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Project: 5012802

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Johnson Street Bridge Interim Project Director
City of Victoria
623 Pandora Avenue
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Ref - Johnson Street Bridge Replacement Project; Supplement Services – Directives issued by the City in regards to overseas structural steel fabrication

Dear Jonathan,

In response to your request, we are writing to provide further clarification of the seismic design undertaken for the Johnson Street Bridge (JSB). It is understood that some of the statements made in the paragraph entitled “Design Approach Summary” of our March 20, 2015 letter may have inadvertently created some concern and confusion.

Although we have stated in our letter that “the 1:2500 year event is not part of the seismic design criteria specified in the JSB 2012 PDR and was not analyzed in the design”, this does not mean that the availability of the JSB for use by emergency and security/defense vehicles following a 1:2500 year return period event cannot be stated with confidence.

Both the Canadian and AASHTO codes are based on a single level seismic design procedure. Each of the codes specifies the use of a single “Design Earthquake” for the analysis of bridges and their components. The Design Earthquake for the Canadian Code is based on a 1:475 year return period while the AASHTO Code, that the JSB is designed for, uses a more stringent 1:1000 year return period.

Neither the Canadian Code nor the AASHTO Code requires explicit verification of the seismic performance criteria for bridges of varying importance categories. Rather, each Code implies that bridges designed using their respective “Design Earthquake” and using the response modifications factors for varying importance categories (critical, essential or others in the case of AASHTO) will satisfy the required performance criteria.

AASHTO Clause C.3.10.5 indicates that if a bridge must remain open to all traffic after the Design Earthquake and be usable by emergency vehicles and for security/defense purposes after a large earthquake, eg. a 2500 year return period event, then the structure needs to be designed as a “Critical Structure” using the response modification factors provided in the code applied to the Design Earthquake.

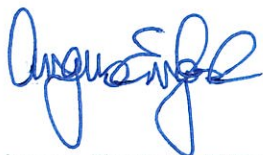
The JSB is a “critical bridge and it is expected to be available for use by emergency and security/defense vehicles immediately following a 1:2500 year earthquake. This inference is based on the AASHTO code stringent design approach corresponding to the 1:000 year “Design Earthquake” and the associated commentary. In essence, a design following the AASHTO methodology ensures a significant reserve capacity in the structure beyond the “Design Earthquake”. This reserve can be relied upon to resist the effects of a large earthquake e.g. one with a 2500-year return period.

In closing, we reiterate that the JSB was designed as a “critical structure” in accordance with the AASHTO Code, using the 1:1000 year “Design Earthquake” and it is not necessary (or required) to actually analyze the structure for a 1:2500 year earthquake for us to be able to confidently state that the JSB will be available for use by emergency and security/defense vehicles following a large earthquake.

We trust this clarifies the design approach used on the Johnson Street Bridge. As stated previously, it is in accordance with the Seismic Design Criteria included in the August 2012 PDR.

Yours truly,

MMM Group



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