



December 17, 2013
EG10030

Alberta Transportation
2nd Floor, Twin Atria Building
499-98th Ave.
Edmonton, AB T6B 2X3

Attention: Mr. Ed Szmata and Mr. Roger Skirrow

Dear Sirs,

**Re: Peace River (Swan Hills) Region Geohazard Assessment
Hwy 33:12 SH1A
Call-Out Report**

This letter documents a callout for an area of pavement cracking and distortion along Highway 33:12 at UTM coordinates of approximately 607876 m E and 6070892 m N. The inspection was carried out by John Richmond, John Heilman, and Curtis Treen of AMEC Environment and Infrastructure Ltd. (AMEC) along with Ed Szmata and Rocky Wang of Alberta Transportation (AT). The identification and inspection of the call-out site was carried out during the Annual Geohazard Site Assessment on June 17, 2013.

Description

During the annual site inspections, AT staff reported an area of pavement cracking and distortion along Highway 33:12. The site is approximately 9.8 km north of Swan Hills, Alberta and 450 m northeast (along the highway) of the Swan Hills Retaining Wall site (Site SH1).

The pavement distress consisted of moderate to severe pavement cracking over an approximate 30 m stretch of the highway. In addition, on the south west side of the site, the pavement cracking was accompanied by moderate pavement distortion over an approximate 10 m stretch of the highway.

The designated site number and location are as follows:

- Site Number: SH1A
- Site Location: N6070892 E607876, NAD 83 Zone 11



Preliminary Site Assessment

This section of Highway 33 is aligned approximately northeast/southwest. The highway embankment traverses across and down the slope of a gully/draw at an approximate 4% grade. In the area of the pavement distress, the west side of the road embankment ranges from approximately 1 m to 1.5 m high and the east side of the road embankment ranges from approximately 2 to 3 m high.

Through examination of lidar imagery, there are some subtle features upslope of the site that may be representative of relic landslide terrain. However, it is noted that the area has been heavily eroded and no distinctly active landslide features are apparent in the lidar imagery. Although it is possible that the pavement distress is related to a larger area of landslide activity, it is considered more likely that the pavement distress is related to poor drainage and associated subgrade softening and/or residual affects of differential frost heave. The areas to the south and west of the site drain surface water to the west roadway ditch. The roadway ditch then conveys water along the ditch to a culvert at the base of the gully/draw at an oblique angle to the natural fall of the slope. Further, surface water was observed in the downslope ditch adjacent to the distressed pavement area. Thus it is possible that, at the site, surface water penetrates the embankment fills as it attempts to follow the natural fall of the slope.

Risk Level

Pavement cracking and distortion is expected to continue. However, assuming pavement maintenance is carried out, sudden and total closure of the highway is not expected.

Based on AT's criteria, the risk level is considered as follows:

Probability Factor (6) * Consequence Factor (2) = Risk (12)
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Although the pavement distress is currently considered a maintenance issue, a probability factor of 6 has been assigned to the site because of the recent manifestation of pavement distress within an area with no prior history of pavement issues and the uncertainty level of the cause of the distress. The consequence factor of 2 has been assigned due to the relatively low height of the embankment and since the pavement distress could affect the safety of the roadway.

Recommendations

Short term repairs of the road surface including routing and sealing of cracks and milling and patching of pavement distortion should be carried out. Annual inspection of the site should be continued to determine if on-going pavement distress is occurring. If on going pavement distress was observed, this would indicate that alternative or additional mitigative measures may be necessary. Based on a preliminary assessment, surface and or subsurface drainage improvements may be required to address impeded water west of the road.

Continued inspection should be completed. If distress continues, a shallow borehole program may be required to confirm the mechanism occurring in the area.

Photographs

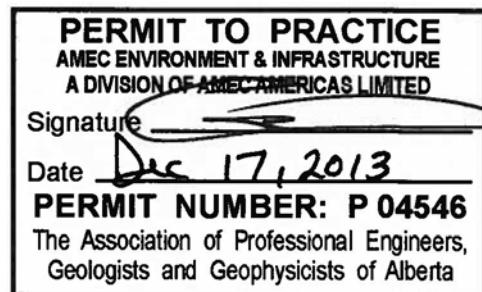
Selected photos of the call-out site inspection carried out during the annual site inspections are attached.

