SOUTHERN REGION GRMP
SITE INSPECTION FORM

SITE NUMBER AND NAME	HIGHWAY & KM	PREVIOUS INSPECTION DATE	INSPECTION DATE
S051 A, B, & C - Pekisko Creek Erosion and Slides	540:02, 5.649 & 4.591	April 30, 2018	**May 6, 2019**

LEGAL DESCRIPTION	NAD 83 COORDINATES			RISK ASSESSMENT
	UTM	Northing	Easting	
08-14-017-02 W5M	11	5590542	701680	Site A & B: PF: 9 CF: 4 TOTAL: 36
12-13-017-02 W5M				Site C: PF: 10 CF: 3 TOTAL: 30

AVERAGE ANNUAL DAILY TRAFFIC (AADT):	CONTRACTOR MAINTENANCE AREA (CMA):
540 (east), (Ref. No. 71130)	27

SUMMARY OF SITE INSTRUMENTATION:	INSPECTED BY:
Site A & B: 3 slope inclinometers and 3 vibrating wire piezometers. LAST READING DATE: May 2019	Chris Gräpel (KCB) Chris Morgan (KCB) Alex Frotten (AT) Roger Skirrow (AT) Nicolas Ropchan (AT)

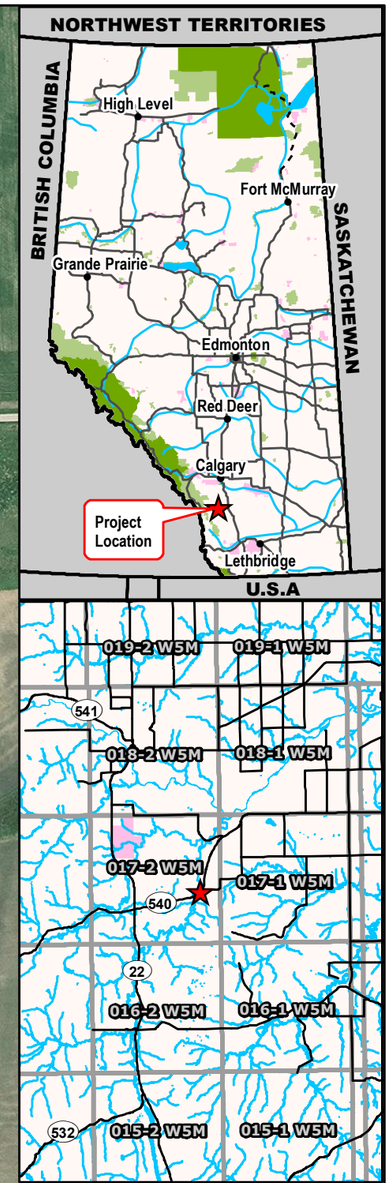
PRIMARY SITE ISSUE: Site A & B are at the head scarps of two landslides located approximately 30 m apart, likely caused by elevated groundwater in the steep bank during rainfall events, further accelerated by surface water draining down the slope from the ditch. Site C is bank erosion on the outside of a sharp (110° attack angle) meander bend. The head scarps at sites A & C have encroached onto highway right-of-way and undermined the highway ditch re-directing ditch flows onto the failed slopes.

APPROXIMATE DIMENSIONS:
Site A has a width of approximately 20 m, and the head scarp is located 1.7 m in from the fence line.
Site B has undermined approximately 30 m of fence line, with total length of the slide being approximately 100 m.
Site C bank erosion is approximately 100 m long with fence undermined for a length of approximately 25 m.

DATE OF ANY REMEDIAL ACTION: Drilling program was carried out in July 2017 at Site A & B. Bridge construction was undertaken to the east of Site B in summer 2017, and the work included an overlay and HTCB.

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress		X	Pavement not affected at the time of the site visit. The head scarp of A has encroached into the slope as far as the highway drainage ditch.		X
Slope Movement	X		Large retrogressive landslide at site A & B.		X
Erosion	X		Site C: Erosion apparent on the bank erosion (along the outside bend) with a large scour hole. Erosion has retrogressed to the ditch with additional gully erosion occurring where the ditch discharges water onto the slide surface.	X	
Seepage	X		Site A: Wet on bench below slide, runoff from ditch draining into slide. Ditch runoff is causing erosion, with sediment being deposited on the slope. Site C: Seepage apparent on the lower slope but no significant seepage erosion apparent.	X	
Culvert Distress		X			X

