

SITE NUMBER AND NAME: C023-I Battle River Crossing Erosion C023-II Slope Failure		HIGHWAY & KM: 854:01, 14.017	PREVIOUS INSPECTION DATE: July 12, 2019	INSPECTION DATE: June 24, 2020
LEGAL DESCRIPTION: 16-07-043-17 W4M	NAD 83 COORDINATES: UTM Northing Easting 12 5839557 402074		RISK ASSESSMENT: C023-I PF: 10 CF: 3 TOTAL: 30 C023-II PF: 8 CF: 4 TOTAL: 32	
AVERAGE ANNUAL DAILY TRAFFIC (AADT): 140 (south) & 110 (north) (Ref No. 114370 & 997079)			CONTRACTOR MAINTENANCE AREA (CMA): 513	

SUMMARY OF SITE INSTRUMENTATION: There is no instrumentation at the C023 site. LAST READING DATE: N/A	INSPECTED BY: Chris Gräpel (KCB) James Lyons (KCB) Rishi Adhikari (AT) Tom Somerville (AT)
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PRIMARY SITE ISSUE: C023 – I: Erosion on north bank of Battle River valley. West side of highway: erosion of unvegetated area upslope of Battle River. East side of highway: failure of gabion mattress armoured ditch chute. C023 – II: A small landslide on the south bank of the Battle River, partially beneath the bridge.

APPROXIMATE DIMENSIONS: C023 – I: West side – 15 m wide by 50 m long (parallel to highway) area of unvegetated soil; East side – 20 m long length of gabion mattress armoured ditch. C023 – II: Slide on south bank is approximately 30 m wide and approximately 5 m high.

DATE OF ANY REMEDIAL ACTION: October 2003 – gabion chute and stilling basin constructed in east ditch. (cross-culvert under road carries west ditch flow to gabion mattress lined ditch); 2015 – sediment and vegetation removed from gabion-basket catch basins.

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		Minimal retrogression of slide west of south abutment; slight retrogression near south abutment below bridge.	X	
Erosion	X		Rill and gully erosion continue to develop on exposed soil upslope of riverbank on west side of highway. Steep downstream section of gabion mattress armoured channel is progressively failing from edge of water to top of slope.		X
Seepage		X	None observed		X
Culvert Distress	X		Overgrown vegetation observed in gabion catch basins at culvert inlet and outlet.		X

COMMENTS

The riverbank along the south abutment directly below the bridge is showing signs of retrogressive slope failure. A steep (approximately 1H:1V) riverbank slope 4 to 5 m high is located at the edge of the river, with approximately 15 m between the crest of the slope and the bridge abutment.

The inlet and outlet gabion catch basin structures on the north side of the bridge remain clogged. The west side gabion catch basin inlet continues to overflow onto the unvegetated slope into the existing erosion gully observed during the 2018 inspection. Although the erosion gully has not expanded significantly since 2018, it will continue to expand if left unrepaired. Grass growth is limited to the areas where coir rolls, now deteriorated, that retained sediments and seeds from previous seeding.

Gabion mattress channel lining on east the side of highway has not been repaired. Water will continue to

undermine the mattress until it is repaired. Gabion mattress channel lining at the discharge point into the river is still in good condition.

