



THURBER ENGINEERING LTD.

GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

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
EMBANKMENT FAILURE
ON HWY 749:02, Km 16.10, BANANA BELT – SH 19
2006 ANNUAL INSPECTION REPORT**

Dear Sir:

This letter documents the 2006 annual site inspection of a slide area located along Hwy 749:02 on the northwest side of the highway about 11 km south 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, M.Sc., of Thurber undertook the inspection on May 24, 2006 in the presence of Mr. Roger Skirrow, P. Eng. and Mr. Ed Szmata of AIT.

1. BACKGROUND

A slide occurred on about September 3, 2004 in the west side slope and shoulder of the highway embankment. The toe of the slide was present in a natural intermittent drainage course at the base of the slope. A call-out was made for this site on September 10, 2004 and the results are provided in our call out report in Section E of the site binder. Slope movements caused a Telus cable that was buried in the sideslope to break. The cable was rerouted over the slide area above ground on about September 5, 2004.

Thurber prepared a design to stabilize the landslide. The construction work was carried out under Contract No. 7043/05 and Job No. Y844M between October 20 and November 3, 2005. The work performed consisted of measures to stabilize a landslide mass affecting the highway's west side slope. The work involved the removal of the existing culvert, excavation of the upper part of the slide, installation of a longer new culvert to allow passage of run-off under a proposed toe berm, construction of a toe berm, installation of subsurface drainage, reconstruction of the upper slope with compacted clay fill, construction of a surface swale, placement of riprap armour at the culvert inlet and outlet, grading the east ditch, and top-soiling and seeding the finished slope and disturbed areas.

The cost of the construction repair work excluding land and engineering costs was \$198,538.

A copy of the as-built construction drawings is attached for inclusion in Section G of the binder.

2. SITE OBSERVATIONS

The as-built survey of the slide area is shown on the attached plan. Selected photographs taken during the site visit are also attached.

At the time of the visit, the final construction inspection of the site was carried out. The reconstructed slope seemed to be performing satisfactorily, the constructed sections were as per the requirements and the slope was nicely contoured. The grass was sparsely growing at the site. During the construction in October/November 2005, the ground conditions were frozen, thus proper seeding and harrowing could not be done. No vegetation was observed to be growing along the flanks of the swale riprap. A memo was forwarded to the Contractor to reseed, fertilize and harrow the site.

Vegetation was observed to be growing within the high flow soil-covering mat placed along the swale but the mat was loose at some spots. No flow was however observed along the swale during the site visit, even though it had rained a day before the visit. The sub-drain was also observed to be dry.

The road patch along the southbound driving lane of the road was in good shape but had few visible minor cracks, which might be related to some slight settlement.

At the time of the visit, there was only a small amount of discharge from the culvert. There was an existing 800 mm diameter centerline CSP that crossed the highway at a skew south of the slide area draining into the natural drainage run

over which the berm had been constructed. The silt fences installed along the culvert outlet were erect and were performing to satisfaction.

A few minor depressions were observed in the east ditch directly across from the slide, and water was ponding in them after periods of rain. The fence along the slide area was erected by the farmer on thin steel posts, which met one of the requirements of the former conditional construction completion certificate.

3. ASSESSMENT

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

The low, saturated area in the east ditch directly across from the slide still collects storm water and may continue to be a source of water, feeding the repaired slide zone. A check should be kept on the amount of ponding within this section; it could still feed the slope and could eventually affect the repairs performed on the main slide area.

The slight crack in the pavement along the west edge of the highway may be due to the settlement of the replaced fill.

4. RISK LEVEL

The slide site has been repaired and it is expected that it does not pose any risk to the commuters using the highway. The remedial measures for the main slide appear to be working well so far and hence a risk level is not assigned to the site this year.

Risk Level = (52 Last year)

5. RECOMMENDATIONS

5.1 Short Term

See 5.3 Maintenance.

5.2 Maintenance

The slide repair work undertaken is performing satisfactorily and it is recommended to undertake regular maintenance/cleaning of the culvert inlets and outlets along with a check on the pooling of water in the east ditch of the highway. It may be necessary to place some topsoil in the east ditch to correct the pooling issue.