COMMENTS
No distress in road pavement; the failures at Sites A, B and C have not reached the pavement.
The east portion of the Site A slide area is a rotational-block failure, and the midslope bench looks like it is rotated by 15°. The west portion of the Site A slide area is shallow and translational (estimated depth of failure of 4 to 5 m). The failure scarp has extended past the fence line and undermined the highway ditch, redirecting ditch flows into the failure zone. Eight fence posts are hanging at Site A. Between Site A and B is an existing section of slope and a power pole.
The head scarp of Site B slide area is 1.75 m away from the fence line (no change from 2018). The ditch at the head of the slide is well defined and ditch flows are conveyed past the slide area.
The Site A and B 2019 inspection noted that the slide zone was generally unchanged. Surface runoff erosion adjacent to the highway appears worse, and water seepage around the SI casing continues. Backfill around the SI appears to have sunk slightly and the area is persistently wet. Sites A and B should continue to be inspected on an annual basis.
Site C: Erosion gullies at outside bend of creek are undermining highway fence line. The failure scarp has extended past the fence line and undermined the highway ditch, redirecting ditch flows into the failure zone. The Site C creek attack angle is 110°.
The Site C erosion gully appeared to have widened since 2018, with a 5 to 10 m wide slide block to the west of the existing back scarp.
Recommendations: <u>Site A & B</u> – Short-Term • Monitor location during and after high flows and significant antecedent rain or snow melt. • Ditch-flow containment should be re-established with a ditch berm. The base of the ditch should be lined with a membrane covered by gravel; the liner should extend over the edges of the ditch. – Long-Term • A pile wall with geosynthetic-reinforced fill may be required to stabilize the upper slide mass and minimize potential for further retrogression. Slope stabilization repairs should include subsurface drainage with provision for conveying water to toe of slope without causing erosion. Another option is to construct a gravel shear key and geosynthetic reinforced slope on stable soil or bedrock. • A toe berm may also be possible but will require a large volume of fill. A borrow area for bridge construction is present in the valley bottom, near the creek. The volume of fill available from the borrow should be assessed if a toe berm is selected. <u>Site C:</u> – Short-Term • Monitor location during and after high flows and significant antecedent rain or snow melt. • The highway ditch should be re-established with a ditch berm. The base of the ditch should be lined with a membrane covered by gravel. • Ditch reconstruction may require slope reconstruction. – Long-Term • Slope reconstruction using Longitudinal Peaked Stone Toe Protection or traditional riprap armouring to protect the erosion zone.



Legend

- GPS Waypoint (May 6, 2019)
- Power Pole
- GPS Track (May 6, 2019)
- Scarp
- Fence
- Flow Direction

Metres
0 250

NOTES:
1. HORIZONTAL DATUM: NAD83
2. GRID ZONE: UTM Zone 11N
3. IMAGE SOURCE: World Imagery from ESRI ArcGIS Online. Source date January 15, 2015

CLIENT: Alberta

Klohn Crippen Berger

PROJECT: SOUTHERN REGION GEOHAZARD RISK MANAGEMENT PROGRAM

TITLE: Site Plan
S051 A, B, & C - Pekisko Creek
Hwy 540:02, km 4.712

SCALE	PROJECT No.	FIG No.
1:5,000	A05115A03	1

Time: 17:36:50 PM
Date: June 12, 2019
File: Z:\AEDM\A05115A03 ABT Southern Region GRMPP400 Drawings\2019\2. Section BMXDS\S051_190517.mxd

Photo 1 **Site A: Head scarp undermining fence line and ditch. Photo was taken facing north on May 6, 2019.**

