THURBER ENGINEERING LTD.

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ALBERTA TRANSPORTATION
LANDSLIDE RISK ASSESSMENT

SECTION A: GEOTECHNICAL FILE REVIEW

NORTH CENTRAL REGION - ATHABASCA

SITE NC077-1: HWY 2:48 WEST OF CANYON CREEK (km 25)

Highway Control Section:	**HWY 2:48**
Nearest Landmark	**25 KM WEST OF SLAVE LAKE** **15.5 KM EAST OF JCT HWY 2 AND 33**
Legal Location:	**SE-34-73-08-W5M**
Date of Initial Observation:	**2012**
Date of Last Inspection:	**May 2016**
Last Inspected By:	**Thurber Engineering Ltd. (Thurber)**
Instruments Installed:	**None**
Instruments Operational:	**N/A**
Risk Assessment:	PF(11) x CF(3) = **33**
Last Updated:	**2017 – Thurber Engineering Ltd.**
Previous Update:	**N/A**

1. LOCATION

The site is located on Highway 2:48 at km 25, and is about 4 km west of the town of Canyon Creek in Alberta and about 15 km east of the junction of Highways 2 and 33.

2. GENERAL DESCRIPTION OF SLOPE INSTABILITY

A 30 m wide landslide (i.e. parallel to the highway driving lanes) occurred within the north side slope of the highway. The head scarp crack of the landslide is located at about 3.4 m from the edge of pavement and has dropped by about 0.9 m. The landslide is toeing out into a treed area that is about 33 m north of the highway surface.

Additional details about the landslide main features are shown in Figure NC077-1.

The main concern with this site is the possibility of landslide retrogression into the highway driving lanes.

3. GEOLOGICAL/GEOTECHNICAL CONDITIONS

Physiographic Region: Located in the boundary between the Peace River Low Land and the Swan Hills Uplands (Atkinson, N. and Lyster, S., 2010).

Bedrock Geology: The bedrock at the site of the Wapiti Formation, grey clayey sandstone and grey bentonitic mudstone with scattered coal beds; marine. (Geological Map of Alberta, AGS, AEUB, 1972).

Surficial Geology: A large-scale surficial deposits map (Surficial Geology of Alberta, ERCB/AGS Map 601; Fenton, M.M., Water, E.J., Pawley, S.M., Atkinson, N., Utting, D.J. and Mckay, K. 2013) indicates that the site is in an area of moraine (till) deposited directly by glacial ice. The till may locally contain blocks of bedrock, stratified sediment, or lenses of glacio-lacustrine and/or glaciofluvial sediments.

Hydrogeology: Local groundwater and surface water flow are expected to be north towards Lesser Slave River. Regional groundwater flow is towards Lesser Slave Lake, located approximately 3 km to the north. (Hydrogeological Map Lesser Slave Lake Alberta, ARC, 1977).

Stratigraphy: No stratigraphy is currently available at the site.

4. CHRONOLOGY

2012

A Call-Out inspection visit was undertaken by Thurber in June 2012. A head scarp crack was observed at about 3.7 m from the edge of the highway WBL. A toe bulge and tilting trees were observed at the bottom of the slope. Seepage and wet surface conditions were noted near the bottom of the slope. Pavement distress was not observed on the highway surface.

2013

The site was added to the North Central Annual Geohazard Assessment program and a site inspection was carried out by Thurber in June 2013. The site observations indicated that the landslide has been active since 2012, as evidenced from additional drop across the head scarp crack and slight retrogression towards the highway. Pavement distress was not observed on the highway.

2014

Additional drop across the head scarp crack and slight retrogression towards the highway was noted. Transverse and longitudinal cracks on the highway surface did not appear to be landslide related cracks.

2015

Additional drop of the head scarp was noted as well as the development of a graben feature. The risk probability factor (PF) was increased from 9 to 11.

2016

The site condition did not change significantly since the 2015 inspection. Existing transverse/longitudinal cracks and pothole on the highway lanes may reflect poor/soft subgrade condition due to high ground water levels in this area but do not appear to be landslide-related cracks.

