Alberta Transportation

CENTRAL REGION GRMP
SITE INSPECTION FORM

Klohn Crippen Berger

SITE NUMBER AND NAME: **C034 Abraham Lake Erosion**	HIGHWAY & KM: 11:04, 11.056	PREVIOUS INSPECTION DATE: June 11, 2018	INSPECTION DATE: **July 9, 2019**
LEGAL DESCRIPTION: 07-07-038-17 W5M	NAD 83 COORDINATES: UTM 11 Northing 5789173 Easting 539996	RISK ASSESSMENT: PF: 12 CF: 5 TOTAL: 60	
AVERAGE ANNUAL DAILY TRAFFIC (AADT): 225 (west) & 216 (east) (Ref No. 50110250)		CONTRACT MAINTENANCE AREA (CMA): 18	

SUMMARY OF SITE INSTRUMENTATION:	INSPECTED BY:
None LAST READING DATE: n/a	Chris Gräpel (KCB) Ryan Gazley (KCB) Rishi Adhikari (AT) Tony Penney (AT)

PRIMARY SITE ISSUE: Erosion and retrogression of a slope along the east side (eastbound lane) of Hwy 11/west side of Abraham Lake – a reservoir created by the Bighorn Dam on the North Saskatchewan River. The erosion is caused by pavement surface runoff, seepage, and wave action when the reservoir level is high.

APPROXIMATE DIMENSIONS: The site is approximately 220 m long, and the slope is approximately 12 m to 15 m high sloped between 1H:1V to 1.5H:1V.

DATE OF ANY REMEDIAL ACTION: July 2006 – slope reinforced with soil nails, steel mesh, and shotcrete; Spring 2017 – the highway was realigned to the north (upslope) towards the backslope, a 3-cable high-tension-cable barrier (HTCB) was installed, and an asphalt curb was installed to redirect pavement surface runoff away from the erosion gullies on the eroded slope. March 2018 – erosion gullies backfilled with gravel (waypoints 675 and 676) and asphalt curb partially removed. July 2019 (after this site visit) – construction of a temporary rockfill berm at the toe of the eroding slope using coarse material raked from the beach.

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress	X		Pavement cracked, undermined and collapsing; guardrail hanging in two locations; highway realigned in 2017	X	
Slope Movement		X	None observed		X
Erosion	X		Slope at or retrogressing towards edge of pavement; erosion gullies forming around edges of gravel backfill; evidence of wave erosion at toe; evidence of seepage erosion on slope	X	
Seepage	X		Seepage erosion observed at various points on slope		X
Culvert Distress	X		1200 mm diameter CSP culvert is disconnected at outlet; a detached culvert segment is washed away		X

