ALBERTA TRANSPORTATION
GEOHAZARD ASSESSMENT PROGRAM
PEACE REGION–GRANDE PRAIRIE
2017 INSPECTION REPORT

THURBER ENGINEERING LTD.

Site Number	Location	Name	Hwy	km
GP14	Hwy 733:04	Bad Heart River South	733:04	8.938
Legal Description		**UTM Co-ordinates (NAD 83)**		
LSD-9-28-75-3 W6M		11U E 412076	N 6154417	

	Date	PF	CF	Total
Previous Inspection:	9-Jun-2016	9	4	36
Current Inspection:	13-Jun-2017	9	4	36
Road AADT:	610		Year:	2016
Inspected by:	Ed Szmata, TRANS Ted Prue, TRANS Rocky Wang, TRANS		Shawn Russell, Thurber Renato Clementino, Thurber Nicole Wilder, Thurber	
Report Attachments:	☑ Photographs ☑ Plans		☐ Maintenance Items	

Primary Site Issue:	The roadway is located within an active landslide area on the Bad Heart River Valley south slope. The ongoing slope movements caused distress and cracking of pavement structure, requiring regular maintenance at a frequency of one to two years. The movement rate of the landslide appears to be slow based on site inspections during last several years.	
Dimensions:	The slide impact area is about 320 m long along the roadway alignment where cracks were observed on the pavement at the time of site inspection. Previous slope inclinometer (SI98-6 and SI-11) readings indicated that the slip surface was located at depths varying from 12 m to 17 m below the ground surface (approximate elevations from 618 m to 628 m). The extent and actual depths of the sliding zone perpendicular to the roadway alignment could not be defined from the existing information and require additional geotechnical instrumentation and monitoring to confirm.	
Maintenance:	Crack sealing, pavement patching and milling was carried out in 2016	
Observations:	**Description**	**Worsened?**
☑ Pavement Distress	Crack opening up to 20 mm was observed during the site inspection as well as increased rutting and settlement in certain areas.	☑
☐ Slope Movement	No obvious slope movement was observed	☐
☐ Erosion		☐
☑ Seepage	Ponded water was observed near the 600mm CSP culvert outlet. The vegetation near the culvert inlet indicated that during wetter months water ponds which may be due to the partial blockage.	☐

☑ Bridge/Culvert Distress	A centerline culvert was observed near the southern limits of the pavement cracks. The culvert appeared to be functioning well at the time of inspection; however, the culvert inlet is partially blocked and may back up during large precipitation events.	☑
☐ Other		☐

Instrumentation:

One slope inclinometer (SI98-7) and three pneumatic piezometers (PN-11A, PN-11B, and PN-11C) have been monitored to date.

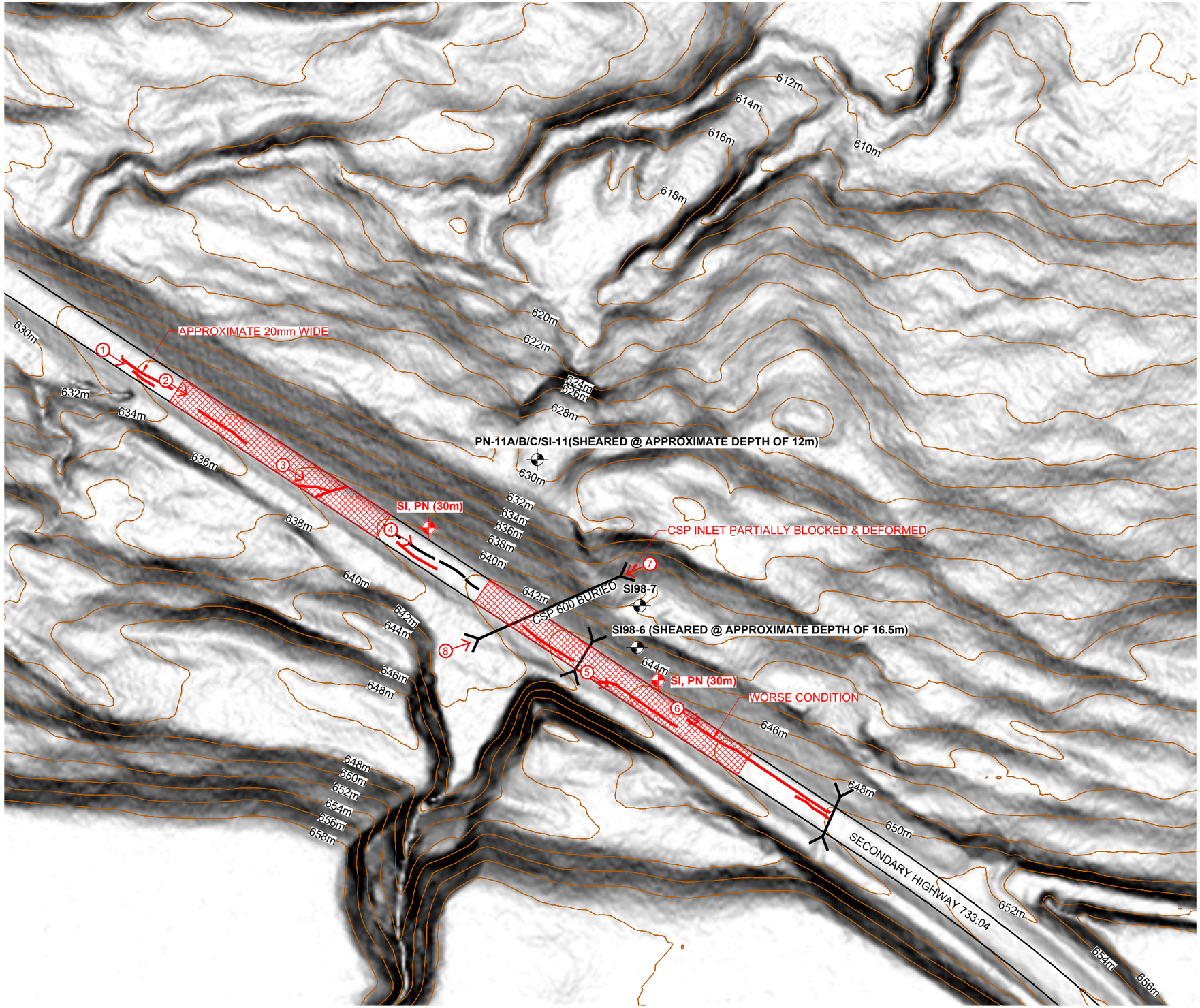
SI98-7	This SI was accessible and located at toe of the embankment slope. The recent readings of this SI did not show any discernible movements.
PN-11A PN-11B PN-11C	The readings from PN-11A and PN-11C pneumatic piezometers indicated an increase in the groundwater level of 0.03 m to 0.05 m respectively since the spring of 2016 instrument readings. PN-11B indicated a decrease in groundwater level of 0.25 m since the last readings in spring 2016.

