August 28, 2009

CG25309.B

Alberta Transportation
2nd Floor, 803 Manning Road NE
Calgary, AB T2E 7M8

Attn: Mr. Ross Dickson

Re: Southern Region Geohazard Assessment Program
Highway 940, KM 82.2 – 82.4, Creek Erosion
June 10, 2009 Inspection Report

This letter documents the June 10, 2009 inspection of the creek bank at KM 82.2 and KM 82.4 adjacent to Highway 940, approximately 82 km northbound along Highway 940 from the intersection between Highway 940 and Highway 3, in Coleman, AB and approximately 9 km northbound from the junction between Highway 940 and Highway 532. The site is within the upper portion of the Wilkinson Creek valley, a short distance northbound of the low pass between the Wilkinson Creek valley and the Dry Creek valley to the south. The site inspection was performed by Mr. Andrew Bidwell, P.Eng. and Mr. Bryan Bale of AMEC Earth & Environmental (AMEC), in the company of Mr. Neil Kjelland, P.Eng., Mr. Ross Dickson and Mr. Rick Nash of Alberta Transportation (AT). The inspection was performed 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).

This segment of Highway 940 is closed between December 1 and April 30 each year.

KM 82.2 – Creek Erosion

BACKGROUND

The June 2009 site inspection by AT and AMEC personnel was the second inspection of this site by AMEC. The site was first inspected in 2008 as part of the Highway 940 geohazard corridor review. Please refer to the 2008 corridor review report for more background information and the 2008 assessment of the site[1]. Note that the 2008 review referred to this site as KM 82.4.

[1]AMEC report, "Geohazards Review, Highway 742 And Highway 940 Corridors, Southwestern Alberta", submitted to AT, April 8, 2009.

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AMEC is not aware of any previously reported problems at this site. As described below, it appears that a repair was made at this site in 2008.

The purpose of the June 2009 inspection was to check the conditions along the right bank of the creek as a follow-up to the September 2008 inspection and to see if the rock armouring that was placed is holding up during/after peak springtime flows.

SITE OBSERVATIONS

Key observations from the 2009 inspection are summarized below:

- The rock fill slope between the road and the creek channel is approximately 6 m high at 38° inclination.

- Relatively fresh cobble to boulder-sized rock fill was visible along an approximately 10 m segment of the slope between the downslope edge of the road and the right creek bank. The rock fill was present during the September 2008 inspection and is understood to have been end-dumped onto the slope as a repair earlier in 2008 in response to erosion along the right creek bank beginning to undermine the road surface. Refer to Photo 1.

- Overall, the site appeared to be in the same condition as was observed in September 2008.

ASSESSMENT

The rock fill appears to have been successful in buttressing the slope between the road and the right creek bank and providing protection against ongoing creek erosion. There was no damage noted due to the spring runoff.

Risk Level

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

- Probability Factor of 5 relative to slope instability along the right creek bank undermining the downslope edge of the road, based on the apparently successful repair, and with a remote chance of erosion reoccurring based on the performance during the Spring 2009 runoff. This is a reduction from the recommended value of 7 following the September 2008 inspection.

- Consequence Factor of 2 because if the downslope edge of the road starts to become undermined in the future, it may be necessary to post warning signs and temporarily reduce the road width for traffic prior to repair.

Therefore, the current recommended Risk Level for this site is 10, which is a reduction from the value of 14 recommended after the September 2008 inspection.

RECOMMENDATIONS

AT's Maintenance Contract Inspector should check the condition of the site periodically to watch for erosion that may affect the road.

No further inspections under the GRMP are recommended, unless AT or maintenance contractor personnel report a change in conditions.

KM 82.4 – Creek Erosion

BACKGROUND

The June 2009 site inspection by AT and AMEC personnel was the second inspection of this site by AMEC. The site was first inspected in 2008 as part of the Highway 940 geohazard corridor review. Please refer to the 2008 corridor review report for more background information and the 2008 assessment of this site. Note that the 2008 review referred to this site as KM 82.2.

AMEC is not aware of any previously reported problems at this site.

SITE OBSERVATIONS

Key observations from the 2009 inspection are summarized below:

- The downslope edge of the highway is at risk of becoming undermined by erosion along the right bank of Wilkinson Creek, which is a few metres downslope of the highway.

- The creek bank at this site is 5 to 6 m high at 48 to 50° slope, with gravel to boulder sized bed and bank material. Willows are abundant in places on the slope. Refer to Photo 2.

- There is minor erosion occurring from the crest of the slope due to runoff from the road.

- The toe of the slope that is exposed to streamflow appears stable.

- The slope appeared to be in the same condition was observed during the September 2008 inspection.

ASSESSMENT

There is a risk of erosion along the right bank of Wilkinson Creek destabilizing the slope between the creek bank and the downslope edge of the road and in turn destabilizing the road itself. This did not appear to be occurring at the time of the September 2008 and June 2009 site inspections, but bears watching in case a situation similar to the Km 82.2 Creek Erosion site begins to develop.

RISK LEVEL

The recommended Risk Level for this site, relative to the potential for future creek erosion undermining the downslope edge of the road, based on AT's general geohazard risk matrix, is as follows:

- Probability Factor of 5 because it does not appear that the road is currently being undermined however with uncertainty as to whether or not it will start to become undermined in the future.

- Consequence Factor of 2 because if the downslope edge of the road starts to become undermined in the future, it may be necessary to post warning signs and temporarily reduce the road width for traffic prior to repair.

Therefore, the recommended Risk Level for this site with respect to the creek erosion hazard is 10, which is unchanged from the 2008 inspection.

RECOMMENDATIONS

AT's Maintenance Contract Inspector should check the condition of the site periodically to watch for erosion that may affect the road.

No further inspections under the GRMP are recommended, unless AT or maintenance contractor personnel report a change in conditions.

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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APEGGA Permit to Practice No. P-04546

Reviewed by:

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

Attachments: Photos

Photo 1 – June 2009
Creek erosion site at KM 82.2, repaired with rip-rap. The site was not damaged by the Spring 2009 runoff, however there is potential for future erosion at, or near, the repaired area.

Photo 2 – June 2009
Creek erosion site at KM 82.4. Erosion does not appear to be occurring, however there is a risk that peak flow events may trigger erosion in the future that would affect the road.