

SITE NUMBER AND NAME: <b>S003 Cochrane</b>		HIGHWAY & KM: 22:16, 9.875	PREVIOUS INSPECTION DATE: May 7, 2019	INSPECTION DATE: <b>June 8, 2020</b>
LEGAL DESCRIPTION: 06-34-025-04 W5M	NAD 83 COORDINATES: UTM Northing Easting 11 5672104 676003		RISK ASSESMENT: PF: 13 CF: 4 TOTAL: 52	
AVERAGE ANNUAL DAILY TRAFFIC (AADT): 20860 (north), 16690 (south) (Ref. No. 70000075)			CONTRACTOR MAINTENANCE AREA (CMA): 28	

SUMMARY OF SITE INSTRUMENTATION:  4 functional piezometers and 1 functional slope inclinometer  LAST READING DATE: May 2020		INSPECTED BY: Chris Morgan (KCB) Margot Lederman (KCB) Roger Skirrow (AT) Alex Frotten (AT)
PRIMARY SITE ISSUE: Slope instability affecting northbound lane, approximately 3 m into northbound lane. Landslide appears to be related to seepage and deeper instability located downslope.		
APPROXIMATE DIMENSIONS: Embankment slope (within highway boundary) is approximately 10 m high and sloped at 3H:1V. Natural slope below embankment is quite high (over 30 m) and there is a zone of landsliding at the outside bend of the Bow River. Embankment slide area is approximately 50 m by 50 m in area of highway with 4 m to 9 m slide depth.  Sliding below the highway embankment appears to be shallow but has the potential to undermine and exacerbate the sliding at the highway embankment. The valley slope below the main slide area has a slope angle of 70%.		
DATE OF ANY REMEDIAL ACTION: Patched as needed over the last three years. Drilling program undertaken in March 2018 that included the installation of 1 SI and 3 VWP.		

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress	X		Increased settlement and cracking on northbound lane and shoulder.	X	
Slope Movement	X		Cracking and settlement on shoulder of highway. Slides observed downslope in wooded area. Toe roll and slope cracking appear more pronounced than in 2019.	X	
Erosion	X		Downslope of highway boundary.	X	
Seepage	X		Downslope of toe roll.	X	
Culvert Distress		X	None present.		X
<b>COMMENTS</b>					
Site has deteriorated since 2019 site visit and the pavement appears to have settled. Cracking at edge of pavement appears to have enlarged since 2019 and is up to 40 mm wide and 400 mm depth (possibly full depth of pavement). Additional feather cracking observed 35 m southeast from VWP18-02.					
Fence across slide zone is deflected, undermined, and tipped over by slope movement.					
The highway ditch across the slide area is lined with geomembrane and riprap, and has completely settled.					

Standing water was present in the ditch. Water discharges directly onto the slide zone and the geotextile is exposed. Pavement patching and crack sealing should continue; however, surface runoff will continue to saturate the slide mass and exacerbate instability. Only one functional slope inclinometer remains at the site.

