

WEST Sacramento Levee Improvement Program
Board of Senior Consultants

Comments and Recommendations
Following Meeting No. 4
Of the Board of Senior Consultants
On Oct 20 - 21, 2010

Report Prepared by:

Board of Senior Consultants:

Dr. David T. Williams
Dr. Ray E. Martin
Mr. George L. Sills

December 7, 2010

December 7, 2010

Mr. Ken Ruzich
General Manager
West Sacramento Area Flood Control Agency (WSAFCA)
1110 W. Capitol Ave.
Sacramento, CA 95691

Dear Mr. Ruzich:

I. Introduction

This report presents the comments and recommendations for the West Sacramento Levee Improvement Program (WSLIP) by the Program's Board of Senior Consultants (BOSC) following a meeting held for, and with, the BOSC on October 20 - 21, 2010. This meeting was the fourth formal meeting of the Board and was held to provide to the Board the progress to date of the analyses and designs being developed as part of the effort to provide 200-year flood protection to the Program.

During the meeting of October 20 – 21, 2010, presentations were made to the Board regarding the following major subjects (the agenda is Attachment 1):

- CHP DESIGN STATUS
- CHP ACADEMY TARGETED COMMENT REVIEW
- THE RIVERS DESIGN STATUS
- THE RIVERS TARGETED COMMENT REVIEW
- BOSC REPORT BACK ON CHP ACA. AND RIVERS EIP
- INTRODUCTION TO SOUTHPORT EIP

The BOSC was also asked to re-read the Charge to the Board (Attachment 2) and address the address the instructions to the Board (Attachment 3 with BOSC responses).

Between the BOSC meetings 3 and 4, a telephone conference call was held on August 23, 2010 and this meeting is documented in Attachment 4.

During the meeting, the BOSC was presented with spreadsheets to the General comments for the 90% review of the CHP and Rivers sites as well as the 60% BODR review of the CHP and Rivers sites. At this time, the BOSC expects to close out the majority of the BOSC items and return to HDR by

December 17. Some will not be able to be closed out because they need additional information or involve analysis that has not been done yet.

Attachment 5 contains the BOSC comments on the 100% HDR Design Documentation Reports, CHP and Rivers sites.

Attachment 6 contains the Review of Kleinfelder's Geotechnical Basis of Design Report, CHP Academy site.

Attachment 7 contains the Review of Kleinfelder's Geotechnical Basis of Design Report, The Rivers site.

Attachment 8 contains the Review of the 100% HDR Design P&S CHP site .

Attachment 9 contains the Review of the 100% HDR Design P&S The Rivers site

II. General Comments

The BOSC is pleased with the progress of the project and the responses of the Design consultants in relation to the bettering the review process.

The BOSC appreciates that there was a presentation on the Southport portion of the project. It is essential that the BOSC get involved as early as possible so that its input and suggestions can be effective.

IV. Closing Remarks

Please note that in Attachment 3, Instructions to the Board, has been responded to.

The Board looks forward to the final closeout of the backchecks for the 100% design documents and PS&E documents.

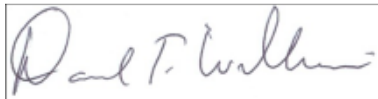
To continue its mandate as a Safety Assurance Review panel, the Board feels that it is essential to attend the kickoff meeting with the contactor(s) as well as attend the mid-construction and end of construction meetings.

The Board appreciates the efforts of the design team members who prepared and presented numerous valuable summaries of the designs completed to date. The various presentations and discussions were informative to the Board and helped introduce and clarify the design teams' thought processes.

The Board looks forward to future meetings, briefings, and discussions on this project and is excited about the next phase of the project.

Very truly yours,

**West Sacramento Levee Improvement Program
Board of Senior Consultants**



Dr. David T. Williams, P.E. CFM.



Mr. George L. Sills, P.E.



Dr. Ray E. Martin, P.E.

Attachments:

- Attachment 1: Meeting Agenda
- Attachment 2: Charge to the Board
- Attachment 3: Instructions to the Board
- Attachment 4: Meeting minutes of August 23, 2010 teleconference
- Attachment 5: Review of HDR 100% Design Documentation Reports, CHP and Rivers sites
- Attachment 6: Review of Kleinfelder's Geotechnical Basis of Design Report, CHP Academy site
- Attachment 7: Review of Kleinfelder's Geotechnical Basis of Design Report, The Rivers site
- Attachment 8: Review of the HDR 100% Design P&S documents, CHP site
- Attachment 9: Review of the HDR 100% Design P&S documents, The Rivers site

