GEOHAZARD ASSESSMENT PROGRAM

PEACE RIVER / HIGH LEVEL AREA

2014 INSPECTION

Site Number	Location	Name	Hwy	km
PH47	West of Deadwood, AB	Deadwood Slide	690:02	2.4
Legal Description		**UTM Co-ordinates**		
SW28-89-23-W5M		11V N 6288759	E 462972	

	Date	PF	CF	Total
Previous Inspection:	May 30, 2013	13	3	39
Current Inspection:	June 12, 2014	13	3	39
Road AADT:	80		**Year:**	2012
Inspected By:	Don Proudfoot and Ken Froese, Thurber Engineering Rocky Wang and Ed Szmata, Alberta Transportation			
Report Attachments:	☑ Photographs ☑ Plans ☐ Maintenance Items			

Primary Site Issue:	Slope movement affecting highway		
Dimensions:	50m length along highway; 80m overall		
Date of any remediation:	None		
Maintenance:	ACP patch (Summer 2013); ACP patch (Fall 2011); 400mm overlay (2008)	**Worsened?**	
Observations	**Description**	**Yes**	**No**
☑ Pavement Distress	Crack widening and vertical drop in asphalt pavement.	☑	☐
☑ Slope Movement	Slow creep movement causing cracks in pavement.	☑	☐
☐ Erosion		☐	☐
☐ Seepage		☐	☐
☑ Bridge/Culvert Distress	Coupling near centreline culvert has separated creating a sinkhole.	☑	☐
☐ Other		☐	☐

Instrumentation:
3 Standpipe Piezometers (SP) - 1 active as SP10-1 was blocked since Fall 2013 reading;
2 Vibrating Wire Piezometers (VW) – both active;
2 Slope Inclinometers (SI) – sheared in 2012 at 10.7m and 6.4m (SI10-1 and -2, respectively).

Assessment (Refer to Figure PH47-1)**:**

- The slope failure appears to be the result of toe erosion caused by the creek located immediately south of the highway leading to over-steeping of the slope. It is expected that, if left untreated, slow creep movements will continue.
- The road pavement was overlaid in 2008 and patched in the fall of 2011 and summer of 2013.
- Pavement cracks have reflected through the 2013 patch with widths of up to about 50 mm and vertical drops of about 10 mm.
- The slumping at the culvert outlet (due to separation) has worsened significantly and is now about 5 m wide and 1.4 m from the highway shoulder.
- The water levels measured in Spring 2014 were up slightly since Fall 2013 which is in agreement with the previous seasonal variation (higher in spring then fall). There does appear to be a slight overall upward trend in VW10-1 and -2 with both instruments having recorded maximum water levels this spring.

Recommendations:

The bridge-sized culvert repair will be done in conjunction with a highway overlay project scheduled for 2015 under the direction of ARA Engineering. Stabilization of the landslide will be done at the same time. Three options have been identified as possible long-term solutions:

The first option would involve construction of a toe berm and regrading of the slope to a flatter angle in order to re-establish slope stability. This will require the installation of a 1500 mm diameter CSP culvert along the toe of the slide to allow for a toe berm to be constructed. The culvert will also prevent further creek erosion of the toe of the slope. A DFO authorization would be required to carry out this option. This option will be implemented.

A second option would be to use a pile wall to stabilize the highway sideslope. Drilled, reinforced concrete piles would likely be needed to stabilize the slide. As the slide appears to be greater than 5 m to 6 m deep, tie-back anchors might also be needed.

A third option would include either partial or full excavation of the slide mass, construction of a deep shear key, and reconstruction of the highway sideslope. This option would also involve the lining of the creek bed with riprap in order to prevent further toe erosion.