

a. Internal communications within Tetra Tech will be conducted on a regular basis as the work is being performed. Extensive communications will be required between the civil designers, the structural designers, geotechnical engineers and the cost estimating designers. External communication for development of the plans and specifications is also required with the environmental specialists (COE), and the SARI line owners (OCSD).

b. Formal communications with the Corps of Engineers will be done between the Tetra Tech project manager, Patti Sexton, and the COE project engineer, Frank Malette. Communications of a routine nature will be conducted between any of the parties as needed. For communications with the local sponsor of other than a routine nature, Tetra Tech will go through the COE Project Engineer. Project meetings will be held with the COE, the sponsor, and Tetra Tech for the purpose of discussing issues and providing status.

c. Requests for modifications to the contract will be initiated by the Tetra Tech project manager to the COE project engineer.

14. RISKS INHERENT IN THE PROJECT

a. The project is to be designed to provide protection from the design outflow from Prado Dam (30,000 cfs). Floods exceeding the design level may escape or damage the river banks and cause flood damage adjacent to the river.

b. Flows within the design ranges (i.e. up to 30,000 cfs) are expected to result in vertical scour to the channel bed and lateral movement of the channel alignment. The bank protection will be designed with the expectation that while the channel is dynamic, the bank protection will be able to withstand that horizontal and vertical movement over a 100 year period of time.

c. Plantings of native species will require special attention to assure successful establishment. This will be the responsibility of the COE.

15. GOVERNMENT FURNISHED ITEMS

The Government will furnish:

- Survey CADD files
- SARI Scour Study
- DGN files of reaches 1, 2A, and 2B
- Environmental Appendix for DDR
- IGE for Phase 2A and 2B
- Specifications for Phase 1, 2A, and 2B
- Supplemental geology report prepared to support sheetpile option
- EC&IFP for Phase 1, 2A, and 2B

17. DOCUMENTS TO BE REVIEWED BY THE ITRT

a. Intermediate (50%) DDR and Design Material
b. Final (100%) DDR and Design Material
c. Final ECIF

18. PARTNERING AND CONFLICT RESOLUTION PROCEDURES

a. Between Tetra Tech and the COE. Routine questions and issues arising during the development of the project will be discussed and resolved, if possible, between Tetra Tech's Ms. Patti Sexton and the COE Project Engineer, Mr. Frank Mallette. Any issues that cannot be reconciled at this working level will be escalated to the appropriate levels in the two organizations. Ms. Sexton and Mr. Mallette will coordinate within their respective organizations to determine the appropriate decision-makers to address the issues and will schedule a meeting between the decision-makers and their support staffs to address and resolve the issues.

b. Between the COE Local Sponsor and Tetra Tech. Any partnering with Orange County Public Works for this project will be under COE auspices. Tetra Tech will attend partnering meetings with the sponsor as a COE technical resource and only at the express invitation of the COE.

19. PROJECT CONSTRAINTS

The project will be designed to provide protection from a 30,000 cfs release from Prado Dam.

20. REVIEW OF GOVERNMENT FURNISHED ITEMS

The COE will provide the Draft Design Documentation Report and Appendices for Tetra Tech's use in developing the project documents. Any discrepancies between the Government-furnished documents and actual site conditions noted by Tetra Tech personnel during the development of the project will be reported to the COE.

Patti Sexton June 14, 2010

Patti Sexton, P.E. (Date)
Technical Development Team Leader

Approved by:

Bob Hall June 14, 2010

Bob Hall, P.E. (Date)
Quality Assurance Manager

ATTACHMENT 2

U. S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT

USACE Contract W912PL-10-D-0023
Task Order 003

Geotechnical Investigation for the Lower Santa Ana River Reach 9 – Phase IIA
Riverside and San Bernardino Counties, California

Quality Control Plan

January 2011

URS Project No. 29871603

Prepared by

URS GROUP, INC.
2020 East First Street, Suite 400
Santa Ana, CA 92705-4032
714-835-6886
Fax 714-973-4062

1.0 QUALITY CONTROL PLAN

This plan delineates specific actions that will be taken to verify that all deliverables are thorough, complete and meet the professional standard of care. The URS QMS applies to this task order. All project deliverables will be detail-checked and reviewed according to the URS QMS and the quality documentation will be maintained in the PCF. The assigned checker and reviewer will have experience with the subject matter and will not have been involved in developing or preparing the work.

A completed Project Initiation Checklist (QMS Form 3-1) that identifies specific parts of the QMS that are expected to apply to this project is included in Attachment A and is filed in the Quality folder *710 Proj Init Checklist* in the PCF. Blank copies of other forms needed for this task order are also included in Attachment A.

1.1 PROJECT INITIATION AUDIT

A Project Initiation Audit is required to be completed within 30 days of project initiation in the Time Sheet Collection System. The Project Manager is responsible for notifying the Division Quality Representative that his project requires a Project Initiation Audit.

