



December 11, 2006

File: 15-85-38

Alberta Infrastructure and Transportation
Room 301, Provincial Building
9621 - 96 Avenue
Peace River, Alberta
T8S 1T4

Attention: Mr. Ed Szmata

**PEACE REGION (SWAN HILLS AREA) GEOHAZARD ASSESSMENT
Hwy 2A:54 GUNN'S CREEK SLIDE (SH15)
2006 ANNUAL INSPECTION REPORT**

Dear Sir:

This letter documents the 2006 annual site inspection of an area of former slope instability located along Hwy 2A:54 about 9 km east of Hwy 49, west of High Prairie, Alberta. Thurber Engineering Ltd. (Thurber) undertook this inspection in partial fulfillment of our Geotechnical Services for Geohazard Assessment, Instrumentation Monitoring and Related Work contract (CE047/2004) with Alberta Infrastructure and Transportation (AIT).

Mr. Barry Meays, P.Eng and Mr. Gurpreet Bala of Thurber undertook the inspection on May 25, 2006 in the presence of Mr. Roger Skirrow, P. Eng. and Mr. Ed Szmata of AIT.

1. BACKGROUND

The original slide was located in the south facing slope of an 18 m high embankment fill over Gunn's Creek. The lower part of the slope was buttressed by a 3 to 4 m high berm of about 16 m in width. The slide was present in the 14 m high 4H:1V upper slope above the berm.

Remedial measures were carried out in the fall of 2002 consisting of subexcavating all of the slide material down to intact clay fill and/or clay till and reconstructing the slope with pit run gravel. A subdrain was installed at the base of the excavation prior to installing the gravel backfill. Some of the better quality clay fill that was removed from the slide area was used to rebuild the outer portion of

the slope to help reduce the amount of gravel required for the repair. The scour bowl of the creek area around the outlet of the culvert and the location of ditch scouring were lined with Class 2 rip rap placed over geotextile. An existing surface half culvert was removed and a high flow soil covering was placed in the same location over the rebuilt slope. Design drawings for the slide repairs and test hole logs are included in Section F of the Binder. The estimated cost for slide repairs, including engineering was about \$331,000.

Further descriptions of the site and site history are summarized in our 2004 Geotechnical File Review included in Section A of the binder.

2. SITE OBSERVATIONS

The changes in condition since last year are shown on the attached site sketch plans and cross-section. Selected photographs taken during the visit are also attached.

In addition to the cracks observed in previous years along the edge of the highway shoulder another 6 m long sealed crack about 10 mm wide was observed at the west end of the slide area, as shown on Figure 15-85-38-SH15-1. These longitudinal cracks run parallel to the shoulder line, but do not appear to be slide related. The crack located along the north edge of the pavement had widened up to about 35 mm at few spots and increased up to 22 m in length. Two new cracks measuring 8 m and 15 m have emerged close to the north guardrail. Some rutting was observed in the eastbound lane. The guardrail on the north side of the highway has been replaced with a new one.

On the surface of the repaired slide area on the sideslope south of the highway, the numerous cracks observed over previous years running in all directions were barely visible this year. This cracking was attributed to desiccation in the surficial high plastic clay used to cover the slope as part of the repairs, which is further being dried out from the root system of the thick alfalfa growth and the underlying gravel drainage layer.

The access road and area west of the eroded channel had established a relatively heavy vegetation cover.

No water was emanating from the subdrain outlet, but the area around the pipe outlet was wet from rain/seepage. Most of the silt fences were lying down or were buried under the riprap armour. In the channel downstream of the toe of the former slide, the erosion and small slumps that were observed in 2003 to 2005 in general did not appear to have changed significantly. The scarps on the east slope of the culvert outlet now appear to be well connected, have minor slumps and had less vegetation cover.

The areas identified last year where riprap replenishment was required along the edges of the creek channel were armored with Class 2 riprap on February 10, 2006 at an approximate cost of \$ 49,000.

