



June 7, 2002

Alberta Transportation
Central Region
#401, 4902 – 51 Street
Red Deer, Alberta
T4N 6K8

Mr. Melvin Mayfield, P.Eng.
Project Engineer

Dear Mr. Mayfield:

Central Region Landslide Assessment Site C7
H16:30 Kenilworth Lake Slide
2002 Annual Inspection Report

Alberta Transportation has initiated a process of risk management at site-specific slope movement sites that includes a 3-ring binder document control system. This Annual Inspection report forms Section B of the document control system for the above site. The annual site inspection was undertaken on May 23, 2002 by Mr. Darren Ratcliffe, P.Eng., of Klohn Crippen Consultants Ltd. Mr. Ratcliffe was accompanied by Mr. Roger Skirrow, P.Eng., and Mr. Melvin Mayfield, P.Eng., of Alberta Transportation.

This report was prepared by Klohn Crippen Consultants Ltd. for Alberta Transportation Central Region under Contract No. CE053/2000.

1. PROJECT BACKGROUND

The slide was located south of Highway 16 about 2 km East of Islay Junction (about Sta. 804+12) along the north shore of the now dry Kenilworth Lake. The shoreline was located about 60 m from the highway and had a vertical elevation difference of about 15 m (about 4H:1V slope). The slide was first observed in 1977 and had no effect on the highway except for some cracks along the shoulder.

Remedial works constructed in 1980 included a dumped pit run gravel toe berm about 25 m wide and 50 m long. Twinning of the Yellowhead Highway past Kenilworth Lake was completed in 1990 or 1991 and followed the original highway alignment. In 1998, Highway 16 was re-paved, which included a nominal amount of additional fill at the crest of the slope to accommodate an increase in highway width. Patching on the shoulder was required in the fall of 1999, indicating that the slide was still active.

Following the last patching work in August 2001, significant displacement was occurring in the driving lane adjacent to the lake. This lane was subsequently closed. The slide repair work at the site started on September 25, 2001. The selected remediation design included a granular berm at the toe of the slope keyed through the potential weak shear zone in combination with an overall flattening of the slope to about 6H:1V. The design is described in our report "H16:30 Kenilworth Lake Slide Proposed Remediation Design" dated February 2001.

Prior to the repair, the slope was generally grass covered with the exception of a band of vegetation (willow trees, wild roses) on the lower portion of the slope, south of the fence line. The soil conditions were observed to be a 1.5 m thick layer of highly saturated organic material (peat) underlying the highway fill. This is underlain by a 3 m thick layer of soft saturated silty clay (till) followed by a 9 m thick layer of medium plasticity sandy clay (till). The clay deposits are underlain by a very dense uniform sand or sandstone.

The slide location, site plan, instrument locations and cross-section are illustrated on Figures 1 and 2. The site features are also illustrated in the attached photographs.

2. SITE OBSERVATIONS

Instrumentation was installed at this site in 1985 - 1986. A summary of the instrumentation at the site is provided in Table 1. All slope inclinometers were previously sheared or blocked and therefore were removed as part of the remedial work.

Table 1 Kenilworth Lake Slide Instrumentation (May 2002)

ID	Old ID	Ground Elevation (m)	Tip Depth/Response Zone (m)	Stick-up (m)	Date Installed	Current Piezometric Elevation (m)	Comments
Slope Inclinometers							
Ken01	1A	614.62	24 (?)	0.9	25-Apr-85	-	Sheared @ 4.9 m
Ken02	2	617.52	24.4	0.9	17-Oct-85	-	Destroyed
Ken03	3	611.88	20.7	1.0	18-Oct-85	-	Sheared @ 3.0 m
Ken04	1	607.40	15.2	0.8	24-Apr-86	-	Blocked @ 2.4 m
Ken05	2	609.18	15.2	0.8	25-Apr-86	-	Blocked @ 2.7 m
Ken06	3	612.61	21.3	1.0	28-Apr-86	-	Blocked @ 3.4 m
Pneumatic Piezometers							
P1		607.40	10.7	-	24-Apr-86	603.6	
P2		607.40	4.6	-	24-Apr-86	603.9	
P3		608.84	10.3	-	25-Apr-86	604.8	
P4		608.84	3.4	-	25-Apr-86	-	No return
P4A	P4	612.06	16.8	-	28-Apr-86	-	No return
P5		612.06	6.1	-	28-Apr-86	-	No return
P6		612.06	3.1	-	28-Apr-86	610.0	
Standpipe Piezometers							
SP 1A		614.65	19.8	1.13	26-Apr-85	610.8	
SP 2		617.59	1.5 - 21.6	0.31	17-Oct-85	-	Removed
SP 3		612.08	0.5 - 16.8	1.40	18-Oct-85	-	Blocked

The observed significant features of this site at present include:

- A 50 m long patched section of the highway containing the outline of 2 distinct longitudinal cracks.
- There was a significant height differential between the new pavement surface and the new fill (about 200 mm), likely to compensate for the significant drop in the road surface prior to the slope repair.
- The new fill surface had been seeded but there was little evidence of the grass germinating, likely due to the very dry weather.
- No cracks were observed in the new fill surface.

- The horizontal drains were observed to have flows from two of the pipes: one a constant drip and the other an intermittent drip.

3. SITE ASSESSMENT

The observed cracking in the new patches of pavement at the crest of the slope are considered to be related to the settlement of the new fill. It is expected that the settlements will reduce significantly this year and allow a final patch to be applied to the pavement.

The observed water levels recorded at the site are very similar to the values obtained in August 2000 and are typically slightly lower. It is considered that these values represent the current conditions of the site and the piezometric assumptions adopted in the remedial design are valid. The data also indicates that any excess pore pressures that were potentially generated by the remedial work have dissipated.

Based on the risk level criteria provided by Alberta Transportation, a risk rating of 3 has been assigned to this site. This is based on a probability factor of 3 for an inactive slide and a consequence factor of 1 as it would likely be a maintenance issue.

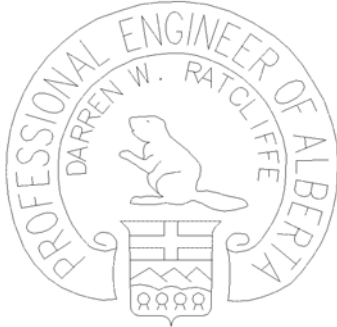
4. RECOMMENDATIONS

It is recommended that this site be deleted from the annual monitoring program unless evidence of continued movement, not related to the settlement of the new fill, is observed. The fill next to the pavement surface should be built up to reduce the height differential.

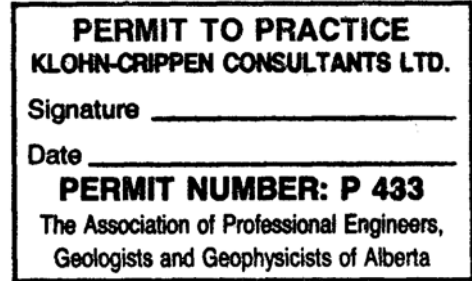
Please contact the undersigned if you have any questions regarding this report.

Yours truly,

KLOHN CRIPPEN CONSULTANTS LTD.



Darren Ratcliffe, P.Eng.
Senior Geotechnical Engineer



FIGURES

