

Natomas Levee Improvement Program
Board of Senior Consultants

Comments and Recommendations
Following Meeting No. 7
of the Board of Senior Consultants
on August 18-19, 2009

Report Prepared by:

Board of Senior Consultants:

Dr. Leslie F. Harder, Jr.
Dr. Ray E. Martin
George L. Sills
Dr. David T. Williams

DRAFT

September 22, 2009

September 22, 2009

Mr. Stein Buer
Executive Director
Sacramento Area Flood Control Agency
1007 7th Street, 7th Floor
Sacramento, CA 95814

Dear Mr. Buer:

1. Introduction

This report presents the comments and recommendations for the Natomas Levee Improvement Program by the Program's Board of Senior Consultants (Board) following a meeting held for the Board on August 18-19, 2009. This meeting was the seventh formal meeting of the Board and was held to provide information to the Board to facilitate expert, independent review to SAFCA and its partners of the analyses and designs being developed as part of the effort to provide 200-year flood protection to the Natomas Basin.

During this meeting, several high-level presentations were made to the Board regarding the following subjects:

- Resolution of General Recommendations from Board's Report No. 1, dated May 9, 2008.
- Resolution of comments and recommendations made by the Board and other external reviewers on specific design documents and contract plans and specifications.
- Update on Natomas Cross Canal Phase 2 (NCC-2) and Sacramento River East Levee Phase 1 (SREL-1) Levee Construction
- Updates on SREL-1B, SREL-2B (60%) Levee Designs, SREL-2A/2B Canals, Pumping Plant 2 Work
- Updates on SREL-3 Preliminary Levee Designs
- Update on SREL-2 Pumping Plants, Canals and Irrigation
- Discussion of NCC-1 and NCC-1B construction work and quality assurance results
- Update on NCC-3, Pleasant Grove Creek Canal (PGCC), and Natomas East Main Drainage Canal (NEMDC) levee designs
- Updates on Hydrology and Hydraulics Issues
- Updates by the United States Army Corps of Engineers (Corps)
- Updates by the California Department of Water Resources (CDWR)

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A site visit to view excavation of the Brookfield Borrow Area, construction of the soil bentonite (SB) slurry cutoff wall at NCC-2, and the initial placement of the adjacent levee fill at SREL-1 was also held on the second day.

Copies of the meeting agenda and notes from this meeting are attached as Attachments 1 and 2 to this document.

The briefings provided a good update regarding the status of various phases of the project and the progress completed to date. Presented in the following sections are comments and recommendations by the Board resulting from this meeting.

2. Comments on the BOSC Report #1 Recommendations

The Board received briefings of the status of the responses of the NLIP design team to the Board's recommendations made in its first report, dated May 8, 2008. Overall, a significant amount of progress has been made on these recommendations and the Board recognizes that some of the recommended work will need to be carried out over several years. As a general comment, the Board recommends that a schedule be developed for the completion of the Board's recommendations. A summary of the responses by the NLIP design team and the Board's comments are as follows:

Recommendation 3A: Vertical Datum - The Board had recommended that a technical memorandum be prepared that describes the datums in use on the project, the processes for converting from one to another, and the quality control measures that are in use to assure that datum errors are not affecting the project designs.. This technical memorandum should be signed by the survey, hydraulics, geotechnical and civil design team members, and the conversions should be concurred with by the Sacramento District of the Corps. The Board understands that this technical memorandum has been finalized, signed, and concurred with by the Corps.

The Board recommends that a copy of the signed document, with the concurrence by the Corps, be submitted to the Board for a final review. Following this last step, the Board expects to be able to close out this recommendation.

Recommendation 3B: Intersections/Connections of Different Levee Improvements - The Board recommended that a technical memorandum be developed detailing the assumptions and procedures used for connecting/overlapping, 1) different levee improvements and 2) different

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levee improvements to areas where no improvement is planned . The Board understands that this is under development, with Wood Rodgers taking the lead.

