GEOHAZARD ASSESSMENT PROGRAM

PEACE REGION – PEACE RIVER/HIGH LEVEL



2013 INSPECTION

Site Number	Locatior	١	Name		Hwy	km	
PH29 Grimms Cr		Creek	Site #4			13.54	
Legal Description		UTM Co-ordinates (NAD83)					
NW36-81-5-W6 11 N 6214740 E 397620)	
		Date	Date PF CF		Total		
Previous Inspection:		June 20, 2012	June 20, 2012 9 5		45	45	
Current Inspection:		June 5, 2013	June 5, 2013 10 5 5		50	1	
Road AADT:		220	220 Year: 20			1	
Inspected By:		Barry Meays, Don Proudfoot (Thurber) Ed Szmata, Ken Szmata, Roger Skirrow (AT)					
Report Attachments:		Photograph	Photographs 🔽 Plans			Maintenance Items	
Primary Site Iss	sue:	On-going m old (former)	On-going movement of the downstream embankment overtop of the old (former) culvert location. Subsidence of the road requires patching.				
Dimensions:		Former slide	Former silde was about 60 m long by 100 m wide.				
Date of any remediation:		was abando	was abandoned with partial grouting.				
Maintenance:		Semi-contin	Semi-continuous milling, patching and crack sealing.				
Observations:			Description				
Pavement Distress		New cracks were observ scarp crack	New cracks, more subsidence, and more defined dips were observed through the previous patching. A large scarp crack could be developing along the highway.				
Slope Movement		The downs continues to significantly	The downstream embankment over the old culvert continues to move (the rate has appeared to increase significantly this past year).				
✓ Erosion		A new se previously ri north embar end of culve significantly The previo embankmen unchanged. downstream	A new severe erosion gully occurred along the previously riprapped east ditch drainage channel on the north embankment. The erosion gully on the upstream end of culvert inlet and east into the bush has enlarged significantly in width & length again this year. The previous gully on the downstream south embankment from east ditch drainage appears unchanged. Also some slight surface erosion on downstream embankment.				
Seepage							
✓ Bridge/Culvert Distress		SS Culvert outle	Culvert outlet about 60% full of sediment.			V	
C Other							

Instrumentation:

Last Read on Sept. 30, 2013

SI1: Sheared off at 14m depth in 2009 (Prev. move zones at 11.5 to 16m); SI2: 3mm/yr over 5m to 10.7m); SI3: No discernible movement; and SI4: 3mm/yr over 0 to 8m (but was 13mm/yr in Spring, 2013). Water levels in PN-1 at 4.2m BGS; PN-1A at 1.0m BGS; PN-2 at 9.4m BGS; PN-2A at 4.9m BGS; PN-3 at 0.9m BGS; and PN-4 at 5.0m BGS.

Assessment:

Movements continue on the downstream embankment nearer the old culvert, and the rate of movement has appeared to have again increased this last year, with additional crack propagation, extensions and active widespread slumping observed. Of the three remaining inclinometers, SI2 near the west end of the site nearer the highway is showing steady movement of ~3mm/yr, SI3 near the lower part of the slope is 0, and SI4 between the new and old culverts near the highway is showing fluctuating movements between 3mm/yr and 13mm/yr in the upper 8 m. New cracks and additional settlements were evident in the pavement surface this year. Three dips also exist on or near the pavement at this site. One dip is over top of the new culvert and is anticipated to be due to settlement of the fill since it's installation in 2009, however if this is true, the movements in SI4 should eventually subside. Two other dips exist about 70 m apart on the highway, and could be coincident with each end of a large scarp that is developing directly above the subsidence and active sliding observed further downslope on the south embankment.

New severe **erosion** was observed this year on the north embankment along the channel that carries highway ditch runoff from the east down to the culvert inlet, where it totally scoured out the existing riprap and non-woven geotextile and created a 2 m deep x 2.3 m wide erosion gully over the entire 60 m long channel. It is anticipated this occurred during the heavy spring runoff, where it overflowed the ditch block near the top of the slope, due to silt infill of the storage area further east at Site PH67. The erosion was also observed to have gotten worse on the upstream (east) gully (extending way into the bush to the east where a natural settling basin and fallen trees were observed), which was also caused from the heavy east ditch runoff further upslope and from Site PH67.

Recommendations:

Maintenance:

Continue to monitor, and seal/patch the pavement crack and dips as required.

Remove the silt fence from the 2009 repairs.

Clean the silt out of the new culvert outlet bowl to retain culvert capacity and to dissipate energy, and also out of the upslope settling basin area to increase runoff retention capacity.

Repair the ditch block at the top of the east highway ditch on the north side.

Short Term:

Repair the erosion on the upstream side by:

- 1) Remove all loose fill by excavation down to the base of the erosion gullies, rolling the clay back along the sideslopes (cutting into the backslope should be discouraged).
- Re-build the bottom of the ditch by compacting the excavated clay back into the erosion channel in thin lifts using a sheepsfoot compactor, supplementing with imported clay from a borrow source where required.
- 3) Grade the surface, forming a neatly contoured, flat-bottomed (min. 2 m wide) ditch before covering the surface with heavy "Type C" non-woven geotextile.
- 4) Line the bottom and sides of the ditch with either
 - a. Class 2 riprap over non-woven geotextile, or
 - b. 0.3 m thick gabion mattress over non-woven geotextile. Gabion basket ditch check weirs should also be incorporated into the liner stepped at maximum 10 m intervals along the channels. The gully leading into the bush should be repaired in this manner for a distance of at least 15 m in front of the riprap inlet bowl, while the upper east runoff ditch channel should be repaired over its entire 60 m length. The cost for this work is estimated to be in the range of \$100,000 to \$150,000.

Long Term:

In order to curtail the rapidly increasing movements on the downstream embankment, it is proposed to flatten the slope further downslope into the old channel and construct a toe berm across it. Common fill for this repair could be obtained from the ridge on the west side of the old channel. A rough cost for this work could be in the order of \$250,000.