ALBERTA TRANSPORTATION
GEOHAZARD ASSESSMENT PROGRAM
PEACE REGION – PEACE-HIGH LEVEL
2020 INSPECTION

THURBER ENGINEERING LTD.

Site Number	Location	Name	Hwy	km
PH009A-1	Shaftesbury	Bricks Hill Slide	684:02	9.240
Legal Description		**UTM Co-ordinates**		
SE¼ 21-082-23 W5M		11U E 467287	N 6219688	

	Date	PF	CF	Total
Previous Inspection:	5-July-2017	15	4	60
Current Inspection:	11-June-2020	5	2	10
Road AADT:	270		**Year:**	2019
Inspected By:	Rocky Wang, TRANS Ed Szmata, TRANS		Don Proudfoot, Thurber	
Report Attachments:	☑ Photographs ☑ Plans		☑ Maintenance Items	

Primary Site Issue:	On July 9, 2016, the EB paved shoulder of Hwy 684:02 had been affected by a slide which extended downslope. This site lies adjacent to the west side of the previously monitored Bricks Hill wash-out feature which was repaired in 2004.	
Dimensions:	A landslide with approximate dimensions of 85 m in length by 40 m in width extended up into the edge of the SBL, affecting approximately 15 m of shoulder pavement.	
Maintenance/Remediation:	A 36-m long patch the full width of the EB driving lane and shoulder was placed in September 2015. In the fall of 2016, pending a decision on a repair, Alberta Transportation built an ACP paved single lane detour along the north side of the NBL and closed the SBL. In addition, the NBL ditch was regraded and armored with rip rap. Concrete jersey barriers were placed along the edge of the backscarp. A pile wall was constructed between 2018 and 2019 to stabilize the landslide area. It consisted of 63 CIP tangent 1200 mm diameter concrete piles. The slope above the wall was reconstructed with geogrid reinforced granular fill. The south ditch was conveyed along the back of the pile wall through a ½ CSP culvert. The road surface was re-established with pavement and the riprap in the upslope ditch was enhanced.	
Observations:	**Description**	**Worsened?**
☑ Pavement Distress	A short section of the edge of the pavement had been eroded (photo 9).	☑
☑ Slope Movement	There are two grassed over small old slumps in the backslope (photo 7).	☐
☑ Erosion	Small section of eroded pavement edge as noted above (photo 9).	☑
☑ Seepage	A few small spots of seepage from the pavement surface (photo 8)	☑
☑ Bridge/Culvert Distress		☐
☑ Other		☐

Instrumentation:

Three slope inclinometers were installed in the pile wall and the readings to date are as follows:

- SI18-P6 - pile head deflection = 4.4 mm
- SI-P23 - pile head deflection = 7.8 mm
- SI-P40 - pile head deflection = 12.7 mm

Two standpipes remain on site. In fall 2020 the groundwater level in SP17-2 was at 14.8 m below ground surface, which is 6.7 m lower than in spring 2020. SP17-6 was dry in all readings prior to fall 2020 at which time a water level of 9.7 m below ground surface was measured.

Assessment:

The recent remedial measures appear to be performing well to date. The rehabilitated highway surface and sideslope do not show any signs of movement and pile head deflections are well within predicted values.

The minor erosion along the edge of pavement is considered to be due to a fast spring runoff that was channelized against the pavement by a compacted windrow of frozen snow.

Minor seepage from the pavement edge could be due to water trapped in the GBC and should be monitored for potential development of local asphalt potholes.

The old slumps in the backslope are grassed over and relatively dormant, likely a result of weathering and loss of cohesion in the clay soils.

Recommendations:

Maintenance:

The damaged end terminal of the guardrail should be replaced.

