

SITE C14: H771:04 Slide and Culvert Distress

LEGAL LOCATION: NW34-45-1-W5

REFERENCE LOCATION
ALONG HIGHWAY:

UTM COORDINATES (NAD 83): N 5,868,192 E 696,622

AT FILE: H771:04

AT PLAN & PROFILE:

Date of Initial Observation: August 2000

Dates of Previous Inspections:
(Inspected by) August 17, 2000 (AT)
April 17, 2001 (KCCL)
June 12, 2001 (KCCL)
May 28, 2002 (KCCL)
May 23, 2003 (KCCL)
May 12, 2004 (KCCL)

Instruments Installed: None

Instruments Operational: None

Reading Dates:
(Read by) None

Risk Assessment: PF(9) * CF(4) = **36**

Last Updated by: Klohn Crippen Consultants Ltd. (KCCL)
Date: June 2004

Location

Highway 771:04 runs on a north-south alignment. About 5 km south of the junction with Highway 13 and immediately north of the Battle River crossing, the highway is located between an approximate 15 m to 20 m high backslope to the east (slopes about 3H:1V), and a watercourse to the west about 5 m to 7 m below road level.

Cracks and a depression are located in the west lane of the highway and extend over a length of about 35 m. The cracking and depression in the highway appear to be caused by a slide located about 20 m to the west on the embankment slope of the adjacent watercourse that parallels the highway. The cracked area was patched in 2001.

General Description of Site Conditions

The slide on the embankment slope has occurred in the stream bank adjacent to a large mature conifer tree. The slide consists of a series of slumps extending over an area about 10 m wide and about 10 m down the slope. The movement appears to reflect a process whereby the initial instability occurred at the toe, leading to progressive instability up the slope due to progressive loss of toe support. The initial instability was likely caused by stream erosion during a large flow event. The presence of the large tree could have caused turbulent flow and eddy currents to develop leading to the toe erosion in this location. The slope may also be saturating from above as the highway ditch to the east contains standing water.

The watercourse to the west is mainly fed from a 0.9 m diameter CSP culvert, which crosses the highway about 500 m to the north. The downstream end of the culvert is in distress due to a small slide about 4 m wide that has occurred about 4 m behind the outlet. The slide has displaced the end of the culvert both horizontally and vertically.

Geotechnical Conditions

The slide material appeared to consist of brown sandy to silty clay. Soil testing from the design phase indicated that the material is a sandy clay with a liquid limit typically ranging from 35% to 45%.

Chronology (Refer to Section G for Further Information)

1986/87

The design work for the section of H771:04 between H611 and H13 was done in 1986/87. It is assumed that construction commenced shortly thereafter. Areas of concern at the time included channelization of the Battle River crossing to remove dangerous meanders which could erode the highway embankment, slumping and bulging in the east

side slopes, and the potential erosion from a water course which ran adjacent to the road for approximately 100 m in NW34-45-1-5.

August 2000

The features described above were observed at the site. An emergency geotechnical inspection was carried out in April 2001.

September 2002

Report prepared by Klohn Crippen providing design recommendations:

It is considered that the slide movement resulted from initial instability at the toe due to stream erosion, leading to progressive instability up the slope. The slope may also be saturating from above as the highway ditch to the east contains standing water. The remediation options must therefore account for these mechanisms in the design.

The proposed remediation of the embankment slide area requires the construction of a 3 m high rock-filled gabion basket retaining wall at the toe with reinstatement of the slope comprising compacted pit run gravel. The downstream end of the culvert should be excavated back to the small slide area. The culvert should be repaired and the slope reinstated.

Terms of Reference and material quantities prepared for Maintenance Contractor.

July 2003

Report prepared by Pisces Environmental regarding aquatic issues associated with the repair work.

Reports and Documents

April 2001 (KCCL) Emergency Inspection Report (April 18, 2001)

June 2001 (KCCL) Inspection Report (June 25, 2001)

May 2002 (KCCL) Inspection Report (June 7, 2002)

May 2003 (KCCL) Inspection Form

May 2004 (KCCL) Inspection Form

Site Remediation Report (KCCL), September 5, 2002

Assessment of the Fisheries Resources and Habitat of an Unnamed Tributary to the Battle River, Pisces Environmental Consulting Services Ltd., July 2003.