September 29, 2008

CG25277.B

Alberta Transportation
2nd 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
2008 Annual Inspection Report

This letter documents the 2008 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 19, 2008 by Mr. Andrew Bidwell, P.Eng. and Mr. Bryan Bale of AMEC in the company of Mr. Ross Dickson and Mr. Roger Skirrow 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[1].

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. The file review for this site showed that in late 1988 a series of lime/gravel columns was installed to stabilize and reinforce the road subgrade. Limited records regarding the geotechnical issues at this site beyond 1991 were found.

[1] AMEC report "Southern Region Geohazard Assessment, Annual Assessment Report, 2007", project number CG25263, submitted to AT on November 6, 2007.

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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 regarding changes in the site conditions since the 2007 inspection are summarized as follows:

- The previously-noted cracking and settlement along the west shoulder of the road at the north end of the site has continued since the 2007 inspection. The approximate location of this damage is shown on the attached site plan. It appeared that at least one overlay had been placed over this area since the June 2007 inspection. Photos S8-1 and S8-2 show the damage to the road surface at the north end of the site.

- Subtle cracking at the south end of the site was visible (marked as “Southern Crack” on the attached site plan), but otherwise no significant additional cracking or other damage to the road surface was observed. Photo S8-3 shows a typical view of the road surface condition at the south end of the site.

The Spring 2008 readings of the instrumentation at this site showed that landslide movement is continuing at various depths across the entire site, i.e. a roughly 110 to 120 m segment of the highway. The visible damage to the road surface at the north end of the site appears to be the result of this ongoing movement, however similar magnitudes of movement below the south end of the site have not resulted in any significant damage to the road surface in that area.

ASSESSMENT

It has been necessary to place several overlays at the north end of this site in recent years due to the ongoing settlement of the west shoulder and a portion of the southbound lane caused by the underlying landslide movement. As shown in Photo S8-1, the multiple overlays have resulted in a steep drop-off from west edge of the pavement.

There has been minimal to negligible 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.

Overall, it appears practical to continue to treat the ongoing damage to the road at the north end of the site as a maintenance issue. However, the installation of a guardrail and/or milling out the

accumulated overlay thickness will likely be required at the north end of the site due to the drop-off from the edge of the pavement in this area.

RISK LEVEL

The current 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 2007 assessment.

RECOMMENDATIONS

Maintenance and Short Term Measures

- AT's maintenance contractor personnel should continue to place overlays and patches at the north end of the site as required to maintain a smooth road grade.

- The asphalt surface in the overlay area at the north end of the side should be milled down and/or a guardrail installed along the west edge of the highway in order to mitigate the steep drop-off from the west edge of the asphalt where numerous overlays have been placed.

- AT's maintenance contractor should recover the paved-over SI 2002-3 in the northbound lane at the south end of the site, as recommended in the spring monitoring report. The location of this instrument was marked on the pavement in April 2007 to guide the search for this instrument, however the marking may no longer be visible.

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 lateral 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 investigation work is recommended for this site.

As discussed on site during the inspection, it is recommended that the previous shear key design be revised based on the more extensive 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.

The ballpark cost to perform the recommended design revisions and produce a new set of design drawings is $10,000 to $15,000. AMEC will submit a proposed scope and estimated costs for this work to AT under separate cover. There would be no short-term consequence or increase in the Risk Level to this site if the shear key design is not revised, however it would be good to do so in order to be proactive.

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

Andrew Bidwell, M.Eng., P.Eng.
Associate Geological Engineer

APEGGA Permit to Practice No. P-04546

Reviewed by:

Pete Barlow, M.Sc., P.Eng.
Principal Geotechnical Engineer

Attachments: Site Plan
Photos