Closure

We trust that the above information is sufficient for your present requirements. However, if you have any questions or concerns, please contact the undersigned.

Respectfully submitted,

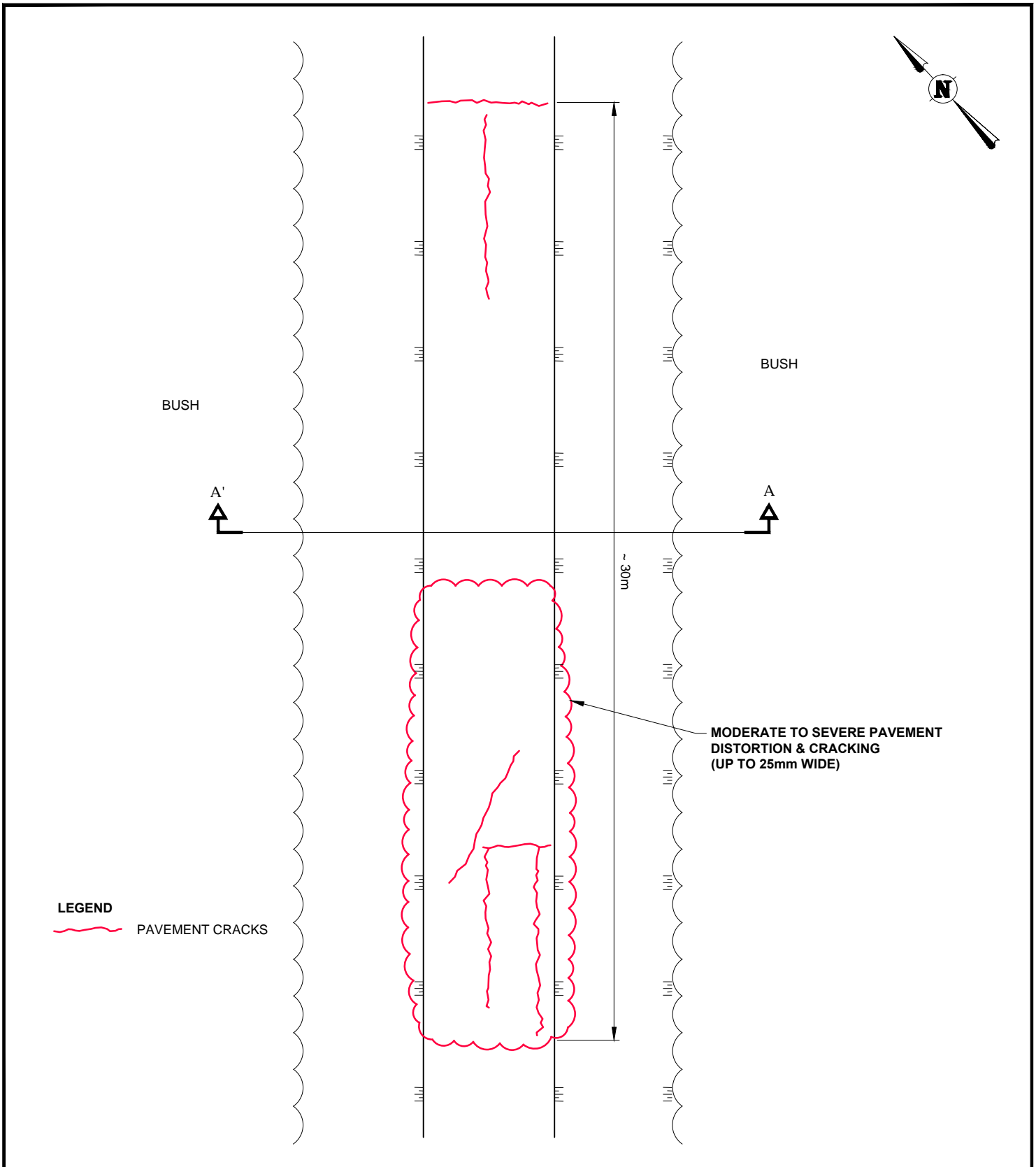
AMEC Environment & Infrastructure





John A. Richmond, P.Eng.
Senior Geotechnical Engineer

Reviewed by:
Curtis R. Treen, M.Eng., P.Eng.
Senior Associate Geotechnical Engineer

