ALBERTA TRANSPORTATION
LANDSLIDE RISK ASSESSMENT

SECTION A: GEOTECHNICAL FILE REVIEW

NORTH CENTRAL REGION - ATHABASCA

SITE NC43: HWY 2:48 km 21.0, WEST OF WIDEWATER

Legal Location:	NE-29-73-07-W5M
Nearest Landmark:	21 KM WEST OF JCT HWY 88 0.5 KM WEST OF WIDEWATER
Highway Control Section:	HWY 2:48
Date of Initial Observation:	2005
Date of Last Inspection:	May 2007
Last Inspected By:	Thurber Engineering Ltd. (Thurber)
Instruments Installed:	2 Slope Inclinometers (2006)
Instruments Operational:	2 Slope Inclinometers (2007)
Risk Assessment:	PF(5).CF(2) = 10
Last Updated:	2009 – Thurber Engineering Ltd.

1. LOCATION

The site is located on Highway 2:48 km 21.0, about 0.5 km west of Widewater and about 21 km west of the junction with Highway 88.

2. GENERAL DESCRIPTION OF SLOPE INSTABILITY

The site is located on the north portion of the highway, about 700 m south from the Lesser Slave Lake margin. It is estimated that the natural slope, on which the highway was constructed is about 8H:1V, based on published topographical mapping.

The site is characterized by about a 70 m long slump-like feature, with a slide scarp/bench feature at about 5 m away from the guard rail and a total vertical drop of about 7.7 m from the pavement to the toe of the slope. Details of the slide main features are shown in sketch on Figure NC43-1 and -2.

An existing ditch that flows toward the toe of the slope controls ditch flow along the slide area coming from the east and the west directions.

Risk levels for this site are relatively low, with no imminent danger to the highway. However, it is recommended to continue inspections especially after heavy precipitation periods to check if erosion/scar retrogresses.

3. GEOLOGICAL/GEOTECHNICAL CONDITIONS

Physiographic Region: Border between the Swan Hills Upland and the Lesser Slave Lake Lowland (1969, Atlas of Alberta, University and Government of Alberta).

Bedrock Geology: The bedrock at the site is an Upper Cretaceous bedrock of the Smoky Group; dark grey marine shale and silty shale with nodules and thin beds of concretionary ironstone; includes unnamed dark grey shale unit on caribou Mountains and Buffalo Head Hills; marine (Geological Map of Alberta, AGS, 1999). The bedrock elevation is about 600 meters (Bedrock Topography of Alberta, AGS, 1995).

Surficial Geology: The available surficial geology map indicates that the surficial geology consists of thick and continuous till blanket (Surficial materials of Canada, AGS, 1995). The thickness of surficial deposits is about 90 m (Drift Thickness of Alberta, AGS, 1995).

Hydrogeology: The Smoky Group bedrock would be limited to less than 0.1 L/s groundwater flow with similar or slightly higher flows expected from the upper

clay till (0.1 to 0.4 L/s). However, higher flow rates (2 to 8 L/s) would be expected from the glacial or pre-glacial sand and gravel lenses overlying the bedrock shale, below the till. Groundwater flow is expected to be north toward Lesser Slave Lake.

Stratigraphy: The stratigraphy at the site is 0 to 2.4 m of firm to stiff clay fill, 3.0 m to 5.2 m of stiff clay, light brown siltstone about 3.6 m to 5.8 m thick, N (SPT) about 13 to 36 blows per 300 mm, with very stiff to hard consistency, followed by grey mudstone at about 7.0 m to 14.0 m depth, based on the slope inclinometer logs available in Appendix G.

4. CHRONOLOGY

2004 / 2005

It is understood that Mr. Fred Bickel from AT first noticed the problem in the fall 2004. The site was added to the North Central Annual GeoHazard Assessment program and a site reconnaissance was carried out in May 2005.

2006

Two slope inclinometers were installed by Jacques Whitford in November 2006. Thurber visited the site in June 2006 and found no significant changes since the last visit in 2005, assessing a risk level of 14.

2007

No significant change noticeable from last inspection. Slope indicators indicated no discernible movement, assessing a risk level of 10.

2009

Only yearly instrumentation readings have been completed at this site since 2007. The SI readings in May 2009 showed no discernable movement.

REFERENCES

1. University and Government of Alberta, 1969. "Atlas of Alberta."

2. Alberta Research Council, 1977. "Earth Sciences Report 77-1, Hydrogeology" Included "Hydrogeological Map, Lesser Slave Lake, Alberta, NTS 83-O."

3. Surveys and Mapping Branch, Department of Energy, Mines and Resources, 1979. NTS 1:50,000 Topographic Map, "Improvement District 17, Alberta."

4. Alberta Geological Survey, Alberta Energy and Utilities Board, 1999. "Geological Map of Alberta." Map No. 236.

5. Alberta Geological Survey, Alberta Energy and Utilities Board, 1995. "Bedrock Topography of Alberta," Map No. 226.

6. Fulton, R.J., 1995. "Surficial Materials of Canada," Alberta Geological Survey, Map 1880A, Scale 1:500,000.

7. Alberta Geological Survey, Alberta Energy and Utilities Board, 1995. "Drift Thickness of Alberta," Map No. 227.