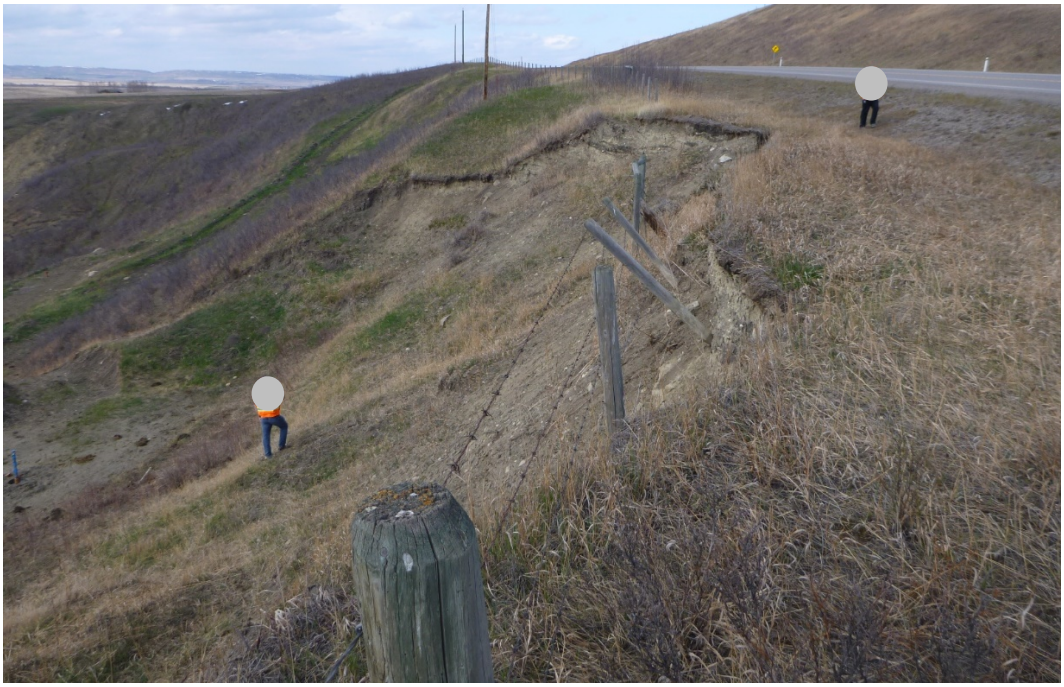


Photo 2 **Site A: Instrumentation bench at mid slope of slide. Area around SI is wet. Photo was taken facing west on May 6, 2019.**

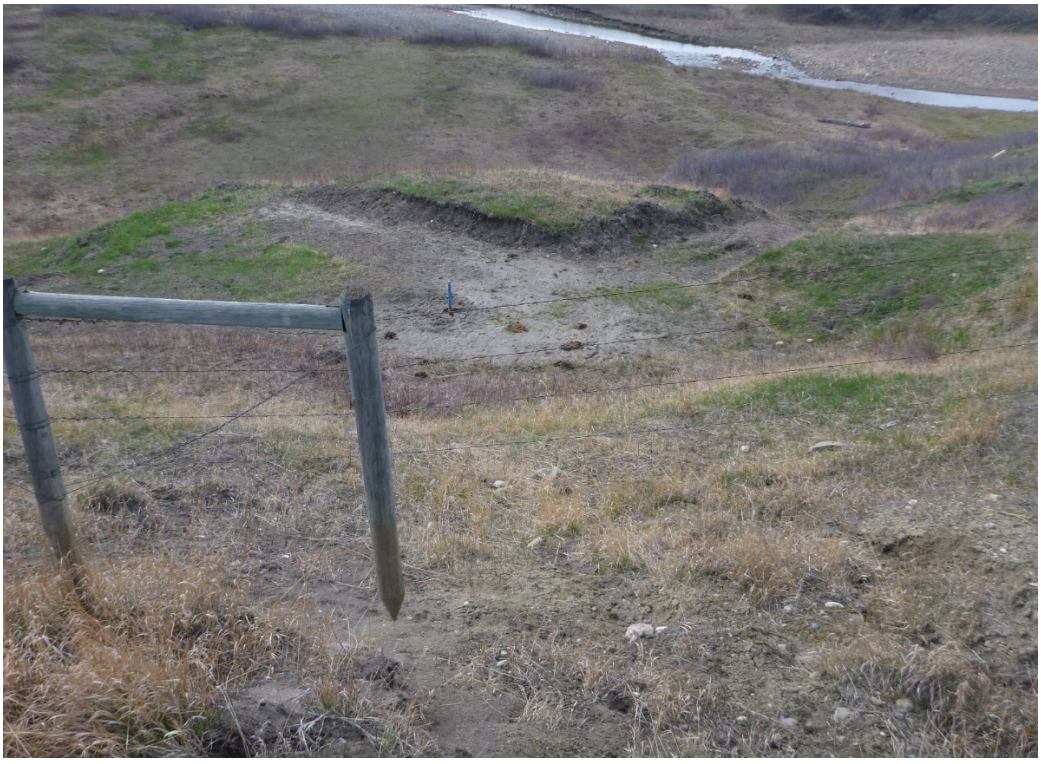


Photo 3 **Site A: View from mid-slope looking up slope. Head scarp at the southern end of Site A has not progressed to the fence line. Photo was taken facing east on May 6, 2019.**

