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October 15, 2004

File: 15-16-192

Alberta Transportation
Room 223, Provincial Building
4709 - 44 Avenue
Stony Plain, Alberta
T7Z 1N4

Attention: Mr. Rob Lonson, P. Eng.

**NORTH CENTRAL REGION GEOHAZARD ASSESSMENT
HWY 39:06 SAUNDERS LAKE (MODEST CREEK) - NC5
2004 ANNUAL INSPECTION REPORT**

Dear Sir:

This letter documents the 2004 annual site inspection of a portion of Highway 39:06, located 9.5 km west of the Junction with Hwy 20. The work was undertaken by Thurber Engineering Ltd. (Thurber) in partial fulfillment of our Geotechnical Services for GeoHazard Assessment, Instrumentation Monitoring and Related Work contract (CE046/2004) with Alberta Transportation (AT).

The inspection was undertaken on May 31, 2004 by Messrs. Don Proudfoot, P.Eng. and Renato Clementino, P.Eng. of Thurber. The site visit was carried out in the presence of Mr. Roger Skirrow, P.Eng. of AT Geotechnical Branch, and Mr. Michael Baik of AT Stony Plain.

1. BACKGROUND

A brief background history of the site can be summarized as follows:

- The pavement distress area was about 70 m long and had been affecting the highway for several years. To mitigate the problem a small toe berm was constructed in 1999-2000. However, this measure was not able to fully stabilize the highway embankment.
- Further geotechnical investigation was performed consisting of the installation of two additional slope inclinometers (SI's) by Thurber Engineering Ltd. on May 2001.

- SI's readings indicated that the failure plane was relatively shallow (6 m to 9 m depth) consisting of a rotational slide in the clay changing to a "squeezing" or spreading failure at the toe of the slope over a 3 m to 5 m thickness. This was likely a re-activation of the old slide base, showing that the original berm did not extend far enough.
- A new toe berm was constructed in October 2002 over a broader area as shown in Figure NC5-1. At that time an extensive erosion gully that was present at the outlet area of the existing culvert was also repaired.

Further descriptions and background for the slide area are provided in Part A of the binder.

2. SITE OBSERVATIONS

The highway surface, and side slopes were inspected in the vicinity of the pavement distress. The following points summarize the observations made during the reconnaissance. Site features are shown on Figure NC5-1 and in the profile on Figure NC5-2 in Section F. Selected photographs taken during the site reconnaissance are also included in Section F.

- An arc shaped cracking pattern about 70 m long was noted in the roadway surface, however the cracking was similar to what was observed last year with no noticeable change in its condition. However two small new cracks were observed on the pavement on the east end as shown in Figure NC5-1.
- The toe berm constructed in 2002 appears to be working well since no significant change in the roadway cracks were noted. In addition, the slope indicators (SI) read this spring during the Instrumentation Reading Program have shown no movement on any of the SIs.
- The vegetation on the berm is growing well and covering the whole berm and adjacent area.
- The scour observed last year at the culvert outlet and extending about 22 m down the slope has increased in depth and width. However, no significant change was noted on the scour downstream at the toe of the berm on its east end as shown in Figure NC5-1, Section F.
- Silt has accumulated at the toe of the berm along the silt fence.
- The central portion of the silt fence is leaning down.

3. ASSESSMENT AND RECOMMENDATIONS

Based on the above noted observations, it appears that, the toe berm is performing well in improving the stability of the highway embankment. However, future SI's readings are still recommended to assess the long term performance of the toe berm.

The two new cracks may be related to side slope above the berm that is still somewhat over steep. Monitoring and assessment of the crack evolution should be performed next year. Minor sideslope flattening above the berm could be carried out at a later date, if required.

It is recommended that the existing scours should be repaired as soon as possible to avoid additional erosion that may end up affecting the berm. The repair at the outlet of the culvert should consist of removing the riprap, cleaning the scour by removing any organic soil and loose material, backfilling with pitrun, over non-woven geotextile, and replacing the riprap extending it 5 m down slope. The repair of the erosion gully should consist of peeling back the adjacent section of soil covering, removing the existing topsoil, re-aligning and widening the existing swale, backfilling the gully with compacted clay fill, re-spreading the topsoil and seeding it, and placing another strip of soil covering (P300 from North American Green) adjacent to the existing to increase the erosion protection area. The same procedure should apply for both affected areas, i.e., immediately downstream of the culvert outlet and at the toe of the berm. The soil covering should be placed as per Alberta Transportation Design Guidelines for Erosion and Sediment Control for Highways manual.

The silt accumulated at the toe of the berm along the silt fence has now established a good vegetation growth and should not present significant erosion susceptibility; therefore it may be left in place. The leaning section of the silt fence should be straightened up and the silt fence should be left on site until the scour repair has vegetation cover re-established.

4. RISK LEVEL

A risk level of 2 is considered applicable to this site, based on a Probability Factor of 1 (inactive, very low probability of slide occurrence) and a Consequence Factor of 2 (slide affecting use of roadway and safety of motorist, but not requiring closure of the roadway).