3. ASSESSMENT

The main slide rehabilitation appears to be performing well at this stage.

The higher than usual spring melt runoff in 2003 that caused the erosion and associated slumping along the channel downstream of the culvert outlet still exists. A few minor slumps were observed along the east slope of the culvert outlet and additional riprap has been laid to prevent toe erosion of the east slope.

The cracks developed along the north edge of the highway warrant extra attention. It is not known at this stage if this condition was created by excess surface infiltration into the area, or if there is potential movements occurring north of the highway

4. RISK LEVEL

The risk level for this site has been assessed as follows:

$$PF(7) * CF(4) = \mathbf{28} \text{ (Last year 28)}$$

The remedial measures for the main slide appear to be working well so far and hence a risk level was not assigned to the site last year. The condition of a separate slide located in the natural slope below the highway embankment west of the culvert outlet slowly continues to worsen but is currently not affecting the highway.

Due to this year's observations along the north side of the highway, a Probability Factor of 7 is considered appropriate since the slide is potentially active with a perceptible rate of movement and the movement pattern is not known and uncertain at this stage. A Consequence Factor of 4 is considered appropriate since the embankment fill is fairly high and a partial closure of the road would be a direct result of an aggressive slide movement.

5. RECOMMENDATIONS

It was decided to take this site out from the annual geo-hazard assessment program.

5.1 Maintenance

The top of the highway should be regularly inspected by the MCI to determine if the cracks along the north edge of the highway become more prominent, which would be a signal of the first indications of a potential slide that extends to the north. These cracks should be sealed to prevent any ingress of water into the pavement.

It is recommended that the silt fence along the east and north side of the culvert outlet and riprap channel be removed. The silt fence west of the outlet can be taken down, as it no longer is required as this area is well vegetated. The recommended additional armoring of the channel downstream was undertaken this year. The valley slope in the slumped areas near the culvert outlet should be seeded.

6. CLOSURE

We trust this assessment and recommendations meet with your needs at this time. Please contact the undersigned should questions arise or if the slide condition worsens.

Yours very truly,
Thurber Engineering Ltd.
Don Proudfoot, P.Eng.
Review Principal