1.2 APPLICABLE QMS ELEMENTS

Below is a minimum list of quality control elements and associated forms that will be used for this project. Refer to Volume 3 – *Quality Instructions* of the QMS for detailed instructions on completing the forms. A hard copy of the forms is included in Attachment A. Electronic copies of individual forms are included in the project directory in folder *701 Blank forms with job info*. When one of these electronic forms is used, it is acceptable to fill in as much information as possible electronically – in this case the form should be saved using a modified name to enable easy retrieval and to preserve the original template.

- Calculation Cover Sheet [Quality Form 3-3] – Required for each calculation
- Detail Check [Quality Form 3-4] – To be completed for each deliverable. The deliverables are listed in Attachment B. The deliverable will undergo a thorough review for correctness of content, completeness, technical accuracy and grammar; it may be necessary to use one checker for grammar and style review and another for other checking.
- Independent Technical Review [Quality Form 3-6] – An ITR of each deliverable will be completed to meet the schedule. Detail checking should be completed before the ITR. The ITR will review the deliverable for completeness, readability and compliance with scope requirements and the professional standard of care.

  The ITR reviewers are assigned by the Project Manager. ITR reviewers are selected based on individual expertise and qualifications to perform the review and will participate in the planning of the Task Order execution and carry through the entire Task Order. ITR reviewers will review all aspects of the work. Attachment A contains the forms for documentation of ITRs.

Comments made by checkers and reviewers must be accepted or rejected by the responsible originator. Any differences of opinion will be resolved by the TOM, PM or PIC. Accepted comments and resolutions will be back-checked to insure they are appropriately incorporated.

Furthermore, the USACE will initiate the DrChecks electronic review comment and response process, and URS will document its responses to the USACE comments. Upon completion and approval by the USACE, the DrChecks process will be closed by the USACE Project Manager, certifying full compliance and satisfactory response to comments on the final work product.

1.3 QUALITY GUIDELINES

The following Quality Guidelines available on the Quality page on the SoURSe will be followed:

- Guidelines for Statements of Limitations
- Guidelines for Project Reviews
- Guidelines for Color-coded Marking Procedures
- Guidelines for Preparing & Checking Calcs
- Guidelines for Preparing & Checking Drawings

1.4 QC STAFF

Messers Michael Luebbers, Fahim Hakemi, and Leo Handfelt are designated to perform Independent Technical Reviews. Messers Luebbers and Handfelt for Geotechnical and Mr. Hakemi for Structural. The Task Order Manager Michael Smith will assign calculations, checkers and detailed checkers as appropriate for the calculations being performed.

1.5 PROJECT REVIEW

Per Procedure 8 in the URS QMS, a Project Review will be required for this project. The TOM will conduct the review after the Draft GDDR has been submitted. The attendees will include (at a minimum) the Office Manager or designee, the TO PIC, the lead team member from each division with a significant role in the project, the Office Quality Officer and the Engineering Manager. QMS Form 8-1 will be used to guide and document the Project Review process. Documentation of the review will be placed in the PCF.

1.6 TECHNICAL SOFTWARE

The definition and usage of technical software is governed by *Quality Instruction 3-6*. In most cases, technical software applications used on projects to help develop a deliverable must be verified. Before using a software application, confirm that the application is listed in Section 4.3 as being authorized for use and as having been verified. If the software application (including the exact version) is not authorized for use or needs to be verified, talk to the Project Manager and/or Discipline Lead Professional (DLP)

about the software application. If verification is required, it must be completed according to *Quality Instruction 3-6* of the URS QMS before using the software application.

1.7 Applicable Standard Operating Procedures

No additional standard operating procedures are required.

1.8 Other Required Quality Plans

The URS Quality Management System is sufficient for this project.

1.9 Client Feedback

Client feedback will be requested prior to the Project Review, with the expectation that the feedback will be available for the review. Either the Online Client Survey System (OCSS) will be used or a hard copy of QMS Form 5-1 Client Feedback Survey will be mailed to solicit feedback. The TOM will notify the client that a survey request will be sent and the TO PIC will follow up with the client after the survey has been completed.

1.10 Corrective and Preventive Actions

When nonconformance or potential nonconformance is identified through audits or otherwise, the TOM must prepare and implement Corrective Action or Preventive Action plans in a timely manner. Corrective Actions must be based on a root cause analysis and must be permanent and effective. The TOM and TO PIC must work with the Office Quality Officer or designee to identify potential improvement opportunities and implement them as appropriate.

1.11 Resolution of Conflicts

The PIC, PM and Technical Manager, as applicable, will meet to discuss and resolve any significant technical disagreements or differences.

