

GEOHAZARD ASSESSMENT PROGRAM
NORTH CENTRAL REGION – ATHABASCA
2012 INSPECTION



Site Number	Location	Name	Hwy	km
NC 6	11 km E. of Slave Lake	Mitsue Lake	2:46	47.5
Legal Description		UTM Co-ordinates (NAD 83)		
NW-7-72-4-W5M		11 N 6177576	E 664053	

	Date	PF	CF	Total
Previous Inspection:	May 28, 2010	8	2	16
Current Inspection:	June 11, 2012	8	2	16
Road AADT:	3540	Year:	2011	
Inspected By:	Tarek Abdelaziz, Don Proudfoot (Thurber) Roger Skirrow, Arthur Kavulok, Gordon Wolters (TRANS)			
Report Attachments:	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Plans <input type="checkbox"/> Maintenance Items			

Primary Site Issue:	Side slope landslide movements related to high seasonal groundwater levels.	
Dimensions:	About 100 m long	
Date of any remediation:	Slope flattening/berming in Fall 2007 and drainage improvements consisting of installation of sub-drains, construction of riprap lined swale, flushing and tying existing sub-horizontal drains to a drainage collection manhole at the bottom of the slope. The highway was overlaid in Fall 2008.	
Maintenance:	Remediation of erosion gullies noted within the swale and placement of additional rip rap to prevent future erosion in Fall 2008	
Observations:	Description	Worse?
<input checked="" type="checkbox"/> Pavement Distress	5 mm wide reflective cracks in the highway surface; 15-25 mm wide diagonal crack at the northeastern limit of the site	<input type="checkbox"/>
<input checked="" type="checkbox"/> Slope Movement	Creep movement in the top part of the side slope	<input type="checkbox"/>
<input type="checkbox"/> Erosion		<input type="checkbox"/>
<input checked="" type="checkbox"/> Seepage	Four of the sub-horizontal drains were flowing into the manhole. Water was flowing steadily from the manhole outflow pipe.	<input type="checkbox"/>
<input type="checkbox"/> Bridge/Culvert Distress		<input type="checkbox"/>
<input checked="" type="checkbox"/> Other	To the east of the manhole outflow pipe, the heavy rock riprap in the swale shifted and exposed the underlying non woven geo-textile fabric	<input type="checkbox"/>
Instrumentation: (2SIs, 3 SPs)		
Rate of movement of 3.5 mm/yr in SI1 and 7.3 mm/yr in SI3. Water levels decreased or remained unchanged in all of the standpipe piezometers.		

Assessment (Refer to attached Figure):

The site conditions have not changed since the 2010 site visit. A few reflective cracks were visible on the highway paved surface. The existing 15-25 mm wide diagonal cracks don't appear to be landslide-related cracks.

Since the implementation of the remedial measure, the operational slope inclinometers continued to show creep movement and the water level readings from the standpipes decreased or remained unchanged. A steady flow from four of the sub-horizontal drains was also noted.

