

SITE NUMBER AND NAME: S054 Highwood River Bridge		HIGHWAY & KM: 22:10, 38	PREVIOUS INSPECTION DATE: N/A	INSPECTION DATE: June 8, 2020
LEGAL DESCRIPTION:	NAD 83 COORDINATES: UTM Northing Easting		RISK ASSESMENT: PF: 9 CF: 6 TOTAL: 54	
AVERAGE ANNUAL DAILY TRAFFIC: 2380 (north), 2260 (south), (Ref No. 75150)			CONTRACTOR MAINTENANCE AREA (CMA): 27	

SUMMARY OF SITE INSTRUMENTATION: 1 Shape Array Accelerometer (SAA) (not functional) & 3 vibrating wire piezometers LAST READING DATE: May 14, 2020		INSPECTED BY: Chris Gräpel (KCB) Chris Morgan (KCB) Roger Skirrow (AT) Alex Frotten (AT) Hasnain Baloch (AT)
PRIMARY SITE ISSUE: Slope instability caused by surface runoff erosion and river bank erosion along the north bank as a result of the 2013 flood. Rotational movement of the Pier 1A pile cap has been reported by an earlier consultant. Surface runoff erosion appears to be removing lateral earth support from Pier 1A and its foundation. Pier 1A is reported to be founded on 24 piles embedded to a depth of 3.66 m.		
APPROXIMATE DIMENSIONS: The north abutment height is estimated as 22 m, based on survey data obtained by ISL Engineering in 2016. In 2020 the slope angle from the south side of Pier 1A to the top of the gabion wall was estimated to be approximately 40 degrees (~1.2H:1V). Immediately downslope of the south side of Pier 1A, tension cracking extended over approximately 12-15 m length.		
DATE OF ANY REMEDIAL ACTION: N/A		

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress		X	None observed however bridge deck deformation was reported by ISL Engineering (BF1741 Slope Stability report issued to AT in December 2016)		
Slope Movement	X		Tension cracking was observed downslope of Pier 1A. Monitoring carried out by ISL Engineering reported rotational movement of Pier 1A to the southwest.		
Erosion	X		Surface runoff erosion from the highway and adjacent area was leading to ongoing slope erosion		
Seepage	X		Groundwater seepage observed midway down the north slope, between Pier 1 and Pier 1A.		
Culvert Distress		X			

COMMENTS
First visit to the site. Site will be monitored moving forward as part of the Southern Region GRMP.
Between 2016 and 2019 the bridge deck and north slope of the river were monitored by ISL Engineering and Thurber Engineering. Monitoring activities consisted of bridge deck survey, topographic surveying, ground

investigation, instrument installation, and visual evaluations. ISL Engineering reported that Pier 1A is founded on 24 piles embedded to a depth of 3.66 m, and that rotational movement to the southwest was measured at Pier 1A. KCB started reading the site instrumentation in spring 2020 and completed a Section B walkover of the site on June 8, 2020.

Ongoing erosion is taking place directly west of Pier 1A due to surface water runoff from upslope areas. An erosion gully appears to be removing lateral support for the Pier 1A pile cap and piles. Erosion has exposed the southwest corner of the Pier 1A concrete pile cap.

Tension cracks were observed upslope and downslope of the Pier 1A pile cap. Cracks upslope of the pile cap were up to 40 mm wide.

Cracks downslope of the pile cap were 12 to 15 m in length and 60 to 150 mm wide. The downslope tension cracking appeared to be due to near surface sloughing on the steep riverbank slope.

