

Donald H. Babbitt
Consultant
3860 West Land Park Drive
Sacramento, CA 95822

Faiz I. Makdisi
SAGE Engineers, Inc.
1999 Harrison Street
Oakland, CA 94612

David T. Williams
Consultant
1112 Oakridge Dr. # 104
Fort Collins, CO 80524

May 13, 2016

Ms. Claire Marie Turner, Project Manager
MBK Engineers
455 University Avenue, Suite 100
Sacramento, CA 95825-6579

**Subject: Review of Western Pacific Interceptor Canal (WPIC) 200-Year Standard
Project 100 Percent Design Packages**

Dear Ms. Turner:

At your request in your letter dated April 20, 2016, the Independent Expert Panel (Panel) reviewed the Western Pacific Interceptor Canal (WPIC) 100 Percent Design Package transmitted to us via your e-mail on the same date. The 100 Percent Design Package included the following documents.

- Basis of Design Report - Western Pacific Interceptor Canal - West Levee Improvement Project (Sta. 00+00 to Sta. 310+00) 100% Submittal Rev-1, dated April 8, 2016, by HDR, Inc.
- Contract Drawings (electronic document: TRLIA-100% REV 1_2016.04.08) by HDR, Inc.
- Contract Specifications - 100% Design Submittal (electronic document: Rev 1_TRLIA 100% Specifications) by HDR, Inc.

Your letter indicated that the 100 % design submittal included the following refinements over the 90% design.

- *Modified Construction Limit in numerous locations (STA 9+00 to 26+00 LS, STA 134+00 to 141+00 WS, STA 135+00 to STA 190+50 LS, STA 189+50 to 233+00 WS, STA 216+50 to 310+00 LS) due to property acquisition and Pacific Gas & Electric (PGE) conflicts. This is important for Reach 5D where we need fill for ULDC. There's a memo on this topic at the ftp link.*
- *Degrade in Reach 1B went from El 58 to El 60 due to UPRR requirement for a safety buffer.*
- *Added two ramps, one on each side of Plumas Arboga/Algodon Road due to property acquisition conflicts. Ramps will be permanent.*
- *Extended Drain Berm 50-ft to STA 216+50 per DWR direction.*
- *Added ramps from top of Stability Berm to crown of levee per LMA request.*
- *Added cutoff wall trench and offset detail to C-306 per SAR Panel.*

The package also contained an Excel spreadsheet that included TRLIA's responses to the Panel's review comments on the 90% Design Documents. The Panel's closure of the responses to its comments on the 90% Design Documents, as well as additional comments from its current review of the 100% Design Documents, are included in a revised spread sheet transmitted with this letter.

In your Transmittal letter of April 20, 2016 that accompanied the 100 % percent design package, you requested that the Panel respond to the seven questions listed below.

1. *Are the models used to assess the hazards appropriate?*
2. *Are the assumptions made for the hazards appropriate?*
3. *Is the quality and quantity of the surveys, investigations, and engineering for the design sufficient to support the models and assumptions made for determining the hazards?*
4. *Does the analysis adequately address the uncertainty given the consequences associated with the potential for loss of life for this type of project?*

5. Do the project features adequately address redundancy, resiliency, or robustness with an emphasis on interfaces between structures, materials, members, and project phases?
6. From a public safety perspective, is the proposed alternative reasonably appropriate or are there other alternatives that should be considered?
7. Do the project features and/or components effectively work as a system?

The Panel has provided responses to these questions during its reviews of earlier submittals of the design documents for the WPIC 200-Year Standard Project. Specifically, in the Panel's letter dated November 17, 2014, providing its review of the "*Draft Geotechnical Alternatives Analysis, 200-Year Urban Levee Criteria Compliance Determination*, by HDR Inc.; in its letter dated January 19, 2015, providing its review of the "*Draft Geotechnical Basis of Design, 200-Year Urban Levee Criteria Compliance Determination*;" and in its letter dated October 2nd, 2015, providing its review comments of the "*Western Pacific Interceptor Canal 65 and 90 Percent Design Packages*," the Panel provided responses to the same set of questions listed above. Accordingly, the Panel does not see the benefits of repeating these responses herein since its opinions on those documents have not changed.

On the basis of its current review of the 100% design documents, the Panel judges that the refinements introduced in the 100% design do not change its earlier responses and conclusions. It is the Panel's opinion, that the design meets the Department of Water Resources (DWR) Urban Levee Design Criteria of May 2012.

