**SOUTHERN REGION GRMP**
**SITE INSPECTION FORM**

| SITE NUMBER AND NAME: **S056-1 West Gorge Creek** | HIGHWAY & KM: 25002:02, 7.693 | PREVIOUS INSPECTION DATE: May 28, 2024 | INSPECTION DATE: **May 27, 2025** |
|---|---|---|---|
| LEGAL DESCRIPTION: 15-29-019-05 W5M | NAD 83 COORDINATES: UTM 11 Northing 5612799 Easting 665797 | RISK ASSESSMENT: PF: 13 CF: 10 TOTAL: 130 | |
| MONTHLY AVERAGE DAILY TRAFFIC (MADT): May 2024 - 242 (west) & 232 (east) (Reference No. 55460220) | | CONTRACTOR MAINTENANCE AREA (CMA): 521 | |

| SUMMARY OF SITE INSTRUMENTATION: | INSPECTED BY: |
|---|---|
| May 2024 – One vibrating wire piezometer (VWP) was installed at the site. A data logger was attached to the VWP on June 21, 2025.<br><br>LAST READING DATE: July 10, 2025 | Chris Gräpel (KCB)<br>Jorge Rodriguez (KCB)<br>Doreen Wang (KCB)<br>Renato Macciotta (UofA)<br>Alex Frotten (TEC)<br>Rishi Adhikari (TEC) |

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|---|
| PRIMARY SITE ISSUE: Erosion on the south side of the highway due to surface runoff, precipitation, and seepage through the slope. The highway is located at the crest of a steep valley slope above Sheep Creek River. The south (eastbound) ditch has been undermined and is draining directly onto the erosion feature. The erosion has encroached on the highway's guardrail. |
| APPROXIMATE DIMENSIONS: The erosion is approximately 20 m wide at the crest of a 30 m high slope above Sheep River. Approximately 1/4 of the way down the slope, the failure area narrows to a 3 m to 5 m wide erosion gully. |
| 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 | Erosion is within 1 m of the edge of driving lane. | | X |
| Slope Movement | X | | Tension cracks and slumping have been observed on the east and west flanks of the erosion feature. There are mild changes as the head scarp steepens from ongoing erosion. | X | |
| Erosion | X | | Erosion due to precipitation and surface water runoff from the south (eastbound) ditch into erosion area. | X | |
| Seepage | X | | Groundwater seepage has been observed approximately 3 m to 4 m down the slope. | | X |
| Culvert Distress | | X | N/A – there is not a culvert at the S056-1 site. | | X |

**COMMENTS**

General:

- The site was first inspected in 2017 during the Southern Region GRMP Section B inspection tour. The site has been inspected annually between 2017 and 2025. The site is located within Sheep River Provincial Park.
- KCB submitted a proposal for the provision of preliminary engineering, environmental services, detailed design, tendering, and construction monitoring on February 15, 2023. TEC approved the proposal on February 16, 2025, and KCB began work.
- A drilling investigation was performed at the site on May 13 and 14, 2023, to support preliminary design work. The investigation consisted of one borehole drilled in the south (eastbound) ditch approximately 35 m west of the erosion feature. The borehole was drilled to a depth of approximately 23.8 m, a VWP was installed to an approximate depth of 15.8 m in the silty clay till, and the borehole was fully backfilled with grout. After stabilizing, the recorded water level has been relatively steady (± 0.3 m). In general, the encountered materials from ground surface to termination depth included silty sand, sand and gravel, silty clay till, clay till, and bedrock.
- A data logger was installed with the VWP during installation. However, the flush-mounted headbox became saturated after installation, and the data logger became inoperable between May and September 2024. A replacement data logger was installed on June 21, 2025, and the logger was also installed in an above-ground headbox to prevent future water damage.
- Preliminary engineering work has been completed. KCB's draft Preliminary Engineer Report (PER) is being prepared for TEC to review and comment. The PER includes an options assessment, and the three rehabilitation options we assessed include highway realignment, installing a pile wall with timber lagging, and a retaining wall and reinforced slope.
- Environmental work is ongoing and is dependent on the rehabilitation option selected by TEC. Once the rehabilitation option has been selected and proceeds to the final design, the environmental work can progress.