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

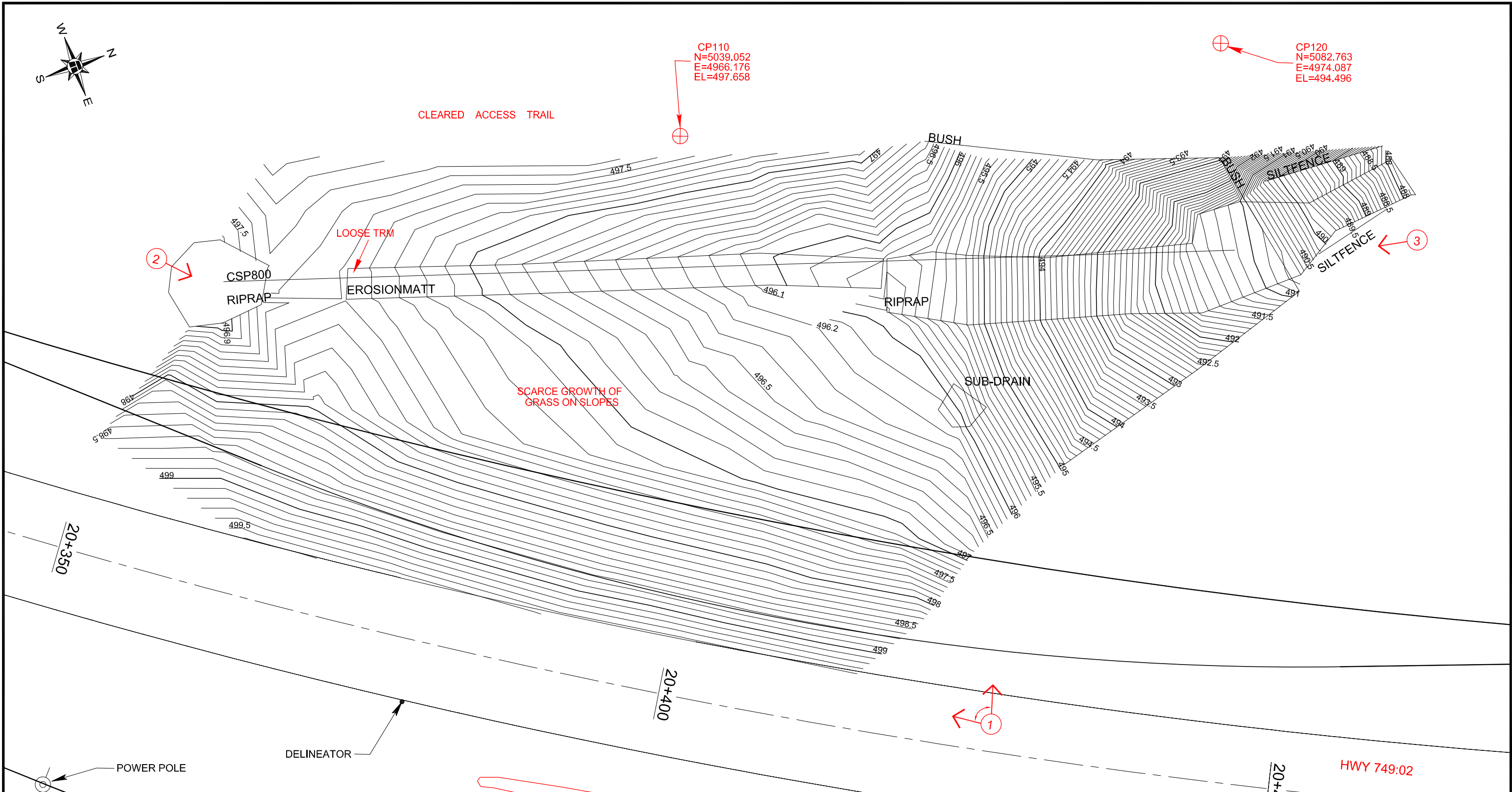
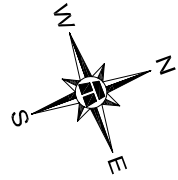
Barry Meays, P.Eng.
Project Engineer

Gurpreet Singh Bala, M.Sc.
Project Coordinator
/dw

Attachments

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

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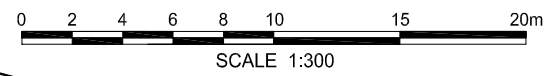
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NOTE
X 2006 OBSERVATIONS
ARE SHOWN IN RED

LEGEND
2 PHOTO AND DIRECTION

POOLED WATER
IN EAST DITCH



BASE PLAN PROVIDED BY EXH ENGINEERING SERVICES LTD.