1.12 Software

The software listed in the following table is approved for use on this project, provided verification is completed or is not required:

Approved Software Application Name and Version[2]	Verification Required?
Microsoft Office Word 2003 with Service Pack 3	No, not technical software[3]
Portable document file (pdf) creators and readers – various, including Nuance PDF Converter Processional V 5, pdf995, Nitro and Adobe	No, not technical software[3]
Lotus Notes V 6.5	No, not technical software[3]
Adobe Photoshop Elements 8	No, not technical software[3]
Microsoft Project Professional 2002	No, not technical software[3]
Microsoft Office Excel 2003 with Service Pack 3	No, exempted by QI 3-6[4]
Microstation V 8	No, exempted by QI 3-6[4]
AutoCAD V 2008	No, exempted by QI 3-6[4]
ArcInfo	No, exempted by QI 3-6[4]
Microsoft Excel workbooks (involving calculations to support a deliverable)	None identified
SlopeW	No, exempted by QI 3-6[4]
CPet-IT	No, exempted by QI 3-6[4]
CLiq	No, exempted by QI 3-6[4]

1. V means version. QI means URS Quality Instruction.
2. Later versions are always acceptable.
3. Products (such as a pdf file) of non-technical software or graphs may be subject to Detail Checking.
4. Although programs such as Excel and MathCAD are exempted from verification, applications such as Excel workbooks written to run on these exempted programs are subject to verification if the results are used to support a deliverable directly.

Based on the above list of approved software applications, verification of technical software applications is not expected to be required for this project. However, additional programs and workbooks may be identified later by discipline leads and must be added to this PXP before being used. If the Discipline Lead Professional (DLP) (Michael Smith for the Geotechnical Division) indicates that verification is required, the technical software application will be verified according to *Quality Instruction 3-6* of the URS QMS. QMS Form 3-9 will be used to document the verification and will be sent by the Discipline Lead Professional to the Office Quality Officer (OQO) and will also be filed in the PCF. QMS Forms 3-9 will also be filed in the PCF for technical software that has been verified.

ATTACHMENT A

QMS FORMS

Project Planning Checklist

Project Name:		**Project Number:**	
Project Location:		**Client Name:**	
PM Name:		**PIC Name:**	

Stage	Required or Done? (check if 'yes')	Activity Relevant to the Project	QMS Reference		
			Procedure	Instruction	Form(s)
Proposal	☐	Review the RFP	2		
	☐	Complete the Go/No Go Process	2		
	☐	Complete the MAR Process	2		
	☐	Respond to the RFP	2		
	☐	Review Proposal and Contract	2		2-1
Planning	☐	Complete project accounting set up including the WAF	3		
	☐	Establish Project Central File/Document Control	1	1-1	
	☐	Prepare Project Execution Plan	3	3-1	3-2S, 3-2L, 3-2B, 3-2C
	☐	Prepare Standalone Project Quality Plan	3	3-1	
	☐	Prepare Project Health and Safety Plan	3		
Performance and Monitoring - All Services	☐	Conduct Project Kickoff Meeting	3		
	☐	Verification and Control of Technical Software	3	3-6	3-9
	☐	Review of Client-Provided Information	3	3-7	3-11
	☐	Review of Subconsultant/Subcontractor/Supplier Information	3	3-2, 3-3	3-12
	☐	Use of Monitoring and Measuring Devices	4		
	☐	Conduct Detail Check: ☐ Calculations ☐ Cost Estimates ☐ Specifications ☐ Drawings ☐ Studies and Reports	3	3-2	3-3, 3-4, 3-5
	☐	Conduct Independent Technical Review	3	3-3	3-5, 3-6
	☐	Prepare Design Directives	3		
	☐	Conduct Coordination Review	3	3-4	3-7
	☐	Conduct Constructability Review and/or Bidability Review	3	3-5	3-8
	☐	Application of Statement of Limitations	3	3-7	
	☐	Application of Electronic Media User Agreements	3	3-7	3-10
	☐	Changing the Work Product	3		
	☐	Conduct Project Closeout Meeting	3		
	☐	Acquire and Respond to Client Feedback	5		5-1
	☐	Internal Quality Audits	6		6-1
	☐	Conduct Project Review	8		8-1
Performance and Monitoring - Construction-related Services	☐	PIC Review	3		3-13
	☐	Construction Administration Log	3	3-9	
	☐	Site Observations	3	3-10	
	☐	Construction Schedule Reviews	3	3-11	
	☐	Payment Tracking and Cost Reporting	3	3-12	
	☐	Schedule Reporting	3	3-13	
	☐	RFI/Submittal Management	3	3-14	
	☐	Inspection Reports	3	3-15	
	☐	Change Order Management and Dispute Resolution	3	3-16	
	☐	Daily Reports	3	3-17	
	☐	Safety Documents	3	3-18	
	☐	Procurement Log	3	3-19	

Project Planning Checklist

Project Name:		**Project Number:**	
Project Location:		**Client Name:**	
PM Name:		**PIC Name:**	

APPROVAL and DISTRIBUTION

Project Manager Signature	**Date**
Principal-in-Charge Signature	**Date**

Distribution:

Project Central File – Quality file folder

Other Specify: _____

Calculation Cover Sheet

URS Quality

Project Name:		**Project Number:**	
Project Location:		**Client Name:**	
PM Name:		**PIC Name:**	

IDENTIFYING INFORMATION

(This section is to be completed by the Originator.)