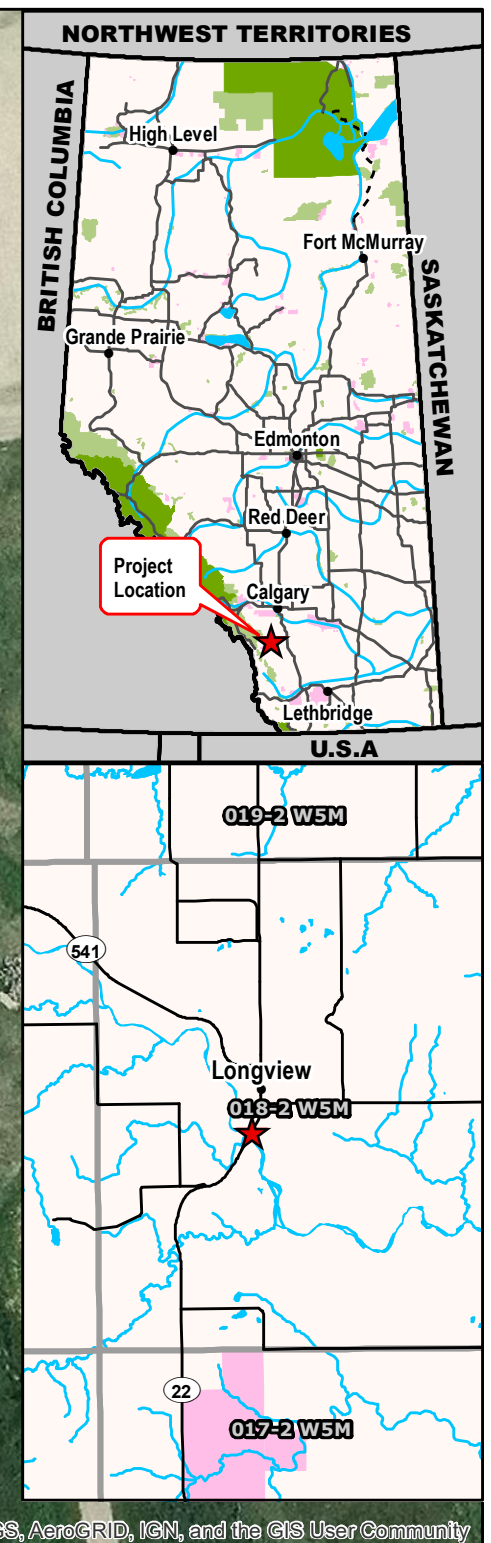
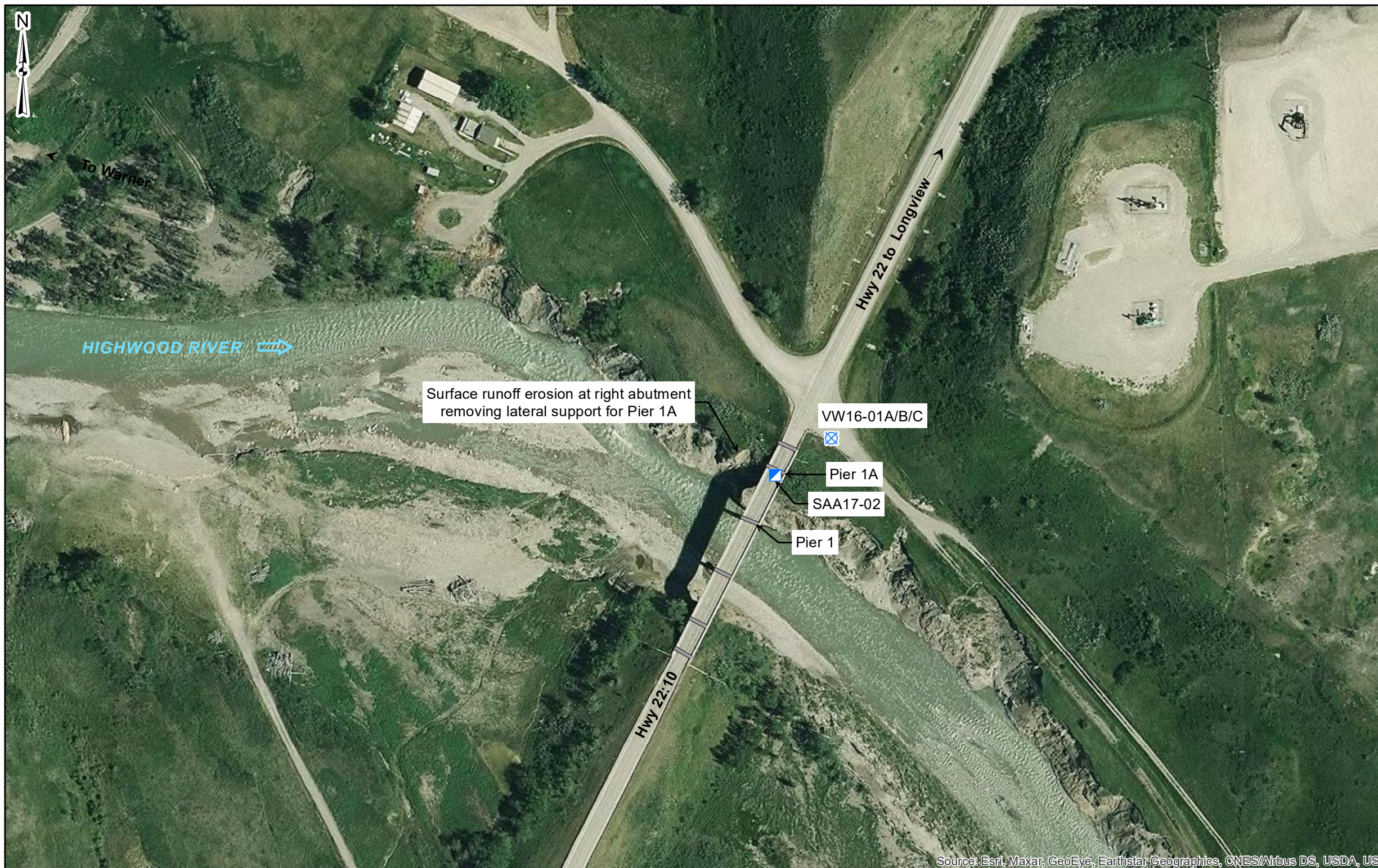
An SAA is located approximately 0.7 m southeast (downslope) of Pier 1A. The SAA was not functional at the time of the inspection because the battery for the readout box was removed in late 2019 by the previous consultant. A replacement battery should be installed.