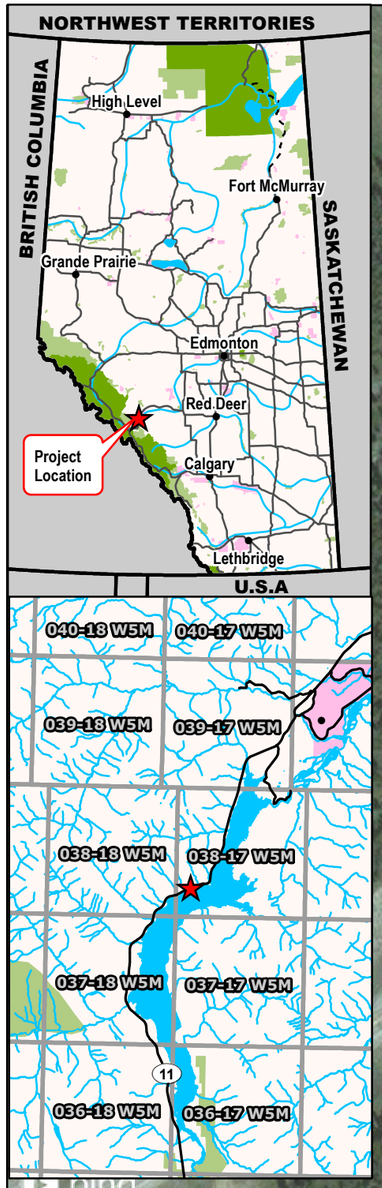
COMMENTS

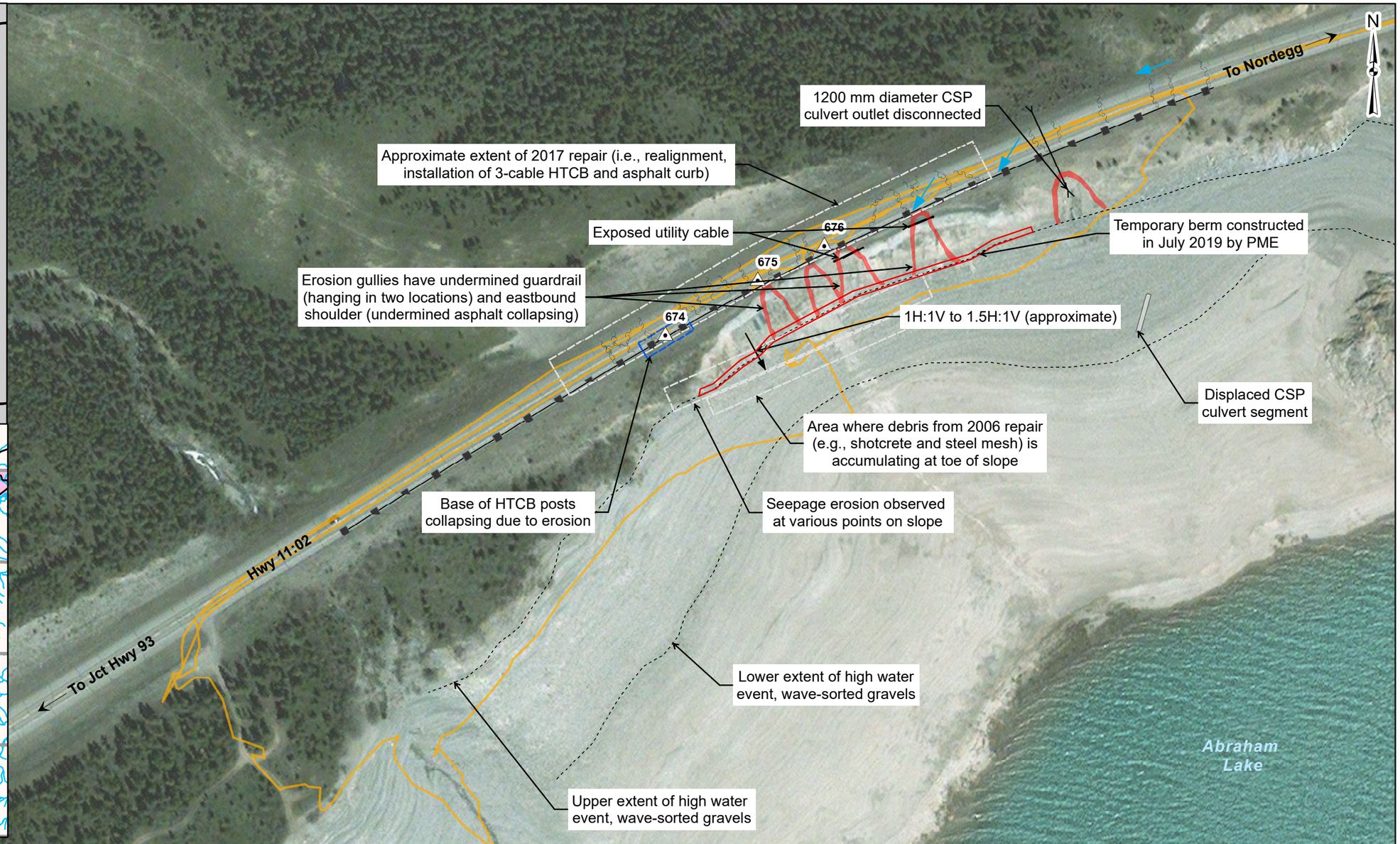
Erosion of the natural soils around the edges of the dumped granular fill is occurring due to surface water runoff and seepage below the pavement surface.