Calculation Medium: ☐ Electronic — File Name:

(Select as appropriate) ☐ Hard-copy — Unique Identification:

Number of pages *(including cover sheet)*:

Discipline: [As needed]

Title of Calculation: [Brief title describing calculation]

Calculation Originator: [Name of primary originator]

Calculation Contributors: [If applicable, names of other contributors]

Calculation Checker: [Name of Checker]

DESCRIPTION & PURPOSE

[Briefly describe calculation and its purpose. Document in greater detail, as needed in calculations.]

BASIS / REFERENCE / ASSUMPTIONS

[Briefly describe here. Document in greater detail, as needed, in calculations.]

ISSUE / REVISION RECORD

Checker comments, if any, provided on: ☐ hard-copy ☐ electronic file ☐ Form 3-5 (MM)

No.	Description	P	S	F	Originator Initials	Date	Checker Initials	Date
0	Initial Issue	☐	☐	☐	[ ]	[ ]	[ ]	[ ]
1		☐	☐	☐	[ ]	[ ]	[ ]	[ ]
2		☐	☐	☐	[ ]	[ ]	[ ]	[ ]
3		☐	☐	☐	[ ]	[ ]	[ ]	[ ]

Note: For a given Revision No. Check off either P (Preliminary), S (Superseding) or F (Final). If there are no revisions to the Initial Issue check off F (Final). Comments may be provided on the hard-copy calculations, electronic file or on Form 3-5 (MM).

APPROVAL and DISTRIBUTION

☐ The calculations associated with this Cover Sheet have been checked.

_____ _____

Originator Signature **Date**

_____ _____

Checker Signature **Date**

_____ _____

Project Manager Signature **Date**

Distribution:

Project Central File – Quality file folder

Other Specify: _____

Detail Check Report

URS Quality

Project Name:		**Project Number:**	
Project Location:		**Client Name:**	
PM Name:		**PIC Name:**	

Identifying Information

(This section is to be completed by the Project Manager.)

Assigned Checker: Checker's Comments Required by:

Work Product Originator:

Work Product to be Checked:

☐ This Detail Check is a check for correctness, completeness and technical accuracy.
☐ This Detail Check is a technical edit for format, spelling, grammar, pagination and readability.

Submitted by: _____ _____

Project Manager Signature **Date**

Detail Check – Part 1: Comments

(This Section is to be completed by the Checker.)

Check box A **or** B:

A. ☐ All items have been found to be correct. Checker has no comments.

or

B. ☐ Checker's comments have been provided on:

☐ Marked directly on Work Product
☐ Comment and Disposition Form (Form 3-5 (MM))
☐ Other Specify: _____

_____ _____

Checker Signature **Date**

Detail Check – Part 2: Verification

(This section is to be completed by the Checker after verification of comment resolution, if box B is checked off above.)

Check box C **or** D and then E:

C. ☐ Verification of comment resolution has been performed by Checker AND any significant issues have been resolved between Originator and Checker.

or

D. ☐ Verification of comment resolution has been performed by Checker AND unresolved issues have been submitted to the Project Manager, Principal-in-Charge or designee for resolution.

and

E. ☐ Verification of correct incorporation of resolved comments into final Work Product is complete.

_____ _____

Checker Signature **Date**

APPROVAL and DISTRIBUTION

*(To be signed after box A **or** E are completed.)*

☐ The Detail Check is complete. Significant issues not resolved between the Checker and the Originator, if any, have been resolved by the Approver.

_____ _____

Project Manager, Principal-in-Charge or Designee Signature **Date**

Distribution:

Project Central File – Quality file folder
Other Specify: _____

URS Independent Technical Review Report Quality

Project Name:		**Project Number:**	
Project Location:		**Client Name:**	
PM Name:		**PIC Name:**	

Identifying Information

(This section is to be completed by the Project Manager.)

Assigned Independent Technical Reviewer: Reviewer's Comments required by:

Work Product Originator:

Work Product to be Reviewed:

Review Scope: [Include specific instructions on disciplines or elements to be reviewed, if any.]

Submitted by: _____ _____

Project Manager Signature **Date**

Independent Technical Review – Part 1: Comments

(This section is to be completed by the Reviewer.)