Attachment 1

**WEST SACRAMENTO AREA FLOOD CONTROL AGENCY
MEETING AGENDA**

**WEST SACRAMENTO LEVEE IMPROVEMENT PROGRAM
BOARD OF SENIOR CONSULTANTS
MEETING NO. 4**

Date: October 20-21, 2010
Time: 8:30 am to 5:00 pm
Location: City of West Sacramento City Hall, 1110 West Capitol Ave, RM 157, West Sacramento, CA 95691
Parking: Spiritual Awareness Center at 1020 West Capital Ave., West Sacramento, CA 95691

DAY 1

- I. INTRODUCTION 8:30 AM-9:00 AM**
- Welcome and Opening Remarks (WSAFCA)
 - WSLIP Program Schedule (WSAFCA)
 - Meeting Purpose & Expectations (MBK)
 - Agenda Overview (HDR)
- II. CHP ACADEMY DESIGN STATUS 9:00 AM-9:45 AM**
- General Overview of Deficiencies/Corrective Measures: 90% submittal, August 2010 TM, 100% Submittal (HDR)
- BREAK 9:45 AM-10:00 AM**
- Review of 100% Geotechnical Evaluation (Kleinfelder) 10:00 AM-10:45 AM
- III. CHP ACADEMY TARGETED COMMENT REVIEW 10:45 AM-11:45 AM**
- Review of Comment Closure Process (MBK)
 - Outstanding Comments, New Comments (BOSC)
- IV. LUNCH (To Be Provided) 11:45 AM-12:45 PM**
- V. THE RIVERS DESIGN STATUS 12:45 PM-1:45 PM**
- General Overview of Site Deficiencies/Corrective Measures 90% submittal, August 2010 TM, 100% submittal (HDR)

BREAK **1:45 PM-2:00 PM**

- Review of 100% Geotechnical Evaluation (Kleinfelder) **2:00 PM-3:00 PM**

VI. THE RIVERS TARGETED COMMENT REVIEW **3:00 AM-4:00 PM**

- Review of Comment Closure Process (MBK)
- Outstanding Comments, New Comments (BOSC)

VII. BOSC WORKING MEETING **4:00 PM– 5:00PM**

DAY 2

I. BOSC REPORT BACK ON CHP ACA. AND RIVERS EIP **8:00 AM – 9:00 AM**

II. INTRODUCTION TO SOUTHPORT EIP **9:00 AM – 10:00 AM**

- Introductory Comments (City)
- Project Background (HDR)
- Design Approach and Status

III. SITE VISIT **10:00 AM – Noon**

IV. LUNCH *(To be Provided)* **Noon – 1:00 PM**

V. BOSC WORKING MEETING **1:00 PM – 2:00 PM**

VI. BOSC REPORT BACK ON SOUTHPORT EIP **2:00 PM – 3:00 PM**

- **Hydraulics**
- **Geotechnical**
- **Environmental**
- **Civil**

VIII. CONCLUSIONS & NEXT STEPS **3:00 PM – 3:30 PM**

Attachment 2

**WEST SACRAMENTO LEVEE IMPROVEMENT PROGRAM
BOARD OF SENIOR CONSULTANTS**

CHARGE TO THE BOARD

The West Sacramento Area Flood Control Agency (WSAFCA) has assembled this Board of Senior Consultants (Board) to conduct an independent and external expert review of the levee improvements under design by the WSAFCA and its consultants for construction. The Board is charged with confirming that the design investigation and analysis and associated recommendations for levee improvements at each site are acceptable for providing 200-year level of flood protection in an urban environment. The Board shall consider current and relevant regulations, policy, standards, and guidance for the design and construction of flood protection measures in rendering its opinion. The Board shall document its findings that will include, but is not limited to, responding to the instructions provided by WSAFCA. WSAFCA shall be responsible for providing the Board with instructions, the historic data and records, programmatic or planning studies, and design phase data and documentation necessary to understand the technical context and natural setting within which the levee improvement recommendation has been proposed.

Attachment 3

**WEST SACRAMENTO LEVEE IMPROVEMENT PROGRAM
BOARD OF SENIOR CONSULTANTS**

INSTRUCTIONS TO THE BOARD, Meeting No. 4

WSAFCA has coordinated closely with the BOSC and our agency partners in the development of the CHP Academy and the Rivers designs. It is the design team's understanding that the modifications to the plans, specifications, and supporting technical documentation now addresses the key issues that have been raised. Comments on value engineering have been addressed to the design team's satisfaction and the focus of this meeting will be on the adequacy of the designs and ensuring that the design team has met the intent of the Safety Assurance Review (SAR) plan. The purpose of a SAR is to ensure that good science, sound engineering, and public health, safety, and welfare are the most important factors that determine a project's fate and is achieved by independent and impartial review. The following are a list of questions that are required to be answered as listed in the WSAFCA SAR plan. Some of the questions are directly related to the design and others cannot be addressed until construction begins.

