



THURBER ENGINEERING LTD.

ALBERTA TRANSPORTATION LANDSLIDE RISK ASSESSMENT

SECTION A: GEOTECHNICAL FILE REVIEW

NORTH CENTRAL REGION - ATHABASCA

**SITE NC72: HWY 2:46 GRADUATION ROCK BACKSLOPE SLUMP
(km 42.5)**

Highway Control Section:	HWY 2:46
Nearest Landmark	20 m EAST OF SOUTH MITSUE ACCESS ROAD
Legal Location:	NE-15-72-4-W5M
Date of Initial Observation:	2009
Date of Last Inspection:	June 2012
Last Inspected By:	Thurber Engineering Ltd. (Thurber)
Instruments Installed:	None
Instruments Operational:	None
Risk Assessment:	PF(7) x CF(2) = 14
Last Updated:	N/A
Previous Update:	N/A



1. LOCATION

The site is located on Highway 2:46 at km 42.5, and approximately 20 m east of the south Mitsue access road.

2. GENERAL DESCRIPTION OF SLOPE INSTABILITY

A slump failure occurred within the south back slope of the highway at this location. The slump is about 5 to 8 m wide (parallel to highway) and 16 m long (parallel to slope surface). The slump debris kept accumulating in the highway east ditch and continued to impede surface drainage in the ditch. The slump failure did not appear to affect the highway surface. Details of the slide main features and a cross section are shown on Figure NC72-1.

Site inspection visits indicated that the existing catch water ditch on the top of the slope has been recharging the highway back slope. Presence of high ground water levels and highly erodible silty sand soils are the main trigger for the slump failure.

3. GEOLOGICAL/GEOTECHNICAL CONDITIONS

Physiographic Region: Located in the Lesser Slave Lowland (Atkinson, N. and Lyster, S., 2010).

Bedrock Geology: The bedrock at the site is of the Wapiti Formation consisting of grey, feldspathic, clayey sandstone, grey bentonitic mudstone and bentonite with scattered coal beds. (Geological Map of Alberta, AGS, AEUB, 1999).

Surficial Geology: Surficial deposits in the area consist of complex glaciofluvial deposits consisting of sand and gravel with local areas of diamicton (poorly sorted sediment). The deposits are undifferentiated ice contact stratified drift and outwash. The deposits can also be glacial till and rock. (Surficial Materials of Canada, GSC, 1995).

Hydrogeology: Local groundwater and surface water flow is expected to be northwest towards Mitsue Lake and Lesser Slave River. Regional groundwater flow is towards Lesser Slave Lake, located approximately 17 km to the northwest of the site. (Hydrogeological Map Lesser Slave Lake Alberta, ARC, 1977).

Stratigraphy: Stratigraphic information was not available for this site.

4. CHRONOLOGY

2009

The slump was first noticed by the local MCI in 2009 and the ditch was cleared of debris.

2010

The ditch was cleared of the slump debris to promote surface drainage.



2011

A Call-Out inspection visit was undertaken by Thurber in May 2011. Up to 1.5 m high multiple scarps were noticed within the slump failure. Erosion gullies were observed on each side of the affected backslope section and water was ponding on the top of the slope in the vicinity of the crest of the backslope.

2012

The site was added to the North Central Annual GeoHazard Assessment program and a site reconnaissance was carried out in June 2012. A slight retrogression of the headscarp cracks were observed. Some erosion was observed within the slump mass. The catch water ditch was dry during this site reconnaissance. The ditch flow was unimpeded. Vegetation grew within the slump mass.