The Board recommends that a schedule be developed for completing an initial version of this document, and that it be updated periodically as other intersections/connections are developed.

Recommendation 4: Seismic Stability - The Board had recommended that a seismic mitigation design approach be developed that would include evaluating the general level of deformations and damage that 100-year to 500-year earthquake loadings might induce in the levee system, developing an emergency response plan that would lead to rapid repair of the damaged levee system (perhaps up to a 25-year level of protection – i.e. restore damaged levee height back up to the 25-year water surface plus 3 feet of freeboard) over a period of a few weeks. The Board also had recommended that seismic stability be explicitly considered in the selection of levee improvement alternatives. The Board recommended that the design team formally put together a seismic mitigation design plan that incorporates the measures that will be adopted and to submit it for review and comment to the State, the Corps, and the Board.

The Board understands that the design team has concurred with the above recommendations, but that not much has been done on implementing them. For example, while there have been seismic deformation analyses completed with results showing different reaches of the levee as being potentially compromised, little appears to have been done on estimating the quantities of material and the effort required to restore a 25-year level of protection (height restored to 25-year water surface plus 3 feet of freeboard). The Board recognizes that SAFCA and its design team will have to work with its State and Federal partners to develop an emergency action plan for potential seismic events as the Corps will most likely lead the repair effort, and the State will likely need to locate and acquire borrow material. However, a plan needs to be developed for the various agencies to be prepared for a seismic event. This approach is the alternative to actually remediating the levees and their foundations to prevent liquefaction, an extremely costly endeavor.

During the meeting, the Board was presented with a general outline of the tasks necessary to develop an emergency action plan (e.g. estimating deformations, estimating quantities of soil to rebuild levee sections, and determining locations of suitable borrow). This outline is consistent with the Board’s recommendations. However, the Board suggests that more reasonable times be used for the

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completion of interim and permanent repairs (e.g. 6 to 8 weeks instead of 3 weeks for interim repairs, 2 years instead of 6 months for permanent repairs). The Board also recommends that potential haul routes be developed, that potential construction contracting mechanisms be identified, and that roles and responsibilities of the different agencies be clearly established.

The Board also recommends that the tasks associated with the work plan should be assigned to the appropriate parties and a schedule developed for completing the emergency action plan. This schedule should be presented to the Board and status reports presented to the Board in future meetings regarding the progress of developing this emergency action plan.

Recommendation 5: Hydrology and Hydraulic Design Approach - The Board had recognized that the FEMA deterministic approach and the Corps' Risk and Uncertainty (R&U) approach yield different water surfaces. The SAFCA design team was proposing to use a 200-year design water surface elevation developed using a deterministic approach with conservative assumptions regarding levee failures upstream of the Natomas basin. The Board had considered this to be acceptable and appropriate, but had also recommended that there should be minimum factors of safety for exit gradient and slope stability for water surfaces set at the top of the levee, consistent with DWR Interim levee criteria. The Board also recommended that for the purposes of obtaining future federal credits for the Natomas work, that SAFCA consider adopting the Corps' R&U approach, not for safety reasons but for business/financial benefits.

The Board understands that the minimum factors of safety for water surfaces set at the top of the levee (commonly referred to as the top of levee check) have been accepted by the design team. The Board also understands that SAFCA has considered the crediting and financial implications, but has decided to stay with the deterministic hydrology/hydraulics approach. The Board considers these comments closed.

Recommendation 6: Approach for Phased 100-year and 200-year Levee Improvements – The Board had understood that the Natomas improvements will be phased to first achieve a 100-year level of flood protection over the next 3-4 years, and then to achieve a 200-year level of flood protection within the next 5 years. However, the design approach was understood to be that, for any improvements necessary to achieve the 100-year level of flood protection, the improvements will be designed to a 200-year standard. That is, if freeboard has to be increased, it is

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increased not to the 100-year plus 3 feet level, but to the 200-year plus 3 feet level. If underseepage mitigation is required, then it is designed to the 200-year deterministic water surface. Presumably, this is to achieve both various economies and to reach higher levels of protection as quickly as possible. The Board strongly agreed with this approach.