5. CLOSURE

We trust this assessment meets with your needs at this time. Please contact the undersigned should questions or concerns arise.

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

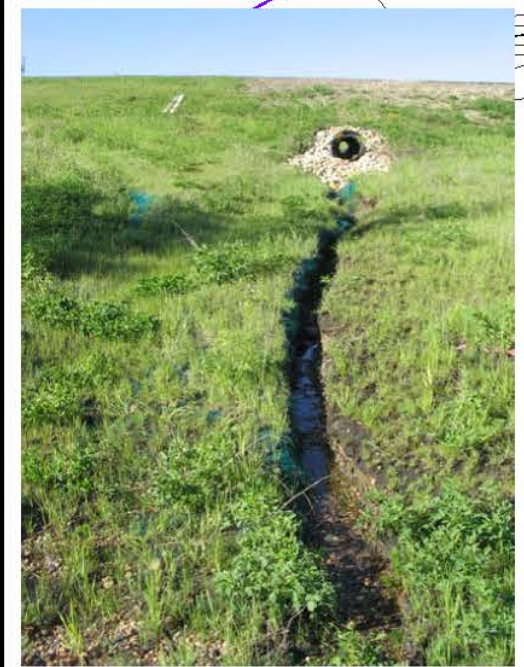
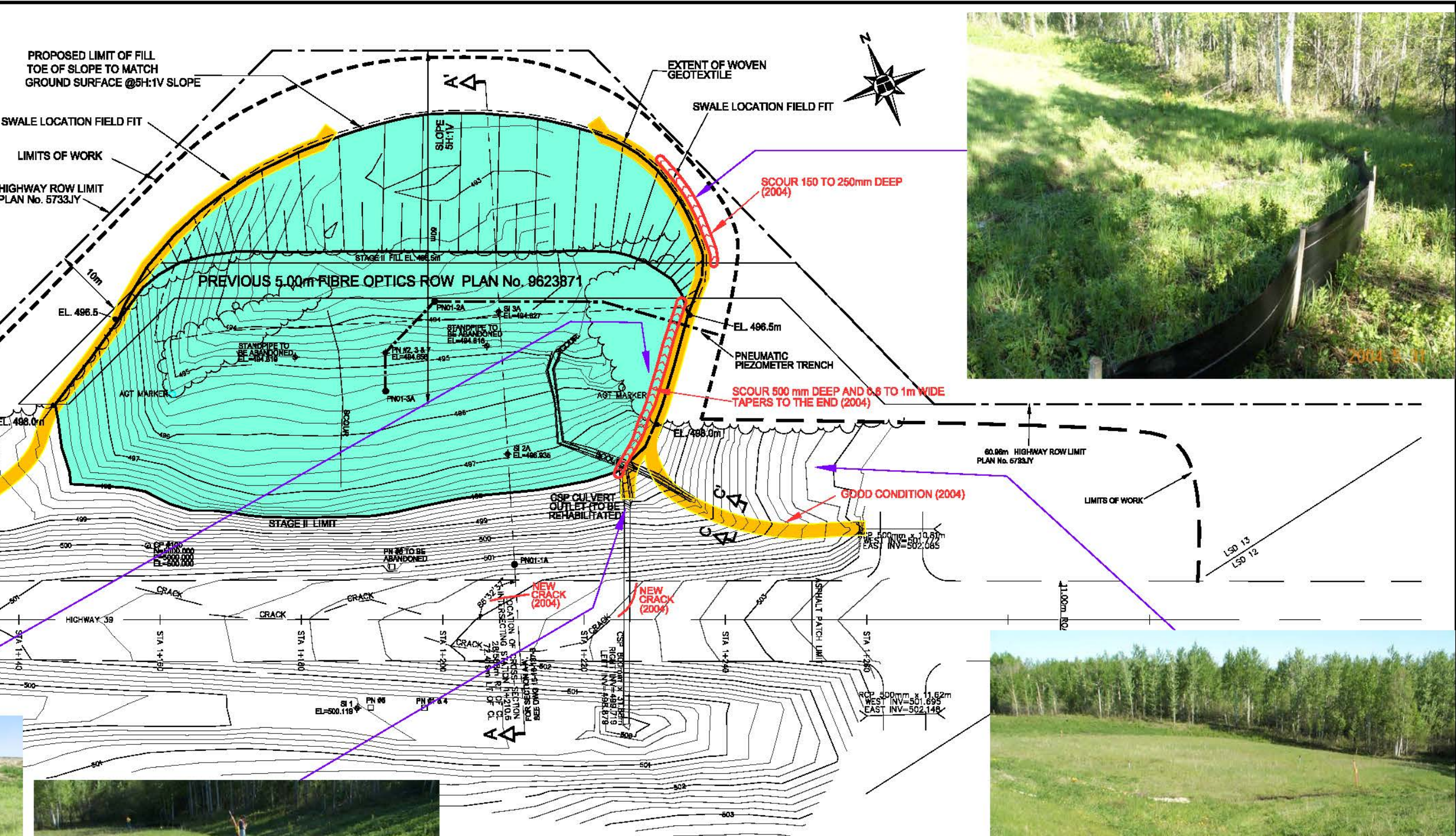
Renato Clementino, P.Eng.
Project Engineer