The previous consultant had reported that Pier 1A was displacing to the southwest, possibly due to slope instability.

Wet areas were visible under the bridge deck at Pier 1A due to surface runoff from recent rainfall.




Short-term recommendations include:

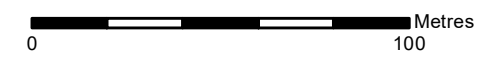
- Reduce surface runoff erosion west of Pier 1A by diverting surface water flow away from the bridge abutment;
- Evaluate bridge deck drainage to divert flows away from Pier 1A and reduce runoff onto the north bank;
- Fill the erosion gully west of Pier 1A, including reinforcement and drainage; and
- Continue to monitor instrumentation and survey monuments on the bridge deck, abutment and north bank.





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

Legend

-  Shape Array Accelerometer
-  Vibrating Wire Piezometer
-  Bridge Pier Location



NOTES: 1. HORIZONTAL DATUM: NAD83 2. GRID ZONE: UTM Zone 11N 3. IMAGE SOURCE: World Imagery, ESRI ArcGIS Online. Source date September 6, 2017 4. Instrument and bridge pier locations are approximate.	CLIENT 	PROJECT SOUTHERN REGION GEOHAZARD RISK MANAGEMENT PROGRAM
		TITLE Site Plan S054 - Highwood River Bridge Hwy 22:10, km 38
SCALE 1:2,000	PROJECT No. A05115A03	FIG No. 1

Time: 15:10:49 PM
 Date: September 08, 2020
 File: Z:\AEDM\A05115A03\ABT Southern Region GRMP\400 Drawings\2020\3. Section C\S054_200908_v2.mxd

Photo 1 Tension cracking downslope of the Pier 1A pile cap. Photo taken facing east on June 8, 2020.



Photo 2 Tension cracking (60 to 150 mm wide) south (downslope) of the exposed Pier 1A pile cap. Photo taken facing west on June 8, 2020.

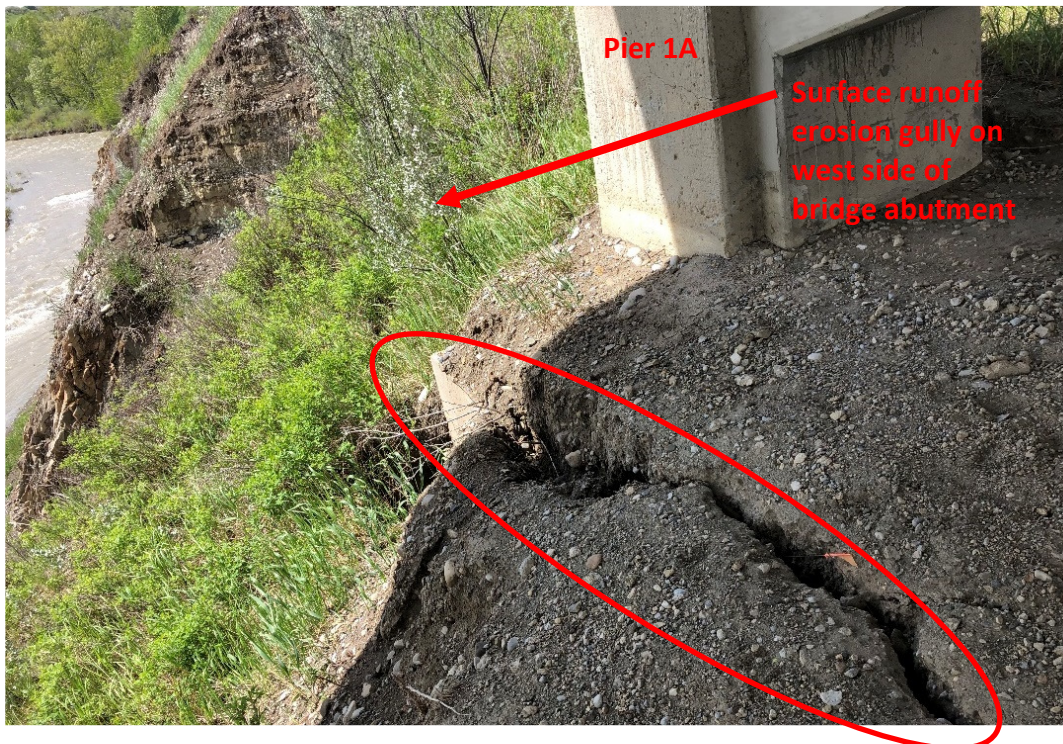


Photo 3 Top view of gabion baskets adjacent to Pier 1. Photo taken on June 8, 2020.



Photo 4 Bridge piers and erosion protection measures in the river channel. Photo taken from southwest of Pier 1A facing south on June 8, 2020.