The Board considers this comment/recommendation closed as long as this approach remains in place.

Recommendation 7: Interim Emergency Action Plans – The Board understood that an Emergency Action Plan is being developed for the Natomas Basin. The Board had recommended that interim plans be developed that define the actions necessary to respond to flood emergencies while the levee improvements are underway. This is particularly important since the system as a whole will have different levels of protection until the project is finalized. The Board believed that levee overtopping locations and possible failure modes could change, depending on the phasing of the project. The interim plans should consider the potential modes for distress and failure, and account for changes in conditions and locations as the improvements progress.

The Board understands that SAFCA and the design team have concurred with this recommendation, but the Board has not been presented with any information regarding how these interim emergency action plans are being developed. The Board would like to reinforce this recommendation and recommends that each year just before the onset of the flood season, that the interim emergency action plan be adjusted to reflect the levee improvements completed to date, the gaps left in the improvements, and any special considerations as a result of the interim levee improvements. The Board believes that such items as pre-positioning of flood-fighting materials, areas of focus for flood patrols and monitoring would be modified each year as additional levee improvements are completed.

Recommendation 8a: Slurry Cutoff Walls – The Board recommended further consideration of the type of slurry cutoff wall to be used, with particular focus on considering the use of a cement-bentonite (CB) slurry wall instead of a soil-bentonite (SB) slurry wall. The Board recommended that a special meeting/session be held that would further investigate this, together with the involvement of industry experts.

The recommended special meeting/session was held on April 8, 2008. As a result of this meeting, SB walls were concluded to be most appropriate by the design team due to their lower cost, faster

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rate of construction, and the uncertainties regarding availability of adequate cement quantities, and perceived better performance during earthquake motions. The Board concurs with this conclusion for this situation, but notes that other types of walls may be more appropriate for other conditions. The Board considers this comment closed.

Recommendation 8b: Levee Embankment Zoning and Borrow Area Analyses – The Board had been briefed on the plan to zone the levee embankments with two different zones. The Board was concerned about the difficulty of separating out Type 1 soils, with liquid limits less than 45 from Type 2 soils, with liquid limits of less than 55. The Board was also concerned that zoning the embankment would lead to higher costs. The Board recommended that more attention be given to this issue.

Since this recommendation was made, it was decided that zoning of the levee was unnecessary and that materials with liquid limits less than 55 could be used throughout the levee sections. The Board concurs with this approach and considers this comment closed.

Recommendation 8c: Levee Impervious Zone – Preliminary plans for the levee improvements, which incorporated a slurry cutoff wall, also included the placement of an impervious zone in the upper 10 feet or so of the levee above the cutoff wall. The Board was concerned that this was an unnecessary cost as the borrow areas largely consisted of clayey materials that would be largely impervious anyway.

Since this recommendation was made, it was decided to eliminate this separate impervious zone within the levee. The Board considers this comment closed.

Recommendation 8d: Piezometers Between Pressure Relief Wells – The Board had been concerned that the plan to place piezometers in the middle of each length between pressure relief wells was excessive. The Board had recommended that an appropriate number of piezometers should be between 3 and 5 for a reach with 60 relief wells.

Since this recommendation was made, the design team has proposed a 1,000-foot spacing between piezometers along a line of relief wells, and that the Sacramento District of the Corps has concurred with this plan. The Board concurs that this is a reasonable number of piezometers to evaluate the performance of the pressure relief well system and considers this comment closed.

Recommendation 8e: Pritchard Lake Area – The Board had been concerned about the past seepage distress in this area, including the development of sand boils in previous floods and the detection of voids beneath the surface. Since this area has been reworked many times and has numerous penetrations in the levee and its foundation, the Board recommended that a second line of defense be considered at this location. Such a second line of defense could consist of a slurry cutoff wall 80 feet deep running along the levee for distance of up to 1,500 feet.

