

SITE NUMBER AND NAME: S060 Lost Knife Creek		HIGHWAY & KM: 40:14, 34.480	PREVIOUS INSPECTION DATE: July 6, 2021	INSPECTION DATE: May 18, 2022
LEGAL DESCRIPTION: 15-29-19-05 W5M	NAD 83 COORDINATES: UTM Northing Easting 11 5612799 665797		RISK ASSESSMENT: PF: 12 CF: 6 TOTAL: 72	
MONTHLY AVERAGE DAILY TRAFFIC (MADT): May 2020 390 (west) & 382 (east) (Reference No. 55460220)			CONTRACTOR MAINTENANCE AREA (CMA): 28	

SUMMARY OF SITE INSTRUMENTATION: There is no instrumentation at the S060 site. LAST READING DATE: N/A	INSPECTED BY: Chris Morgan (KCB) Laura Assaad (KCB) Roger Skirrow (AT) Alex Frotten (AT)
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PRIMARY SITE ISSUE: Erosion channel / slope failure on the east side of the highway. The culvert under the highway at the centre of the slide mass has disconnected at a joint; however, it is unknown whether slope movement led to culvert separation, or whether culvert separation led to the erosion feature.
APPROXIMATE DIMENSIONS: Head scarp is approximately 5.8 m wide (5.3 m in 2020) at the crest of a 30 m to 40 m high slope above an unnamed creek (possibly Lost Knife Creek).
DATE OF ANY REMEDIAL ACTION: None

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress		X	Gravel road. Backscarp has started to undermine the east (northbound) lane	X	
Slope Movement	X		Slope failure on east side of highway undermining the guardrail.	X	
Erosion	X		Erosion from ditch and highway runoff into slide area.	X	
Seepage	X		Groundwater seepage previously observed below culvert invert and approximately 6 m below highway elevation.	X	
Culvert Distress	X		Existing 800 mm diameter CSP culvert under highway has disconnected at a joint and has been undermined by approximately 3.5 m (from the end of the CSP).	X	

COMMENTS
The site is on a gravel surfaced road, oriented roughly southeast to northwest at the site.
Surface water runoff has undermined approximately 5.8 m of the east (northbound) guardrail (Photo 1). The erosion has retrogressed approximately 1.3 m (measured from the guardrail) (Photo 2) since the 2020 inspection and has undermined 2 guardrail posts (WP 102) (Photo 3). Slope erosion will likely continue to undermine the guardrail and further encroach past the guardrail on the highway surface.

Surface water runoff, snow melt, culvert discharge, and groundwater seepage through the embankment are contributing to ongoing erosion and sloughing of embankment material, undermining of the culvert, and retrogression of the erosion feature laterally and longitudinally. Sloughing material is accumulating on top of the culvert. The erosion channel downstream of the culvert is approximately 5 m to 6 m deep and is discharging sediment into a fish bearing creek (potentially Lost Knife Creek) (Photo 2). The sloughing is worse at the left (north) flank.

Water in the ditch on the west side of the highway is discharging into the culvert and draining onto the slide area. Active seepage and slope retrogression of the saturated embankment side slope is occurring.

A delineator post was placed near the edge of the gravel road to indicate the erosion that is encroaching on the highway surface (Photo 4).

Approximately five black TELUS cables (one broken) were exposed and observed in the gully.

North of the site, the east (northbound) ditch narrows until it is non-existent.

Maintenance/Repair/Monitoring Recommendations:

- Improvements to surface water drainage (e.g., removing the ditch block downslope of the culvert inlet may result in problems further down grade because the ditch block was installed for a reason); or
- Preferred option: Embankment stabilization including; (i) reconstruction of the embankment slope with granular fill, construction of a slope drain, and armouring the toe of the embankment and creek channel downstream of the culvert inlet; (ii) installation of a gabion basket retaining wall and rebuilding the embankment with granular fill and repairing the CSP culvert; or
- Realigning the highway to the west.

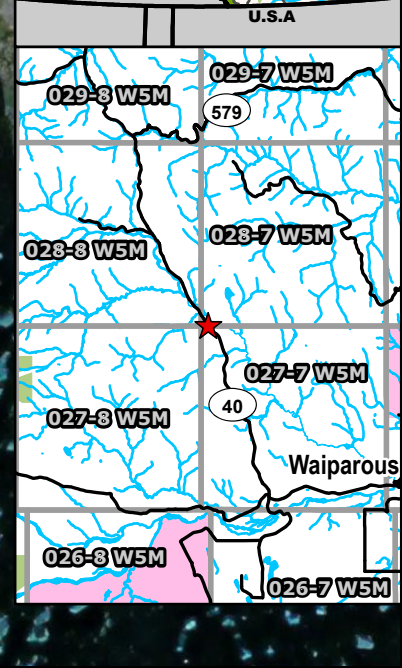
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<p>Chris Gräpel, M.Eng., P.Eng. Senior Civil Engineer, Associate</p>	
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Legend

- GPS Waypoint (May 18, 2022)
- GPS Track (May 18, 2022)
- Flow Direction
- Scarp
- Culvert
- Guardrail

NOTES:
 1. HORIZONTAL DATUM: NAD83
 2. GRID ZONE: UTM ZONE 11N
 3. IMAGE SOURCE: ESRI, MAXAR, EARTHSTAR
 GEOGRAPHICS AND THE GIS USER COMMUNITY.

CLIENT

PROJECT SOUTHERN REGION GEOHAZARD RISK MANAGEMENT PROGRAM		
TITLE Site Plan S060 - Lost Knife Creek Hwy 40:14, km 34.480		
SCALE 1:1,250	PROJECT No. A05116A03	FIG No. 1

Inspection Photographs

Photo 1 Head scarp on east side of Hwy 40. The erosion extends approximately 1.3 m west from the guardrail (indicated by black line). The CSP culvert is being undermined (indicated by black arrow). Photo taken May 18, 2022, facing northwest.



Photo 2 View from highway down the erosion gully and toward the separated culvert. Photo taken May 18, 2022, facing northeast.



Photo 3 The erosion has undermined two guardrail posts and they are hanging. Slumping is visible on the right flank due to the ongoing erosion. The length of the undermined CSP culvert is approximately 3.5 m. Photo taken May 18, 2022, facing northwest.



Photo 4 Delineator used to mark the location of where the erosion is retrogressing into the gravel road surface. Photo taken May 18, 2022 facing northwest.