THURBER PROJECT #15-85-38

ALBERTA INFRASTRUCTURE AND TRANSPORTATION

**FINAL AS-BUILT CONTOUR
PLAN OF SLIDE REPAIRS**

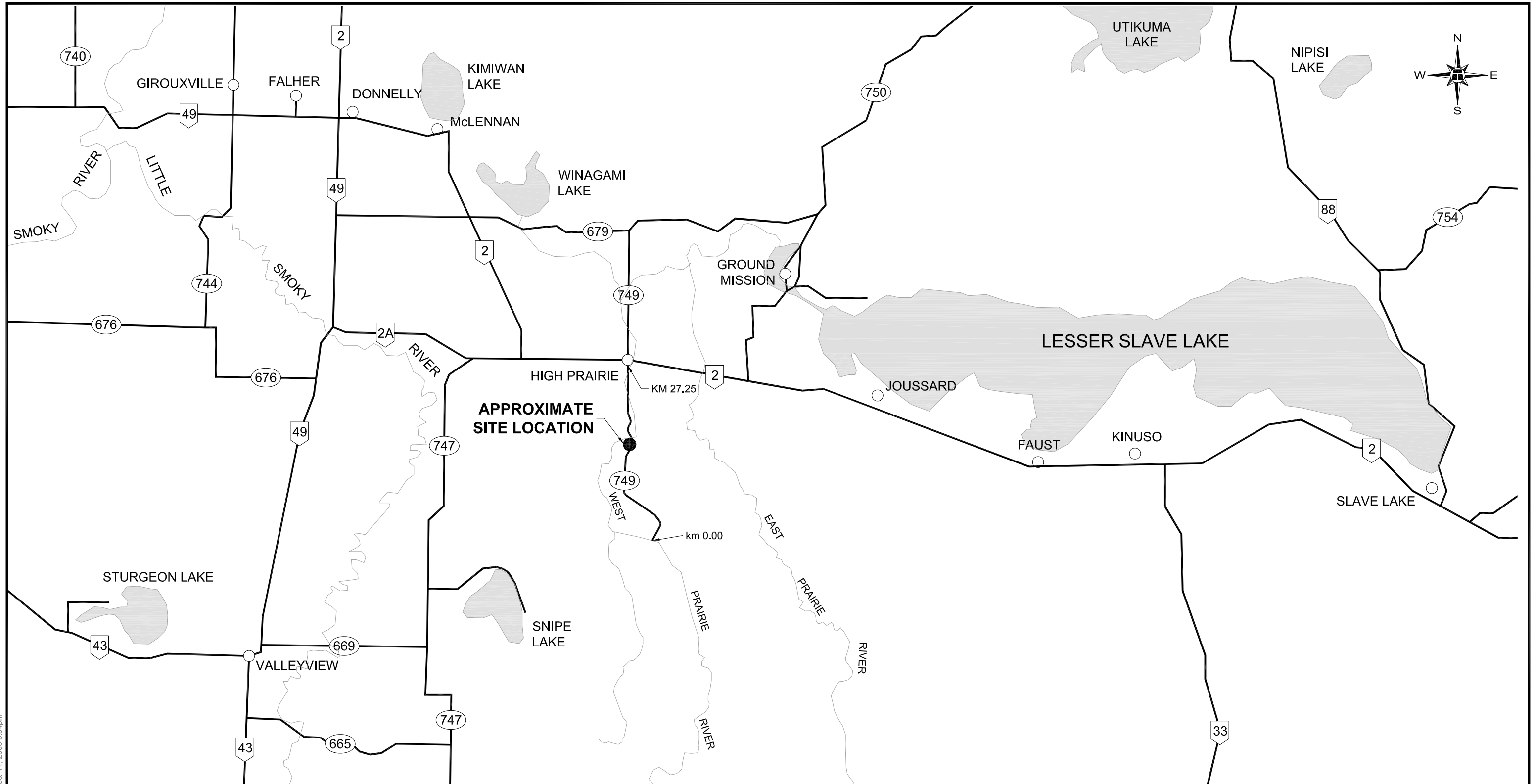
HWY 749:02 KM 16.10
SLIDE REMEDIATION

SOUTH OF HIGH PRAIRIE, AB

THURBER ENGINEERING LTD.
GEOTECHNICAL • ENVIRONMENTAL • MATERIALS

ENGINEER:	DRAWN:	CONTRACT:
GSB/BDM	HH	
DATE:	SCALE:	DRAWING No.
JUNE 2006	1:300	15-85-38-SH19-1

S.W. Sec.24-073-17 W.5M.
TYREL D MACKENZIE
HIGH PRAIRIE, ALBERTA



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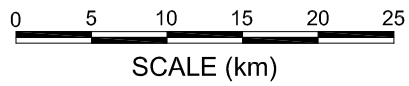
BASE MAP PROVIDED BY ALBERTA MOTOR ASSOCIATION

THURBER PROJECT #15-16-202

ALBERTA INFRASTRUCTURE AND TRANSPORTATION



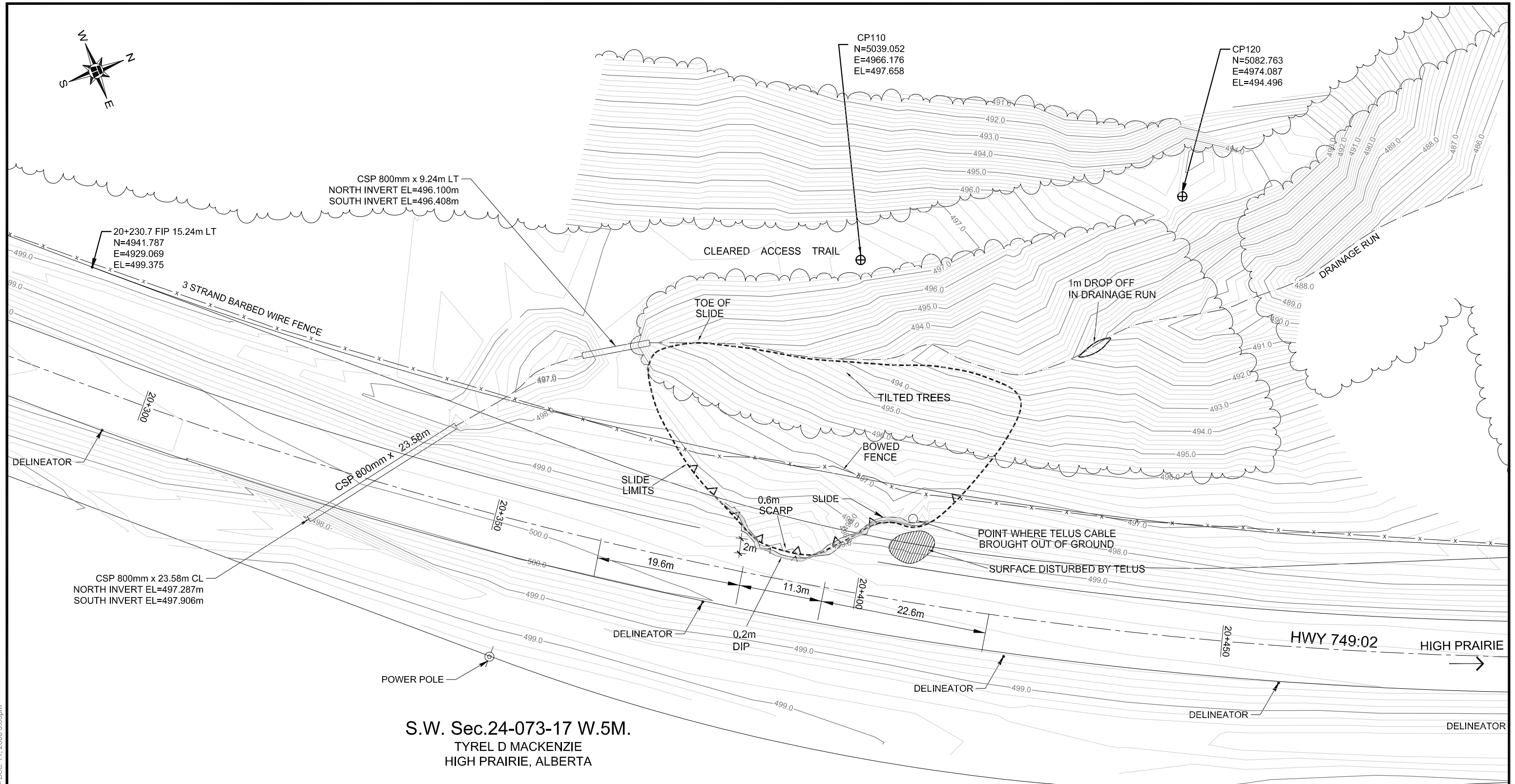
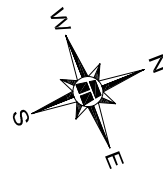
SITE LOCATION PLAN



HWY 749:02 KM 16.10
SLIDE REMEDIATION

SOUTH OF HIGH PRAIRIE, AB

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BDM	ZD	7043/05
DATE:	SCALE:	DRAWING No.
JAN 2005	1:500,000	15-16-202-1

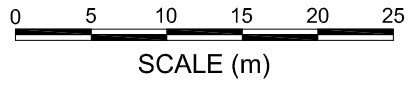


S.W. Sec.24-073-17 W.5M.
 TYREL D MACKENZIE
 HIGH PRAIRIE, ALBERTA

BASE PLAN PROVIDED BY EXH ENGINEERING SERVICES LTD.