Since this recommendation was made, the design team has proposed a 1,000-foot-long SB wall between Station 191+50 and 201+50 extending down to Elevation –25 feet. The Board believes that this would satisfy the recommendation for a second line of defense in this area as long as the seepage remediation for this site is designed without the SB wall. The Board understands that the seepage remediation being planned for this reach is a 300-foot-wide berm.

After reviewing some of the seepage analyses, the Board is concerned that the remedial designs for this area incorporate this SB wall as part of the first line of defense since analyses of the adequacy of the 300-foot-wide berm in this area all incorporate the SB wall. This does not strictly adhere to the idea of a second line of defense. The Board recommends that seepage analyses be performed to determine the influence of the partially penetrating SB wall at this location and its effect on determining the adequacy of the 300-foot-wide seepage berm.

3. Resolution of Comments and Recommendations made by the Board and other External Reviewers on Specific Design Documents and Contract Plans and Specifications

The Board has been concerned about resolution of the numerous comments and recommendations made by the Board and other external reviewers on specific design documents and construction plans and specifications. The Board notes that there are probably several hundred such comments and recommendations, but it is not clear whether the comments were addressed and the recommendations accepted. After much discussion, the design team proposed the following process:

- A. HDR will establish an Excel spreadsheet that summarizes each comment and recommendation.

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- B. The other design team members will provide HDR responses to the comments/recommendations. For responses that include modifications to designs and/or documents, the design team member will reference the document, page number or drawing that incorporates the modifications.

- C. The Excel spread sheet will be distributed to the external reviewers, including the Board, and the reviewers will back check the responses to determine that the comment/recommendation was appropriately addressed. This would include verifying that the appropriate changes were made in the documents. Comments/recommendations that were verified as being appropriately addressed can be closed out by the reviewer. Those that were not will require another round of responses and reviews.

It was recognized that this will be a significant effort and cannot be done all at once. The Board recommends that the comments be prioritized and offered the following priority:

- i. Comments/recommendations which might affect reaches under current construction – these would include soft soil issues on SREL, end-of-construction slope stability, and SB wall stability

- ii. Comments/recommendations which might affect designs for upcoming contracts – these might include the widths of seepage berms in Reach 4B and other areas

- iii. Other comments/recommendations

The Board strongly recommends that resolution of these comments/recommendations be given a high priority and that appropriate assignments be made and a schedule be developed for implementation.

The Board has also offered to meet, either in person or by conference call, to help resolve particular design issues that are still outstanding.

4. Review of Proposed Modifications to Quality Control Specifications for Slurry Wall Construction

The Board was presented with proposed modifications to quality control specifications by Ken Criley of Vector Engineering. The proposed modifications were largely associated with making the specifications more consistent with standard terms and practices in the industry. The Board concurs with the proposed changes.

5. Discussion of Adequacy of 300-foot-wide Seepage Berm for SREL 1B, Reach 4B

There was a brief discussion regarding the adequacy of the 300-foot-wide seepage berm proposed for Reach 4B. While Kleinfelder has completed analyses using certain assumptions that would show that the berm would keep seepage exit gradients at the toe of the berm within the maximum allowable value of 0.8, the reviews by DWR/URS question this and using other assumptions obtain exit gradients of over 1. Part of the issue is the unknown thickness of the blanket layer at large distances away from the levee. This issue also involves the use of the SB wall near Pritchard Lake as a second line of defense and the issue of whether there is a need to go beyond a 300-foot-wide berm.

While the Board is not at all convinced that a 300-foot-wide berm would not work in this area and meet existing criteria, the Board asked that this issue be analyzed further looking at the degree of conservatism of the various assumptions. Consideration should also be given to performing a number of cone penetrometer soundings 300 feet away from the toe of the planned adjacent levee to better inform the design process.