/slp

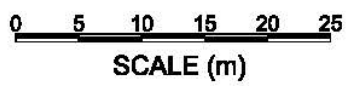
Attachments

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

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- NOTES :**
1. FEATURE LOCATIONS ARE APPROXIMATE.
 2. PREVIOUS OBSERVATIONS SHOWN IN BLACK
 3. JUNE 2004 OBSERVATIONS SHOWN IN RED



BASE PLAN WAS TAKEN FROM THURBER REPORT #15-16-187

ENGINEER	RVC
DRAWN	MNG
DATE	JULY 2004
APPROVED	
SCALE	1:600

ALBERTA TRANSPORTATION

SITE PLAN SHOWING TOE BERM

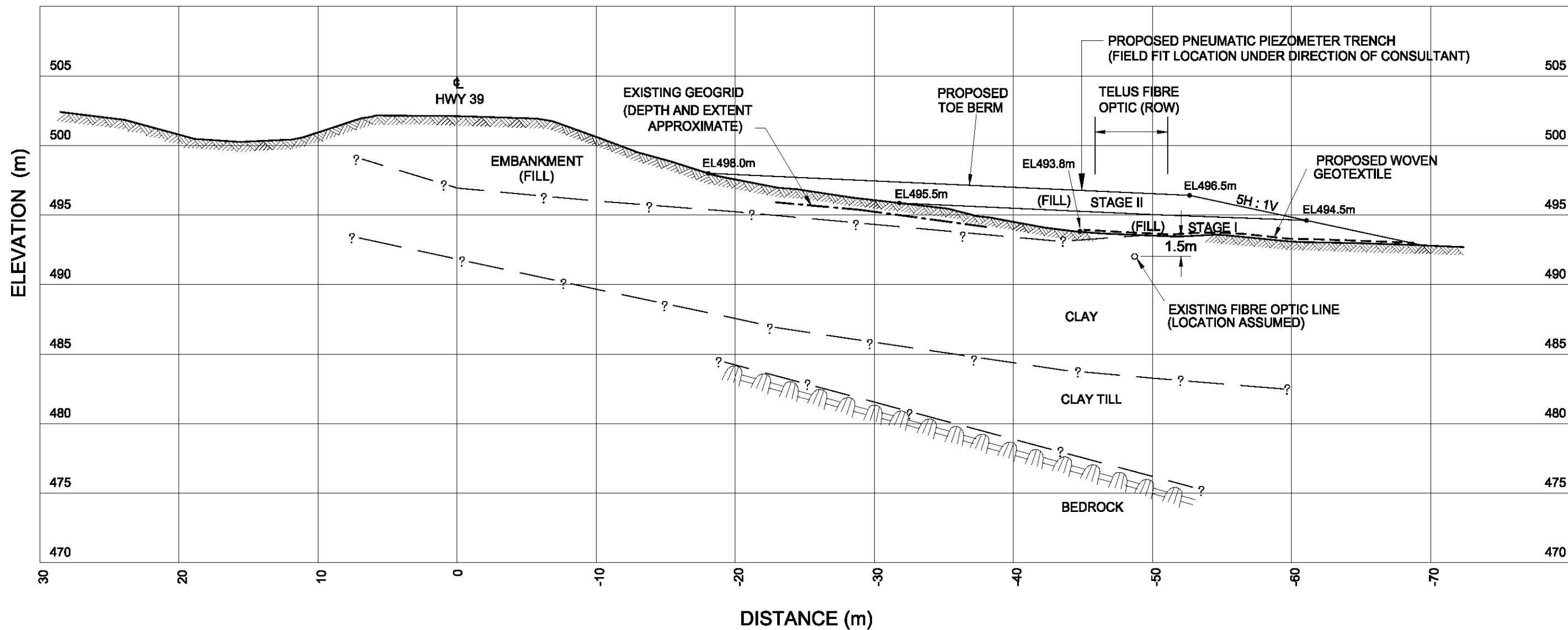
NC5 - HWY 39:08 km 1+200
SAUNDERS LAKE
NW-36-48-05-W5M

THURBER PROJECT #15-16-192

THURBER

DRAWING No. **FIGURE NC5-1**

NORTH CENTRAL GEOHAZARD ASSESSMENTS



BASE PLAN WAS TAKEN FROM THURBER REPORT #15-16-137

THURBER PROJECT #15-16-192


ENGINEER	RVC
DRAWN	MNG
DATE	JULY 2004
APPROVED	
SCALE	1:600

ALBERTA TRANSPORTATION

CROSS-SECTION A-A'
AT STATION 1+210

NC5 - HWY 39:06 km 1+200
SAUNDERS LAKE
NW-36-48-05-W5M

NORTH CENTRAL GEOHAZARD ASSESSMENTS



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DRAWING No.
FIGURE NC5-2



Photo 1. New crack at the east flank.



Photo 2. Toe berm vegetation cover.



Photo 3. West swale vegetation cover



Photo 4. Toe scour.