As stated above, the Panel's specific review comments on the 100% Design Documents are included in the enclosed Excel spreadsheet.

Respectfully submitted,



Donald H. Babbitt, P.E.
Member of the Panel



Faiz I. Makdisi, P.E. D.GE.
Member of the Panel



David T. Williams, P.E.
Member of the Panel

Enclosure: Review comments spreadsheet.

65% - 100% Design Drawings and BOD

Three Rivers Levee Improvement Authority
WPIC West Levee Improvement Project STA 0+00 to 310+00

SAR PANEL REVIEW

ADMIN USE ONLY				RESPONDENT						REVIEWER	
COMMENT ID <small>(DO NOT Edit this Column)</small>	LOCATION IN REPORT/DOC	DATE OF ORIGINAL REVIEW COMMENT MM/DD/YY	ORIGINAL REVIEW COMMENT	RESPONDENT CONTACT INFO	DATE OF RESPONSE MM/DD/YY	RESPONSE	CONCUR	NON-CONCUR	FIO	CARRY FORWARD	CLOSED Y/N
EXT/TITLE-017	General	9/13/2015	There should be a bibliography of all the cited reports and manuals	Nick Gooding HDR 916.817.4981	10/6/15	This information is provided in Section 3, Table 1. Additional references have been added to the table.	X				
EXT/TITLE-018	Contents	9/13/2015	Consider renaming Appendix B, to Design Criteria.	Nick Gooding HDR 916.817.4981	10/6/15	Appendix B has been renamed to "Geotechnical Design Criteria."	X				Y
EXT/TITLE-019	Sec. 4.0	9/13/2015	Bullet no. 7, second sentence: The depressions are located between stations 153+00; should be changed to 153+50, per sheet C-106.	Nick Gooding HDR 916.817.4981	10/6/15	This has been changed to 153+50.	X				Y
EXT/TITLE-020	Sec. 6.1	9/13/2015	The report says 2 cut-off walls were installed at 2 locations. What were the depths of the cutoff walls?	Nick Gooding HDR 916.817.4981	10/6/15	The depths were added to the report (35.6 and 43.8 feet per as-builts).	X				Y
EXT/TITLE-021	Sec. 6.1	9/13/2015	For the last item, what kind of revetment was placed on the waterside slopes?	Nick Gooding HDR 916.817.4981	10/6/15	Report has been revised to state rock slope protection was placed.	X				Y
EXT/TITLE-022	Sec. 6.4	9/13/2015	Should explicitly state that the HTOL is the <u>lower</u> of the median 200-year WSE plus 3 feet and Median 500-year WSE	Nick Gooding HDR 916.817.4981	10/6/15	This is stated in the report: "The HTOL water surface elevation is defined in the ULDC as the lower of the following two elevations:"	X				Y
EXT/TITLE-023	Sec. 6.5	9/13/2015	Third bullet: It is helpful to specify the Station number for Reach 4C (such as Sta. 216+00).	Nick Gooding HDR 916.817.4981	10/6/15	The station number has been added at this location.	X				Y
EXT/TITLE-024	Sec. 6.5.1	9/13/2015	Text indicates Levee Fill "Soil Type 1" is required for the Drain Berm, while Figure 4 (Drawing C-303 -5- Typical Drain Berm) indicates "Soil Type 2", and similarly, Spec. Scetion 31 00 00, Part 2.2.2."	Nick Gooding HDR 916.817.4981	10/6/15	This paragraph has been revised to state type 2 is used in the drain berm.	X				Y
EXT/TITLE-025	Sec. 6.5.3	9/13/2015	4th Paragraph of Section 6.5.3 refers to 1-ft layer of "drain rock" for seepage collection. This layer is designated as 1-ft "sand layer" on the drawings and in other sections of the report.	Nick Gooding HDR 916.817.4981	10/6/15	This paragraph has been deleted from the report. Paragraph 3 has been revised to state that the stability berm includes a 1-ft sand layer.	X				Y
EXT/TITLE-026	Sec 6.6	9/13/2015	Appendix C indicates that the existing levee crown width is less than 12 feet at some 20 loctions. Discuss how this will be addressed. Note that Figures 3 and 5 show a crown width of 15 to 20 feet.	Nick Gooding HDR 916.817.4981	10/6/15	Appendix C has been updated. The original version of this table was based on preliminary LiDAR. HDR has completed several field visits and field measurements to update this information. There are no locations along the WPIC with a crown width narrower than 12 ft.	X				Y