SARGENT

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October 9, 2013

Ms. Paula Cox
Chelan County Public Works
316 Washington Street, Suite 402
Wenatchee, WA 98801

RE: Mill Creek Bridge
Project No.: A13133.04

Dear Ms. Cox:

A bridge is proposed to carry Mountain Home Ranch Road over Mill Creek just off Highway 97. The proposed bridge is a precast concrete bridge with precast concrete voided slabs for the superstructure and precast concrete blocks for the substructure.

This report summarizes comments on the design of the bridge after a cursory review of the design calculations and plans. A detailed check of the design was not performed.

Evidently, there has not been a geotechnical study performed for the bridge. The bridge is a heavy structure and proper support from the soils is important. Therefore, we recommend that a geotechnical study be performed.

It was not apparent if there has been a hydraulic and scour study performed for the bridge. If not, we recommend that a hydraulic study be performed to evaluate if the water way is adequate to carry debris through the bridge opening and to evaluate the scour potential of the stream on the bridge. For a mountain stream, it does not look appropriate for the spread foundations of the bridge to be above the streambed. Usually the foundations are placed below the streambed so that they will not scour in the future in case the stream should move laterally. We recommend that they be placed below the streambed. The distance below the streambed needs to be determined with the scour study.

Wingwalls are not indicated on the plans. With the profile shown on sheet 5 and the plan shown on sheet 4 there is nothing to keep the approach fills from raveling at the corners of the bridge. Wingwalls should be added to retain this fill.

We do not know what the requirements were for the bridge rail, but we recommend that there be installed a crash test railing, transitions, and terminals. This is usually required for federally funded projects. It has been found that you cannot tell how a rail will perform by designing it to resist certain prescribed forces. It is necessary to actually crash test the rail to see how it will perform.

We notice that the designer used an analysis to determine the portion of a truck (distribution factor) that is carried by a precast slab in the structure. They noted the distribution factors on the second sheet of the

plans. However, when we reviewed the calculations, it appears that a different distribution factor was derived and then not used in the design. It is also not obvious if the multiple presence factor was included in the single lane derivation of the distribution factor. The distribution factors used in design are smaller than what was derived. Therefore, the slabs could be under designed.

These slabs were not designed to the WSDOT requirement of zero allowable tension when the slabs are fully loaded. The slabs were however designed to the requirements of the AASHTO LRFD Bridge Design Specifications requirements. You should evaluate if this is important to you or not.

The abutment design earth pressures assume that the abutments are constructed from the top down with struts or ties to hold the wall and fill in place. This is not the case. The abutment will be excavated and then backfilled. Therefore, the earth pressure diagrams from section 3.11.5.9 of the AASHTO LRFD Bridge Design Specifications apply.

If you have any questions, regarding this review, please let me know.

Respectfully,
Sargent Engineers, Inc.

Monte Smith
Principal

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