Design Questions

- 1) Are the models used to assess hazards appropriate? Yes
- 2) Are the assumptions made for the hazards appropriate? Yes
- 3) Is the quality and quantity of the surveys, investigations, and engineering for the concept design sufficient to support the models and assumptions made for determining the hazards?
Yes
- 4) Does the analysis adequately address the uncertainty associated with the models reviewed given the consequences associated with the potential for loss of life for this type of project?
Yes
- 5) Do the assumptions made during the planning phase for hazards remain valid through the completion of design as additional knowledge was gained and the state-of-the-art evolved?
Yes
- 6) Do the project features adequately address redundancy, robustness, and resiliency with an emphasis on interfaces between structures, materials, members, and project phases? Yes

Construction

- 7) Do the assumptions made during design remain valid through construction? Yes

O&M

- 8) For O&M manuals, do the requirements adequately maintain the conditions assumed during design and validated during construction; and will the project monitoring adequately reveal any

Board of Senior Consultants – Report from Meeting No. 4 (Oct. 20 - 21, 2010)

deviations from assumptions made for performance and is sufficient to evaluate the change in project effectiveness? Yes

In providing commentary on the design related SAR questions, please provide the following where possible:

- During the design process was the purpose and intent of the SAR plan met;
- If it was not met, what additional information would be required to met the intent of the SAR;

Attachment 4

West Sacramento Levee Improvement Program
CHP Academy and Rivers EIPs

23 August 2010 Conference Call

**MEETING NOTES FROM REVIEW OF SUPPLEMENTAL GEOTECHNICAL
INVESTIGATIONS IN SUPPORT OF 100% LEVEE UPGRADE DESIGNS**

Call-in: 866-994-6437
Pass Code: 9168174946
Leader PIN (HDR Arden Only): 127604

Attending Conference Call Meeting: John Hess (HDR), Michael Vecchio (HDR), Les Harder (HDR), Ken Ruzic (WSAFCA), Michael Bessette (WSAFCA), Chase White (Kleinfelder), Tim Williams (Kleinfelder), Rick Stauber (Kleinfelder), Ray Martin (BOSC), George Sills (BOSC), David Williams (BOSC), Loren Murray (DWR), Dan Fua (CVFPB), David Williams (CVFPB), Debabrata Biswas (CVFPB), Derek Larsen (MBK)

AGENDA

- | | |
|--|--------------|
| 1. Introduction/Background | -HDR |
| 2. CHP Academy Investigations/modeling results | -Kleinfelder |
| 3. Discussion | - All |
| 4. The Rivers Investigations/modeling results | -Kleinfelder |
| 5. Discussion | -All |
| 6. Next Steps | -HDR |

TOPICS DISCUSSED

1. Is the amount and type of geotechnical data gathered adequate for 100% designs at these sites?

The general consensus on this question was that yes enough data has been gathered to support a 100% design submittal. That consensus includes the opinions of the BOSC members, John Hess, and Les Harder – HDR geotechnical reviewers, as well as Mary Perlea for the Corps per a separate review conducted on 3 August 2010. Notes from that meeting are provided in Attachment A.

2. Are the seepage and stability models assembled for these sites consistent with that data?

There was a good amount of discussion about this topic with respect to a) justification of the 400-ft segment of cutoff wall at CHP Academy proposed for installation to elevation -15 ft and b) the thickness of the blanket layer and the permeability of the deeper, coarse strata at the Rivers. The general consensus was that the 400-ft panel's final toe elevation would be finalized in conjunction with the

Board of Senior Consultants – Report from Meeting No. 4 (Oct. 20 - 21, 2010)

100% design submittal. A sensitivity analysis varying the permeability of the coarse, deeper strata and the thickness and anisotropic ratio of the blanket layer at the Rivers provided additional data justifying the proposed cutoff wall depths at that site.

3. Are the hydraulic conductivity and anisotropic ratio values assigned in the seepage models reasonable for the subsurface material types at the sites, and for use in design of seepage cutoff walls?

A final check of these values will be made in support of the 100% submittal, but no modifications of the values assigned in the models used to set cutoff wall depths were requested.

4. There was some discussion about whether the boring logs at CHP Academy might justify a slightly more shallow cutoff wall on the west end of the site. Kleinfelder is completing a review of boring logs in that area and their final recommendation will be reflected in the 100% design submittal.

5. The feasibility of installing a cutoff wall to the depth recommended by Kleinfelder at the west end of the Rivers site was discussed. The toe elevation is currently specified as -105 ft (NAVD 88) and the existing levee crest is approximately elevation 40 ft. Les Harder noted that walls on that order of depth have not been installed in the Central Valley for flood protection purposes. It was noted that an upcoming Marysville ring levee improvement calls for a 135 ft deep wall. When the BOSC was specifically queried regarding the feasibility of installing the deep panel at the west end of the Rivers site, George Sills stated that the technology exists to install a wall at that depth. He added that a specification like that developed by the Corps for the Marysville job – one that provides equipment-specific specifications – would be appropriate for the Rivers job.

