GEOHAZARD ASSESSMENT PROGRAM

NORTH CENTRAL REGION – ATHABASCA

2013 INSPECTION

THURBER ENGINEERING LTD.

Alberta Government

Site Number	Location	Name	Hwy	km
NC 58	6.5 km west of the junction between Hwy 881 and 858 to the north of Lac La Biche	**NORTH OF LAC LA BICHE**	858:02	45.85
Legal Description		**UTM Co-ordinates (NAD 83)**		
SW- 30-68-13-W4M		12 N 6085029	E 436771	

	Date	PF	CF	Total
Previous Inspection:	June 13, 2012	9	3	27
Current Inspection:	June 12, 2013	9	3	27
Road AADT:	260		**Year:**	2013
Inspected By:	Tarek Abdelaziz, Don Proudfoot (Thurber) Roger Skirrow, Calvin Kissel, Arthur Kavulok, Brandon Sandford (TRANS)			
Report Attachments:	☑ Photographs ☑ Plans ☐ Maintenance Items			

Primary Site Issue:	An active landslide occurred after a heavy rainfall event, causing severe pavement distress on the eastbound lane of the highway.	
Dimensions:	About 80 m along the highway and 30 m perpendicular to the highway centerline	
Date of any remediation:	The remedial measure, completed in July 2011, involved the construction of a 90 m long pile wall to retain the landslide mass. The pile wall consisted of 15 m long driven steel H piles (HP 310x110 piles), installed at a center-to-center spacing of 0.62 m.	
Maintenance:	ACP patch was placed on the highway eastbound lane in July 2011 after construction completion; highway eastbound and westbound cracks sealed in spring 2012, both highway lanes patched again in fall 2012.	
Observations:	**Description**	**Worse?**
☑ Pavement Distress	Slight dip on the highway east bound lane	☐
☑ Slope Movement	10 to 15 mm wide reflective cracks with 5 mm differential height in the eastbound lane surface; cracks were not visible in the westbound lane surface	☐
☐ Erosion		☐
☐ Seepage		☐
☐ Bridge/Culvert Distress		☐
☑ Other	Voids formed at three locations along the pile wall alignment	☐

Instrumentation: (5 PNs)

The slope inclinometers installed at this site were sheared off prior to the implementation of the remedial measure. At present, there are five operational pneumatic piezometers, which were not read after construction completion.

Assessment (Refer to attached Figure)**:**

The site observations indicated that the implemented remedial measure has been effective in stabilizing the landslide mass. Existing landslide reflective cracks on the highway eastbound lane are indicative of the progressive lateral deflection of the pile wall. Further opening of reflective cracks should be anticipated over time until the pile wall mobilizes the full magnitude of the landslide stabilizing force.

The formation of voids along the tops of the piles could be attributed to settlement of the clay cap what was placed over the piles at these discrete locations.

Although cracks were not visible during this site visit on the highway westbound lane due to the placement of the ACP patch in fall 2012, the existing soil and groundwater conditions are similar on both sides of the highway and a new landslide may develop in the future on the north side of the highway.

Recommendations:

This site should be visited again to conclude the effectiveness of the repair measure on the south side of the highway and to check for any signs of slope instability on the north side of the highway.

In the short term, the MCI should seal any open cracks on the highway lanes, and watch closely for new cracks and extension of existing cracks on both lanes, and in particular any drop across the cracks on the highway westbound lane. It is anticipated that the highway will need to be patched again within the next couple of years.

Existing voids along the top of the piles should be filled with clay or gravel to prevent exposure of the pile tops.

If future site observations confirm the presence of a landslide on the highway westbound lane, a remedial measure similar to the one implemented at the south side of the highway could be considered. The ballpark cost of a pile wall could be in the range of $600,000. Prior to the design of a remedial measure, consideration should be given for installing slope inclinometers on the north side of the highway to confirm the depth of movement (if any).