The 5 m and 15 m section of asphalt curb that was removed in 2017 has not been replaced (waypoint 675 and 676, respectively).

Three posts of the high-tension-cable barrier (HTCB) close to the edge of asphalt are exhibiting minor pavement

collapse around the base (waypoint 674). The pavement collapse appears to be due to erosion of the underlying materials exposed when the HTCB posts were installed.
The slope continues to retrogress into the eastbound shoulder. Pavement cracks have extended to the white line marking the boundary of the old eastbound lane.
The soil nail, steel mesh, and shotcrete repair continue to be undermined by erosion, and debris from the failed repair is accumulating at the toe of the slope.
A buried utility cable is exposed at several locations along the slope.
A contract for slope stabilization repair work was awarded to PME Inc. in 2019 (AT contract CON0019442). Construction was planned for summer 2019 but delays in contract signing allowed the reservoir level to rise too high to complete the full scope of work in 2019. Instead, temporary construction works were carried out by PME from July 19 to 23, 2019. The temporary work included the construction of a 3-m wide by 2-m high temporary berm at the toe of the slope to reduce the possibility of further erosion until spring/summer 2020 when the full scope of work can be completed. The temporary berm was constructed with coarse beach surface materials comprising cobbles, gravel, and sand. The availability of coarse material was limited to a layer approximately 0.3 m thick on exposed beach above the rising reservoir level.





Legend

- GPS Waypoint (June 11, 2018)
- GPS Track (July 9, 2019)
- Crack
- Guardrail
- Culvert
- Flow Direction
- Erosion
- Extent of Guardrail Collapse

Meters
0 100

NOTES:
1. HORIZONTAL DATUM: NAD83
2. GRID ZONE: UTM Zone 11N
3. IMAGE SOURCE: Bing Maps 2018, Microsoft Corporation. Image dated May 2012

CLIENT: Alberta

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PROJECT: CENTRAL REGION GEOHAZARD RISK MANAGEMENT PROGRAM

TITLE: Site Plan
C034 - Abraham Lake
Hwy 11:02, km 11.056

SCALE	PROJECT No.	FIG No.
1:2,000	A05115A02	1

Time: 09:55:13 AM
Date: August 06, 2019
File: Z:\AE\EDM\A05115A02 ABT Central Region GRMP\400 Drawings\2019\2. Section B\2. 2019 Site Inspections\MXD\C034_190806.mxd

Photo 1 **View of slope from beach. Arrows indicate where granular fill was placed in March 2018. Photo taken July 9, 2019 looking northwest.**

Photo 2 **Shotcrete debris and steel mesh accumulating at the toe of the slope. Photo taken July 9, 2019 looking north.**

Photo 3 **Photo showing erosion occurring around the edges of dumped granular fill. Photo taken July 9, 2019 looking south.**

Photo 4 **Photo showing the condition of the pavement above the main erosion gullies. Pavement cracks have extended to the white line marking the edge of the old eastbound lane. Photo taken July 9, 2019 looking northeast.**

Photo 5 **Condition of dumped granular fill in western-most erosion gully. Photo taken July 9, 2019 looking south.**

Photo 6 **Photo showing the extent of temporary rock-fill berm constructed at the toe of the eroding slope. Berm was constructed by PME as part of the 2019 Temporary Works at the C034 site. Photo taken July 23, 2019 looking north.**

Photo 7 **Close-up view of the finished temporary berm slope comprising cobbles, gravel, and sand from the beach. Photo taken July 22, 2019 looking northwest.**