



September 8, 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 S22 – “S” Curve Slide, Highway 762:02
2008 Annual Inspection Report**

This letter documents the 2008 annual site inspection of Site S22 – “S” Curve Slide along Highway 762:02, south of Bragg Creek, AB and approximately 14 km southbound from the junction between Highway 22 and Highway 762.

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 previous annual inspection report¹ and are summarized as follows:

- The highway is constructed on an approximately 4 m thick fill embankment on the south/southeast facing slope above the west bank of a small creek.
- Ongoing landslide movement in the native soils underlying the embankment has been causing cracking and settlement of the road surface that has been inspected and monitored by AT and AMEC since 2006.

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

- Geotechnical borehole drilling, instrument installations and readings from the spring of 2007 onwards have shown that the landslide movement is occurring at or slightly below the elevation of the creek channel at the toe of the slope. The attached cross-section on Figure S22-2 shows the stratigraphy and depth of landslide movement. The primary cause of the landslide movement is judged to be the piezometric pressures in the native clay/silt underlying the embankment along with the load of the embankment which is resulting in sliding occurring at the contact with the harder, underlying clay till soils.

SITE OBSERVATIONS

- At least one overlay had been placed across the entire site since the June 2007 inspection. At the time of the June 2008 inspection, tension cracking had formed through the most recent overlay with the same extent and pattern as noted in previous overlays in the 2006 and 2007 inspections. Photos S22-1 to S22-4 show the extent of the cracking as it appeared at the time of the June 2008 inspection. The site plan attached as Figure S22-1 shows the site layout and distribution of the cracking.
- The Spring 2008 instrument readings at this site showed a continuation of the landslide movement at or slightly below the creek elevation in the SI locations in the south shoulder of the highway. The landslide movement since SI installation in the spring of 2007 has deformed one of the SI casings to the point where the SI probe will no longer pass below the depth of the landslide movement surface. The piezometric pressures in the native soils underlying the road embankment continue to be equivalent to a groundwater surface roughly 4 to 6 m above the landslide movement surface.

ASSESSMENT

The ongoing landslide movement at this site continues to cause cracking and settlement of the road surface. This has been treated as a maintenance issue since roughly 2005, with several overlays having been placed at the site to maintain a smooth running surface. The data from the SI's and piezometers show that the landsliding movement is continuing and the piezometric pressures – which are considered to be the primary driver for landslide movement – have not changed significantly over the past year. Therefore, it is judged that the landslide movement will continue at rates similar to those measured in 2007/2008.

RISK LEVEL

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

- Probability Factor of 10 to reflect the active slope movement being tracked in the SI's.

- Consequence Factor of 2 to reflect the impacts upon the road to date and the expected future damage to the road, i.e. annual to semi-annual repaving required to maintain a smooth running surface.

Therefore, the recommended Risk Level for this site is 20, which is unchanged from the recommendation after the 2007 inspection.

RECOMMENDATIONS

Maintenance and Short Term Measures

AT's maintenance contractor should continue to place overlays as required to maintain a smooth running surface.

Long Term Measures

The previous recommendation for drainage trenches installed with one-pass trenching equipment to lower the groundwater levels in the landslide area and thereby attempt to reduce future landslide damage to the road surface remains valid. This option is still considered to be the most practical and cost-effective mitigative option for this site. The drainage trench layout discussed on-site during the inspection is shown on Figure S22-1.

As discussed on site, AMEC will submit a proposal and cost estimate for the design of the drainage trenches to AT.

The annual inspections by AT and AMEC personnel should be continued.

Investigation

No further investigation work for this site is recommended at this time. The SI that is no longer in service does not need to be replaced because the depth of landslide movement has been confirmed at that location.



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:

Paul Cavanagh, M.Eng., P.Eng.
Associate Geotechnical Engineer

Attachments: Site Plan
Cross-Section
Photos