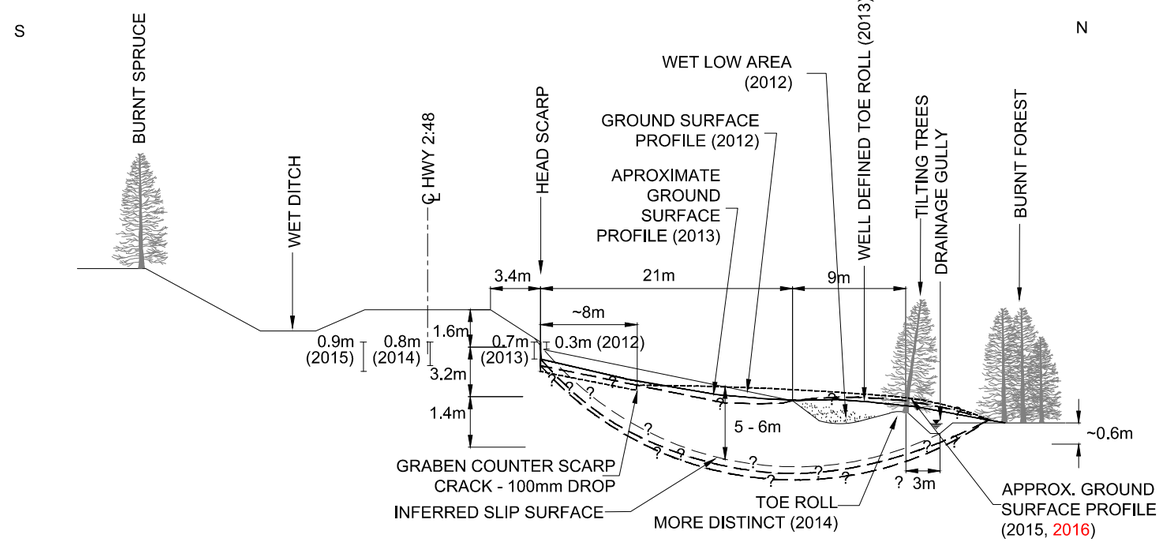
REFERENCES

1. Atkinson, N. and Lyster, S., 2010. “Bedrock Topography of Alberta, Canada,” ERCB/AGS Map 50, scale 1:1,500,000.

2. Geological Map of Alberta, AGS, AEUB, 1972 “Geological Map of Alberta.” Scale 1:1,267,000, compiled by Green, R., Price, Copeland, F.L.

3. Surficial Geology of Alberta, ERCB/AGS Map 601; Fenton, M.M., Water, E.J., Pawley, S.M., Atkinson, N., Utting, D.J. and Mckay, K. 2013.

4. Alberta Research Council, 1977. “Hydrogeological Map Lesser Slave Lake Alberta.”



CROSS SECTION A -A'
APPROX. SCALE: 1:500

NOTES:

1. THE DIMENSIONS SHOWN ON THE SITE PLAN AND CROSS SECTION ARE BASED ON SIMPLE FIELD MEASUREMENTS AND MAY DEVIATE FROM THE ACTUAL CONDITIONS.
2. MAY 18, 2016 OBSERVATIONS ARE SHOWN IN RED.

LEGEND

- ACTIVE SCARP
- WET/LOW AREA
- FENCE LINE
- TREE LINE
- OVER HEAD POWER LINE
- TELUS LINE
- PHOTOGRAPH NUMBER, AND APPROXIMATE DIRECTION AND LOCATION
- POWER POLE

Alberta Transportation

NORTH CENTRAL REGION (ATHABASCA AREA) - 2016 GEOHAZARD ASSESSMENT

NC077-1: HWY 2:48 (km 26) WEST OF CANYON CREEK LANDSLIDE SKETCH SITE PLAN & CROSS SECTION A-A'

DWG NO. NC077-1

DRAWN BY	ML
DESIGNED BY	JGP
APPROVED BY	TSA
SCALE	APPROX. 1:500
DATE	JUNE 2016
FILE No.	13357

THURBER ENGINEERING LTD.