ATTACHMENT A

Summary of Directives Provided by the Sacramento USACE at 3 August 2010 Meeting to Review Supplemental Geotechnical Investigations, Revised Stability and Seepage Model Runs and Cutoff Wall Depth Confirmation

These can be downloaded from the WSAFCA DTS website:

<http://www.cmdts.com/login>

File directories for seepage analysis documents

WSLIP

Design

The Rivers

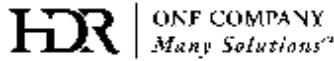
Preliminary Seepage Analysis

WSLIP

Design

CHP Academy

Preliminary Seepage Analysis



Meeting Notes

Subject	Corps comments on supplemental geotechnical investigations at the River and CHP Academy EIP sites, and landside slopes at CHP Academy		
Client	City of West Sacramento		
Project	West Sacramento EIP	Project No.	101208, 101209
Meeting Date	8/3/10	Meeting Location	J Street Corps Office
Attendees	Mary Perlea, Tim Williams, Chase White, Ray Costa, Michael Vecchio, Ken Jameson		
Notes by	Michael Vecchio		

Decisions/Directives:

1. The amount of additional geotechnical investigation completed by Kleinfelder in July 2010 at the Rivers and CHP Academy sites is adequate to confirm the cutoff wall depths at a 100% design level.
2. The cutoff wall depths recommended by Kleinfelder are reasonable and consistent with the geotechnical information collected and evaluated for these projects.
3. Landside slopes steeper than 2.75(H):1.0(V) at the CHP Academy site are acceptable assuming that they satisfy stability criteria.

Attachment 5

WEST SACRAMENTO EARLY IMPROVEMENT PROJECT
Review of 100% Design Documents
WEST SACRAMENTO, CA

Comments by BOSC

The Rivers Site

100% Design Submittal, Design Documentation Report, October 2010 (HDR)

General comment: How can this be the 100% if the Kleinfelder GBODR is not included – this document still references the TM?

1.0 Project Background – page 1 – Last sentence says 90%.

1.1 Previous Studies and Reports – 1.1.2 – The wording in the last sentence about Auburn Dam is confusing.

1.1.6 The term 44 CFR 65.10 should be defined.

1.1.7 The term KSN should be defined.

1.1.9 The term MKB should be defined.

3.0 Project Data

– Add conversion from NGVD 29 to NAVD 88.

– ICF should be defined.

4.2.3 Case II Sudden Drawdown. We suggest not change for this report but on future reports, consider a more reasonable drawdown. The levee will never stay saturated long enough at the peak stage to saturate the levee so a stage a few feet down should be used as before drawdown and a reasonable drop from that stage assumed.

CHP Academy Site

100% Design Submittal, Design Documentation Report, October 2010 (HDR)

Board of Senior Consultants – Report from Meeting No. 4 (Oct. 20 - 21, 2010)

1.0 Project Syllabus – Suggest move Table 1-1 to section 2.0 Purpose, since it is referenced in that section.

1.2 Previous Studies and Reports

- The term 44 CFR 65.10 should be defined
- The term MKB should be defined

4.2.2 Slope Stability

- Case IV – Earthquake was not discussed

4.2.4.2 Case II Sudden Drawdown. We suggest not change for this report but on future reports consider a more reasonable drawdown. The levee will never stay saturated long enough at the peak stage to saturate the levee so a stage a few feet down should be used as before drawdown and a reasonable drop from that stage assumed.

Attachment 6:

Review of Kleinfelder’s Geotechnical Basis of Design Report
CHP Academy Early Implementation Project Site
Sacramento River Bypass South Levee
West Sacramento Levee Improvement Program
West Sacramento (Yolo County), California

Comments by BOSC

Executive Summary

This section should be modified to reflect any changes resulting from the suggestions noted below.

Section 1 Introduction

No comments.

Section 2 Background Information

Page 6 – Section 2.2 Sacramento Area Flooding History – The report states that “[t]he quantity of water flowing out of the Sierra Nevada Mountains during large floods appears to be increasing.” It would be helpful to discuss briefly this in a little more detail. It is not that the flows are increasing, but rather that the database through 1950 was so small that statistically it was not reliable. It is likely that huge floods occurred during the Holocene but were not able to be documented. This is understandable based on the width and depth of Holocene sediments in the Sacramento River Valley.

Section 3 Geology, Geomorphology, And Groundwater

Page 13 - Section 3.1 Geologic Setting – Define the term “mélange” as a breccia above a subduction zone.

Section 4 Site Characterization

Page 29 – Section 4.2 Subsurface Conditions – The discussion about crevasse splay deposits suggests that they are shown on Plate 3-4. This figure lumps all of the surficial Holocene deposits together as “Holocene Alluvium – Sand.” It is not clear why this plate is mentioned in the context of crevasse splay deposits. This is not a major concern, just one of context. An elevation scale should also be added in Plate 3-4.

