

GEOHAZARD RISK ASSESSMENT
CENTRAL REGION

SITE C58: H570:02 SINKHOLES

LEGAL LOCATION: **NE 8-27-17-W4**

REFERENCE LOCATION
ALONG HIGHWAY: **Km 12**

UTM COORDINATES: **N 5683522 E 405454 (NAD83)**

AT FILE: **H570:02**

AT PLAN & PROFILE:

Date of Initial Observation: April 2010

Date of Previous Inspection: May 17, 2011

Inspected By: Klohn Crippen Berger Ltd.

Date of Current Inspection: **June 15, 2012**

Inspected By: Klohn Crippen Berger Ltd.

Instruments Installed: none

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

Last Updated by: Klohn-Crippen Berger Ltd.

Date: June 15, 2012

Location and General Description of Instability

Site A is located on Highway 570:01 about 30 km east of Drumheller and about 2 km west of Dorothy. The highway is located on the north bank of the Red Deer River. Sinkholes on either side of the highway at this location have been observed in the past and were reactivated in April 2010.

Geotechnical Conditions

The native soil is highly erodible and highly susceptible to sink hole formation.

Chronology (Refer to Section G for Further Information)

2010

In April 2010, sinkholes were reactivated. The site was remediated using injected expanding foam supplied by Uretex Inc. (now Polymor) on May 3, 2010. Three holes (15 mm diameter) were drilled to a depth of about 3 m along the white line (about 1.5 m from the guardrail) in the area of maximum pavement settlement. Foam was injected into the three holes one at a time until foam was observed expanding into the exposed sinkhole in the road embankment. To intercept the seepage on the north side of the highway, a perforated drain pipe was installed in the ditch extending to the valley to the east (about 60 m).

Site B comprised a second sinkhole located about 800 m to the west of Site A. This sinkhole was located below the road and was filled with expanding foam using a lance to place foam as far back into the hole as possible.

May 2011

During the May 2011 site visit, the following observations were noted for the two sites:

Site A (N 51°17.686', W 112°21.338')

- On the north side of the highway, the area has begun to subside exposing the drain. No pavement distress was observed in this area.
- The south side of the highway was patched in the location of the grouted sinkhole. No further settlement or fill subsidence was observed in this area.

Site B (N 51°17.877', W 112°21.802')

- Highway surface has dropped significantly adjacent to a HDPE culvert in the location of the sinkhole grouted in May 2010.
- Ditch flows appear to be flowing into a sinkhole and under the road upstream of the culvert.

- On the south side of the highway, two seepage exits are apparent: one from the outlet of the culvert and one aligning with the pavement settlement.

It was recommended to conduct a Ground Penetrating Radar survey to detect voids; however, the results were inconclusive.

June 2012

Settlement and cracking developed in the pavement. Internal erosion and sinkholes exist in the ditch and under the road way. It was recommended that seepage cut off be installed if road condition deteriorates.