

SITE C20: H771:02 Pavement Distress

LEGAL LOCATION: SW3-41-1-W5, SE4-41-1-W5
NE33-40-1-W5, NW-34-40-1-W5

REFERENCE LOCATION
ALONG HIGHWAY: km 2.0

UTM COORDINATES (NAD 83): **N 5,820,026 E 698,635**

AT FILE: H771:02

AT PLAN & PROFILE:

Date of Initial Observation: 2001

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

Instruments Installed: None

Instruments Operational: None

Reading Dates: None
(Read by)

Risk Assessment: $PF(9) * CF(1) = 9$

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

Location

At the intersection of SH771:02 with the Township Road 41-0, about 2 km north of Highway 20, the road surface is indicating signs of distress, including cracking and rutting, over a length of about 150 m. During the site inspection in June 2001 standing water was present in the east ditch and it was conjectured that the pavement is beginning to fail due to the water and corresponding softening of the road base.

A 20 mm thick patch was placed in this area in 2001, however the patched area is breaking up in the center of the intersection.

General Description of Site Conditions

Highway 771:02 runs on a north-south alignment. The surrounding terrain is very flat, but there is a small fall in grade to the west and a slight fall in grade to the south.

The main drainage for the site appears to be generally southward along the Highway 771 ditches. The 0.8 m diameter CSP culverts under SH771 on the north and south sides of Twp Rd 41-0 permit some flow to pass to the west alongside the local road. A 0.6 m diameter CSP culvert on the east side of SH771 passes under the local road to permit southward flow.

Based on the survey, the following ditch grades were calculated:

- North – South: 0.3% to 1.0%
- East – West: 4% west of H771, 1.3% east of H771
- The highway pavement was typically 1.0 m to 1.5 m above the invert of the ditches.

Significant areas of standing water were observed in the east ditch of SH771. A small dam in the ditch about 80 m south of the local road was contributing to the ponded water. The ditch on the west side of SH771 was dry.

A review of the survey also indicated two problem areas on the south side of the local road intersection where the ditch invert is locally too high to facilitate proper drainage.

Numerous cracks and depressions were observed on the last inspection in the pavement over a length of about 150 m. The distress in the pavement generally corresponded with the standing water in the ditches. A 20 mm thick patch was placed in 2001, however this is breaking up in the centre of the intersection. The effects of frost heave are also likely contributing to the pavement distress.

Geotechnical Conditions

Chronology (Refer to Section G for Further Information)

June 2001

Initial site inspection performed by Klohn Crippen.

September 2001

Topographic survey undertaken.

October 2001

Preliminary recommendations by Klohn Crippen to improve drainage around intersection by deepening ditches and installing larger culverts.

August 2002

Revised recommendations issued in conjunction with Terms of Reference and quantity estimates. The recommendations are summarized below:

Immediate Remediation

The small dam in the east ditch should be removed.

All culverts should be checked for obstructions and cleaned as required.

The ditches in the southeast and southwest corners of the intersection should be excavated by about 0.3 m to prevent water ponding in these areas.

All the surrounding ditches should be cleaned out to ensure the unobstructed flow of water.

Long Term Remediation

The proposed remediation for the site is to reverse the drainage pattern south of the local road over the length where the pavement is distressed. The steeper grade to the west is utilized to drain the area. The following steps are recommended for the long-term remediation of this site.

The pavement should be removed for a length of about 160 m corresponding to the areas of distress. The road structure as defined in the Pavement Management System comprises 60 mm of ACP over 230 mm of granular base course. The quantity of asphalt to be removed and replaced therefore should be about 100 m³ (about 230 tonnes).

The granular base course should be inspected by proof rolling or other means to determine a competent base. Any soft spots should be removed and replaced with well-compacted granular material.

The 0.8 m diameter CSP south of the local road should be removed and replaced with a 1.0 m diameter culvert at an invert approximately 1 m lower than the existing culvert. Culverts should be installed and backfilled as per the latest version of Alberta Transportation Standard Detail CB6-2.4M1: "Corrugated Metal Pipe Culvert Installation (Open-Cut)".

The 0.6 m diameter CSP under the local road should be removed and replaced with the previously removed 0.8 m diameter culvert at an invert approximately 0.5 m lower than the existing culvert. The CSP should be inspected prior to re-installation and repaired as required. Due to the lower elevation, additional length of new culvert will also be required. The culvert excavation should be backfilled with well-compacted granular material to road level with clay plugs as required.

The culvert north of the local road under SH771 should be removed completely to satisfy the Landowner complaints.

The ditches north and south of the replaced culverts should be excavated to provide an even grade. Topsoil should be salvaged and restored on completion of the re-grading. An appropriate topsoil mix would be Foul Blue Grass (40%), Creeping Red Fescue (30%), Red Top (10%), and Aliske Clover (20%).

The work was submitted to maintenance contractor for quotation.

Fall 2003

Phase 1 work completed comprising ditch re-grading and culvert installation. Phase 2 work comprising removal of pavement and subgrade inspection/replacement deferred to 2004.

Reports and Documents

June 2001 (KCCL) Inspection Report

May 2002 (KCCL) Inspection Report

May 2003 (KCCL) Inspection Form

May 2004 (KCCL) Inspection Form

Topographic Survey and Recommendations, August 23, 2002