

SITE NUMBER AND NAME: <b>S032 Crowfoot Ferry</b>		HIGHWAY & KM: <b>H56</b>	PREVIOUS INSPECTION DATE: May 8, 2019	INSPECTION DATE: <b>July 15, 2020</b>
LEGAL DESCRIPTION: 10/14/15-24-021-20 W4M	NAD 83 COORDINATES: UTM Northing Easting 12 5629086 383958		RISK ASSESMENT: PF: 13 CF: 4 TOTAL: 52	
AVERAGE ANNUAL DAILY TRAFFIC (AADT): 60 (south) (Ref. No. 110170)			CONTRACTOR MAINTENANCE AREA (CMA): 30	

SUMMARY OF SITE INSTRUMENTATION:  None  LAST READING DATE: N/A	INSPECTED BY: Justin Corbiell (AT)
PRIMARY SITE ISSUE: River erosion and slope instability along east bank of the Bow River retrogressing towards north access road to Crowfoot Ferry (BF 13129).	
APPROXIMATE DIMENSIONS: Landslide estimated as approximately 350 m long. Slope is approximately 15 m high and slope of failure surface is approximately 5H to 6H:1V. The backscarp is 3.6 m from the edge of highway.	
DATE OF ANY REMEDIAL ACTION: Ferry infrastructure was replaced to make the ferry operational, but no repairs to the river bank slide were carried out.	

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress		X	Gravel surfaced road		X
Slope Movement	X		New block failures and cracking. The extent of barbed-wire fence undermining has increased since 2019.	X	
Erosion	X		Outside bend of Bow River		X
Seepage		X	None observed		X
Culvert Distress		X	None present		X

<b>COMMENTS</b>
Site was not visited by KCB during the annual GRMP tour due to COVID-19 restrictions. Photos and measurements were provided by the MCI.
June 2013 flood caused retrogression of riverbank failure on the outside bend. Retrogression continues due to toe erosion and ongoing deformation. Lock blocks have been placed adjacent to the highway to keep pedestrians and horseback riders away from the tension cracks.
Tension cracks have widened and slide has retrogressed towards the road since previous inspection. Cracks appear to be up to 1 m deep in places. Slide appears to have retrogressed at the northern side over a 10 m to 15 m length.
In 2020, the back scarp was 3.6 m away from the edge of highway (at the closest point) and six fence posts were undermined.

Landslide appears to be a translational slide with graben blocks which indicates sliding on near-horizontal weak layer, which appears to be below river level. There is backward rotation of blocks which suggests there is some rotational component to the slide movement. The exposed soils in the landslide blocks are coarse gravel with some sand bars, with glacial till at the base of the cut face. No seepage was observed but access to the lower portion of the slide is difficult.

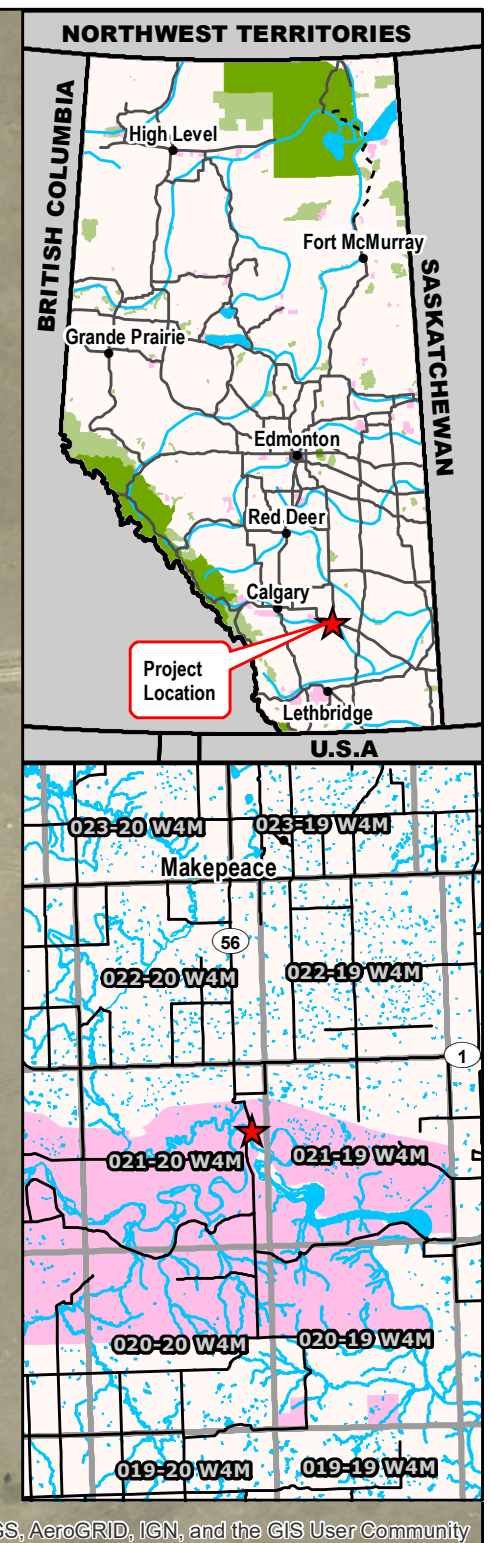
Continued bank erosion has the potential to impact the ferry by eroding behind the upstream riprap protecting the east-bank ferry landing. Redirecting the flow away from the ferry-landing area with a sheet pile wall or rock spur dykes should be considered. AT to advise the ferry operators about the potential for continued bank erosion on operation of the ferry. The scope of work for the designers of the ferry repairs did not include stabilization of the slope, only repair of the ferry facilities.

Realignment of road to east, away from the slide zone, appears to be the most practical option in the short-term to keep the road open. It is understood that realignment will require land acquisition from the Siksika First Nation. Discussions with the Siksika First Nation are ongoing to obtain the necessary land and permissions to relocate the road.

A "15 year" realignment option is suggested, requiring relocation of the road and multiple power poles.



Site was not visited by KCB as part of the 2020 GRMP tour due to COVID-19. MCI provided photos and measurements.



Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



**Legend**

- ✕ — ✕ Fence
- ▬ Main Scarp

NOTES: 1. HORIZONTAL DATUM: NAD83 2. GRID ZONE: UTM Zone 12N 3. IMAGE SOURCE: World Imagery, ArcGIS Online. Source date August 30, 2018 (Vulcan County)	CLIENT 	PROJECT SOUTHERN REGION GEOHAZARD RISK MANAGEMENT PROGRAM
		TITLE Site Plan S032 - Crowfoot Ferry (BF 13129)
SCALE 1:3,000	PROJECT No. A05115A03	FIG No. 1

Time: 15:09:04 PM  
 Date: August 07, 2020  
 File: Z:\AEDM\A05115A03\ABT Southern Region GRMP\A00 Drawings\2020\2. Section BIM\XD\S032\_200807.mxd

**Photo 1** Retrogressing river bank slide north of the Crowfoot Ferry. Photo was taken facing north from south end of slide on July 15, 2020.



**Photo 2** Tension cracking at the north end of the slide. Photo taken facing north on July 15, 2020.



**Photo 3** Tension cracking and fence undermining adjacent to the highway. Photo was taken midway along the slide facing south on July 15, 2020.



**Photo 4** Six fence posts undermined by sliding. Photo taken near south end of slide facing south on July 15, 2020.