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REQUESTED HIGHWAY R/W

GRASS COVERED BACKSLOPE SLUMPS

CRASH TERMINAL DAMAGED BY TRAFFIC

SLIGHT EROSION ALONG EDGE OF PAVEMENT

INSTALLED GUARDRAIL

SLOPE TRANSITIONS FROM 3.25:1 TO 3:1

INSTALLED NEW BARBED WIRE FENCE

RE-INSTATED RIPRAP

INSTALLED BURIED 800mm Ø CSP PIPE

FILL TIED INTO EXISTING DITCH

800 mm Ø 1/2 CULVERT

SW22 82-23-5

WALER / PILE WALL

TRENCHED IN SUBDRAIN

HIGHWAY R/W

LIMIT OF 2017-06-08 SURVEY BY WSP

INSTALLED RIPRAP

800mm Ø CSP CULVERT GROUTED AND ABANDONED DURING CONSTRUCTION

HWY 684:02

INSTALLED RIPRAP

INSTALLED NEW BARBED WIRE FENCE

GRADED AREA DOWNSLOPE OF THE PILE WALL

TH17-1 (SP)
TH17-2 (SP)
TH17-3
TH17-4
TH17-6 (SP)
TH17-9 (SP)

9+000
9+100
9+200
9+300
9+400
9+500

465 460 455 450 445 440 435 430 425 420 415 410 405

LEGEND

- APPROXIMATE TEST HOLE LOCATION
- (SP) STANDPIPE PIEZOMETER
- (SI) SLOPE INCLINOMETER
- (PN) PNEUMATIC PIEZOMETER
- RIPRAP
- SCARP CRACK
- GUARD RAIL
- x BARBED WIRE FENCE
- TREE LINE
- CULVERT
- DESIGN GRADING LIMITS
- ① PHOTOGRAPH NUMBER, AND APPROXIMATE DIRECTION AND LOCATION
- SEEPAGE FROM PAVEMENT
- SLIDE SCARP (APPROXIMATE)

NOTES:

1. JUNE 11, 2020 SITE OBSERVATION SHOWN IN RED

0 10 20 30 40 50 60m
SCALE 1:1000

Alberta

PEACE REGION (PEACE RIVER/HIGH LEVEL)
PH009A-1: HWY 684:02 BRICK'S HILL LANDSLIDE

2020 INSPECTION PLAN

DWG No. 13351-PH009A-1

DRAWN BY	ML
DESIGNED BY	DWP
APPROVED BY	DWP
SCALE	1:1000
DATE	JUNE 11, 2020
FILE No.	13351

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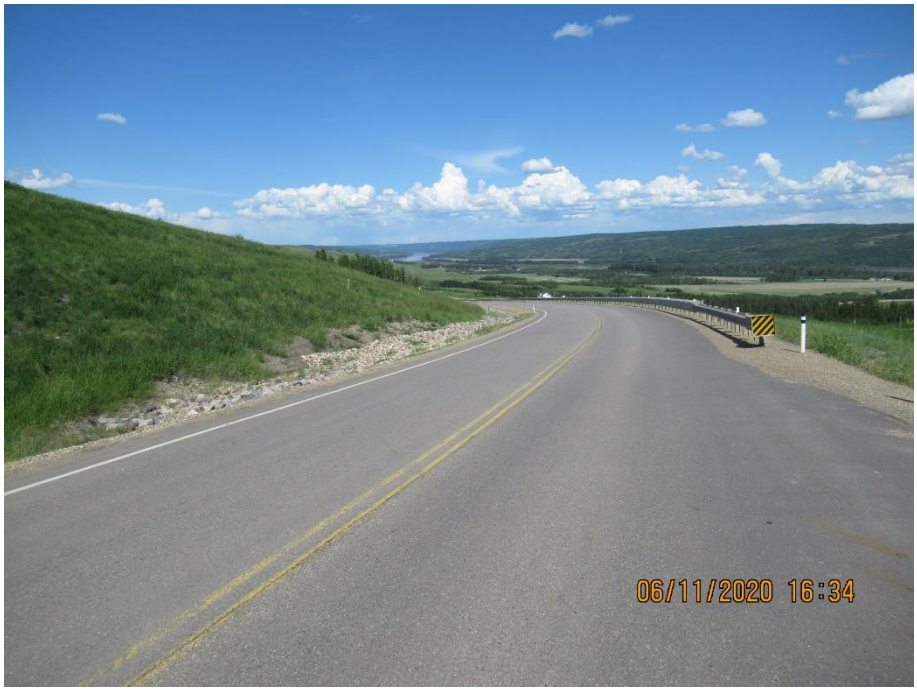
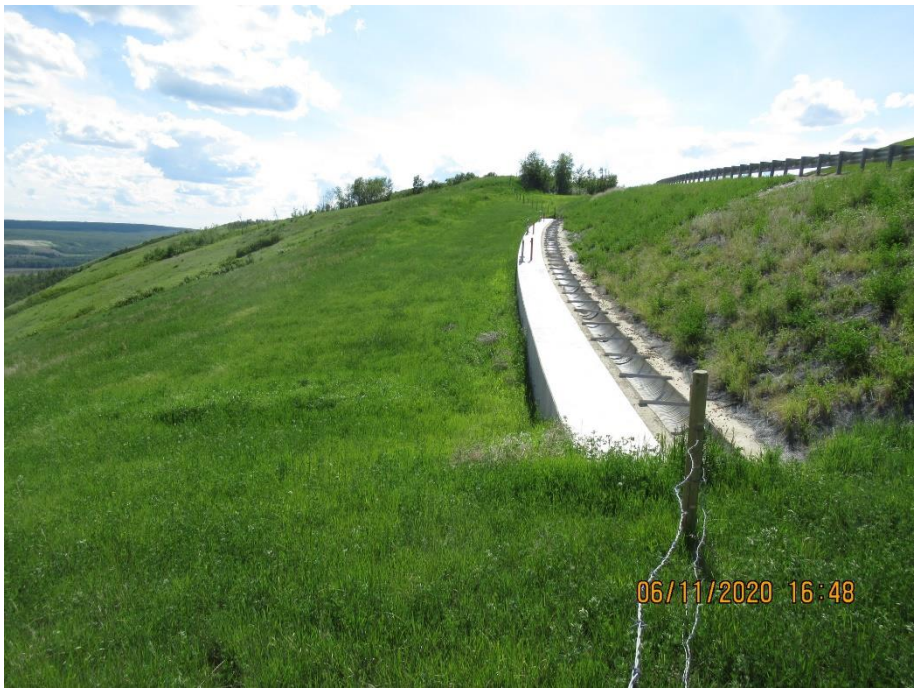
	**Photo 1.** Looking northeast at repaired highway.
	**Photo 2.** Looking northeast at reconstructed sideslope and pile wall.