Check box A **or** B:

A. ☐ Reviewer performed review and has no comments.

or

B. ☐ The Reviewer's comments have been provided on:

☐ Marked directly on Work Product
☐ Comment and Disposition Form (Form 3-5 (MM))
☐ Other Specify: _____

_____ _____

Reviewer Signature **Date**

Independent Technical Review – Part 2: Verification

(This section is to be completed by the Reviewer after verification of comment resolution, if box B is checked off above.)

Check box C **or** D and then E:

C. ☐ Verification of comment resolution has been performed by Reviewer AND any significant issues have been resolved between Originator and Reviewer.

or

D. ☐ Verification of comment resolution has been performed by Reviewer AND unresolved issues have been submitted to the Project Manager, Principal-in-Charge or designee for resolution.

and

E. ☐ Verification of correct incorporation of resolved comments into final Work Product is complete.

_____ _____

Reviewer Signature **Date**

APPROVAL and DISTRIBUTION

*(To be signed after box A **or** E are completed.)*

☐ The review is complete. Significant issues not resolved between the Reviewer and the Originator, if any, have been resolved by the Approver.

_____ _____

Project Manager, Principal-in-Charge or Designee Signature **Date**

Distribution:

Project Central File – Quality file folder
Other Specify: _____

ATTACHMENT B

LIST OF DELIVERABLES

LIST OF DELIVERABLES

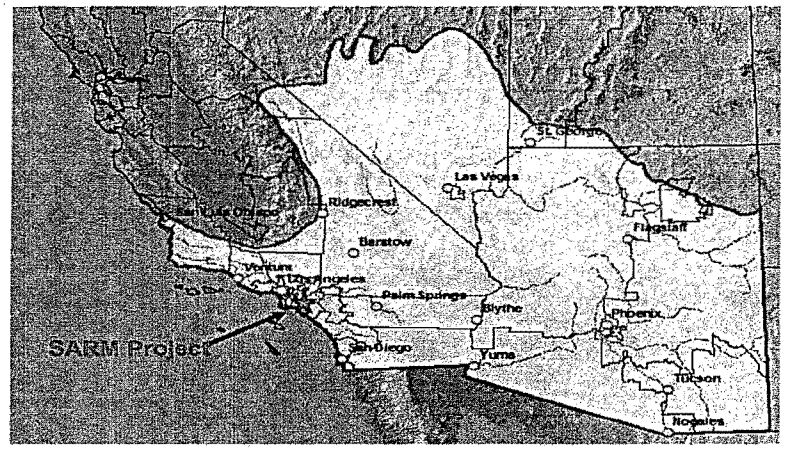
1. Draft and Final Geotechnical Appendix, Design Documentation Report
2. Draft and Final Geotechnical Memo MWD 119" feeder protection
3. Design plans for MWD feeder protection Structure
4. Review of selected technical specifications
5. Review of bank protection

APPENDIX- A

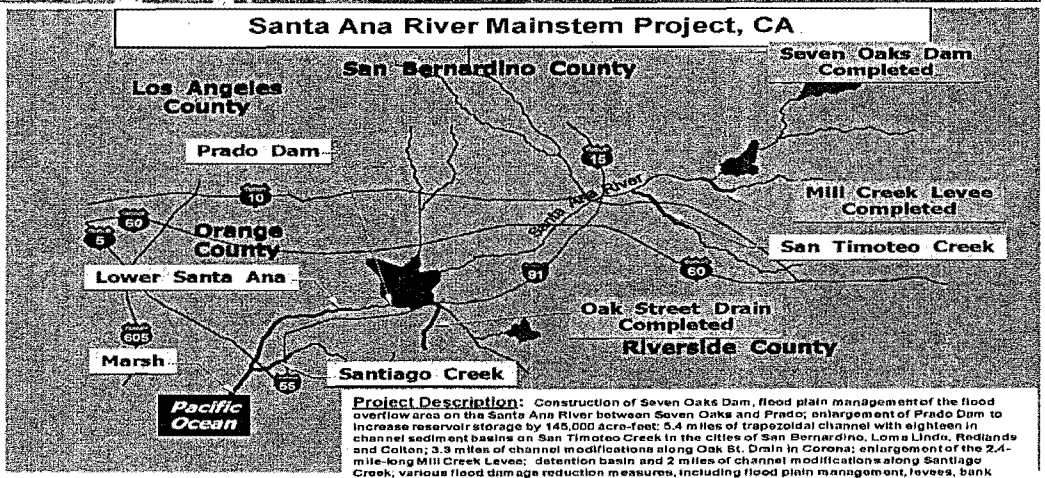
PROJECT LOCATION MAP

US Army Corps of Engineers

Project Location: The project is located along a 75-mile reach of the Santa Ana River in Orange, San Bernardino and Riverside Counties, southeast of and adjacent to metropolitan Los Angeles, California.