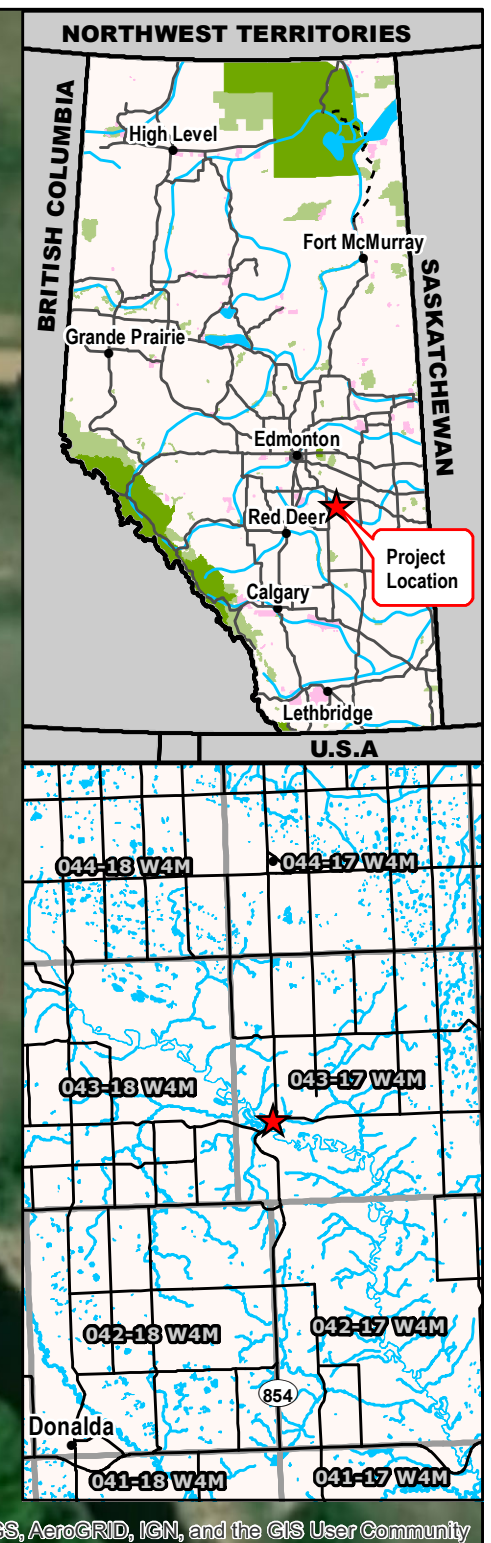
Discussed remedial actions:

C023 – I:

- West-side repair should consist of drill seeding the exposed soil and then hydro-mulch the exposed area to promote grass growth. Alternatively, given that bedrock is exposed at surface, a bonded-fiber matrix, flexible growth medium and hydroseed treatment could be applied to the slope to give the seeds a better chance to germinate and form a stable vegetative cover on the western erosion site. The soil/bedrock chemistry should be tested to improve the likelihood that work results in stable vegetation
- Sediment build-up and vegetation in gabion catch basins on both side of highway need to be cleaned out. Drainage ditch needs cleaning/trimming of overgrown vegetation.
- Gullying downslope of the west side gabion catch basin should be repaired.
- Repair options for failed gabion mattress could include excavation of gabion mattress and replacement with rip rap with proper bedding and check trenches. Size of rip rap should be designed based on flow rate determined from required rainfall event return period and catchment area.

C023-II:

- The slope failure observed on the west side of and adjacent to the south abutment of the bridge should be monitored. Repair of the slope failure could start with armouring the riverbank to control erosion upstream of and underneath the bridge deck. Soil nailing could be used to stabilize the slide, or the slope below the bridge could be flattened with an excavator, with excavated material hauled away.



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

Legend

- Culvert
- Scarp
- Silt Fence
- Fence
- Guardrail
- Erosion



NOTES:
 1. HORIZONTAL DATUM: NAD83
 2. GRID ZONE: UTM Zone 12N
 3. IMAGE SOURCE: World Imagery, ESRI ArcGIS Online
 Source date May 26, 2018

CLIENT

PROJECT	CENTRAL REGION GEOHAZARD RISK MANAGEMENT PROGRAM	
TITLE	Site Plan C023 - Battle River Crossing Erosion and Slope Failure Hwy 854:01, km 14.017	
SCALE	PROJECT No.	FIG No.
1:1,300	A05115A02	1

Time: 14:26:10 PM
 Date: July 30, 2020
 File: Z:\A\EDM\A05115\A02 ABT Central Region GRM\PI\00 Drawings\2020\2. Section BIMXD\C023_200713.mxd

Photo 1 Gully erosion below gabion catch-basin inlet on west side of highway. Inlet overflowed from being clogged with sediment and vegetation. The inlet is still clogged and needs to be cleaned out. Photo June 24, 2020 facing southwest.



Photo 2 Vegetation and sediment build-up at the catch basin structure at the inlet of the culvert. Photo taken June 24, 2020 facing east.



Photo 3 Gabion basket outlet structure on east side of highway still clogged with sediments and dense vegetation. Photo taken June 24, 2020 looking northeast.



Photo 4 Sediment deposit from a previous high-water event at the outlet of the gabion mattress lined channel. Photo taken June 24, 2020 facing south.



Photo 5 Slide on the south embankment of the Battle River (Photo from 2019 inspection included for comparison). Photo taken June 24, 2020 looking west.



Photo 6 Unstable south abutment riverbank directly below bridge deck. Photo taken June 24, 2020 from the east and west side of the bridge, respectively.