6. Update on Hydrology and Hydraulics Issues

During the meeting, there was a break-out session for the review of the R&U hydrology and hydraulic analyses performed for NLIP. The participants in this break-out session included David Williams (BOSC), Mike Archer (MBK Engineers), and Nathan Pingel (David Ford Consulting Engineers, Inc). The following items were discussed:

- The risk analysis in support of the 408 application for NLIP.
- The August 11, 2009 SAFCA-USACE meeting regarding the risk analysis in support of the 408 application for NLIP.
- The Ground Rules for the risk analysis, dated March 4, 2009.
- The Ford report *Conditional Risk Analysis for Natomas Levee Improvement Project*, dated July 6, 2009.
- Ford responses to USACE comments on the Ford report, dated August 13, 2009.
- The MBK report *Natomas Levee Improvement Project, Hydraulic Analysis for Section 408 Hydraulic Impact Risk Analysis*, dated June 30, 2009.

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- MBK responses to USACE comments MBK report, dated August 10, 2009.

The point of the meeting was for the lead member of the Board of Senior Consultants (BOSC) for risk and uncertainty analysis, David Williams, to review and comment on the noted documents. During the discussion, David Williams expressed the concerns noted below, together with responses from the other participants, shown in italics.

It was noted that the USACE wanted to further review the analysis and potentially request additional index points for the analysis and that they intended to respond during the week of 8/24.

In general, no major concerns were expressed that would require additional analysis or revisions. Nothing discussed would change findings in either report.

Concerns and responses:

1. Were consistent hydraulic model parameters, such as convergence criteria and computation time step, were used in the simulation of all scenarios for a given flood event?

Hydraulic model parameters will be summarized. Where inconsistent values have been used sensitivity analyses will be performed to see if the inconsistency affects results.

2. In the Ground Rules, item 1b notes that “Levees will be allowed to overtop and spill water to the storage areas adjacent to the levees.” Once the flow leaves the channel and enters the floodplain, can it return? Is levee failure from interior erosion included?

In the UNET model, flow can go over the lateral weirs in both directions. That is, flow from the channel can enter the floodplain and flow from the floodplain can return to the channel. Levee failure from interior erosion (high interior water surface) is not included. The assumption of levee overtopping without failure was held consistent for all evaluation scenarios. The report will be modified to clarify this.

3. For scenario 2 where all EIPs are added on top of the base condition, were the EIPs phased or all presumed in place?

All EIPs were considered in place. The only incremental analysis involved scenarios 2 and 3 and looked at the incremental impact of the NLIP only. In scenario 2, all EIPs were considered in place, including all phases of NLIP. In scenario 3, all were considered in place except for NLIP. The report will be modified to clarify this.

4. In the Ground Rules, it is stated that the Sacramento Centering was used as the basis of the hydrology. Doesn't the Shanghai Centering produce the worst conditions?

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The Shanghai centering produces slightly higher water surfaces than the Sacramento centering, but the difference is very small. The Sacramento Centering stresses the system the most when all sides of Natomas are considered. For the purpose of this analysis it was determined that the Sacramento centering was sufficient by itself. It was also noted that the frequency of the flood event relates to the latitude of Sacramento and not necessarily to the location of the individual index points.

5. In the Ground Rules, item 4d notes that, “System input flow frequency curves will need to account for the arbitrary nature of the tributary inflows input to the model but unsupported by appropriate hydrologic analysis.” The USACE noted, “We plan to work with you on how to do this, but currently have no further guidance.” How was this addressed?

The risk analysis followed the procedures described in the HEC Demonstration document. The base equivalent record length (the one from the statistical analysis of unregulated flows) was adjusted lower to account for the additional uncertainty in hydrology due to the factors noted. We have not received any additional guidance from the USACE on this issue.