THURBER PROJECT #15-16-202

LEGEND :
 LANDSLIDE SCARP



ALBERTA INFRASTRUCTURE AND TRANSPORTATION

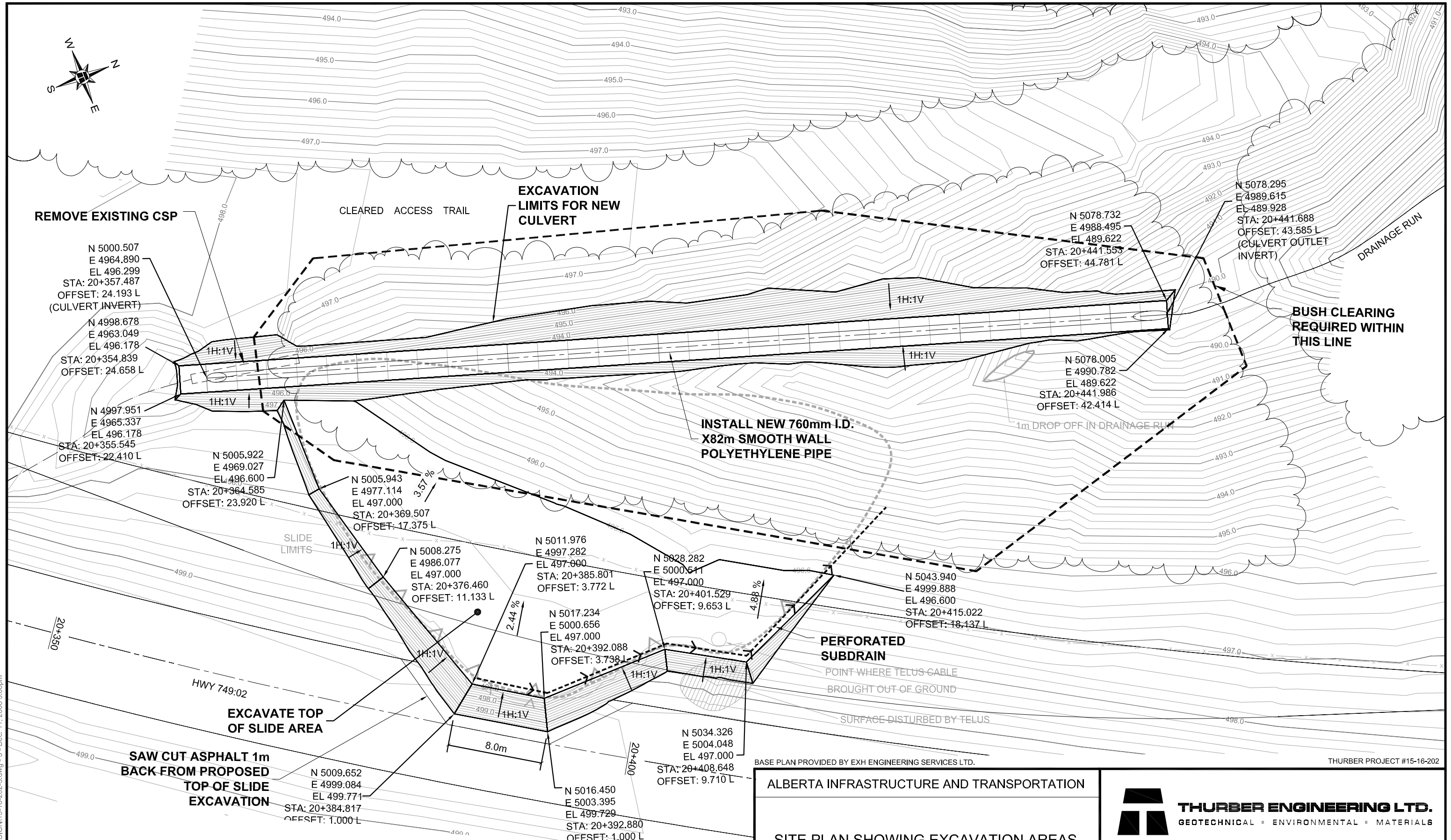
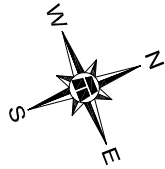
SITE PLAN SHOWING EXISTING CONDITIONS
 HWY 749:02 KM 16.10
 SLIDE REMEDIATION
 SOUTH OF HIGH PRAIRIE, AB



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ENGINEER:	BDM	DRAWN:	ZD	CONTRACT:	7043/05
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NOTE:
ARRANGE FOR RELOCATION OF TELUS CABLE AROUND WORK AREA.



BASE PLAN PROVIDED BY EXH ENGINEERING SERVICES LTD.

