
MEMORANDUM

TO: Mr. Dave Lewis
County of Santa Barbara
Department of Public Works
Transportation Engineering Section

FROM: Robert E. Hawthorne

SUBJECT: Seismic Retrofit of Jalama Road Bridge (51C0016)
Project Construction Cost Implications

October 2, 2008

Construction Cost Implications:

Enclosed are the planning estimates for the cost changes between the original channel shaped abutment retrofit to the new CIDH pile retrofit. The estimates define the costs of the changes not including similar items used for each of the two systems. These are partial costs of the project only, relative to the changes in retrofit approach, and are listed in today's dollars.

The original channel shaped abutment retrofit presents significant issues with the constructability of the channel section and being able to provide one lane of traffic at all times. The concern is in the ability of the contractor to provide the excavations needed in the original proposed condition.

The new CIDH pile configuration moves the support piles away from the center of the roadway to near center of the lane allowing easy excavation techniques while maintaining a single lane of traffic. Trying to move the transverse passive arm of the channel shaped assembly away from the center of the road was reviewed and it was found that there was not enough soil distance from the retrofit structure to the drainage channels at the side of the road, to maintain the projected passive resistance. The 35 degree skew and the tieback wall assembly at the west side also create complications.

The original channel shaped abutment retrofit:	\$ 80,000.00
The new 48" diameter CIDH concrete pile retrofit:	<u>\$ 170,000.00</u>
Added Cost Difference:	\$ 90,000.00

Design Cost Implications:

In design of the CIDH pile configuration, there has been additional design analysis effort required to implement a more constructible retrofit.

The change in design effort consisted of developing the new concept for the CIDH pile assembly, discussing the design parameters with the client and the geotechnical representative, analyzing the new geotechnical data provided, and developing the soil spring coefficients. The design model was then modified to reflect the new configuration.

In review of the results of the analysis, the rock spring constant parameters, with the low unit weight of the rock and the compressible rock with a high void ratio, presented unanticipated results. Additional conversations with the geotechnical representative were then held. The spring constants were then

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revised, the larger section properties were calculated, the piles were lengthened, and the design model was revised.

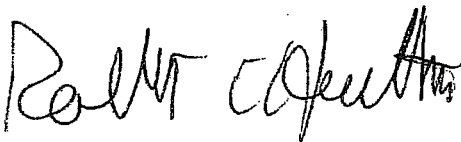
The program was rerun and the new results were analyzed. The pile assembly behavior was closer to an acceptable result but required additional modifications.

The design model was then revised accordingly, by modifying the spring coefficients, increasing the pile size, recalculation the section properties, and modifying the length of the pile slightly. The design model was then modified in accordance with the changes and the results indicated an acceptable design.

The attached Project Budget identifies the work effort listed above. The additional cost for the design effort is \$ 17,382.

The structural design of the new CIDH pile assembly, pile cap, and retrofit attachment to the bridge structure will replace the structural design costs of the channel shaped assembly.

If any questions should arise please feel free to contact me at 505-883-7700.



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