

SITE NUMBER AND NAME: <b>C048 – I &amp; III Slides</b>		HIGHWAY & KM: 575:04, 14.5	PREVIOUS INSPECTION DATE: July 11, 2019	INSPECTION DATE: <b>June 09, 2020</b>
LEGAL DESCRIPTION:	NAD 83 COORDINATES: UTM Northing Easting		RISK ASSESSMENT:	
<b>C048-I</b> 03-28-029-22 W4M	12	5707777 358483	PF: 10	CF: 4 TOTAL: 40
<b>C048-III</b> 14-21-029-22 W4M	12	5707780 358250	PF: 10	CF: 4 TOTAL: 40
AVERAGE ANNUAL DAILY TRAFFIC (AADT): 980 (west) and 940 (east) (Ref No. 106230 & 105240)			CONTRACT MAINTENANCE AREA (CMA): 517	

SUMMARY OF SITE INSTRUMENTATION:  Inoperable: One slope inclinometer (SI) installed at C048 – I in 2011.  LAST READING DATE: 2012	INSPECTED BY: Chris Gräpel (KCB) James Lyons (KCB) Tony Penney (AT) Kristen Tappenden (AT)
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PRIMARY SITE ISSUE: C048 – I and III: two shallow slides in the highway embankment fill. Both slides are located on the south side (eastbound lane) of Hwy 575 near the east and west abutments, respectively.

APPROXIMATE DIMENSIONS:

DATE OF ANY REMEDIAL ACTION: C048 – I: July 2010 – soil nails launched (52 nails, 4 rows); July 2014 – H-pile wall installed (65 HP310 X 93 piles, 0.75 m spacing, 48 m long, 12 m deep); “retaining wall” constructed behind the H-pile wall, by excavating to a depth of 2 m, placing filter cloth, installing 2x10 pressure-treated-wood lagging between the piles, and then backfilling with gravel.

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress	X		C048 – I: pavement subsided and cracked C048 – III: pavement cracks in eastbound lane have expanded.	X	
Slope Movement	X		C048 – I: slide has out flanked the H-pile wall C048 – III: ground cracking extends past head of slide; toe roll more developed downslope of pile wall		X
Erosion		X	None observed		X
Seepage		X	None observed		X
Culvert Distress		X	N/A – No culvert present		X

**COMMENTS**

At C048 – I:

- The pile wall has been outflanked to the east and west by slide movement. Ground cracking extends 10 m to 15 m beyond the east end of pile wall (end of cracking at Waypoint 698, east end of pile wall at Waypoint 699, west end of pile wall at Waypoint 701, and west limit of pavement cracking at Waypoint 700).
- Settlement of the slide in front of the pile wall has exposed 1.0 m to 1.8 m of soil below the final row of lagging. Soil is eroding from behind the piles. Soil nails that were installed in July 2010 are becoming exposed.
- Some of the piles are deflected or misaligned, which may be a result of collision with the soil nails during installation.
- The fill behind the H-pile wall is retained at the flanks by unsupported 2” x 10” planks which are held in

place by corroded wire fastened to guardrail posts. The planks are starting to separate allowing fill to erode through the gaps in the planks. The planks will continue to collapse if left unrepaired.

- The toe roll approximately 12 m downslope of the pile wall is in similar condition than during the 2019 inspection (end points of toe roll marked by Waypoint 883 and 884).
- An asphalt overlay was completed in 2015.

At C048 – III:

- Slide does not appear to have widened since the 2019 inspection.
- The backscarp of the slide remains within 2 m of the pavement edge, with cracking in the eastbound shoulder. The width of the pavement cracks appears to be similar than during the 2019 inspection.
- A beaver pond is located at the toe of the slope.
- The highway surface near the C048-III site is poorly drained during heavy rainfall.

During the 2017 inspection, pavement surface runoff was observed to flow down the shoulder of the highway and discharge onto C048-I and C048-III slide areas. Water infiltration is exacerbating slope instability. Seepage from the valley slope into the embankment fill may be contributing to slope instability at the C048-I and -III sites.

KCB completed a drilling investigation at the C048-I and C048-III sites in March 2019 that included logging of the subsurface conditions, SPT testing, soil sampling, and laboratory testing. The results of the drilling investigation and conceptual repair designs for C048-III are summarized in a letter sent to AT in July 2019.

