SITE C23: H854:01 Erosion

LEGAL LOCATION:	SW18-43-17-W$
REFERENCE LOCATION ALONG HIGHWAY:	Battle River Bridge (BF 9511)
UTM COORDINATES (NAD 83):	**N 5,839,620 E 402,103**
AT FILE:	H854:01
AT PLAN & PROFILE:	
Date of Initial Observation:	June 2002
Dates of Previous Inspections: (Inspected by)	June 19, 2002 (KCCL) May 22, 2003 (KCCL) May 19, 2004 (KCCL)
Instruments Installed:	None
Instruments Operational:	None
Readings: (Read by)	None
Risk Assessment:	PF(9) * CF(10) = **90** (Prior to 2003 remedial work)
Last Updated by:	Klohn Crippen Consultants Ltd. (KCCL)
Date:	May 2004

Location

H854:01 and the Battle River Bridge Crossing (BF 9511) were constructed in 1985. The bridge is located about 10 km south of Rosalind, Alberta. Ditch flows, over an indeterminate period, had created significant erosion channels on either side of the bridge that flow into the Battle River. Although it was considered that there is no immediate risk to the highway or bridge, significant siltation of the Battle River was occurring due to the flow of material into the river. Ownership of the bridge and highway was passed to Alberta Transportation from the county in 2001.

General Description of Site Conditions

Ditch flows, over an indeterminate period, had created significant erosion channels on either side of the bridge that flow into the Battle River. The features that existed on each side of the bridge prior to remediation are described separately below.

West Side

Approximately 65 m north of the bridge, an erosion channel developed immediately south of a hard sandstone bedrock outcrop, about 6 m from the highway edge. The channel extended for a length of about 50 m, with an average width of about 7 m, and was up to 3 m deep. About 12 m east of the main channel, minor channels and sinkholes were forming. At the south end of the channel, water flow continued underground for a distance of about 28 m. The channel then reappeared for a length of about 13 m by about 5 m wide flowing into the Battle River. On the opposite river bank, broken concrete slab riprap had been provided. The erosion channel met the river about 30 m west of the highway and bridge. Standing water was present at the base of the ditches and the sinkhole and it was assumed that this was indicative of the local groundwater table.

East Side

The ditch on the east side of the highway contained the remains of straw bale flow checks anchored with steel pins. The ditch was sparsely vegetated, but some grass was growing in the erosion channels. Typically, the ditch erosion was limited to a less than 0.5 m wide channel, up to about 0.4 m deep. About 45 m north of the bridge, the channel began to enlarge to about 2.5 m wide and was up to 2 m deep adjacent to the end of the guardrail. The flow disappeared underground and then reappeared in an 8.5 m wide channel, up to 4 m deep, leading to the Battle River. The channel was approximately 25 m from the edge of the bridge. Immediately east of the bridge are the remains of the timber piles from the old bridge location. A material fan had developed in the river and there was evidence of erosion on the opposite bank, which would imply that flows into the river are very high.

Geotechnical Conditions

The bedrock in the area consists of interbedded sedimentary strata of the Upper Cretaceous Horseshoe Canyon Formation. The lithologic units in this formation comprise clayey sandstone, bentonitic mudstone, and carbonaceous shale, with minor ironstone, coal and bentonite beds.

Chronology (Refer to Section G for Further Information)

June 2002
Following the emergency inspection at this site, it was recommended that further evaluation of this erosion site be considered. A topographic survey of the area was completed in August 2002. A draft report presenting the results of the evaluation of the site and the recommended remediation work was submitted to Alberta Transportation in November 2002. In the design approach at the time, proposed ditches and their related structures were to be constructed on both sides of the highway.

March 2003
Klohn Crippen was asked to review alternatives to the proposed site remediation to reduce the project cost. In the revised design, only the east ditch was remediated with the installation of a new culvert to convey runoff from the west side of the highway to the east side. Based on the revised design, Construction Drawings and Terms of Reference were produced to enable the repairs to be constructed by the local maintenance contractor, Transportation Systems Management Inc.

October 2003
The repair work was awarded to Transportation Systems Management Inc. (TSM). Construction started on October 14, 2003 and was substantially complete by November 13, 2003. The construction is described in the Klohn Crippen report "Erosion Repair As-Built Report", dated March 2004.

Reports and Documents

June 2002 (KCCL) Geotechnical Inspection Report
May 2003 (KCCL) Geotechnical Inspection Report
May 2004 (KCCL) Geotechnical Inspection Report

Topographic Survey (Challenger), August 2002
Remediation Design Report (KCCL), April 2003
As-Built Report (KCCL), March 2004