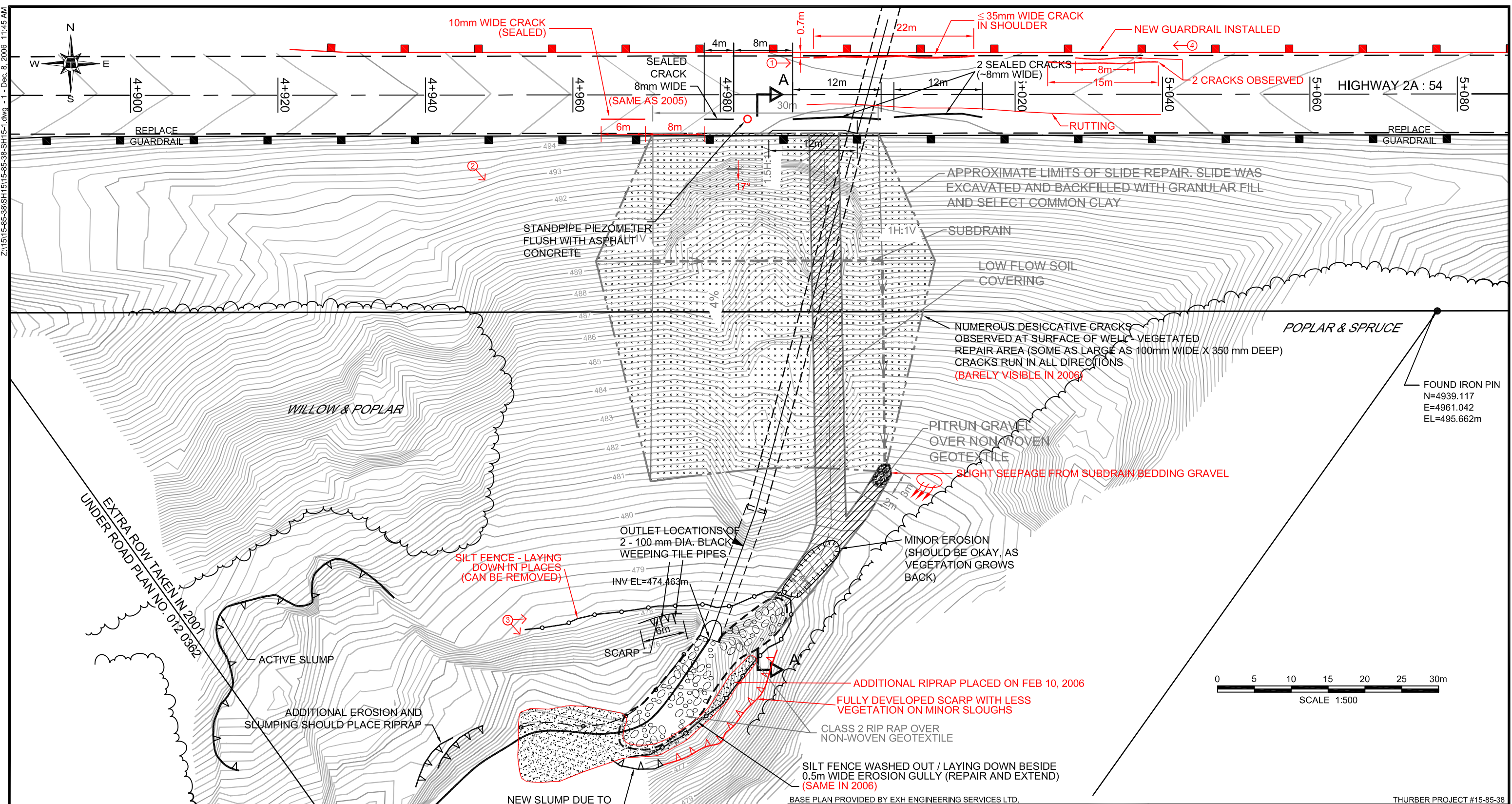
Barry Meays, P.Eng.
Project Engineer

Gurpreet Bala, M.Sc.
Project Coordinator
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Attachments

cc: Mr. Roger Skirrow, P.Eng.
Director of Geotechnical Services, AIT

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LEGEND

*****	GRANULAR FILL COVERED WITH SELECT COMMON CLAY FILL		LANDSLIDE SCARP
	DESIGN SLOPE OF UNDERSIDE OF GRANULAR FILL ZONE		EROSION
	SUBDRAIN		PHOTO AND DIRECTION
	CRACKS		

- NOTES :**
1. FEATURE LOCATIONS ARE APPROXIMATE.
 2. PREVIOUS OBSERVATIONS SHOWN IN BLACK
 3. MAY 25, 2006 OBSERVATIONS SHOWN IN RED

ALBERTA INFRASTRUCTURE AND TRANSPORTATION

ANNUAL GEOHAZARD ASSESSMENT
UPDATED SITE PLAN

Highway 2A:54 West of Gunn's Creek HIGH PRAIRIE, AB

THURBER ENGINEERING LTD.
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

ENGINEER:	GSB/BHM	DRAWN:	HH	APPROVED:	
DATE:	JUNE 2006	SCALE:	1:500	DRAWING No.	15-85-38-SH15-1

THURBER PROJECT #15-85-38



Photo 1 - Looking east along north guardrail, May 25, 2006.



Photo 2 - Southeast view of the additional Class2 riprap at culvert outlet,
May 25, 2006.



Photo 3 - Panoramic view of the culvert outlet and the Class 2 armour, May 25, 2006.