

GEOHAZARD RISK ASSESSMENT
CENTRAL REGION

SITE C54: H56:16 SETTLEMENT

LEGAL LOCATION: **NE 8-44-19-W4**

REFERENCE LOCATION
ALONG HIGHWAY: **km 23**

UTM COORDINATES: **N 5849337 E 384357** (NAD83)

AT FILE: **H56:16**

AT PLAN & PROFILE: Jct. Highway 609

Date of Initial Observation: June 2008

Date of Previous Inspection: May 20, 2011

Inspected By: Klohn Crippen Berger Ltd.

Date of Current Inspection: **June 19, 2012**

Inspected By: Klohn Crippen Berger Ltd.

Instruments Installed: none

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

Last Updated by: Klohn-Crippen Consultants Ltd.
Date: **June 19, 2012**

Location and General Description of Instability

Highway 56:16 is an undivided two-lane road with a width of about 11 m on a north south alignment. A distressed area of pavement is located about 400 m south of the intersection with Highway 609 along the west shoulder of the road over a length of about 30 m. The shoulder and west lane of the road has experienced continued settlement requiring cumulative asphalt patching to a current thickness of about 0.5 m. A field investigation was conducted in September 2008. Three test holes, designated as AH08-05 to AH08-07, were advanced on the west side of the highway.

Geotechnical Conditions

Pavement Structure

A 530 mm to 610 mm thick layer of pavement structure was encountered. The pavement structure consisted of a 350 mm to 450 mm thick layer of asphalt overlying a 160 mm to 180 mm thick layer of granular base course.

Clay Fill

A 2.5 m to 2.9 m thick layer of clay fill was encountered beneath the pavement structure. The material was silty, sandy, and contained trace gravel and organics. The clay fill was soft to stiff, medium plasticity, moist to wet and dark brown. SPT values within the clay fill ranged between 3 and 5 blows per 300 mm. Atterberg limits testing indicated that the liquid limit of the clay fill was about 41% with a plastic limit of 15%. Moisture content of the clay fill ranged between 16% and 25%, and was typically about 20%.

Clay

Soft clay was encountered beneath the fill material and extended below the termination depths of test holes. The clay was generally silty with trace gravel, soft to firm, medium plasticity, wet and brownish yellow in colour. SPT values within the clay till ranged between 3 and 10 blows per 300 mm. Atterberg limits testing indicated that the liquid limit of the clay was about 37% with a plastic limit of 16%. Moisture content of the clay till ranged between 19% and 36%.

Chronology (Refer to Section G for Further Information)

September 2008

A field investigation was conducted in September 2008 which included three test holes, that were advanced on the west side of the highway.

June 2009

It was noted that the subgrade soil in the areas of maximum settlement on Highway 56 consists of soft to firm, medium plasticity clay. It was considered that the settlement of this soft layer was causing the observed settlement at the highway level. Due to the on-going expense of frequent patching at this location, it was recommended that sub-grade improvement be undertaken.

August 2011

The pavement settlement site was repaired with the injection of expanding foam resin between August 8 to 12, 2011 by Total Water & Sewer Ltd. under the supervision of Klohn Crippen Berger (KCB). The Highway was subsequently repaved.

June 2012

No settlement or pavement distress has been observed since the foam injection and repaving work in August 2011.