

August 28, 2009

CG25309.B

Alberta Transportation  
2<sup>nd</sup> Floor, 803 Manning Road NE  
Calgary, AB T2E 7M8

Attn: Mr. Ross Dickson

**Re: Southern Region Geohazard Assessment Program  
Site S8 – Fisher Creek, Highway 762:02  
2009 Annual Inspection Report**

This letter documents the 2009 annual site inspection of Site S8 – Fisher Creek on Highway 762:02, approximately 2 km north of the junction with SH 549 and approximately 900 m north of the Highway 762 bridge over Fisher Creek.

AMEC Earth & Environmental (AMEC), a division of AMEC Americas Limited, performed this inspection in partial fulfillment of the scope of work for the supply of geotechnical services for Alberta Transportation's (AT's) Southern Region (AT contract CE061/08).

The site inspection was performed on June 12, 2009 by Mr. Andrew Bidwell, P.Eng., and Mr. Bryan Bale, EIT of AMEC in the company of Mr. Ross Dickson and Mr. Neil Kjelland, P.Eng. of AT.

## **BACKGROUND**

A general description of the geohazard conditions at this site along with the site geological setting and chronology of previous events, investigations, monitoring and repair work were provided in the Geotechnical File Review (Section A of binder) and summarized in previous annual inspection reports<sup>1</sup>.

This site has been monitored by AT and their consultants since 1988 when a diagonal crack formed across the road surface with up to 100 mm of adjacent settlement. In late 1988 a series of lime/gravel columns was installed to stabilize and reinforce the road subgrade. There are limited records regarding the geotechnical issues at this site beyond 1991 were found.

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<sup>1</sup> AMEC report "Southern Region Geohazard Assessment, Annual Assessment Report, 2007", project number CG25263, submitted to AT on November 6, 2007.

The site has more recently been inspected and monitored by AT and AMEC personnel since 2000, including a geotechnical site investigation with instrument installations in 2001 and 2002 and some additional and replacement instrument installations in 2007. The instruments have confirmed ongoing landslide movement below the road surface. However, since 2000 only the north end of the site has experienced significant road surface cracking and settlement. This damage has been treated as a maintenance issue.

## **SITE OBSERVATIONS**

Key observations from the June 2009 inspection are listed below. Please also refer to the attached Figure 1 for a site plan.

- At the time of the June 2009 inspection, there was a crack extending across the entire road surface around the southern flank of the damaged segment of the highway (Photo S8-1). This cracking appears to be a further development of the cracking that was noted in the June 2008 inspection (i.e. no overlays in the area since that time).
- There was also some cracking in the southbound (downslope) lane around the north end of the site, as shown in Photos S8-2 and S8-3. The pattern and extent of the damage to the road surface was similar to that noted in the previous annual inspections. The cracking visible in this area appears to have developed since a late summer 2008 overlay.

## **ASSESSMENT**

The assessment of the hazard to the highway at this site has not changed in recent years. It continues to be necessary to place overlays, typically on an annual basis, due to ongoing settlement of the west shoulder and a portion of the southbound lane caused by the underlying landslide movement. The multiple overlays have resulted in a steep drop-off from the west edge of the pavement. There has been relatively less damage to the road surface at the south end of the site despite underlying landslide movement at comparable rates to that below the north end of the site.

As noted in previous annual inspection reports, it appears practical to continue to treat the ongoing damage to the road at the north end of the site as a maintenance issue.

## **RISK LEVEL**

The recommended Risk Level for this site, based on AT's general geohazard risk matrix, is as follows:

- Probability Factor of 8 based on the ongoing movement being tracked in the SI's and the continued cracking and settlement at the north end of the site.
- Consequence Factor of 3 to reflect the magnitude and extent of the cracking and settlement of the road in recent years which has affected the road surface but not required partial closure of the road.

Therefore, the current recommended Risk Level for this site is 24, which is unchanged from the previous assessment.

## **RECOMMENDATIONS**

### **Maintenance and Short Term Measures**

- AT's maintenance contractor should continue to place overlays and patches at the north end of the site as required to maintain a smooth road grade.
- The steep drop-off along the west side of the road due to the multiple overlays should be checked relative to AT's November 2007 Roadside Design Guide to determine if a guardrail is warranted, and/or the asphalt thickness milled down to reduce the magnitude of the drop-off if possible.
- The location of the paved-over SI 2002-3 in the northbound lane at the south end of the site should be marked so that AT's maintenance contractor can uncover it and restore access to it for the Fall 2009 readings. As discussed with AT, AMEC will send a survey crew to mark the previously-surveyed location of this instrument. AMEC used a metal detector/pin finder to attempt to locate this instrument during some instrument repairs and maintenance in June 2009, however this was not successful.

### **Long Term Measures**

- As discussed on site during the inspection, AT should continue to treat this site as a maintenance issue with a backup plan of installing a shear key if required if the magnitude or extent of the damage to the road surface increases in the future. The previous, preliminary shear key design for this site should be revised based on the more extensive landslide movement data from the 2007-series SI's. See the "Investigation and Additional Work" section below for additional discussion.

- The semi-annual readings of the functioning instruments should be continued.
- The annual site inspections should be continued.

### **Investigation and Additional Work**

No further field investigation work is recommended for this site.

AMEC will revise the previous shear key design based on the more recent landslide movement data from the 2007-series SI's. The purpose of the revision would be to optimize the size and layout of the shear key, possibly including multiple shear keys with different base elevations if that would be optimal to mitigate landslide movement at various base elevations below the road.

## **CLOSURE**

This report has been prepared for the exclusive use of Alberta Transportation for the specific project described herein. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it are the responsibility of such third parties. AMEC Earth & Environmental, a division of AMEC Americas Limited, cannot accept responsibility for such damages, if any, suffered by any third party as a result of decisions made or actions based on this report. This report has been prepared in accordance with accepted geotechnical engineering practices. No other warranty, expressed or implied, is made.

We trust that this meets your needs at this time. Please contact the undersigned if you have any questions or require any further information.

Respectfully Submitted,

**AMEC Earth & Environmental,  
a division of AMEC Americas Limited**

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Associate Geological Engineer

APEGGA Permit to Practice No. P-04546

Reviewed by:

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Attachments: Figure S8-1  
Photos S8-1 to S8-3