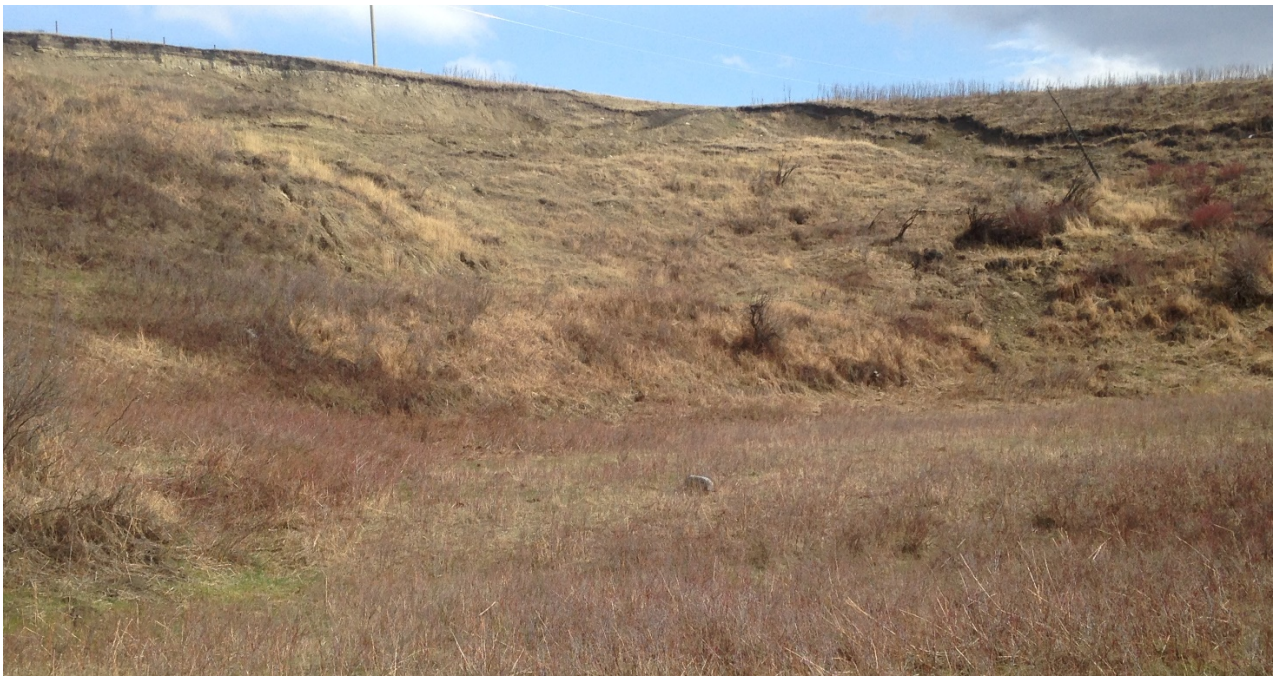


Photo 4 **Site A and Site B: View of head scarps. Photo was taken facing east on May 6, 2019.**