Page 29 to 32 – Section 4.2 Subsurface Conditions – Plate 3-4 could also be referenced in the second paragraph on page 29 and later on page 32.

Page 36 – Section 4.3.1 Reach 1 – Section 4.3.1.3 Subsurface Conditions – The waterside toe surficial blanket layer is noted to be “soft clay and silt soils” but on Cross Section Plate 4-2, the blanket is shown

Board of Senior Consultants – Report from Meeting No. 4 (Oct. 20 - 21, 2010)

as silty sand. The waterside borings are not shown on the Plan and Profile, Plate 1-3 and were not found in the Appendix. Some of the landside borings are also missing from Plate 1-3.

Page 38 – Section 4.3.1 Reach 1 – Section 4.3.1.4 Analytical Model – The reasons for the difference discussed above are not entirely justified as discussed at the BOSC meeting in October. Table 4.2 does not include the waterside sand layer discussed above.

Page 41 – Section 4.3.2 Reach 2 – Section 4.3.2.3 Subsurface Conditions – Same comments as noted above for Reach 1.

Page 42 – Section 4.3.2 Reach 2 – Section 4.3.2.4 Analytical Model – The reasons for the difference discussed above are not entirely justified as discussed at the BOSC meeting in October.

Page 47 – Section 4.3.3 Reach 3 – Section 4.3.2.3 Subsurface Conditions – Same comments as noted above for Reaches 1 and 2.

Page 48 – Section 4.3.3 Reach 3 – Section 4.3.3.4 Analytical Model – The reasons for the difference discussed above are not entirely justified as discussed at the BOSC meeting in October.

Section 5 Geotechnical Evaluation

Page 57-63 Section 5.2 Seepage Analysis - The discussion above on pages 36 - 48 applies to this section. At this point it appears moot and will not be discussed further.

Section 6 Remedial Design and Construction Recommendations

Page 103 – Section 6.7.1 Compaction and Testing Requirements/Compaction Requirements - Suggest an 8 inch loose lift thickness and a 6 inch compacted thickness.

Section 7 Limitations

Page 117 - Section 7.0 Limitations – The first sentence in the second paragraph states “... *that level of care and skill ordinarily exercised by other members of Kleinfelder’s profession practicing in the same locality ...* ” is confusing. Would it not be more appropriate to state “... *that level of care and skill ordinarily exercised by other members of the geotechnical profession ~~Kleinfelder’s profession~~ practicing in the same locality ...*”?

Attachment 7:

Review of Kleinfelder Geotechnical Basis of Design Report
Rivers Early Implementation Project Site
Sacramento River West North Levee
West Sacramento Levee Improvement Program
West Sacramento (Yolo County), California

Comments by BOSC

Executive Summary

This section should be modified to reflect any changes resulting from the suggestions noted below.

Section 1 Introduction

No comments.

Section 2 Background Information

Page 6 – Section 2.2 Sacramento Area Flooding History – The report states that “[t]he quantity of water flowing out of the Sierra Nevada Mountains during large floods appears to be increasing.” It would be helpful to discuss briefly this in a little more detail. It is not that the flows are increasing, but rather that the database through 1950 was so small that statistically it was not reliable. It is likely that huge floods occurred during the Holocene but were not able to be documented. This is understandable based on the width and depth of Holocene sediments in the Sacramento River Valley.

Page 10- Section 2.4 Past Performance - States “man-made lakes ‘roles’ during high water events... “ This should be further investigated. It is not common for something like this to happen and could indicate a serious problem.

Section 3 Geology, Geomorphology, And Groundwater

Page 13 - Section 3.1 Geologic Setting – Define the term “mélange” as a breccia above a subduction zone.

Section 4 Site Characterization

No comments.

Section 5 Geotechnical Evaluation

Page 30, Section 5.1.1 Seepage Analysis Design Criteria—should modify section to read “seepage through a levee embankment and foundation can occur ...”. Also for “piping”, section currently reads only for embankment piping should include foundation.

Page 33 – Section 5.1.4 Design Criteria/Geotechnical Cross Sections Studied – The three cross section evaluated appear to be very conservative. In each case, the data suggests that the blanket may be thicker than indicated. The table below indicates the existing base of the blanket and the suggested base grade for each cross section.

Analyzed and Suggested Base of Blanket Grade

<u>Cross Section Station</u>	<u>Analyzed Base of Blanket Grade</u>	<u>Suggested Base of Blanket Grade</u>
71+50	El 10	El 5
87+50	El 16	El 0
97+50	El 15/El 0 landside	El 15

Page 33 - Section 5.1.4 Design Criteria/Geotechnical Cross Sections Studied – Has a SB wall been considered with DSM technology?

Page 33 - Section 5.1.4 Design Criteria/Geotechnical Cross Sections Studied – States “(SCB) walls constructed by the deep mixing method (DMM), should be revised to read, “by an in situ mixing method”.