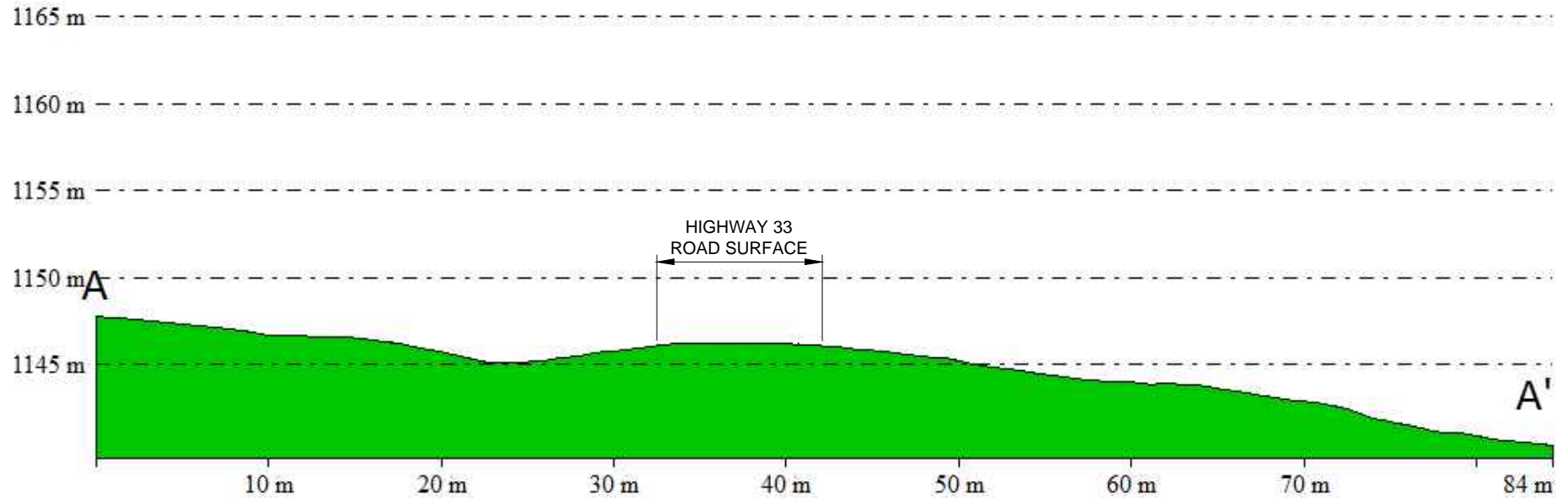
Attachments:
Figure 1. SH1A Plan View
Figure 2. SH1A Cross Section
Photo's



CLIENT: 	DWN BY: CMG	PROJECT: GEO HAZARD ASSESSMENT PEACE REGION (SWAN HILLS)	DATE: DECEMBER, 2013
	CHK'D BY: EP		PROJECT No.: EG10030
 AMEC Environment & Infrastructure 5681-70 STREET, EDMONTON, ALBERTA, T6B 3P6 PHONE 780-436-2152, FAX 780-435-8425	DATUM: -	TITLE: SH1A HWY 33:12 PLAN VIEW	REV. No.: A
	PROJECTION: -		FIGURE No.: FIGURE 1
	SCALE: NOT TO SCALE		

From Pos: 607874.243, 6070843.328

To Pos: 607808.199, 6070895.934





CLIENT: 	DWN BY: EL	PROJECT: GEOHAZARD ASSESSMENT PEACE REGION (SWAN HILLS)	DATE: DECEMBER, 2013
	CHK'D BY: EP		PROJECT No.: EG10030
AMEC Environment & Infrastructure 5681-70 STREET, EDMONTON, ALBERTA, T6B 3P6 PHONE 780-436-2152, FAX 780-435-8425 	DATUM: -	TITLE: SH1A HWY 33:12 CROSS-SECTION A-A'	REV. No.: A
	PROJECTION: -		FIGURE No.: FIGURE 2
	SCALE: N.T.S.		



Photo 1: Looking north. Note pavement cracking and distortion.



Photo 2: Looking north east along downslope side of highway embankment.



Photo 3: Looking south. Wet area of downslope ditch