	**Photo 3.** Looking northeast along the ½ culvert lined drainage south drainage ditch.
	**Photo 4.** Looking southwest along the pile wall.

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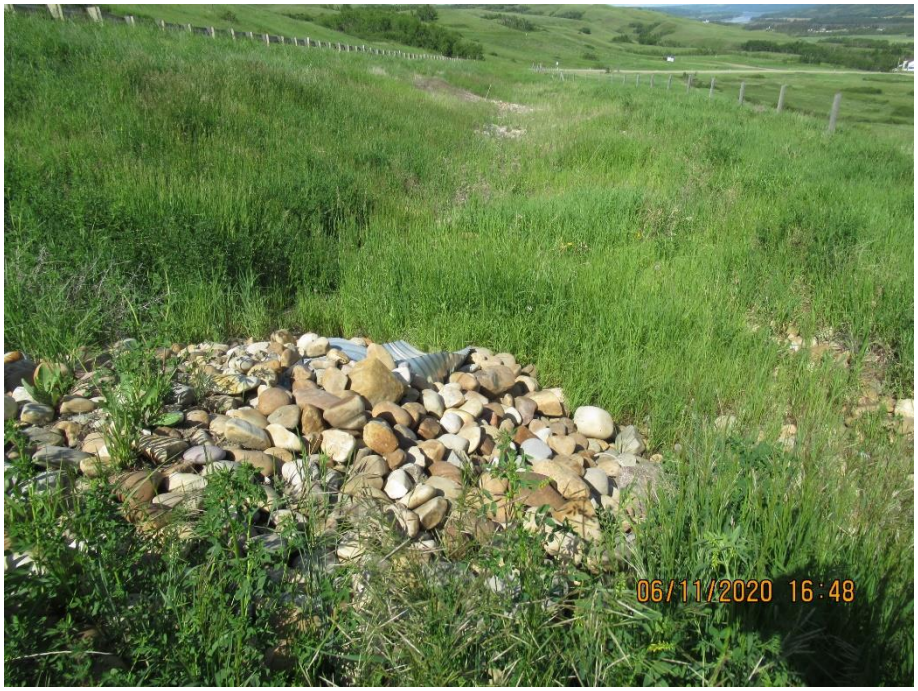
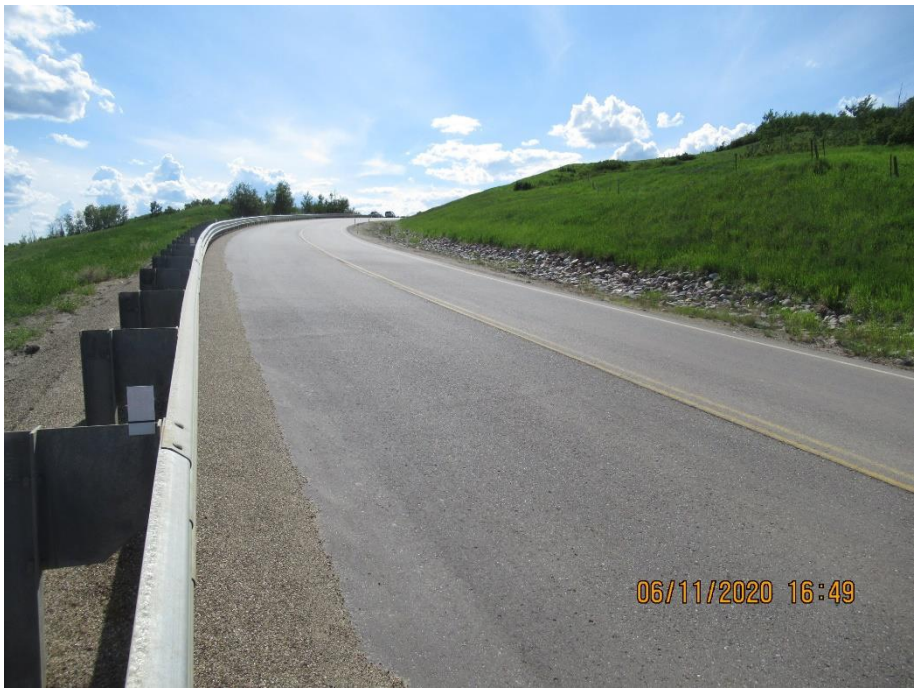
	**Photo 5.** Looking northeast along the south ditch.
	**Photo 6.** Looking southwest at the repaired highway.