Page 41 - Section 5.2.1 Seepage Analysis/Parametric Seepage Analysis/Parametric Analysis of Blanket Layer - Would it be possible to add a technical reference supporting the use of kv/kh ratio of 0.1 for the lenticular Holocene soils?

Page 43 - Section 5.2.1 Seepage Analysis/Parametric Seepage Analysis/Parametric Analysis of Blanket Layer/Table 5.10 – What would be the impact on this study if a thicker blanket with $k = 1 \times 10^{-5}$ cm/sec were considered? This may not negate the need for a cutoff wall but, given the cost, it is worth considering.

Page 48 - Section 5.3 Slope Stability Analysis – Tables 5.15, 5.16, and 5.17 are not referenced in the text.

Page 51 - Section 5.3 Slope Stability Analysis - Would it be possible to add a brief discussion about the use of drained cohesion values greater than 0 psf in steady state seepage stability analyses?

Page 51 - Section 5.3 Slope Stability Analysis – Rapid Drawdown - For the Rivers Site, the suggested changes does not appear to be required, but should be considered for other future reaches. The assumption that the drawdown range starts from the “HTOL WSE” is not generally reasonable because the water surface has to remain at that elevation long enough to saturate the levee. Probability a water surface several feet below this would provide a better estimate while still providing public safety.

Page 53 - Section 5.3.3 Slope Stability Analysis/Slope Stability Analysis Results - 200-Year WSE – There is no introduction to the Rapid Drawdown Case.

Section 6 Remedial Design and Construction Recommendations

Page 63 – Section 6.2 Seepage Cutoff Wall Design - The Environmental Contamination should be discussed because of the potential problems “in situ methods” could present if implemented. All references to requiring the DMM should be removed.

Page 63 – Section 6.2 Seepage Cutoff Wall Design – Suggest that a sentence or two be added to describe why an SCB wall is required where the cutoff is greater than 80 feet deep. Also would change 80 to 85 feet.

Page 64 – Section 6.2 Seepage Cutoff Wall Design - Because some in situ mixing methods use less than a 36 inch wide wall, this requirement should be removed or a wall range stated. Wall strength of 200 psi is very stiff. This wall will crack as it sets and crack if subjected to an earthquake which would be worst than a wall of 50 psi. Why is 200 psi required?

Page 64 – Section 6.2 Seepage Cutoff Wall Design - CPT spacing of 100 feet is discussed here, while 150 feet is specified in the 100% specification. The 100 feet should be specified.

Page 64 – Section 6.2.2 Soil Bentonite Cutoff Wall - Large settlements are discussed within this section. Could Kleinfelder please furnish a copy of this report for review that contains this data? If not, please remove this statement from this report. Has it been verified that 10 feet on each side of trench is sufficient? Most contactors would prefer 15 feet on the mixing side.

Page 72 – Section 6.7.1 Compaction and Testing Requirements/Compaction Requirements - Suggest an 8 inch loose lift thickness and a 6 inch compacted thickness.

Page 75- Section 6.8.3, Construction Considerations - Suggest adding a statement about the potential for environmental contamination to this section.

Section 7 Limitations

Page 85 - Section 7.0 Limitations – The first sentence in the second paragraph states “... *that level of care and skill ordinarily exercised by other members of Kleinfelder’s profession practicing in the same locality ...* ” is confusing. Would it not be more appropriate to state “... *that level of care and skill ordinarily exercised by other members of the geotechnical profession ~~Kleinfelder’s profession~~ practicing in the same locality ...*”?

The limitations by Kleinfelder for the SAFCA projects are two pages long; however, for this project, it is only one half page long.

Attachment 8:

WEST SACRAMENTO EARLY IMPLEMENTATION PROJECT
SACRAMENTO BYPASS SOUTH LEVEE
CHP ACADEMY SITE
Review of 100% DESIGN P&S SUBMITTAL

