

**GEOHAZARD ASSESSMENT PROGRAM
NORTH CENTRAL REGION – ATHABASCA
2016 INSPECTION**



Site Number	Location	Name	Hwy	km
NC014-1	Northeast boundary of the Town of Fort Assiniboine	Fort Assiniboine	661:02	1.8
Legal Description		UTM Co-ordinates (NAD 83)		
NW-1-62-6-W5M		11 N 6023391	E 644779	

	Date	PF	CF	Total
Previous Inspection:	May 11, 2015	8	4	32
Current Inspection:	May 18, 2016	8	4	32
Road AADT:	1000	Year:		2015
Inspected By:	Tarek Abdelaziz, José Pineda (Thurber) Roger Skirrow, Arthur Kavulok, (TRANS)			
Report Attachments:	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Plans <input type="checkbox"/> Maintenance Items			

Primary Site Issue:	Slope creep movements causing pavement distress to a sidehill alignment due to seasonal high ground water levels	
Dimensions:	About 250 m long	
Date of any remediation:	None recently	
Maintenance:	Silt in Manholes 1 and 2 was hydrovaced from the interior of the CSP pipes. Highway cracks were spray patched in the fall 2014. No additional maintenance was carried out in 2015.	
Observations:	Description	Worse?
<input checked="" type="checkbox"/> Pavement Distress	35 to 40 mm depression in the SBL of the Mid-Hill section.	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Slope Movement	Mid-Hill slope section: 20 to 70 mm wide cracks with up to 40 mm differential height across cracks;	<input checked="" type="checkbox"/>
<input type="checkbox"/> Erosion		<input type="checkbox"/>
<input checked="" type="checkbox"/> Seepage	<ul style="list-style-type: none"> ▪ MH#1: Water levels dropped by 0.2 m since last year ▪ MH#2: Heavily oxidized interior walls. Minor flow from one of the sub-horizontal drains 	<input type="checkbox"/>
<input type="checkbox"/> Bridge/Culvert Distress		<input type="checkbox"/>
<input type="checkbox"/> Other		<input type="checkbox"/>
Instrumentation: (2SIs and 11 SPs)		
No discernable movement in SI06-6 and 06-11; groundwater levels fluctuated in the majority of the standpipes by +/-0.2 m; SP06-19 continued to be dry.		

Assessment (Refer to attached Drawings):

The site observations and historical instrument readings indicates that the site continued to experience slow creep movements due to seasonal fluctuations in ground water levels.

The highway condition continued to deteriorate with time as evidenced from the progressive opening and widening of cracks within the highway surface. This is in addition to the pronounced pavement distress within the Mid-Hill slope section that has been getting worse.

The presence of clear water in MH#1 indicates the effectiveness of the maintenance work completed in 2014. The spring of 2016 has been dry and therefore the water level dropped in MH#1 by about .2 m. It is likely that the rock filled channel running downslope of MH#1 has been partially filled with silt, impeding free flow of water out of the manhole.

Minor flow was noted from one of the sub-horizontal drains inside MH#2. The remaining sub-horizontal drains connected to MH#2 may have become completely plugged. MH#2 has no outflow pipe and the collected flow from the flowing sub-horizontal sub-drain is likely percolating into the ground.

Recommendations:

In the short term, it is recommended to seal all open cracks in the pavement to prevent surface water infiltration into the landslide cracks. A bump sign should be placed to the north of the Mid-Hill section dip area to warn motorists of the existing hazard. Consideration should be given in the future for patching the Mid-Hill slope section to provide a smooth ride to travellers on the highway.

The existing manholes should be inspected regularly by the local MCI and silt should be removed from the inside of the manholes, as needed to promote surface and sub-surface drainage.

In the future, it may be required to replace the rock filled trench connected to MH#1 to promote faster drainage into the downslope manholes. In addition, consideration should be given for excavating and replacing MH#2 with a bigger diameter manhole for future access. The existing sub-horizontal drains in MH#2 should also be flushed to promote sub-surface drainage. The new manhole should consist of 1.2 m diameter CSP pipe, complete with a ladder, perforation, an outflow pipe, and surrounded by washed rock enveloped in a non-woven geotextile fabric. The outflow pipe should be connected to the existing storm water drainage system. Upgrading MH#2 will require approvals from the Town of Fort Assiniboine since the manhole is located outside AT right-of-way.