Assessment:

No discernable slope movements were observed at this site during this inspection. Ongoing embankment creep was observed and appeared to account for the observed distress and cracking of the roadway pavement structure. Further details of the background information about this site can be obtained from the previous reports in the site Geohazard Binder and are not repeated herein.

In order to keep the roadway surface in a suitable driving condition, TRANS has been sealing cracks and patching the pavement at a frequency of one to two years.

Recommendations:	**Ballpark Cost**
In the short term, it is recommended that the cracks in the pavement be sealed or overlain with an asphalt patch as required. All observed drops along the landslide backscarp should also be milled and the area should be regularly monitored for signs of active slope movements.	Maintenance ($60,000 every 2 years)
A geotechnical investigation is required to assess the mechanisms of the persistent embankment failure observed at this site and to design long term mitigation measures. The locations of the proposed new instruments are presented herein on the 2017 Geohazard Inspection Figure Drawing 13353-GP14-1.	$30,000



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LEGEND

- PROPOSED INSTRUMENT LOCATION
- APPROXIMATE LOCATION OF EXISTING INSTRUMENT
- SI SLOPE INCLINOMETER
- PN PNEUMATIC PIEZOMETER
- GROUND SURFACE CONTOUR (2m INTERVAL)
- CRACK (APPROXIMATE)
- PATCHED AREA
- ① DIRECTION AND NUMBER OF PHOTO

NOTES:

1. PREVIOUS OBSERVATIONS SHOWN IN BLACK.
2. GROUND SURFACE CONTOUR GENERATED FROM LIDAR DATA.
3. JUNE 13, 2017 OBSERVATIONS SHOWN IN RED

0 20 40 60 80 m
SCALE 1:1500

BASE PLAN PROVIDED BY ALBERTA TRANSPORTATION

Alberta Transportation

PEACE REGION (GRANDE PRAIRIE) 2017
GP014-1: HWY 733:04 BAD HEART RIVER SOUTH

2017 INSPECTION FIGURES

DWG No. 13353-GP014-1-1

DRAWN BY	ML
DESIGNED BY	NPW
APPROVED BY	RVC
SCALE	1:1500
DATE	JUNE 2017
FILE No.	13353

THURBER ENGINEERING LTD.

	**Photo 1.** Looking southeast along Hwy 733.
	**Photo 2.** Cracks reflecting through patch in pavement.

	**Photo 3.** Crack near middle of northmost asphalt patch.
	**Photo 4.** Cracks on asphalt in between the two patches.

	**Photo 5.** Crack near middle of southmost patch which may be a scarp crack from arch shape.
	**Photo 6.** Cracks on southern asphalt patch in northbound lane.

	**Photo 7.** 600 mm CSP culvert outlet with water ponding around outlet.
	**Photo 8.** Culvert inlet patially damaged and blocked.