Comments by BOSC

1. Section 02020, Para. 3.1.1, Geotechnical Data. The word “relevant” should not be used. Instead, the sentence should state, “All Agency explorations within the job limits of this project are included.” Also, the words “where applicable” should not be used. In addition, additional reports should not be referenced which contain engineering interpretations.
2. Section 02110, Para. 3.2.1, General. In this paragraph and in 3.2.2, the diameter of the roots is specified differently. Why not use a constant description?
3. Section 02226, Para. 2.1.1, Embankment Materials. The paragraph says the “Material shall have a minimum of 30% passing the number 200”. This will permit SM material to be used. By definition, ML and CL must have a minimum 50% passing. In addition, the organic content should be required to contain no visual organic, rather than the 4% specified.
4. Section 02226, Para. 2.2, Types of Materials. Type 1 - The 30% passing 200, should be 50% passing and the organic content should be changed as described above.
5. Section 02226, Para. 2.2.2, Patrol Road Subgrade. The % passing the 200 and the organic content is incorrect again.
6. Section 02226, Para. 2.2.3, Concrete Slope Base Type 2. It is not clear why the specs describe Type 1 and Type 2 soils. It appears they are the same.
7. Section 02226, Para. 3.4.1, General. The +3% and -2% range can be too large for some silts. The designer should consider -1% to +2%?
8. Section 02226, Para. 3.4.1.3, Drying Wet Material. It is reasonable to require doing some drying at the Borrow Area; however, it should not be dried within the limits because moisture could be lost or gained in transit between Borrow Site and Construction Site. Contractors should be required to only have to meet these moisture criteria once.
9. Section 02226, Para. 3.4.1.4, Increasing Moisture. It is OK to wet the material as it is brought out of the Borrow Site. Final moisture should only be required at the Construction Site.
10. Section 02226, Para. 3.5.2, Clay Cap Fill. We could not locate where this fill was required in the drawings. The previous specs had clay cap but it has been deleted.

11. Section 02352, Para. 2.6, Trench Bentonite Slurry Mixture. The word “between” was omitted and should be added so the Slurry Density is between 64 and 85.
12. Section 02352, Para. 2.7, Additional Bentonite. The Contractor is clearly given the responsibility for trench stability during construction (see paragraph 3.3.6). The Specifications should not tell him that he may have to add additional bentonite for stability.
13. Section 02352, Para. 2.8, Soil for Cutoff Wall Backfill. The words “no visible” should be added in front of organic materials.
14. Section 02352, Para. 3.3.2, Trench Excavation. Insert the following after “The excavation should be carried immediately to the depth shown at the point where excavation is started.”
INSERT: “The lead-in trench shall be outside the limits of pay. At locations within the length of cutoff wall excavation where the cutoff wall tip elevation drops in the direction of excavation by 5 feet or more, the Contractor shall cut an in-trench transition slope no steeper than 1H:1V. The in-trench transition slope shall begin in the shallow wall section and reach the trench tip elevation for the deeper wall section at the limit of work shown on the Plans.” Also, insert the following at the end of the first paragraph. INSERT: “The Contractor shall segregate the final bucket cuttings excavated from the trench bottom, representative of the impermeable tie-in layer, by placing them in an area adjacent to the trench (on one side only) such that they may be reviewed by Agency personnel. This temporarily stockpiled material may be removed at the end of the shift, or as otherwise directed by the Agency.”
15. Section 02352, Para. 3.3.10, Placement of Backfill. Delete the last sentence in the second paragraph, “Dozing or pushing material into the cutoff wall trench will not be allowed.”
16. Section 02352, Para. 3.3.12, Temporary Cap. ML materials should not be allowed.
17. Section 02352, Para. 3.8.4.3, Slurry Properties. Why test the slurry for sand content? Additionally, somewhere within the specifications (and this paragraph may be the best place), the following statement should be added. “The density of the backfill should be a minimum of 15 pcf heavier than the maximum slurry density in the trench.”
18. Section 02373, Para. 1.4, Submittals, Geotextile. Needle punch should not be required for non-wovens, and only non-wovens should be allowed.
19. Drawing C-01. Is the Geotextile shown on these sections “existing” or “new”? Plans should state existing or new
20. Drawing C-05 and C-06. The area requiring Type 2 Fill will be very difficult to construct as shown. In addition, recommend only using CL materials for Type 2. Type 1 and Type 2 fill are the same if the 30% fines is corrected to 50% fines.
21. Drawing C-08. The typical roadway section appears to allow water to flow beneath the roadway. Recommend this design be changed so that no water can flow through this area. In the Section containing “lengthen drain rock” and the note that says “Remove and salvage exist riprap”,

Board of Senior Consultants – Report from Meeting No. 4 (Oct. 20 - 21, 2010)

“Exist” should be “Existing”, and a note of the material type to replace this material should be added.

22. Drawing C-10. In the Section for Step 4, the arrow pointing to “cutoff wall working platform” points to the fill and should point at the very bottom of the fill.
23. Drawing C-23. The transition Rock Remove and Replace should be discussed in the specifications. Also, in the Section on Rock Remove and Replace, how thick is the area beneath the rock?
24. Drawing C-43. Have the Design Engineers verified that vertical drains should be required?

