CENTRAL REGION GRMP
SITE INSPECTION FORM

SITE NUMBER AND NAME: **C017-1, -2, and -3 Truckstop Slide**	HIGHWAY & KM: 575:04, 26.631 to 26.050	PREVIOUS INSPECTION DATE: June 26, 2023	INSPECTION DATE: **June 18, 2024**
LEGAL DESCRIPTION: **C017-1** 04-26-29-21 W4M **C017-2** 01-27-29-21 W4M **C017-3** 01-27-29-21 W4M	NAD 83 COORDINATES: UTM Northing Easting 12 5707574 370869 12 5707733 370415 12 5707738 370340	RISK ASSESSMENT: **C017-1** PF: 9 CF: 4 TOTAL: 36 **C017-2** PF: 10 CF: 3 TOTAL: 30 **C017-3** PF: 9 CF: 4 TOTAL: 36	
AVERAGE ANNUAL DAILY TRAFFIC (AADT): 930 (east) and 1000 (west) (Ref No. 105240 & 106230)		CONTRACT MAINTENANCE AREA (CMA): 517	

SUMMARY OF SITE INSTRUMENTATION: Operable: One slope inclinometer (SI) and two vibrating wire piezometers (VWPs) were installed in fall 2020 at the C017-3 subsite. LAST READING DATE: May 13, 2024	INSPECTED BY: Chris Gräpel (KCB) James Lyons (KCB) Tony Penney (TEC) Rocky Wang (TEC)
PRIMARY SITE ISSUE: C017-1: a shallow embankment slope failure on the north side (westbound lane) of Hwy 575; C017-2: an erosion gully that has formed downslope of a culvert outlet on the north side of Hwy 575; and C017-3: a moderately deep-seated slide (5 m to 6 m deep based on an SI installed in 2020) on the north side of Hwy 575 where the highway crosses a creek and enters a cut section in the valley wall	
APPROXIMATE DIMENSIONS: The slides at C017-1 and -3 are approximately 20 m and 40 m wide, respectively. The zone of sliding onto Hwy 837 was approximately 100 m long (total) in various locations on June 13, 2017.	
DATE OF ANY REMEDIAL ACTION: In late-2020 or early-2021, TEC's HMC used failed material from the nearby C018 site as backfill material for the erosion gully in the south (eastbound) ditch near the C017-3 site (approximately 50 m to 100 m long section).	

ITEM	**CONDITION EXISTS**		**DESCRIPTION AND LOCATION**	**NOTICABLE CHANGE FROM LAST INSPECTION**	
	YES	NO		YES	NO
Pavement Distress	X		C017-1 and -3: Pavement cracking has been observed in both lanes of Hwy 575.		X
Slope Movement	X		C017-1: Little change between the 2023 and 2024 inspections. C017-3: Minor retrogression towards Hwy 575 (including ground cracking between the guardrail and head scarp).	X	
Erosion	X		C017-2: There is ongoing ditch erosion in the south (eastbound) ditch (up to 1.5 m deep). C017-3: There is erosion near the west extent of the backscarp.	X	
Seepage		X	N/A – none observed during the 2023 inspection.		X
Culvert Distress		X	C017-2: The culvert inlet is mostly buried, and the outlet is undermined, hanging, and detached.		X

COMMENTS

General:

- A test pitting program was completed in fall 2022 at the C017-1 and -3 subsites (monitored by KCB) to support design work.
- A drilling and instrument installation program was completed in fall of 2020 at the C017-3 subsite (monitored by KCB) to support design work. An SI and two VWPs were installed in the slide mass to monitor movement and ground water conditions, respectively. An additional borehole was drilled in spring 2022 in the north (westbound) lane upslope of the 2020 borehole to support design work.
- In October 2021, KCB submitted a proposal for preliminary engineering, final design, tendering, contract administration, and post-construction services for slope and ditch repairs at the C017 site. The design work was completed in 2022. KCB has issued an Environmental Evaluation (EE) report in March 2023 and c-estimates in June and August 2023. In 2023, TEC requested KCB prepare a combined tender document for the C017-1 and -3 and C018-1 and -2 repairs (Tender No. TND0022533).
- Regulatory approvals including Water Act, Public Lands Act, Fisheries Act, and Navigable Waters Act. Historic Resources Act (HRA) were received in April 2024.The final tender was issued to TEC in early-May 2024, advertised on May 22, 2024, a pre-tender meeting was held on May 31, 2024, and the tender closing date was July 5, 2024.The tender was awarded in early-September, a pre-construction meeting is to be scheduled, and construction is anticipated to be completed in fall 2024.

C017-1:

- No significant changes were observed since the 2023 inspection (Photo 8).
- In 2024, ground cracks were observed between 0.3 m to 1.0 m behind (upslope) of the head scarp.
- The upper 1 m of the slide head scarp is unvegetated and is susceptible to erosion.
- A ground depression was observed near the right (east) flank of the slide. However, KCB suspects this irregularity may be a depression from highway construction and not from additional movement/lateral expansion of the slide.