THURBER PROJECT #15-16-202

ALBERTA INFRASTRUCTURE AND TRANSPORTATION

SITE PLAN SHOWING EXCAVATION AREAS AND NEW CULVERT ALIGNMENT

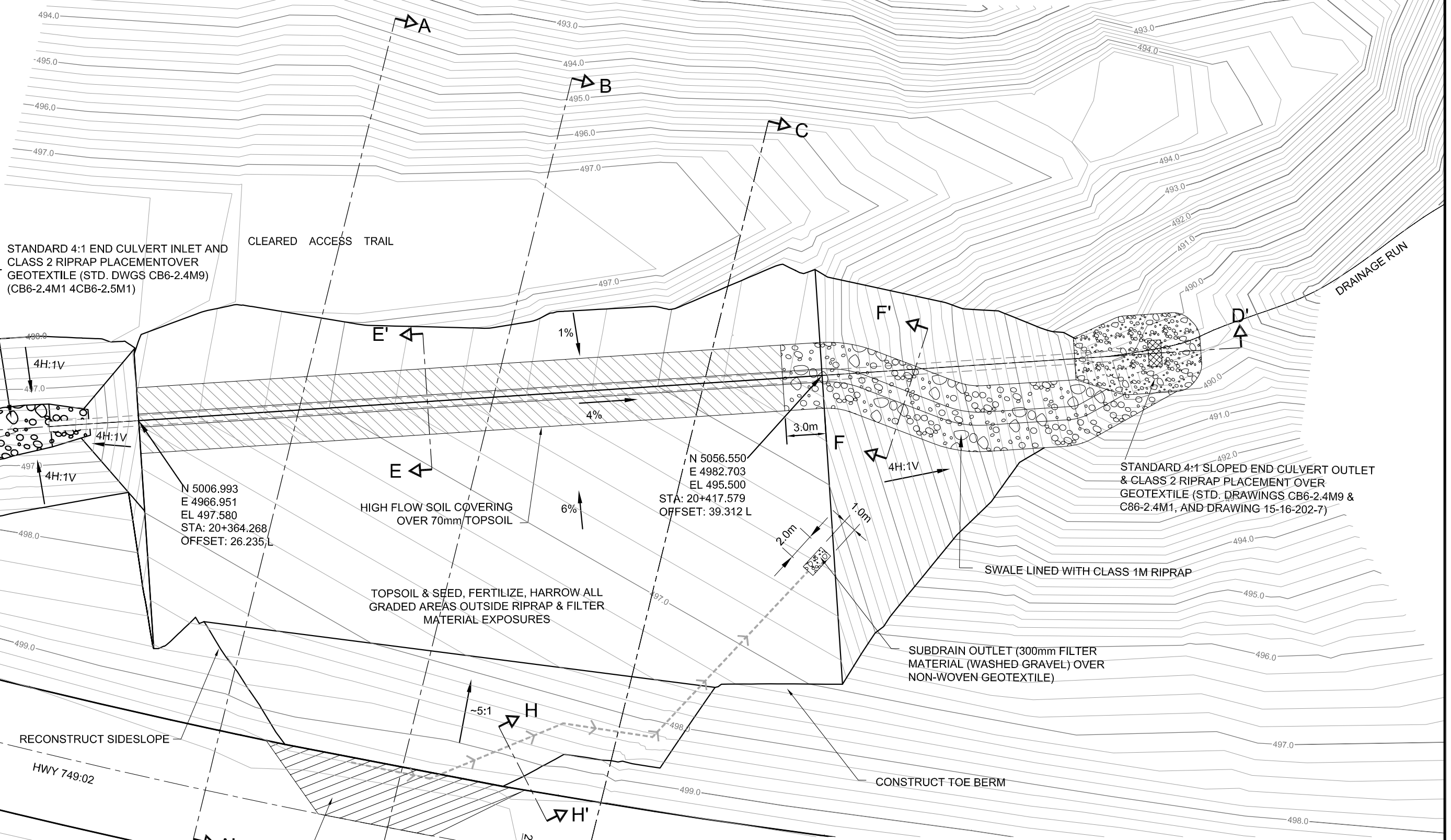
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SLIDE REMEDIATION
SOUTH OF HIGH PRAIRIE, AB



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BASE PLAN PROVIDED BY EXH ENGINEERING SERVICES LTD.

THURBER PROJECT #15-16-202

ALBERTA INFRASTRUCTION AND TRANSPORTATION

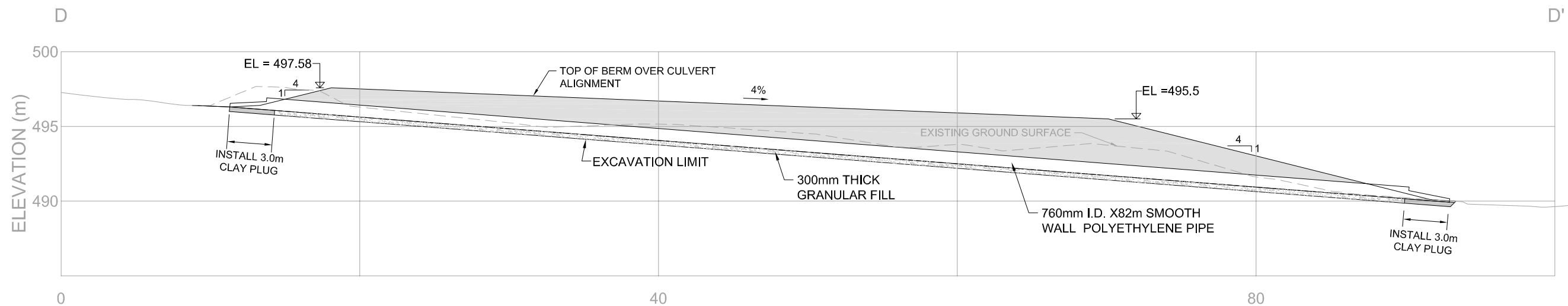
SITE PLAN SHOWING EMBANKMENT / BERM FILL AND EROSION CONTROL MEASURES

HWY 749:02 KM 16.10
SLIDE REMEDIATION

SOUTH OF HIGH PRAIRIE, AB

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ENGINEER:	BDM	DRAWN:	ZD	CONTRACT:	7043/05
DATE:	JAN 2005	SCALE:	1:300	DRAWING No.	15-16-202-4



THURBER PROJECT #15-16-202

ALBERTA INFRASTRUCTION AND TRANSPORTATION

LONGITUDINAL SECTION ALONG CULVERT
(SECTION D-D')