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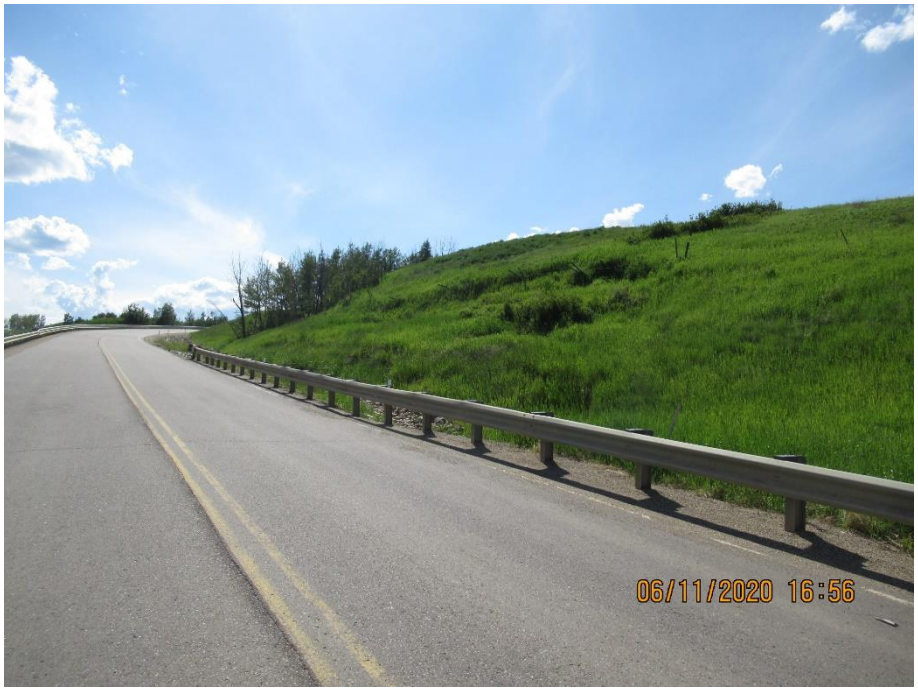
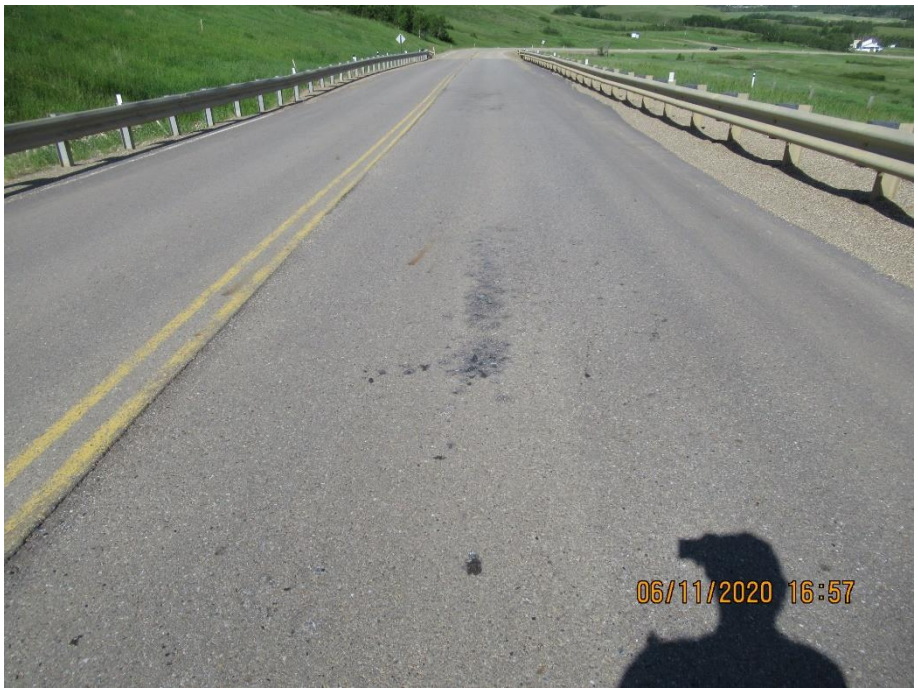
	**Photo 7.** Looking southwest at an old grass covered slump in the backslope.
	**Photo 8.** Seepage from the pavement.