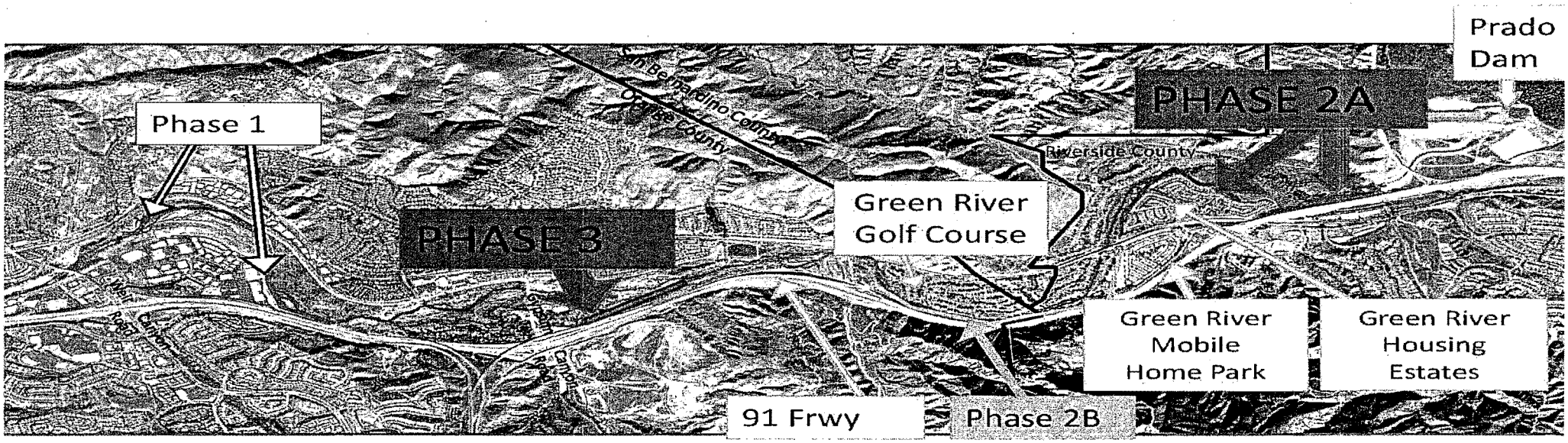


US Army Corps of Engineers



SANTA ANA RIVER MAINSTEM, INCLUDING SANTIAGO CREEK, California

Lower Santa Ana River
Weir Canyon Road To Prado Dam
Reach 9 – Phase 2A and Phase 3



Constructed Bank Protection – Phase 1 (Completed 2006)

Future Bank Protection – Phase 2A and Phase III

Bank Protection – Phase 2B (Awarded 2009)

APPENDIX- B

ATR AND TYPE II - IEPR

REVIEW TEAM ROSTER

POINTS OF CONTACT

POINTS OF CONTACT		
OFFICE NAME	Name	Phone No.
Planning Center of Expertise (PCX)		
Directory of Expertise (DX)		
Vertical Team:		
South Pacific Division (SPD)	Paul Bowers	415-503-6556
Regional Management Center (RMC)	Colin Krumdieck	720-215-5545
Headquarters, U.S. Army Corps of		
Engineers (HQUSACE)		
Outside Eligible Organization (OEO)		

AGENCY TECHNICAL REVIEW

AGENCY TECHNICAL REVIEW (ATR)			
ATR Discipline	Name	Agency/Office	Phone No.
ATR Team Leader	Jacob Owen	Kansas City District	816-389-3314
Civil	Jacob Owen	Kansas City District	816-389-3314
Hydrology&Hydraulics	Bill Firth	San Francisco District	415-503-6901
Geotechnical	Brian Hubel	San Francisco District	415-503-6922
Structural	Ricardo Galdamez	San Francisco District	415-503-6885
Cost Engineer	Gary Smith	MVP	615-290-5518
Cost Engineer	James Neubauer	NWW	509-527-7332
Geology	Brian Hubel	San Francisco District	415-503-6922
Construction	TBD		
Real Estate	Paul Zianno	Sacramento District	916-557-6993
Environmental	Doug Edwards	Sacramento District	916-557-7026

ATR members for must have the minimum expertise listed below for the appropriate discipline:

ATR Team Leader. The ATR Team Leader should have 10 or more years of experience with Civil Works Projects and have performed ATR Team Leader duties on complex civil works projects.

Civil Engineering. The team member shall have 10 or more years of experience in design of flood control structures including levees, guide dikes and channels utilizing sandy soils (soft soils). Experience utilizing grouted stone, riprap, derrick stone, concrete and sheet pile in design of levees, guide dikes and channels for large civil works projects is required. Demonstrated knowledge regarding site layout, surveying, 3-dimensional modeling, construction techniques, hydraulic structures, erosion control, interior drainage is required.