HWY 749:02 KM 16.10
SLIDE REMEDIATION

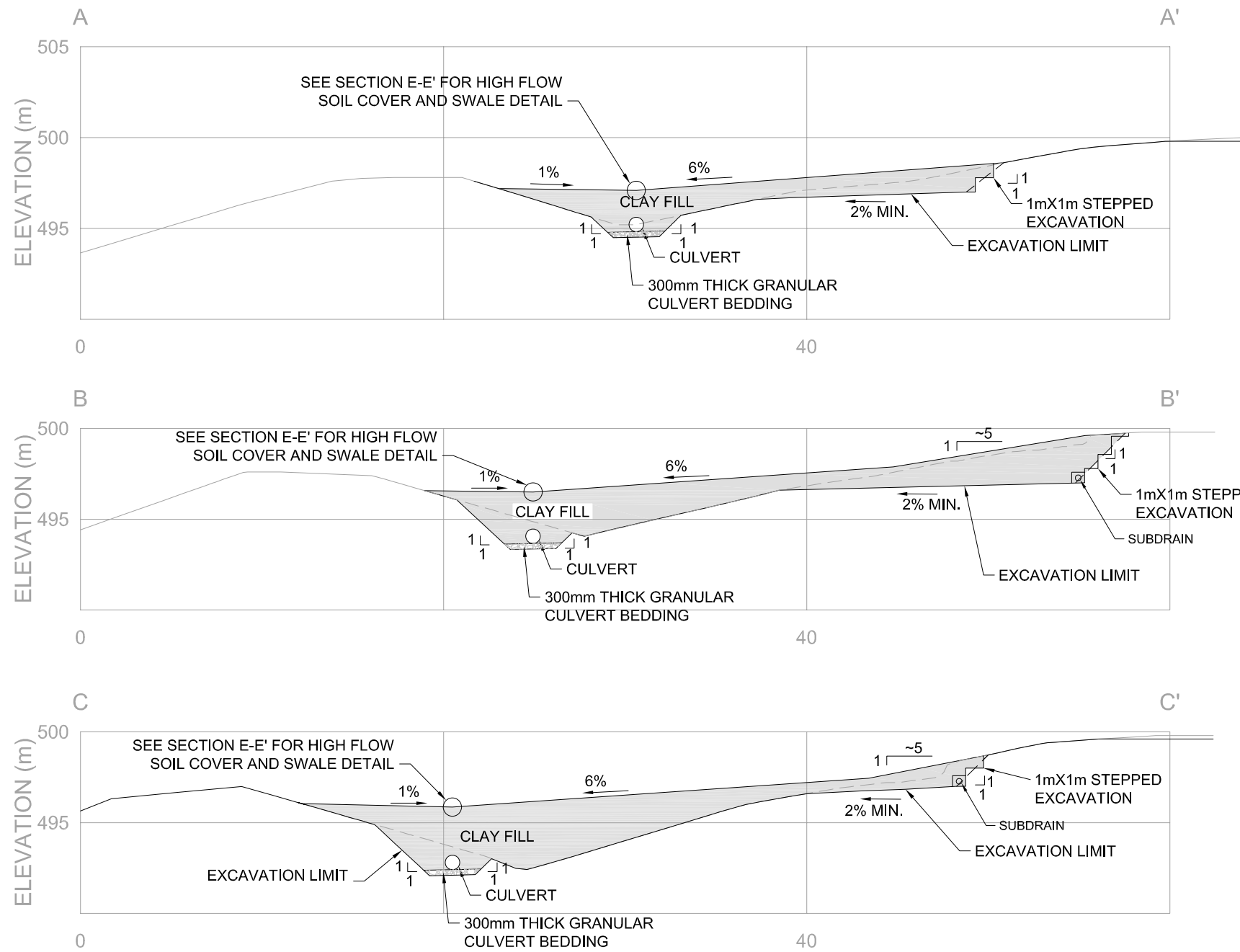
SOUTH OF HIGH PRAIRIE, AB



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THURBER PROJECT #15-16-202

ALBERTA INFRASTRUCTURE AND TRANSPORTATION

CROSS-SECTIONS A-A', B-B', AND C-C'

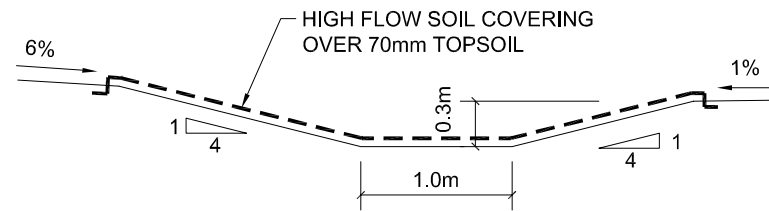
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SLIDE REMEDIATION

SOUTH OF HIGH PRAIRIE, AB



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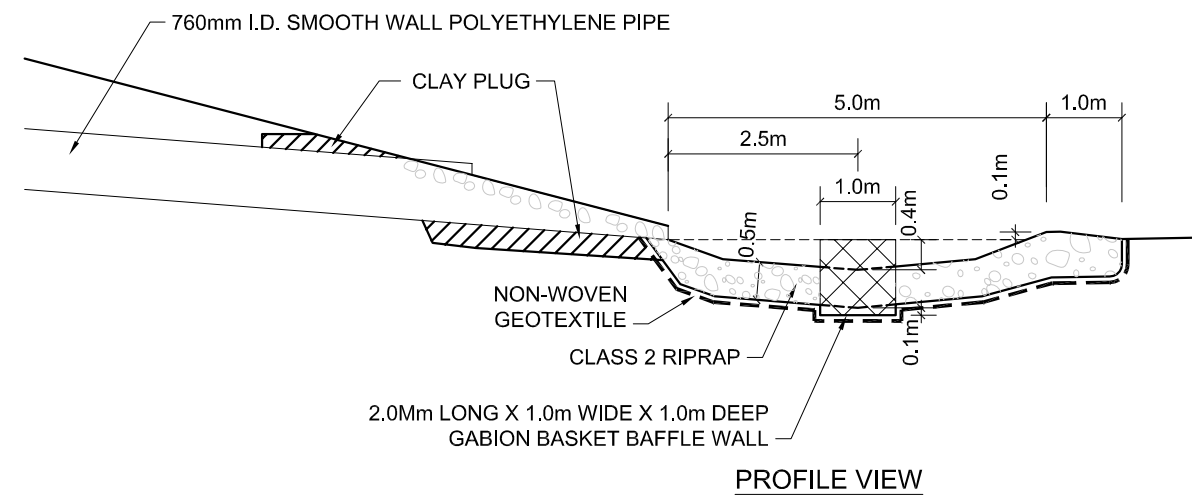
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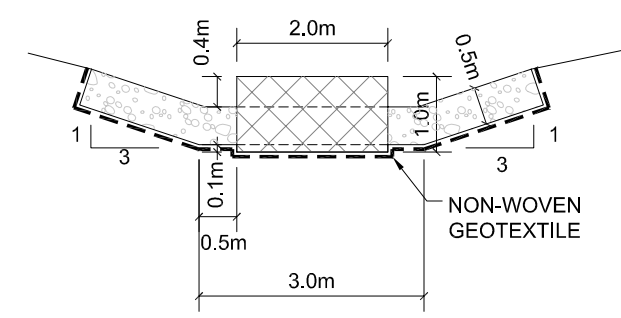
SECTION E-E'