Attachment 9:

WEST SACRAMENTO EARLY IMPLEMENTATION PROJECT
THE RIVERS SITE
Review of 100% DESIGN P&S SUBMITTAL

Comments by BOSC

1. Section 02020, Para. 3.1.1, Geotechnical Data. The word “relevant” should not be used. Instead, sentence should state, “All Agency explorations within the job limits of this project are included.” Also, the words “where applicable” should not be used. In addition, additional reports should not be referenced which contain engineering interpretations.
2. Section 02110, Para. 3.2.1, General. In this paragraph and in 3.2.2, the diameter of the roots is specified differently. Why not, use a constant description?
3. Section 02226, Para. 2.1.1, Embankment Materials. The paragraph says the “Material shall have a minimum of 30% passing the number 200”. This will permit SM material to be used. By definition ML and CL must have a minimum 50% passing. In addition, the organic content should be required to contain no visual organic, rather than the 4% specified.
4. Section 02226, Para. 2.2, Types of Materials. Type 1 - The 30% passing 200, should be 50 and the organic content should be changed as described above.
5. Section 02226, Para. 2.2.2, Patrol Road Subgrade. Is this Para. Needed here? The R value is apparently what is being specified. Is this the correct place to specified this value?
6. Section 02226, Para. 3.4.1, General. The +3% and -2% range can be too large for some silts. The designer may want to consider -1% to +2%?
7. Section 02226, Para. 3.4.1.3, Drying Wet Material. It is reasonable to require doing some drying at the Borrow Area, however, it should not be dried within the limits, because moisture could be lost or gained between Borrow Site and Construction Site. Contractors should be required to only have to meet these moisture criteria once.
8. Section 02226, Para. 3.4.1.4, Increasing Moisture. It is OK to wet the material as it is brought out of the Borrow Site. Final moisture should only be required at the Construction Site.
9. Section 02226, Para. 3.5.2, Clay Cap Fill. Could not locate where this fill was required in the drawings. The previous specs had clay cap but it has been deleted.
10. Section 02262, Para. 1.1, Scope. The term “individual panels” should be clearly defined within this Scope to ensure that TRD walls are acceptable.

Board of Senior Consultants – Report from Meeting No. 4 (Oct. 20 - 21, 2010)

11. Section 02262, Para. 1.5.1, Soil-Mixed SCB Cutoff Wall. Consideration should be given to include definition of Panel in this paragraph.
12. Section 02262, Para. 1.8.1, Exploration Borings. It is never a good idea to reference a Geotechnical Data Report that contains Engineering Interpretations. The Geotechnical Report should be for information only and the boring logs part of the contract.
13. Section 02262, Para. 3.2.2, Verification of Impermeable Layer. Why is “Sonic Drilling” required? Also, where did 150 foot spacing originate? The designer should consider SPT borings on 100 ft cc? The impermeable layer should be well defined
14. Section 02262, Para. 3.4.1, General. This paragraph was hard to read and comprehend. It appears that the minimum acceptable wall thickness is 36 inches. TRD walls generally run 18 to 30 inches. Paragraph should be re-written to clearly allow multiple technologies. In addition, in bullet “d”, wall strength max is listed as 200 psi. This will produce a very stiff and brittle wall. Was it the designer’s intent to allow this strong of a wall. I would suggest a range between 10 and 20 psi.
15. Section 02262, Para. 3.6.1, Laboratory Trial Mixes. The 200 psi strength is again referenced.
16. Section 02262, Para. 3.8.8, Quality Assurance Borings. Why require borings every 250 feet along the wall? The Contractor is required to build a 100 foot test section. During that time, with each technology, the in-place mixing rates and percentages will be recorded. The Contractor should be required to obtain a minimum of two borings within this section. As the Contractor proceeds with the production wall, unless the Contractor makes significant changes to his in-place mixing procedure, why require any additional borings. Every time you drill the wall, you run a risk you run the risk of damaging a perfectly good wall. Also, if you drilled it on 50 foot centers, you only know what the wall is like at the points of drilling. Interpretations have to be made between borings. If the designers are insistent on QA Borings, recommend a much larger spacing, along the lines of 1000 foot, between borings while keeping a close inspection of the Contractor’s mixing QA procedures.
17. Section 02262, Para. 3.10.2, Acceptance Criteria Synopsis. Bullet item (b), minimum width of 36 is again specified. Recommend re-writing so multiple technologies can be used.
18. Section 02373, Para. 1.4, Submittals, Geotextile. Needle punch should not be required for non-wovens, and only non-wovens should be allowed.
19. Drawing C-04 and others. The cutoff wall cap is shown as Type 1 fill; recommend changing this to a CL or CH material
20. Drawing C-04. In typical detail 2, why is the area along the land side toe over excavated and back filled?
21. Drawing C-05. In typical detail 4, why is the area along the land side toe over excavated and back filled?

22. Drawing C-103. In Step 5, the note pointing to the “Cutoff wall working platform”, is pointing incorrectly.
23. Drawing C-202 and C-206. Several of these sections have been over excavated along the landside and backfilled. Why?
24. Drawing C-305. It appears that current design plans are to have a layer of highly pervious material below the levee roadway. During an extreme flood event, this could pose a problem even though it is above design flood levels. Recommend some type of impervious cutoff be designed so that, if the levee is ever over-topped, over-topping will go over the roadway not beneath it.