Hydrology and Hydraulics. Team member should be a registered professional with 10 or more years of experience in conducting and evaluating hydrologic and hydraulic analyses for flood risk management projects. Experience with all aspects of hydraulic engineering including: knowledge of analyses techniques of sediment and regime flows, forecasting of scour based on channel slope, sediment loads, sediment budget, geology, and basin/historic hydrology; hydraulic analyses and designs for outlet structures, diversion structures; and designing of the appropriate protection/launching apron dimensions and other river engineering structures; water velocities, pressures, directions, trajectories, and erosion potential; and hydraulic modeling is desired. Experience with the Dam or Levee Safety program is also desired. Active participation in related professional societies is encouraged. (Review work products, as necessary.)

Geotechnical Engineering. Team member shall have 20 or more years of experience in geotechnical engineering and shall be a recognized expert in the analysis, design and construction of embankment dams and levees on alluvial foundations with extensive experience in subsurface investigations, liquefaction analyses, earthquake induced embankment deformations, seepage and slope stability analysis, sheet pile analysis, design and construction, and preparing plans and specifications for embankment dams and levees. The Geotechnical Engineer shall be a licensed professional engineer. Experience with the Dam or Levee Safety program is also desired. Active participation in related professional societies is encouraged. (Review work products, as necessary)

Structural Engineering. The team member shall have 10 or more years of experience in structural engineering. The Structural Engineer shall have extensive experience in design and evaluations of large complex hydraulic structures associated with flood risk management projects such as deep sheet pile walls subject to erosion and undermining by direct high flows and meandering action. Also experience in design of hydraulic structures such as side drains constructed through levees. Experience with AASHTO and state road and bridge standards as well as practical knowledge of construction methods and techniques as it relates to structural portions of projects is encouraged. (Review work products, as necessary)

Cost Engineering. The team member should have 10 or more years demonstrated in the preparation of cost estimates, cost risk analyses and cost engineering. Experience is needed for complex Civil Works projects to include levee and floodwalls systems. Reviewer should be

certified as a Cost Engineer by the Walla Walla DX which requires an 8 hour training and signed certificate. (Review work products, as necessary)

Geology. The team member shall have 10 or more years of experience in flood control projects assuring that the geologic factors affecting the location, design, construction, operation, maintenance of dams and levees, including the necessary investigations and testing are within the Corps current standards and criteria.

Construction Engineering/Operations. The team member should have 10 or more years of experience of construction management in complex large scale public works projects, including coordinating efforts in horizontal construction, specializing in earthwork, concrete work, drilled piles, floodwalls, roads and highways, relocations, paving and drainage.

Environmental. The team member should have 10 or more years of experience in NEPA compliance activities and preparation of Environmental Assessments and Environmental Impact Statements for complex civil/site work projects. Experience is needed for levee system projects. (Review work products, as necessary)

Real Estate. Team member will be experienced in federal civil works real estate laws, policies, and guidance. (Review work products, as necessary)

TYPE II, INDEPENDENT EXTERNAL PEER REVIEW

The Type II IEPR panel will include the following disciplines: Civil, Hydrology and Hydraulics, Geotechnical, Structural and Environmental. To ensure that an appropriate level of review expertise is obtained, the following models are anticipated to be used in the design of the project. Civil 3-diminsional modeling will include: InRoads. H&H analyses will include the following models: CHANLPRO, HEC RAS, HEC 6T and HEC FDA. Geotechnical and structural analyses will include the following models: Seep/W, Slope/W, CLiq, CWALSSI, PILE BUCK, CUFRBC, CORTCUL and MATHCAD. In addition, Type II, IEPR panel members must have the minimum expertise listed below for the appropriate discipline:

Civil Engineering Panel Member. The Civil Engineer panel member should be a registered professional from academia, a public agency, or an Architect-Engineer or consulting firm with 10 or more years of experience in design of flood control structures including levees, guide dikes and channels utilizing sandy soils (soft soils). Experience utilizing riprap, grouted stone, derrick stone and sheet pile in design of bank protection and channels for large civil works projects is required. Demonstrated knowledge regarding site layout, surveying, 3-dimensional modeling, construction techniques, grading, hydraulic structures, erosion control, interior drainage, road design and retaining walls is required.