1:50

(REFER TO STANDARD DRAWING CB6-2.16 M6 FOR INSTALLATION DETAILS)



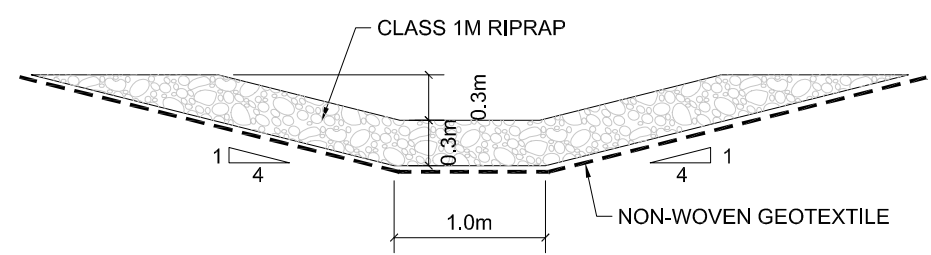
PROFILE VIEW



SECTION G-G'

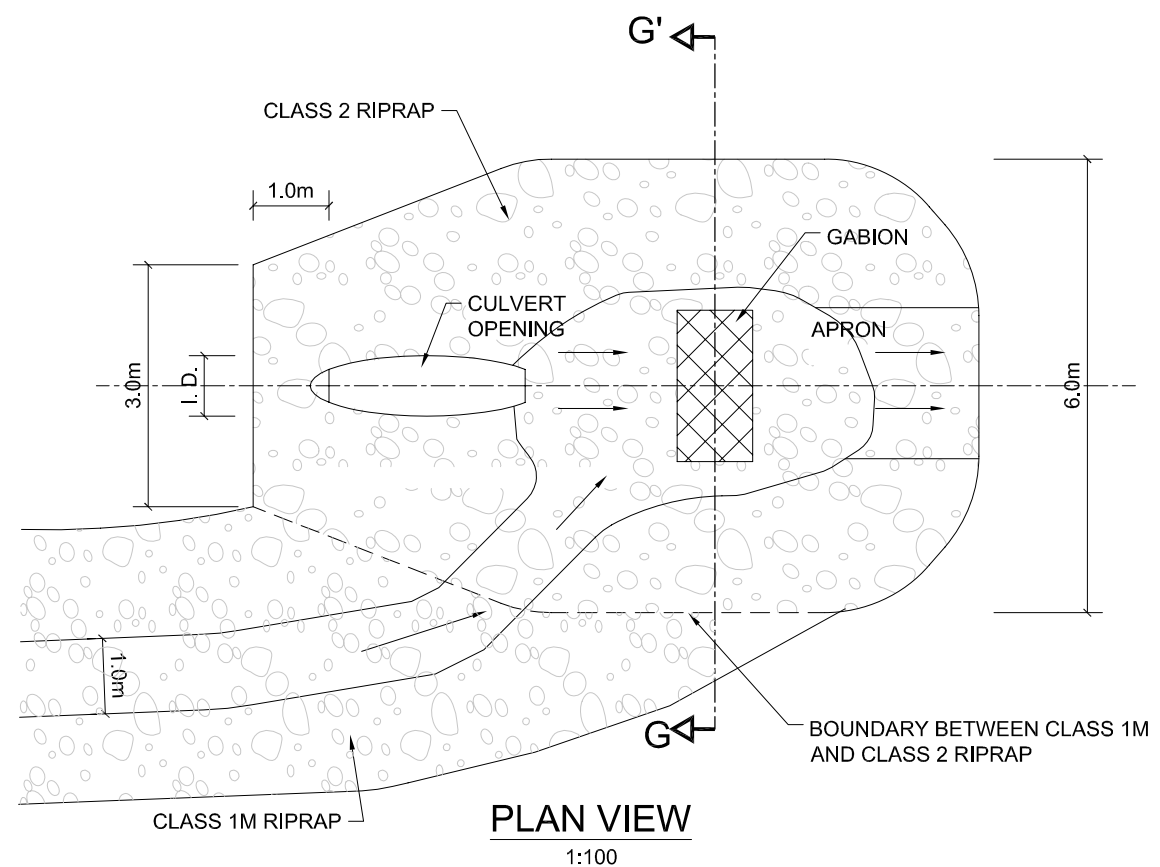
CULVERT OUTLET DETAILS

1:100



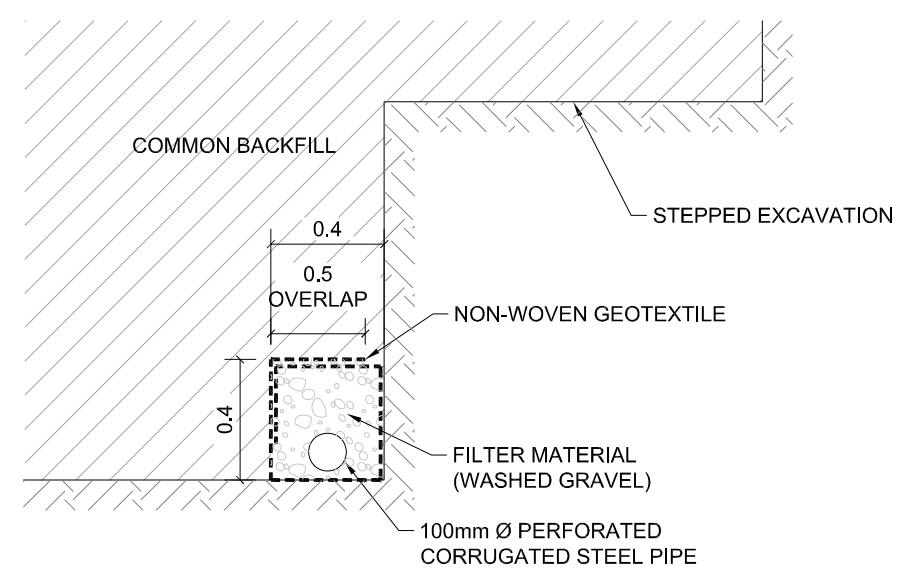
SECTION F-F'

