



BRIEF SITE SUMMARY
AND
RISK ASSESSMENT

- 1) Site (SH 18): Hwy 33:14 Deer Mountain Erosion
- 2) Reference Location: Hwy 33:14 @ 35.2 km North of Town of Swan Hills
- 3) Legal Description Along Highway: LSD 11 - Sec 23 - Twp 69 - Rge 9 - W5M
- 4) UTM Coordinates: N 6095038.3, E 611315.3 (Zone 11)
- 5) AT File: Hwy 33:14
- 6) AT Plan and Profile:
- 7) General Description of Instability:

The site distress entails the slumping of backslope as a result of toe erosion from the flow scour of a creek.

The site is situated at the southeast corner of the intersection of Hwy 33:14 and Deer Mountain Road. It was likely that, prior to the highway construction, the creek channel crossed the highway alignment on a skew angle and the creek was likely realigned as part of the highway construction. The creek/runoff flows from east to west. At the SE corner of this intersection, a creek presently runs along the south ditch of Deer Mountain Road and is carried across beneath Hwy 33:14 via a culvert (a 700 mm diameter smooth steel lined culvert). Prior to inflow into the highway culvert at this SE corner of intersection, the creek channel was realigned to run along the ditch of Deer Mountain road and then, at this road junction SE corner, skirted along the toe of the back slope (a cut slope) of the highway alignment before connecting to the culvert to flow across the highway. Evidently, the creek flow along the ditch (creek channel) has caused erosion of toe of the back slope resulting in retrogressive slumping failures of the backslope.

The eroded backslope scarp has exposed soil for a vertical height of approximately 3 to 6 m. The exposed soil appears to comprise: SAND, some silt to silty, trace to some clay, fine to medium grained, damp to moist, and brown. The sand is highly susceptible to erosion. It was likely that seepage and groundwater flow also contributed to the slumping failure of backslope in addition to the toe erosion by creek flow.

From published information and previous site observations, it was apparent that adverse groundwater flow and seepage conditions prevails in the area to provide adverse impact to the stability of backslope of such wet sandy soils.

The back slope slumping failures caused blockage of the ditch to require clean-outs. However, such hazards of erosion and ditch blockage have not adversely affected the roadway as yet.

As of Jan 2009 (Review meeting with AT), responsibility of this site has been reverted back to AT Geotechnical Branch so that their engineering team can carry out the design of repairs and manage the construction works. This site has been selected by AT for their In-Source Engineering program so that their in-house engineers can resume a portion of the engineering design and project management responsibilities, expertise and functions.

It is understood that AT will pursue the options of bio-engineering remediation BMPs for this site.

8) Date of Initial Observation:

- June 2004 (Callout Inspection)

9) Date of Last Inspection:

- July 2008 (2008 Slide Tour Inspection)

10) Instruments Installed:

- None

11) Instruments Operational:

- N/A

12) Risk Assessment:

$$PF (11) * CF (2) = 22 \text{ (in 2008)} \quad (13*2 = 26 \text{ in 2007})$$

$$PF = 11$$

- Active with moderate but increasing rate of erosion of the creek channel along toe of the back slope.
- The slumping failure along the back slope is a result of erosion of toe of slope.

$$CF = 2$$

- Low backslope height.
- Blockage of ditch will be likely adverse consequence.
 - Further channel bank and erosion slumping failure of back slope may adversely impact upland treed lands at top of backslope.
- Roadway will unlikely be affected and roadway closure unlikely.

Note: This Risk Assessment rating is based on Scheme proposed by AI in the Request for Proposal. (2000)

Probability Factor (PF) : 1 to 20 scale

Consequence Factor (CF) : 1 to 10 scale

13) Geotechnical Conditions:

From published information, it is apparent

- The generalized geologic structure consists of overburden soils of 0 to 20 m of quaternary deposits underlain by bedrock of the Wapiti Formation (Cretaceous) which extends to depths greater than 100 m below surface.
 - Quaternary Deposits – typically overburden soils of glacial and glacio-lacustrine soils comprising primarily of sands, gravels, silts, and clay beds
 - Wapiti Formation (Cretaceous) – grey, feldspathic clayey sandstone, bentonitic mudstone and bentonite, scattered coal beds, generally non-marine
 - Surface drainage and groundwater regime is generally directed to the west – northwest, towards the Swan River.

From site observation, it apparent

- The soil on the exposed backslope comprises: SAND, some silt to silty, trace to some clay, fine to medium grained, damp to moist, and brown. Silty sand is highly susceptible to erosion.

14) Chronology:

2004 – Callout Report by Thurber Consultants.

- In the past, AT had lined the creek/runoff channel bed with pit run and non-woven geotextile fabric underlay to provide a pragmatic channel lining to contain the flow and reduce erosion.

2005 – Annual Geohazard Assessment Site Inspection (Slide Tour) by Thurber Consultants.

- Noted no appreciable deterioration as compared to 2004 Callout Report. 2005 Site Inspection Report suggested bio-engineering remedial measures.

2006 – Annual Geohazard Assessment Site (Slide Tour) (by Thurber Consultants).

END