C017-2:

- The erosion gully downstream of the inoperable corrugated-steel-pipe (CSP) culvert is similar in size as during the 2023 inspection (Photo 4). The gully was partially backfilled in fall 2020 to allow access for the excavator completing test pits at the C017-3 site (monitored by KCB). The access road for test pitting was partially eroded between the 2021 and 2022 inspections, but no significant erosion has occurred between 2022 and 2024.
- The ongoing erosion in the south (eastbound) ditch does not appear to have changed significantly since the 2023 inspection (Photo 5 and 7). The erosion gullies are 1.0 m to 1.5 m deep and 1 m to 2 m wide.
    - Near the midpoint of the site, the erosion is beginning to get closer to the highway and is approximately 2 m from the edge of movement (Photo 7).
- The guardrail near the east (right) extent of the slide appears to have been struck by a vehicle between the 2023 and 2024 inspections and is damaged (Photo 6).
- There is a municipal water line running beneath the south (eastbound) ditch and stakes were placed before the 2022 drilling investigation and instrumentation installation program. The water line is approximately 6 m to 7 m below ground surface.
- The CSP culvert inlet on the south side of the highway is mostly buried (top of culvert was observed during the 2024 inspection, but it was not observed during the 2023 inspection). If flow through the culvert towards the C017-2 erosion gully is re-established during a heavy rainfall event, it could lead to increased erosion in the downstream erosion gully.

C017-3:

- The guardrail west of the C017-3 slide was damaged (indicated by broken guardrail posts and guardrail deflection) between the 2022 and 2023 inspections. The damage was most likely caused by a vehicle collision or road maintenance activities. The guardrail west of the slide was not inspected during the 2024 inspection.
- The slide has expanded significantly(up to approximately 1 m closer the highway) near the northwest (left) side of the backscarp, most likely attributed to additional slide movement and erosion from surface water flow from the north (westbound) ditch (Photos 1 and 2). The gullying was first observed during the 2021 inspections and erosion has progressed between 2021 and 2024 (most significantly between 2023 and 2024).
- Longitudinal ground cracking (Photo 3) has been observed between the backscarp and the shoulder of Hwy 575 since the 2021 inspection. The cracks are approximately 1.5 m from the backscarp and 3 m from the guardrail.
- The C017-3 backscarp is approximately 4 m to 5 m from the guardrail at the closest point.
- Longitudinal pavement cracking in the north (westbound) lane could indicate potential retrogression of the backscarp onto the highway. The degree of cracking does not appear to have changed significantly between the 2023 and 2024 inspections.
- Ditch erosion in the south (eastbound) ditch between C017-2 and C017-3 continues to worsen, with gullies up to 1.0 m to 1.5 m in depth. The fill placed between the 2020 and 2021 inspections (removed from the C018 geohazard site) is beginning to erode and is progressing uphill (west).

Maintenance/Repair/Monitoring Recommendations:

General:

- The site should continue to be regularly inspected by TEC's Maintenance Contract Inspector (MCI).
- The site should continue to be inspected annually as part of the Central Region GRMP Section B Inspections.

C017-1:

- In 2022, KCB completed a design to reinforcement the head scarp of the slide with 84 soil nails. The soil nails will be installed in three rows (1.5 m vertical spacing, 2.0 m horizontal spacing, and 14.0 m deep) through the upper half of the slide. This repair is included as part of Tender No. TND0022533 and is anticipated to be repaired in summer or fall of 2024.

C017-2:

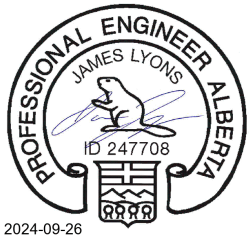
- In 2022, KCB completed a design to decommission and permanently block the 600-mm-diameter CSP culvert underlying Hwy 575 (oriented approximately northeast-southwest) and repair the ditch erosion in the south (eastbound) ditch. The ditch repair will include backfilling the erosion gullies, grading the ditch into a channel shape, lining the base of the ditch with non-woven geotextile, and armouring the ditch with a Turf Reinforced Mat (TRM) product. Check trenches (0.5 m deep and 1.0 m wide) would be installed at 10 m spacing along the ditch bottom to reduce the likelihood of undermining the TRM and non-woven geotextile.
- In 2023, TEC requested that KCB exclude this repair from tender, as the tender will only include the slide repair work for C017-1, C017-3, and C018-1. The repair for the ditch erosion along C017-2 is in on hold.

C017-3:

- In 2022, KCB completed a repair design to improve drainage and stabilize the slide.
    - The drainage improvements proposed by KCB include building a ditch block upstream (west) of the slide and diverting ditch flows into the south (eastbound) ditch via a CSP culvert underlying the highway (oriented north-south). The erosion repair was excluded from TND0022533 due to the cost of armouring the ditch erosion with riprap and alternative repairs and being discussed

between KCB and TEC (e.g., potentially including some erosion repair work as an Extra Work Order as part of the upcoming work included in TND0022533).