REFERENCES

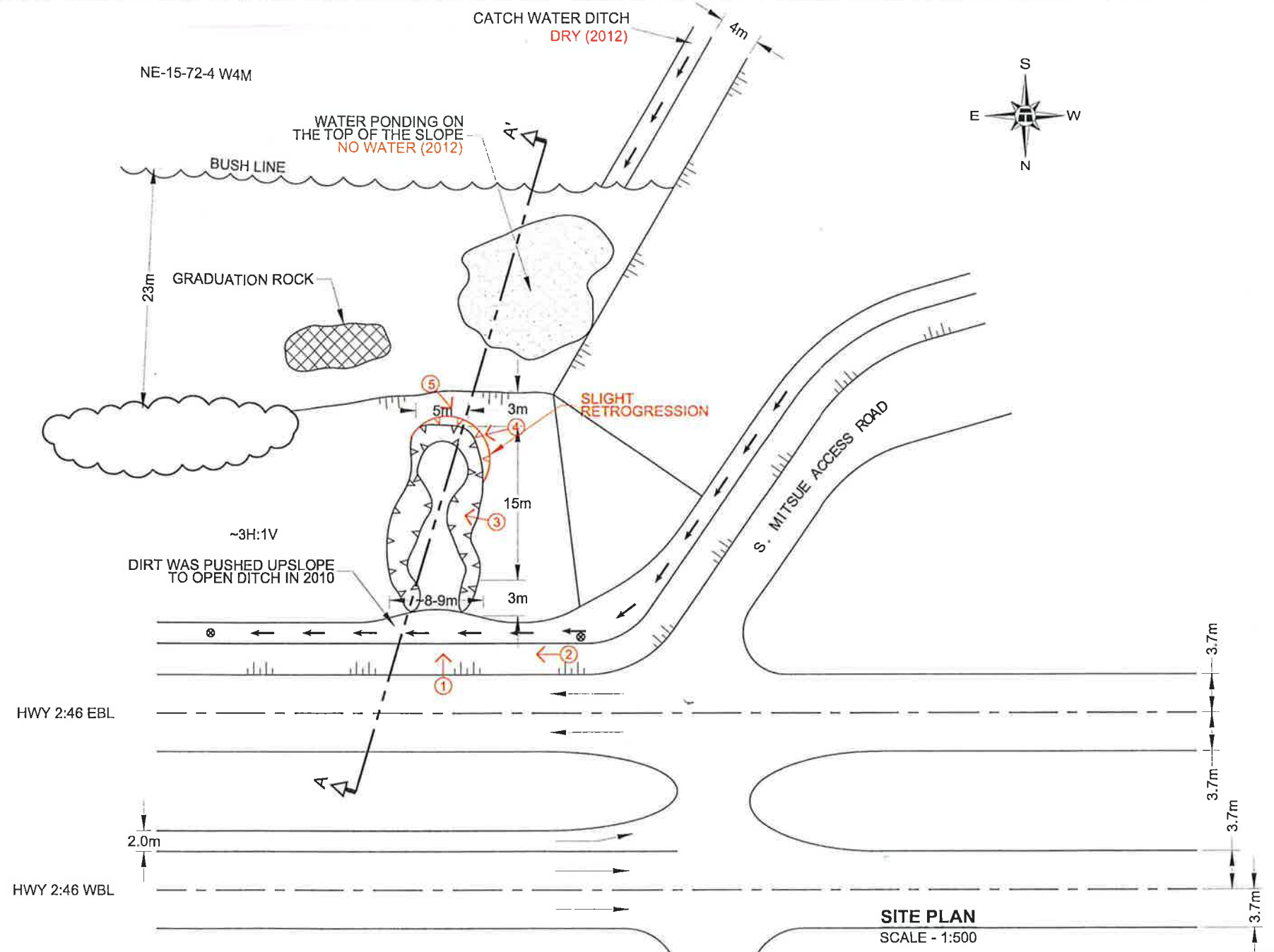
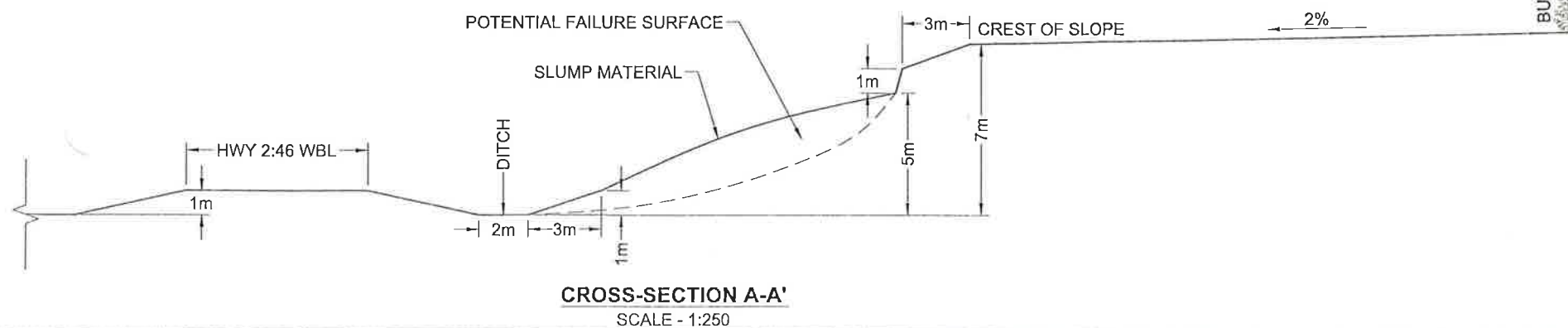
1. Atkinson, N. and Lyster, S., 2010. "Bedrock Topography of Alberta, Canada," ERCB/AGS Map 50, scale 1:1,500,000.
2. Alberta Geological Survey, Alberta Energy and Utilities Board, 1999. "Geological Map of Alberta." Map No. 236, scale 1:1,000,000, compiled by Hamilton, W.N., Price, M.C. and Langenberg, C.W..
3. Geological Survey of Canada, 1995. "Surficial Materials of Canada," Map 1880A, scale 1:500,000, compiled by Fulton, R.J..
4. Alberta Research Council, 1977. "Hydrogeological Map Lesser Slave Lake Alberta."

LEGEND

- ① → PHOTOGRAPH NUMBER, AND APPROXIMATE DIRECTION AND LOCATION (JUNE 11, 2012)
- ⊗ LIGHT POLE
- ▲ SCARP
- ~~~~~ BUSH LINE

NOTES:

1. THE DIMENSIONS SHOWN ON THE SITE PLAN AND CROSS-SECTION ARE BASED ON SIMPLE FIELD MEASUREMENTS AND MAY DEVIATE FROM THE ACTUAL CONDITION.
2. JUNE 11, 2012 SITE OBSERVATIONS ARE SHOWN IN RED.



NORTH CENTRAL REGION (ATHABASCA AREA) - 2012 GEOHAZARD ASSESSMENT

NC72: HWY 2:46 GRADUATION ROCK BACKSLOPE SLUMP (km 42.5) SITE PLAN AND CROSS - SECTION A-A'

FIGURE NC72-1

DRAWN BY	ML
DESIGNED BY	TSA
APPROVED BY	DWP
SCALE	AS SHOWN
DATE	NOVEMBER 2012
FILE No.	15-16-275