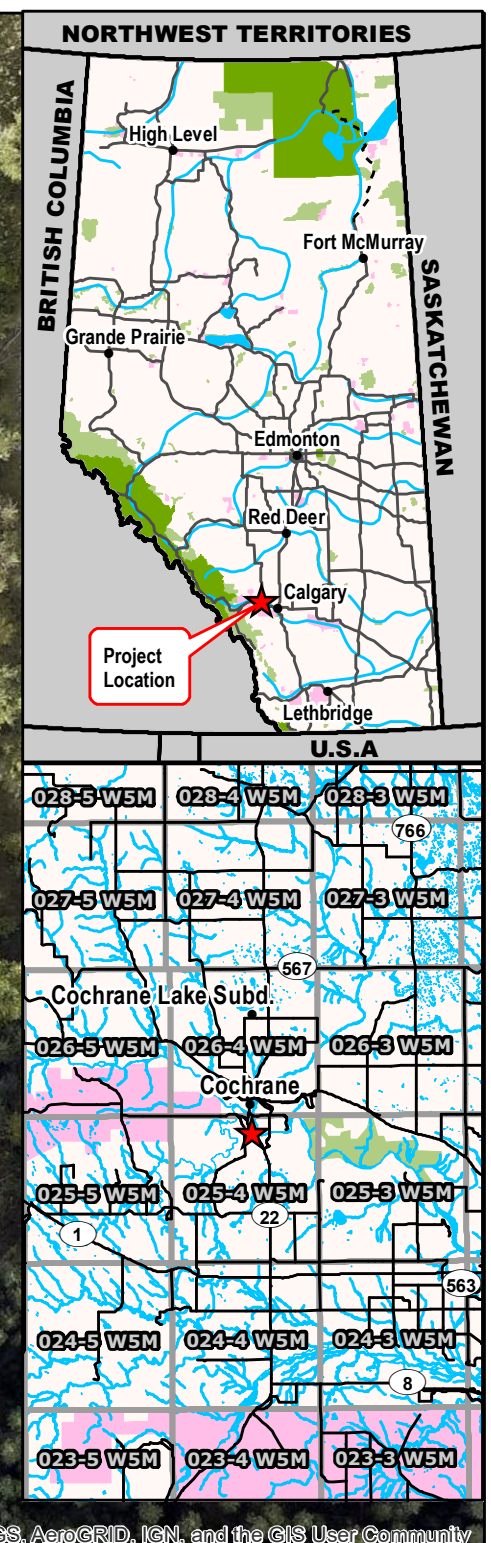
Toe roll is more defined than last year. Wet areas visible on right flank of the slide, below the toe roll.

Shallow failures downstream correspond with runoff areas. Slope movement on the steeper section of the slope (outside of highway boundary) are visible, including tension cracking, erosion scars, and leaning trees. Some sections of the slide are moving faster than others.

One black utility cable is exposed in the ditch (unchanged from 2019).

Long-term plans at this site include twinning on the uphill side. A design has been submitted by KCB which includes a pile wall to stabilize the existing highway lanes, drainage, and an improved ditch. The ditch should be lined and be upslope of the pile wall to maintain ditch integrity. The pile wall is planned to be installed off the northbound lane shoulder, and design allowed for an additional lane width of fill on the east side of the highway (to account for loading when the highway is twinned). Pile wall construction is scheduled for 2021.





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

**Legend**

- ◆ Pneumatic Piezometer
- ▣ Slope Inclinator
- ⊗ Vibrating Wire Piezometer
- GPS Track (June 8, 2020)
- ~~~~ Crack
- ▬ Main Scarp
- ➡ Flow Direction



NOTES: 1. HORIZONTAL DATUM: NAD83 2. GRID ZONE: UTM Zone 11N 3. IMAGE SOURCE: World Imagery from ArcGIS Online. Source date January 1, 2017	CLIENT	PROJECT
		SOUTHERN REGION GEOHAZARD RISK MANAGEMENT PROGRAM
	TITLE Site Plan S003 - Cochrane Hwy 22:16, km 9.875	
SCALE 1:1,000	PROJECT No. A05115A03	FIG No. 1

Time: 16:59:40 PM  
 Date: June 23, 2020  
 File: Z:\A\EDM\A05115A03\ABT Southern Region GRMP\400 Drawings\2020\2. Section BIM\XDS\003\_200623.mxd



**Photo 1**      **Landslide affecting northbound lane. Photo was taken facing southeast on June 8, 2020.**



**Photo 2**      **Cracking and settlement on the highway shoulder approximately 3 m into the lane (red arrow). Photo taken facing northwest on June 8, 2020.**





**Photo 3** Complete settlement of the drainage ditch with exposed liner, surface water runoff now discharging directly onto the slide zone. Photo taken facing northwest on June 8, 2020.



**Photo 4** Tension cracking near fence line due to midslope movement (minor scarp). Photo taken facing north on June 8, 2020.