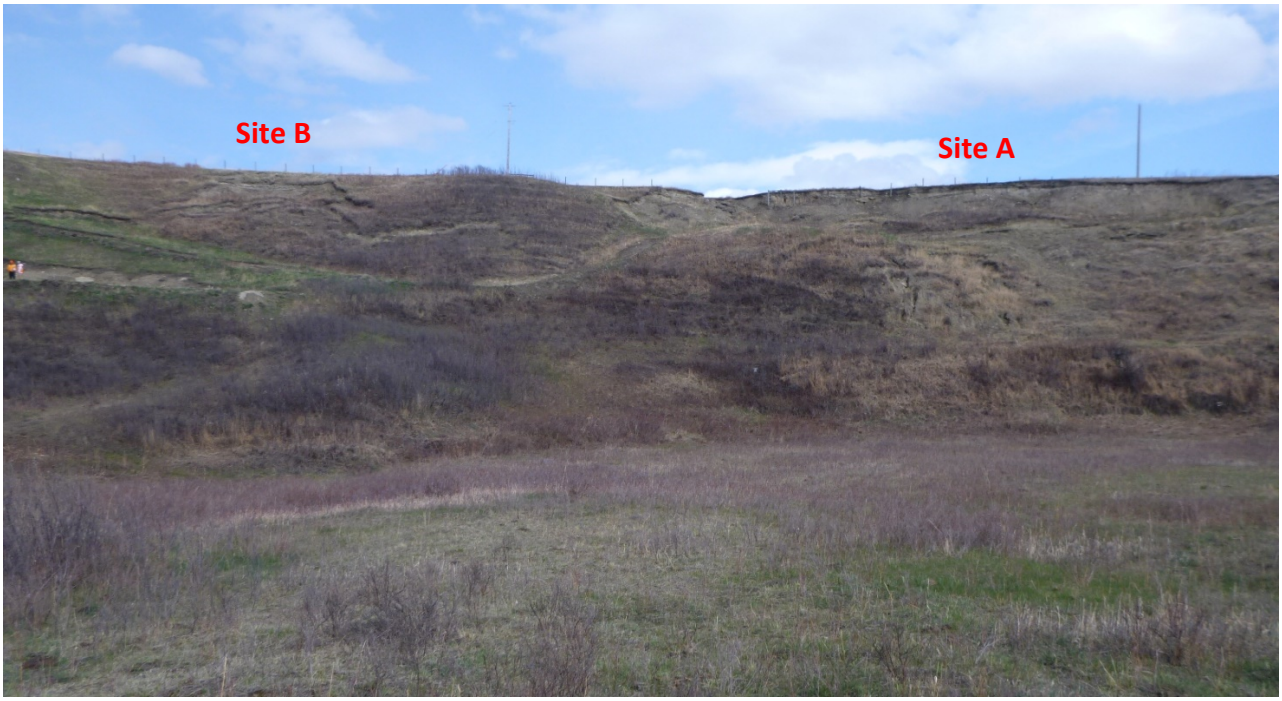


Photo 5 **Site C: Slope erosion extending past fence line. Photo was taken facing northeast on May 6, 2019.**

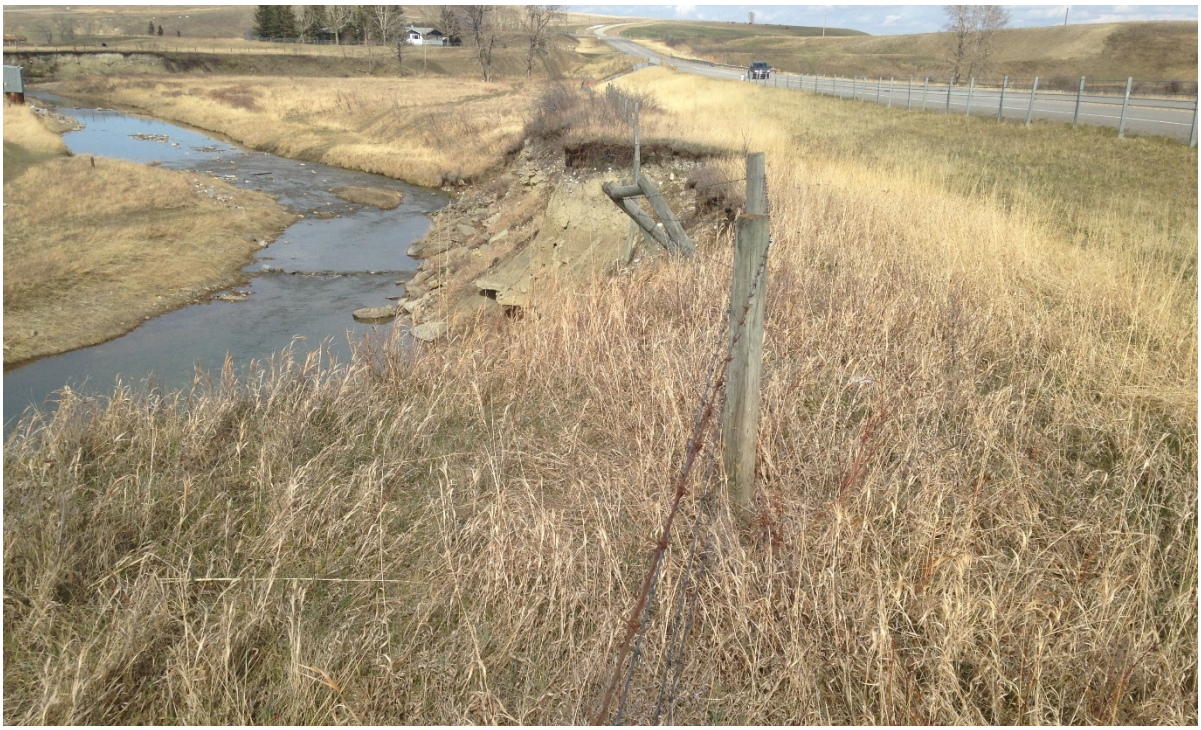


Photo 6 **Site C: Creek erosion failure extending into highway ditch. Utility cable hanging across failure. Photo was taken facing southwest on May 6, 2019.**