Hydrology and Hydraulics (H&H) Panel Member. The H&H panel member should be a registered professional from academia, a public agency, or an Architect-Engineer or consulting firm with 15 or more years of experience in conducting and evaluating hydrologic and hydraulic analyses for flood risk management projects. The panel member should be experienced in Flood Damage Reduction Projects, including large earth-fill, rock-fill, concrete or combination dams or systems of dams with their many hydraulic appurtenances such as gated and un-gated spillways, stilling basins, outlet works, control gates and valves, power intake structures, tunnels, conduits and approach and diversion channels and appurtenant control structures; and/or Local Flood Damage Reduction Projects including levees; floodwalls; gravity outlet and gate closure structures; pumping stations; detention basins; storm drainage structures; lined and unlined flood control channels and improvement structures. Active participation in related professional societies is encouraged. (Review work products, as necessary)

Geotechnical Engineering Panel Member. Geotechnical Engineer panel member should be a registered professional geotechnical engineer from academia, a public agency, an Architect-Engineer or consulting firm with 20 years or more experience in geotechnical and earthquake engineering for critical flood risk management infrastructure and levee safety evaluations. It is preferred that panel member possess a PhD degree in geotechnical engineering, although an MS degree is acceptable. Panel member will be a recognized expert in the analysis, design and construction of embankment dams and levees on alluvial foundations with extensive experience in subsurface investigations; liquefaction analyses; earthquake induced embankment deformations; seepage and slope stability analysis; sheet pile analysis; design and construction of grouted stone embankments; and preparing plans and specifications for embankment dams and levees. (Review work products, as necessary.)

Structural Engineering Panel Member. Structural Engineer should be a registered professional from academia, a public agency, or an Architect-Engineer or consulting firm with 10 or more years of experience in design of hydraulic structures for large and complex civil works projects including deep sheet pile walls subject to erosion and undermining by direct high flows and meandering action, design of sheet pile in shallow bedrock. Also experience in design of hydraulic structures such as side drains constructed through levees. Practical knowledge of construction methods and techniques as it relates to structural portions of projects is encouraged. (Review work products, as necessary)

Environmental – This Member should have a minimum of 10 years demonstrated experience in evaluating and conducting NEPA impact assessments, including cumulative effects analyses, for complex multi-objective public works projects with competing trade-offs. The panel member should have a minimum MS degree or higher in an appropriate field of study. Experience should encompass determining the scope and appropriate methodologies for impact assessment and analyses for a variety of projects and programs with high public and interagency

interests and having project impacts to nearby sensitive habitats. (Review work products, as necessary).

APPENDIX- C

Review Plan Approval Memo

APPENDIX- D

ATR CERTIFICATION

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. Box 532711
LOS ANGELES, CALIFORNIA 90053-2325

COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the **Plans and Specifications and DDR for the Lower Santa Ana River Reach 9 Phase 2A, Riverside County and Orange County, California**. The ATR was conducted as defined in the project's Review Plan to comply with the requirements of EC 1165-2-209. During the ATR, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions, methods, procedures, and material used in analyses, alternatives evaluated, the appropriateness of data used and level obtained, and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing US Army Corps of Engineers policy. The ATR also assessed the District Quality Control (DQC) documentation and made the determination that the DQC activities employed appear to be appropriate and effective. All comments resulting from the ATR have been resolved and the comments have been closed in DrChecks.

_____ _____

Jacob W. Owen
ATR Team Leader
CENWK-ED-DT

Date

_____ _____

Oscar T. Bucklew
Project Manager
CESPL-PM-C

Date

_____ _____

Arthur Y. Jung, P.E.
Chief, Design Branch
CESPL-ED-D

Date

CERTIFICATION OF AGENCY TECHNICAL REVIEW

Significant concerns and the explanation of the resolution are as follows:

All comments were resolved to the satisfaction of the reviewers.

As noted above, all concerns resulting from the ATR of the project have been fully resolved.

_____ _____

Richard J. Leifield, P.E. Date
Chief, Engineering Division
CESPL-ED

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. Box 532711
LOS ANGELES, CALIFORNIA 90053-2325

COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the **Plans and Specifications and DDR for the Lower Santa Ana River Reach 9 Phase 3, Riverside County and Orange County, California**. The ATR was conducted as defined in the project's Review Plan to comply with the requirements of EC 1165-2-209. During the ATR, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions, methods, procedures, and material used in analyses, alternatives evaluated, the appropriateness of data used and level obtained, and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing US Army Corps of Engineers policy. The ATR also assessed the District Quality Control (DQC) documentation and made the determination that the DQC activities employed appear to be appropriate and effective. All comments resulting from the ATR have been resolved and the comments have been closed in DrChecks.

_____ _____

Jacob W. Owen Date
ATR Team Leader
CENWK-ED-DT

_____ _____

Oscar T. Bucklew Date
Project Manager
CESPL-PM-C

_____ _____

Arthur Y. Jung, P.E. Date
Chief, Design Branch
CESPL-ED-D

CERTIFICATION OF AGENCY TECHNICAL REVIEW

Significant concerns and the explanation of the resolution are as follows:

All comments were resolved to the satisfaction of the reviewers.

As noted above, all concerns resulting from the ATR of the project have been fully resolved.

_____ _____

Richard J. Leifield, P.E. Date
Chief, Engineering Division
CESPL-ED