Discussed remedial actions:

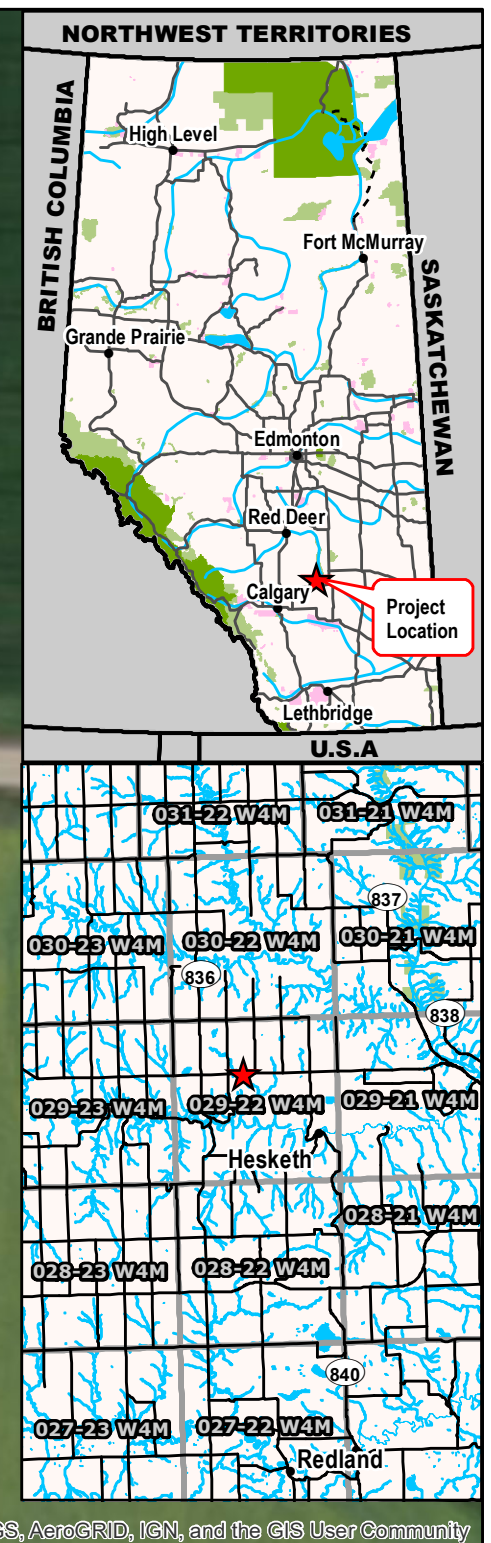
C048 – I:

- Reconstruct the highway. Grade line redesign may reduce load on the slide.
- Extend the H-pile wall to address movements to the east and west. Thicker section timbers more suited as lagging to retain the gravel backfill should be installed between the piles.
- A tender for multiple pile walls on four sites will be released in the fall of 2020 that will include the C048-I site.

C048 – III:

- Option I: Excavate and replace failed slope with granular fill wrapped in non-woven geotextile. The backslope of the excavation would need to be reinforced with soil nails to achieve a short-term FOS of 1.1.
- Option II: Install a wire mesh over the soil-nail reinforced excavation and infill the wire mesh with a bonded fibre matrix hydromulch, soil amendments, and approved seed mix to improve revegetation and reduce erosion.
- Option III: Assess stability of backslope with panel excavation and, if backslope remains stable, execute Option I without soil nails

At both the C048-I and -III sites, improve drainage to divert surface water flow away from the slide areas in slope drains.



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

**Legend**

- ▲ GPS Waypoint (June 12, 2018)
- ▲ GPS Waypoint (July 11, 2019)
- Power Pole
- ~~~~~ Crack
- ✕ Fence
- Guardrail
- TTTTT Top of Slope
- TTTTT Toe Roll
- TTTTT Scarp
- Flow Direction



NOTES: 1. HORIZONTAL DATUM: NAD83 2. GRID ZONE: UTM Zone 12N 3. IMAGE SOURCE: World Imagery, ESRI ArcGIS Online Source date July 22, 2019	CLIENT 	PROJECT CENTRAL REGION GEOHAZARD RISK MANAGEMENT PROGRAM
		TITLE Site Plan C048 - I and III Slides Hwy 575:04, km 14.5
SCALE 1:2,000	PROJECT No. A05115A02	FIG No. 1

Time: 14:40:14 PM  
 Date: July 30, 2020  
 File: Z:\A\EDM\A05115\A02 ABT Central Region GRM\PI\00 Drawings\2020\2. Section BIMXD\C048\_200713.mxd

**Photo 1** Cracking of the pavement upslope of the C048-I slide area. Pavement cracks appear to be wider since the 2019 inspection. Photo taken June 9, 2020 facing east.



**Photo 2** Wooden retaining structure at east end of pile wall has deflected more since the 2019 inspection. Photo taken June 9, 2020 facing north.



**Photo 3** Slow rate of material loss through the bottom of the retaining structure under the geotextile and wooden planks. Photo taken June 9, 2020 facing northeast.



**Photo 4** C048-III slide viewed from the roadway just south of Hwy 575. Photo taken June 9, 2020 facing northeast.



**Photo 5** Head of slide at C048-III has changed little since 2019 inspection. Photo taken June 9, 2020 looking northwest.



**Photo 6** Pavement cracking in eastbound lane above head of slide at C048-III. Cracks appear to have expanded slightly since 2019. Photo taken June 6, 2020 facing east.