6. In the Ford report, page 13, the term “precision” is used twice. Suggest the first usage (first paragraph) be changed to “tolerance”. Suggest the second use “Precision of values” be changed to “Accuracy of values”.

The report will be modified per these suggestions.

7. In the Ford report, it is noted that some of the inputs were extrapolated for use in the risk analysis. What extrapolation was required and how was it done? When possible, rather than extrapolating results or curves, the model could be used with larger inputs to define the extreme ends of the curves.

The 2 inputs requiring extrapolation were the system input flow frequency curve and the inflow-outflow transform. The system input flow frequency curve was extrapolated graphically in a consistent manner with the HEC demonstration document. This extrapolation was required to ensure that the full frequency curve (0.999 through 0.001) was defined. The inflow-outflow transform required extrapolation for a small number of index points. For these points, the largest simulated event did not result in stages or flows that equaled or exceeded the target elevation (the basis of the conditional-annual exceedence probabilities computed.) The project team did consider factoring up the input hydrographs and simulating those factored flows with the model to define the extreme upper end of the inflow-outflow curve. However, because the model wasn't calibrated for flows of that magnitude or

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configured for flows of that magnitude, the results may not be reasonable. Thus, these curves were extrapolated graphically as well.

As noted, the extrapolation of the inflow-outflow transform was only required when the target elevation was not exceeded by the greatest simulated event ($p=0.002$). Thus, these index points had a C-AEP less than 0.002.

8. In the Ford report, page 11, the first paragraph notes, “we used equivalent years of record consistent with EM 1110-2-1619.” Does this include the adjustment of the record length to describe the additional uncertainty?

The use of the equivalent record length to describe the uncertainty is consistent with EM 1110-2-1619. But, the adjustment to the “original” record length to describe the additional uncertainty is consistent with the HEC demonstration project. This is noted in the report.

9. In the Ford report, the method to develop the standard deviation is described and it is noted that a normal distribution was used. Were other distributions considered? Were histograms or cumulative distribution functions developed from the model results to confirm the validity of the use of the normal distribution (CDF)?

Use of a normal distribution for such applications is the standard of practice. It is the selected method in the HEC demonstration document as well as various risk and uncertainty analyses by the Corps in the Central Valley. Further, EM 1110-2-1619, page 5-6, suggests computation of the standard deviation by estimating “reasonable” upper and lower bounds and then dividing by 4 (consistent with the Ford and HEC reports.)

A detailed analysis of the results was not completed to confirm this distribution here. Such an analysis would require a great many hydraulic model runs and significant research. For example, if the range in Manning n values used and weir coefficients were discretized into 8 increments each, then all combinations simulated for a given system input flow dataset (such as the $p=0.01$ flow), then 64 simulations would be required. Even then, assumptions regarding the uncertainty distribution in each of the factors varied (Manning n and weir coefficients) would be required, and these would not be known with certainty. At the completion of the research and simulations, such a histogram or CDF could be developed.

Based on our judgment, use of a different distribution would not change the study results or conclusions.

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10. In the MBK report it is noted that the range in Manning n values considered was +/- 20%. How does this compare to recommendation from EM 1110-2-1619 (specifically Figure 5-4). How was +/- 20% selected?

The +/- 20% was selected based on judgment and experience with the Sacramento River UNET model.

Using Figure 5.4 of EM 1110-2-1619, this might suggest using a different range in Manning's n values. Using this figure, an average Manning's n value of 0.03 calls for a standard deviation of n value of 0.08. If this value is multiplied by 4, this would give the range to consider, or the maximum and minimum value. So, 4 multiplied by 0.008 is 0.032. Half of this is +/- 0.016. This suggests a range of +/- 50% variation in Manning's n value. However, professional judgment based on experience with the model and it's calibration suggests this is too high.

Note that the in the risk analysis, the minimum standard deviation about the flow-stage transform, as suggested by EM 1110-2-1619 was used when the computed standard deviation was less. This is noted in the Ford report.