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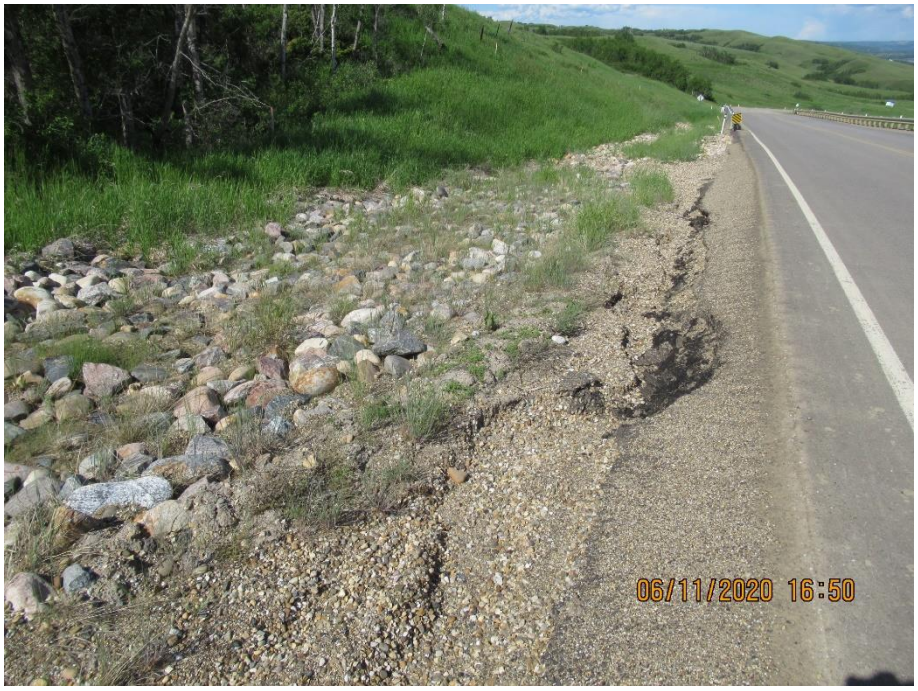	**Photo 9.** Erosion along the north shoulder of the highway.