



BRIEF SITE SUMMARY
AND
RISK ASSESSMENT

- 1) Site (SH 26): Hwy 2A:54 Gunn's Creek – Embankment Slide
North (upstream) facing slope
- 2) Reference Location:
 - i) Hwy 2A:54 @ 33.2 km west of Town of High Prairie
 - ii) 9.2 km east of junction of Hwy 2A and Hwy 49
 - iii) Gunns Creek Culvert (BF 73423) @ Hwy 2A:54 km 18.4
- 3) Legal Description Along Highway: LSD 03 - Sec 02 - Twp 75 - Rge 20 - W5M
- 4) UTM Coordinates: N 6146170.3, E 500409.3, Zone 11
- 5) AT File: Hwy 2A:54, BF 73423 (Gunns Creek Culvert)
- 6) AT Plan and Profile::
- 7) General Description of Instability:

Sliding failure has occurred at the north (upstream) facing slope of a high fill embankment at Gunn's Creek.

This fill slope was constructed across Gunn's Creek with a bridge culvert beneath to carry the creek flow. Both sides of embankment (i.e. the north facing slope on the upstream side and the south facing slope on the downstream side) had a history of sliding failures. The south facing slope (SH-15) (downstream side) was recently repaired in 2003.

Sliding failure of this south (downstream) embankment fill slope (SH-26) occurred along the upper 2/3 heights of this 19m high fill slope at the north (upstream) side of the embankment. (July 2008 Observation in 2008 Slide Tour Report)

- An escarpment was formed at top 2/3 elevation of this 19m fill slope. Width of escarpment can be estimated about 25m (along roadway direction) and height of escarpment is 1-2m range. The escarpment was located at about 7 to 10m offset from shoulder edge with no immediate danger to highway yet.
- A portion of intermediate escarpment exposed wet gravel (pit run) material indicating seepage water flow within the fills (Apparently some previous repair work was carried out for the slope)
- There is a run of slumped soil down from the top escarpment and a minor 1-2m high toe roll can be observed just above the toe berm above the culvert outlet.

7.1 Background

For this north (downstream) facing slope, signs of slope movements can be noted from previous site inspection(s) of the adjacent (SH-15) south slope and some previous history of past movement distress can be noted from AT files.

- Past (Dec 19, 2005 by Thurber) inspection records indicated that tension cracks was under-development along north guardrail and the bowing of guardrail started to become apparent along the crest of slope.
- In early 1990's, it was very likely that AT carried out some repair to this north side of the embankment slope as some minor AT records indicated some distress failure occurred along this slope as well. In subsequent years, it was likely that AT district forces might have carried out some more repairs as well. This repair history and present site condition remains to be investigated.

For the south facing slope (SH-15) which was on the opposite (downstream) side and recently repaired in 2003

- The slope was reconstructed around 2003 using granular fill with a clay fill cap on top and a toe berm with extension of culvert. (Investigation and design of repair by Thurber)
- In the early 1990's, AT carried out repair of this south slope but sliding movement recurred in 2001-2002.

8) Date of Initial Observation:

- Early 1990's (observed by AT)
- July 2008 (Slide Tour 2008) (by Consultant)

9) Date of Last Inspection:

- July 2008 (2008 annual Geohazard Assessment Site Inspection)

10) Instruments Installed:

- None

11) Instruments Operational:

- N/A

12) Risk Assessment:

The following assessment is provided.

$$PF (12) * CF (4) = 48$$

$$PF = 12$$

- This is a 19m high fill slope with a 2300mm dia. bridge culvert structure at bottom. The current slumping movement of soils is in CH clay material which is commonly recognized as a weak strength soil for use as embankment fills especially when the fill slope is wetted by water infiltration . The slide is considered active.
- The slide is recurring along a previously repaired fill slope. Past history of repair construction remains to be investigated for proper site assessment.
- Deterioration of slide is anticipated. Water pore pressure, seepage and weak strength of CH fill and past repair history will be the issues.

CF = 4

- This is 19m fill with a bridge culvert at bottom. Partial closure of roadway can be probable in cause of deterioration of slide.

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:

The high fill embankment was constructed with locally available high plasticity CH clay material which was noted for its weak strength very likely contributory to failure of a high fill slope constructed at 3H:1V to 19m high.

This evidence of weak strength of local CH clay borrow as cause of slope failure was demonstrated by previous failures of this fill embankment.

- This included the previous (early 1990's) repairs by AT along both upstream and downstream side slopes of the embankment.
- This also included the repair of the opposite side (south and downstream) of slope which was recently (2003) repair with the use of granular fill.

The aging of CH clay and its slickening under cycling moisture wetting most likely contribute to a deterioration to its weak soil strength. It can be possible, that with passage of time, the desiccation and fissuring of such CH clay occurred and that cyclic surface water infiltration caused a wetting and weakening of the CH clay material.