11. Are there criteria defined to determine level of significance of R&U hydraulic impact results?

No. The need for significance criteria was discussed at the 8/11/09 SAFCA-USACE meeting. MBK and Ford agreed to include a significance discussion in the R&U analysis reporting.

12. The Ground Rules specify that an assumption of infinite levees is to be used for the development of the flow-transform function development? Why was this assumption used?

It is our understanding that the primary reason for the infinite levee assumption was to ensure that the flow-transform function extended above the analysis target elevation at each index point.

7. Closing Remarks

The Board very much appreciates the efforts of the design team members who prepared and presented numerous valuable summaries of the work completed to date. The various discussions were both informative to the Board and helped clarify some of the issues for the design team. The field trip was also very much appreciated as it was an excellent opportunity to view the excavation and mixing of borrow materials and the construction of the SB wall at the end of NCC-2.

The Natomas Levee Improvement Program remains a huge undertaking on a very aggressive schedule. Important issues still remain to be resolved and the Board hopes that the design team is able to expeditiously gather the appropriate information and perform the needed analyses.

The Board looks forward to future meetings, briefings, and discussions on this project.

Very truly yours,

**Natomas Levee Improvement Program
Board of Senior Consultants**

Dr. Leslie F. Harder, Jr., P.E., G.E.

George L. Sills, P.E.

Dr. Ray E. Martin, P.E.

**Dr. David T. Williams, P.E., P.H.,
CFM, DWRE**

Attachments:

Attachment 1: Meeting Agenda

Attachment 2: Action Items from NLIP Board of Senior Consultants – Session 7

Attachment 1:
Meeting Agenda



Natomas Levee Improvement Program
Board of Senior Consultants, Seventh Meeting – August 18 & 19, 2009

AGENDA

DAY 1: Tuesday, August 18, 2009 8:00 a.m. – 5:00 p.m.
Mead & Hunt, 180 Promenade Circle, Sacramento, CA, 95834

0800 – 0815	Introductions	(John Bassett)
0815 – 0830	Program Overview	(John Bassett)
0830 – 0900	Response to BOSC Report #1 Comments	(Jonathan Kors, Chris Krivanec, Mark Stanley)
0900 - 1000	Update on BOSC Review Comments	(All)
1000 - 1015	<i>BREAK</i>	
1015 - 1100	Update on BOSC Review Comments (continued)	(All)
1100 – 1200	Update to NCC-2/SREL-1 Construction	(Jonathan Kors)
1200 - 1300 by	WORKING LUNCH – Continue Discussions of BOSC Review Comments and Construction Issues for NCC-2/SREL-1 as needed.	(Lunch provided Mead & Hunt)
1300 - 1330	SREL-1B Update	(Blake Johnson)
1330 - 1430	SREL-2B 60% Design SREL-2A & 2B Canals, Pumping Plant 2	(Chris Krivanec) (Steve Sullivan)
1430 - 1445	<i>BREAK</i>	
1445 – 1530	SREL-3 Preliminary Design SREL-3 Pumping Plants, Canals and Irrigation	(Chris Krivanec) (Steve Sullivan)
Concurring:	<u>Track 1</u>	
1530 - 1600	a) NCC-1 and NCC-1B construction closeout and QA sampling results	(Jonathan Kors)
	b) SB sampling and testing (Vector)	(Jonathan Kors)

1600-1700	Update on NCC-3, PGCC and NEMDC <u>Track 2</u>	(Pete Tobia)
1530 – 1700	Hydrology and Hydraulics Issues • R&U Analyses	(MBK)
1700	Adjourn for the Day	

DAY 2 : Alternate Schedule 2 (Morning Site Visit)

Wednesday, August 19, 2009 8:00 a.m. – 5:00 p.m.

