

May 25, 2001

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

Mr. Melvin Mayfield, P.Eng.
Construction Services Coordinator

Dear Mr. Mayfield:

Central Region Landslide Assessment Site C12
H841:02 Ditch Erosion
2001 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 22, 2001 by Mr. Darren Ratcliffe, P.Eng. of Klohn Crippen Consultants Ltd. Mr. Ratcliffe was accompanied by Mr. Roger Skirrow, P.Eng., Mr. Fred Cheng, P.Eng., Mr. Melvin Mayfield, P.Eng., Mr. Frank Vidmar, Mr. Nelson Chipiuk and Mr. Stephan Zitterer 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

Serious erosion features close to highways are common in Central Alberta, particularly in the Drumheller area where the soils exhibit highly erodible properties. “Flash” flooding is a typical occurrence where large volumes of water are passed along the ditches in a short time period. This causes damage, mostly in the form of gully erosion, and is considered to be the result of steep gradients combined with the lack of vegetation growth in the ditches.

H841:02 is located about 10 km southeast of Drumheller on the approach down to the Rosebud River and the CNR line. The highway is located at the base of steep backslopes, which are about 10 m to 20 m high. The erosion feature was originally reported on October 18, 2000. Prior to the site visit on November 10, 2000, some remediation work

was completed in the north part of the ditch. This involved backfilling of the overdeepened ditch with fill material scraped from the backslope area. Minor flow check structures, about 0.3 m high were also constructed of fill at intervals down the ditch. The work ceased when the distance from the edge of the road reached the “clear zone” of about 9 m. We understand that problems with the landowner also contributed to the cessation of work. No work was undertaken in the south part of the ditch erosion.

Prior to the recent May 2001 site visit, some of the south portion the ditch was backfilled. The work stopped however at a power pole location where the eroded ditch was outside the 9 m clear zone. The eroded section of the ditch is approximately 5 m deep and 10 m wide and extends over a distance of about 65 m. As the ditch grade flattens to the south, the depth of erosion tapers out and disappears.

The current features of the site are illustrated in Figure 1 and in the attached photographs.

2. SITE OBSERVATIONS

Within 9 m of the pavement, the ditch was adequately backfilled to remove any safety concerns to the highway traffic. However, no erosion protection was placed on the invert of the ditch and the fine grained backfill is susceptible to further erosion. In fact, the ditch is already exhibiting rills and the start of erosion gullies under the small runoff flows that have occurred since placement. The small check berms constructed of the ditch backfill material have already been eroded through.

3. SITE ASSESSMENT

The safety hazard to traffic due to a deep eroded ditch located close to the highway was eliminated by backfilling the ditch and restoring the original grade. It is understood that straw bales will soon be placed to act as check structures along the ditch to reduce the flow velocity.

Based on the risk level criteria provided by Alberta Transportation, a risk rating of 9 has been assigned to this site. This is based on a probability factor of 9 for an active erosion feature and a consequence factor of 1.

4. RECOMMENDATIONS

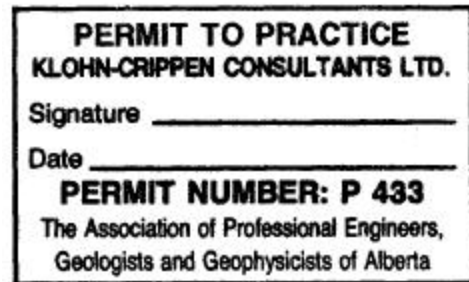
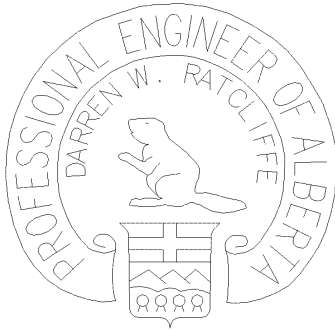
The following recommendations are provided and are based on the general recommendations provided in our report “Ditch Erosion Remediation Study and Recommendations” dated March 2001:

- With no surface protection measures in place, the ditch is highly vulnerable to severe erosion in the event of storm runoff flows. It is considered that the backfill is likely more erodable than the in-situ material as little compaction could be achieved during backfill placement.
- The placement of the straw bale check structures will provide some protection although these are considered a temporary solution, as erosion will rapidly occur around them ultimately leading to undermining and washing away.
- The long-term solution for this type of erosion feature is to protect the surface with a hard armouring to prevent soil particle motion under flow conditions. This can be successfully achieved by the use of rock filled gabion mats, but at a significant cost. A more economic solution was the use of gravel filled “Geo-Cells” placed over a filter fabric. The cellular construction provides confinement to the gravel particles to prevent motion under flow.
- It is considered that protection should only be provided within 9 m of the highway edge. However, some backfilling of the deep erosion channel is recommended to prevent the loss of the power pole.

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

Brian Rogers, P.Eng.
Manager, Alberta





South end of erosion gully



Looking north



Looking north. Gully is about 5 m deep at power pole.



Looking south towards intermediate unfilled ditch section



Looking north