1:50



PLAN VIEW

1:100



**SUBDRAIN DETAIL
(CROSS-SECTION H-H')**

1:20

THURBER PROJECT #15-16-202

ALBERTA INFRASTRUCTURE AND TRANSPORTATION



DESIGN DETAILS

HWY 749:02 KM 16.10
SLIDE REMEDIATION

SOUTH OF HIGH PRAIRIE, AB

ENGINEER:	DRAWN:	CONTRACT:
BDM	ZD	7043/05
DATE:	SCALE:	DRAWING No.
JAN 2005	AS SHOWN	15-16-202-7

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LEGEND

 AREA OF R.O.W. REQUESTED

NOTE: AERIAL PHOTO PROVIDED BY ALBERTA SUSTAINABLE RESOURCE DEVELOPMENT-AIR PHOTO SERVICES, PHOTO DATED AUGUST 3, 1999. SCALE 1:30,000

**PRELIMINARY DESIGN
RIGHT OF WAY REQUEST #1**

Alberta
INFRASTRUCTURE AND
TRANSPORTATION

METRIC

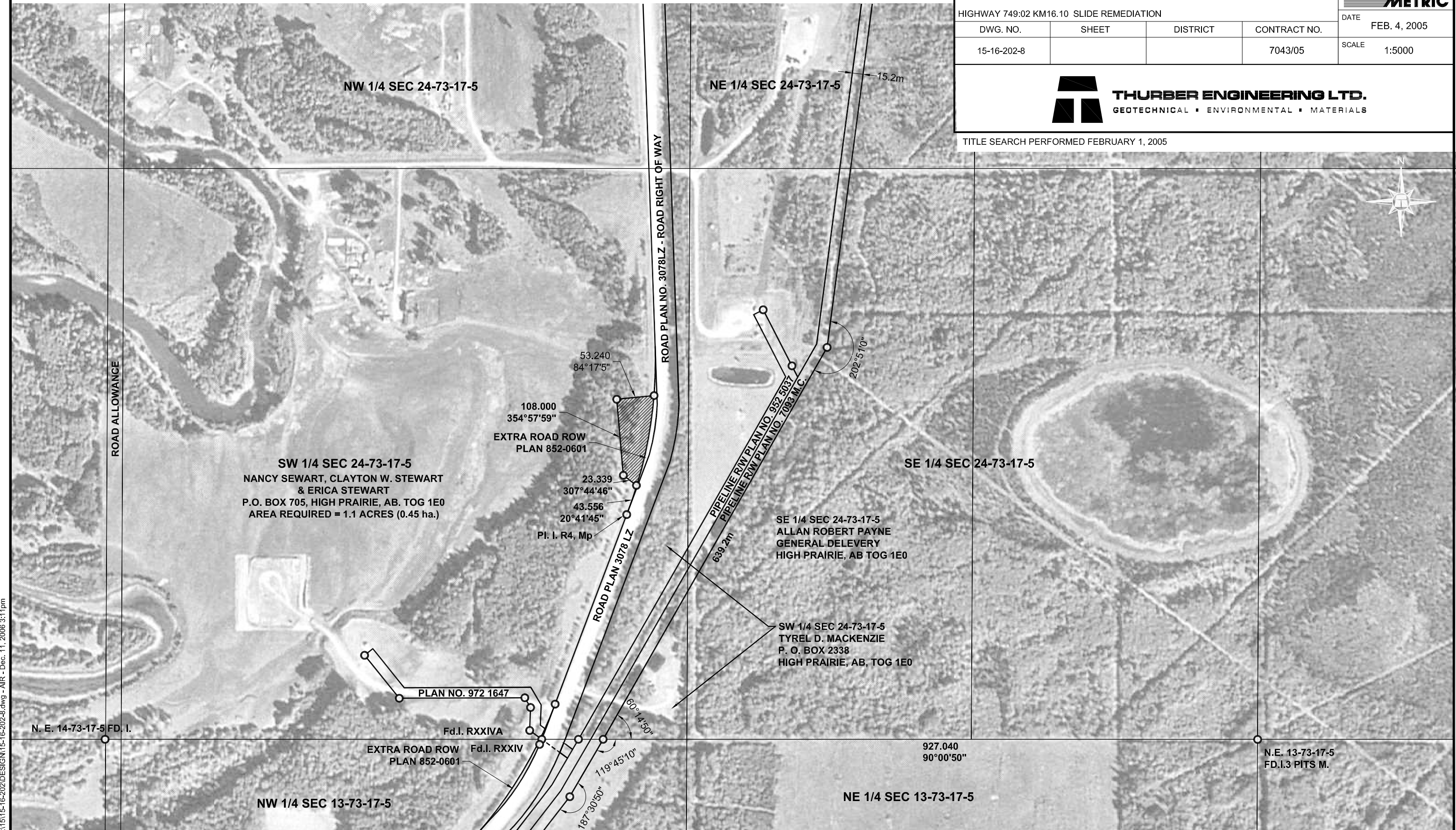
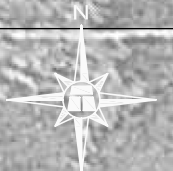
HIGHWAY 749:02 KM16.10 SLIDE REMEDIATION

DWG. NO.	SHEET	DISTRICT	CONTRACT NO.	DATE
15-16-202-8			7043/05	FEB. 4, 2005
				SCALE
				1:5000



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TITLE SEARCH PERFORMED FEBRUARY 1, 2005



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Photo 1 - Panoramic view of the Banana Belt Slide Area, May 24, 2006.



Photo 2 - Looking north at culvert inlet, May 24, 2006.



Photo 3 - Looking south at culvert outlet, May 24, 2006.