**Corps of Engineers Office, 1325 J Street, Sacramento, CA 95814
Room 1424**

0800 - 1200	Site Visit (<i>provide own transportation</i>) Board Session	
1200 – 1300	<i>Lunch (on your own)</i>	
1300 - 1400	Recap and Discussion of Previous Day	(Les Harder)
1400 – 1415	USACE Update and Issues	(Ed Ketchum)
1415 – 1430	DWR Update and Issues	(Mike Inamine)
1430 – 1445	<i>Break</i>	
1445 – 1600	Look Ahead • SREL-3	(Chris Krivanec)
1600 – 1630	Additional Discussion as Necessary	
1630	Tentative Adjournment	

Attachment 2:

Action Items from

NLIP Board of Senior Consultants Meeting

Session 7

(DRAFT prepared by Pro Mitra, MBK Engineers)

Connections between levee units

Determine flood fight procedures for NCC gaps. URS/DWR

Seismic Stability

HDR to refer to DWR interim criteria HDR

HDR to work with DWR in determining reasonable duration of repair based on time of year and material availability. HDR

Hydrology and Hydraulic Design Approach

Comment will be closed based on deterministic approach for design, mandated by USACE and DWR. MBK

Emergency Action Plan

Offline discussion with BOSCO, NLIP designers, USACE (Meegan Nagy) and DWR. Loren Murray (URS/DWR) to assemble qualified DWR staff for EAP coordination. All

Identify weak points along SREL and ARNL. Review URS report to be provided by Perlea. Kleinfelder

Kleinfelder to provide draft report / proposal on piezometers as a means for levee performance monitoring during high-water events. Kleinfelder

BOSCO Review Comments

HDR (QA Manager) to centralize all comments and develop methodology to be accessible by all NLIP designers and reviewers. HDR to lead meeting with other design firms and to schedule the resolution of prioritized comments (see below). HDR

All design firms to send comments to HDR as they become available. All

Prioritize comments:

- 1. Current design and construction issues: Soft soils issues, trench-wall stability, end-of-construction stability HDR - QC
- 2. Future design and construction - to be resolved by November 2009
- 3. Other

HDR and Kleinfelder to evaluate end-of-construction design and submit to BOSC for recommendations. Deliverables will include x-sections, updated EAP for flood protection, determine weak points and gaps. HDR, Kleinfelder

Reach 4B

Kleinfelder to obtain and analyze more samples (i.e. SPTs). Kleinfelder

Kleinfelder to provide supplementary explanation for areas with thin blanket and resolve issues with SAFCA and USACE. Kleinfelder

HDR and Kleinfelder to identify and evaluate interim condition at Prichard Pumping Plant for upcoming flood season and determine that the interim condition is not worse than pre-modification. HDR, Kleinfelder

Soft Soils Report

USACE requests testing on soil used for platform. Kleinfelder

Construction Status

NCC

Wood Rodgers to send documentation to justify adding sand to cutoff wall slurry mix. Wood Rodgers

Kleinfelder to investigate settlement at NCC 96+50 was 3", while other locations averaged 1" in settlement. Kleinfelder

Vector to send ASTM testing method for slurry mix to BOSC.

SREL-2B

HDR and Kleinfelder to determine feasibility of constructing 2:1 slope at I-5 crossing (Reach 9A). HDR, Kleinfelder

Borrow BOD: Mead & Hunt and Kleinfelder to determine:

- 1. Quantities with different PI ranges (i.e. <45, 45-55, >55)
 - 2. Percent of different material that may be classified as unacceptable by USACE
 - 3. Plot distribution of CH soils over LL=55% at every 5% LL interval, up to maximum LL
- Mead & Hunt, Kleinfelder

SREL-3

HDR to send DWR/DOE ongoing schedule updates for report and design deliverables.

HDR

HDR to resolve concern from USACE (Ketchum) regarding the possibility of standing water if berm slope is less than 2%.

HDR

HDR to resolve power pole and utility relocation policies with USACE and investigate feasibilities of installing services underground. An official rejection from the USACE regarding utility relocation variance may be required to move forward.

HDR