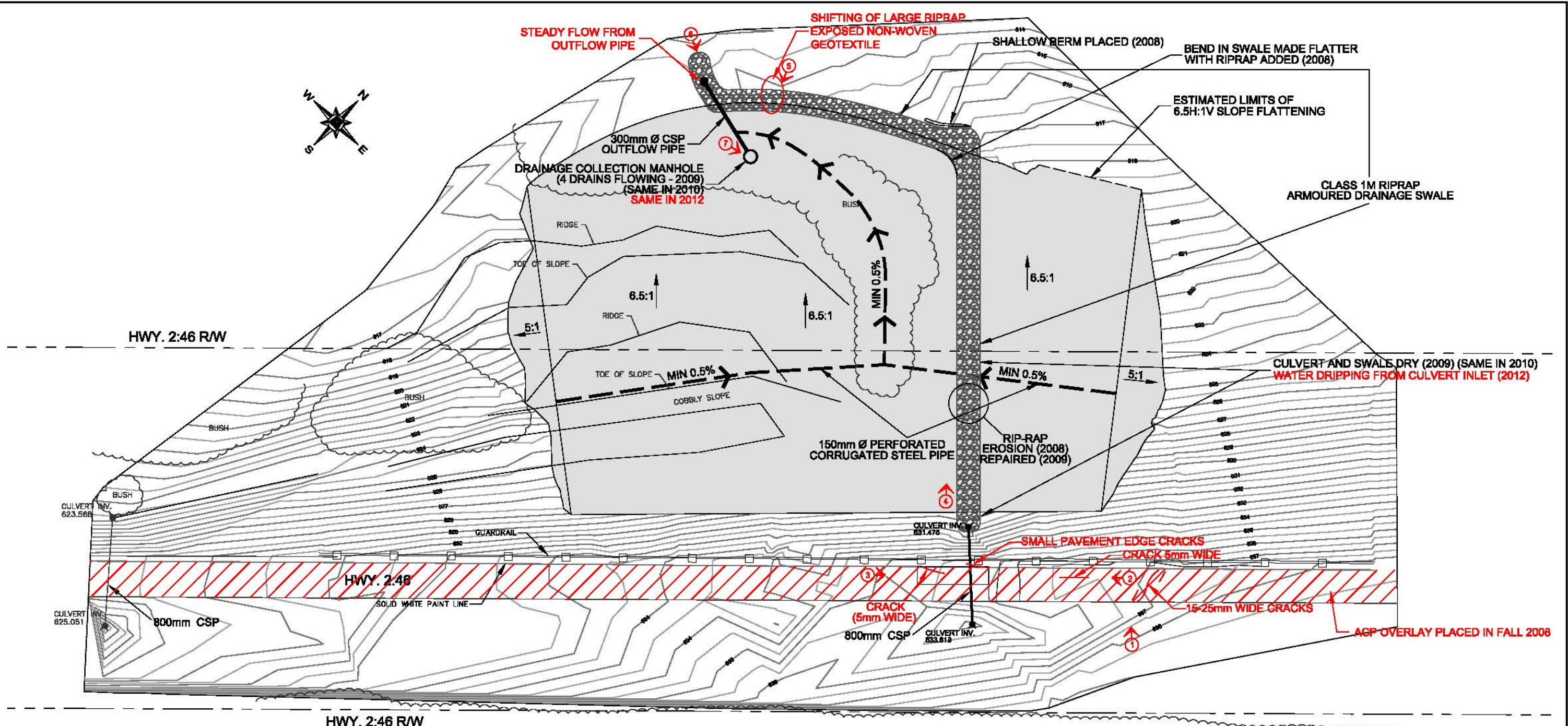
The 2007 remedial measures appear to have mitigated the global slope movement. However, some shallow creep movements appear to be occurring in the top part of the side slope which could require periodic sealing of pavement edge cracks.

Recommendations:

The site conditions have been consistent since the implementation of the repair measures and therefore, it is recommended to defer future inspections for a few years. However, the instruments should be read on an annual basis to assess the ongoing effectiveness of the remedial measure.

At the location where the riprap has been shifted, it is recommended to place additional riprap on the top of the exposed geotextile fabric to reduce the likelihood of future erosion.

The MCI should seal any open cracks and continue to watch for any signs of movement and particularly after heavy precipitation events. We also recommend that the local MCI undertake a periodic inspection of the drains inside the manhole. If the flowing drains become plugged and dry in the future, it will be necessary to flush these drains to reduce the probability of raising ground water levels within the repaired slope area. The standpipe water levels will provide another indication of the ongoing effectiveness of the drains.



LEGEND

- SUBDRAIN ALIGNMENT
- RIPRAP ARMoured CHANNEL
- EXISTING PIPES (HORIZONTAL DRAINS)
- PHOTOGRAPH NUMBER, AND APPROXIMATE LOCATION AND DIRECTION (JUNE 11, 2012)

JUNE 11, 2012 OBSERVATIONS ARE SHOWN IN RED

NOTE

MANHOLE APPROXIMATE GPS COORDINATE (UTM NAD83) 11U N6122311, E651653



**NORTH CENTRAL REGION (ATHABASCA AREA)
- 2012 GEOHAZARD ASSESSMENT**

**NC6: HWY 2:46 MITSUE LAKE (km 47.5)
SITE PLAN**

FIGURE NC6-1A

DRAWN BY	ML
DESIGNED BY	TSA
APPROVED BY	DWP
SCALE	AS SHOWN
DATE	NOVEMBER 2012
FILE No.	15-16-275





Photo#1 Looking northwest at a diagonal crack near the northeast limit of the site



Photo#2 Looking northwest at a longitudinal reflective crack



Photo#3 Looking northeast at a diagonal reflective crack



Photo#4 Looking towards the riprap-lined swale from the crest of the slope (looking west)



Photo#5 Exposed non-woven geotextile fabric below heavy rock riprap (looking south)



Photo#6 Looking at the outflow pipe from the bottom of the slope



Photo#7 Looking inside the drainage collection manhole