Further investigation should still be carried out to assess the causes of sliding.

14) Chronology:

Early 1990

Slide investigation and repair design by AT geotechnical section

- For both north and south facing slopes
- Repair undertaken by AT district forces

Subsequent
Years

Repair initiatives on this north facing (downstream) slide might have been undertaken by AT district forces. Details of past repair works to be investigated.

2003

Opposite slope (SH-15) (south facing) downstream slope failed and repaired.

Slide investigation and repair design by Thurber Consultants

- Slide retrogressed to edge of pavement at slope crest
Cracking of settlement of pavement occurred to affect roadway.
- Slide repair construction completed by end of year.

2005

2005 Slide Tour Report (Thurber Report of Dec 15, 2005)

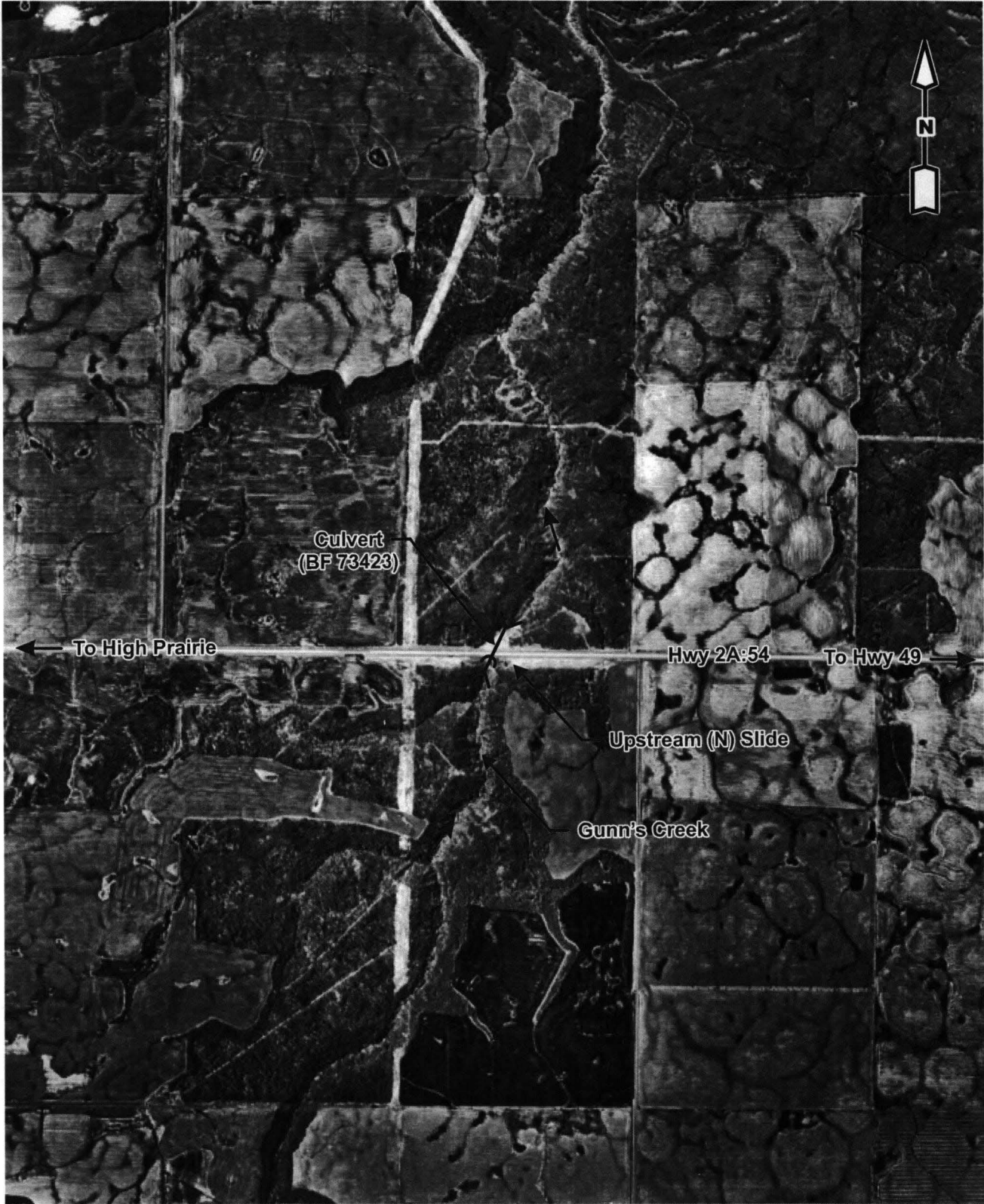
Indicated tension crack and sign of sliding under development.

2008

2008 Slide Tour

Sliding movement of slope has deteriorated and occurred.

END



1997 Aerial Photograph



Figure 1
Aerial Photo
Site Location Plan