- Surface water flows from the north (westbound) ditch upstream of the C017-3 slide should be re-routed as the surface water flow is exacerbating the erosion of the west (left) extent of the head scarp (retrogressing towards the highway surface) and discharging onto the slide mass (which could lead to higher groundwater levels and increased rates of movement).
- Stabilizing the slide includes the installation of 116 soil nails installed in four rows (1.5 m vertical spacing, 2.0 m horizontal spacing, and 14.0 m deep) in the upper portion of the north slope. This repair is included as part of Tender No. TND0022533 and is anticipated to be repaired in summer or fall of 2024.



James Lyons, P.Eng.
Civil Engineer

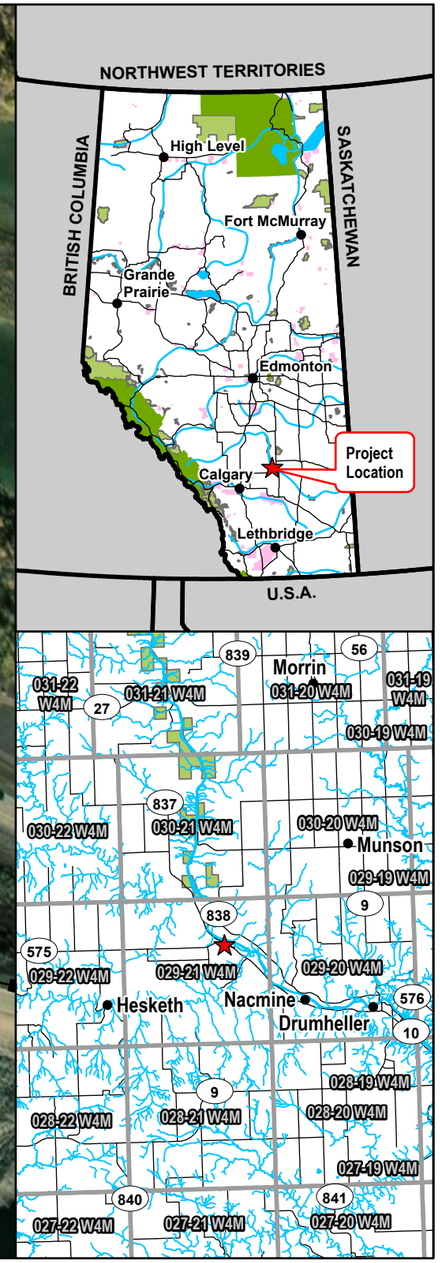
PERMIT TO PRACTICE
KLOHN CRIPPEN BERGER LTD.

RM SIGNATURE: Pamela Jones

RM APEGA ID #: 187607

DATE: 26 Sep. 2024

PERMIT NUMBER: P009196
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)



Legend

- Borehole
- Flow Direction
- Top of Bank
- Scarp
- Guardrail
- Culvert
- Crack
- Erosion

0 125 Metres

NOTES:
1. HORIZONTAL DATUM: NAD83
2. GRID ZONE: UTM ZONE 12N
3. IMAGE SOURCE: 2024 MICROSOFT CORPORATION, MAXAR, CNES DISTRIBUTION AIRBUS DS.

CLIENT: Alberta

Klohn Crippen Berger

PROJECT: CENTRAL REGION GEOHAZARD RISK MANAGEMENT PROGRAM

TITLE: Site Plan
C017-1, -2, and -3 Truckstop Slide
Hwy 575:04, km 26.631

SCALE 1:2,500 | PROJECT No. A05116A02 | FIG No. 1

File: Z:\AE\DMA\05116A02 ABT Central Region GRMP400 Drawings\GIS\02_ProFiles\2024\Section B\AT_CentralRegion_SectionB_240627\AT_CentralRegion_SectionB_240627.aprx Date: Time: Creator: : EQuine

Photo 1 **Aerial oblique photo of the C017-3 site. The slide appears to be in similar condition as during the 2023 inspection, but the amount of erosion of the west (left) side of the head scarp has increased (location indicated by red arrow). Photo taken June 18, 2024, facing southwest.**

Photo 2 **The severity of erosion at the west (left) flank of the C017-3 slide has increased since the 2023 inspection. Photo taken June 18, 2024, facing north.**

Photo 3 **Ground cracking between 1 m to 1.5 m upslope of the head scarp (within 3 m of the guardrail) was observed during the 2024 inspection. Photo taken June 18, 2024, facing west.**

Photo 4 **Aerial oblique photo of the C017-2 site. The degree of erosion appears to be similar as during the 2023 inspection. Photo taken June 18, 2024, facing southwest.**

Photo 5 **Aerial photo showing the east extent of the C017-2 site (ditch erosion indicated by red arrows) where the ditch grade increases to between approximately 15% and 20%. Photo taken June 18, 2024, facing west.**

Photo 6 **The guardrail between the C017-2 and -3 sites appears to have been struck by a vehicle between the 2023 and 2024 inspections (location indicated by red arrow). Photo taken June 18, 2024, facing east.**

Photo 7 **The erosion in the south (eastbound) lane near the midpoint of the C017-2 site is expanding and it within 2 m of the edge of pavement. Photo taken June 18, 2024, facing east.**

Photo 8 Aerial photo of the C017-1 site (location indicated by red circle). Photo taken June 18, 2024, facing east.