S056-1:

- The erosion fully is approximately 20 m wide near the edge of the highway and narrows to approximately 3 m to 5 m approximately 8 m below the highway surface (Photos 1, 3, 5, and 6).
- The erosion is within approximately 1 m from the edge of the highway (Photo 1 and 2). Erosion has completely undermined the south (eastbound) ditch and has begun to undermine the guardrail posts, and one guardrail post is mostly exposed (Photo 2). No pavement distress or guardrail deflection has been observed.
- Surface water runoff from the south (eastbound) ditch is being conveyed onto the erosion gully (Photo 3). Flow is exacerbating erosion as there is no vegetative cover in the erosion gully (Photos 1 through 3).
- Seepage through the slope has been observed in the erosion gully approximately 3 m to 4 m below the highway elevation (Photo 3). There does not appear to be a significant change in the seepage between the 2024 and 2025 inspections.
- Outside of the erosion gully, the highway embankment and river valley slopes are well vegetated with grass, shrubs, and trees (Photo 5).
- Erosion of the slope appears to be depositing an alluvial fan into Sheep River.
- The highway embankment and river valley slope are steep. The slope is near vertical at the edge of the highway, flattens to approximately 1H:1V for the upper third of the slope, before flattening to approximately 2H:1V for the bottom half to two-thirds of the slope.

- The erosion gully is continuing to expand to the east and west. The overall slope of the erosion feature is flattening in the upper section as the erosion gully deepens, and ongoing erosion continues to remove sediment.
- In 2022, a wooden stake was installed and painted orange, west of the erosion gully edge, to estimate gully expansion. During 2022-2023 inspections, the stake was about 1.7 m from the edge; no measurements were taken in 2024-2025. Visual inspection suggests it's now approximately 1.5 m away (Photo 7).
- During the 2020 inspection, tension cracking and slumping were first observed on the left (east) flank of the slope failure. Between the 2021 and 2022 inspections, the ground surface appears to have dropped approximately 0.3 m, and a tree had fallen down the slope. Since 2023, there has been minimal change observed in this area. The area is expected to eventually erode into the downslope erosion feature, enlarging the disturbed area.
- The north backslope is sloped at approximately 2H:1V and appears to consist of mostly coarse-grained soils (sand and gravel with cobbles) (Photo 8). The slope appears unchanged and not showing a deep seated movement.
- The depth of the north and south ditches was estimated during the 2025 inspection. The estimated depths were approximately 0.70 m and 0.85 m, respectively.

Maintenance/Repair/Monitoring Recommendations:

Short-term:

- The site should be regularly inspected by TEC's Maintenance Contract Inspector (MCI), particularly after precipitation events, since it is an erosion geohazard site.
- The site should be inspected annually as part of the Southern Region GRMP Section B inspections.
- The site should be read twice per year as part of the Southern Region GRMP Section C readings.

Long-term:

- The repair options discussed during the 2025 inspection include:
  - Realigning the highway. The highway could be shifted north by one lane (approximately 3.5 m), similar to what was completed for a length of the highway east of the site where erosion was encroaching upon the south lane. The highway backslope would need to be partially excavated to make room for the new lane and to accommodate shifting the ditch further north.
  - Installing a retaining wall and reinforced slope. The retaining wall should be installed where the erosion gully narrows to 3 m to 5 m and a reinforced slope (geogrid-reinforced granular fill) built above the retaining wall. Drainage pipes should be installed behind the retaining wall and erosion protection should be installed downslope of the retaining wall. Construction should be performed to limit disturbance to the well vegetated slopes outside of the erosion gully.
  - A cross culvert should be installed below the highway, west (upstream) of the site to convey surface water flow from the south ditch to the north ditch. Due to the relatively shallow depth of the ditches (between approximately 0.70 m and 0.85 m), inlet and outlet structures will be required, and the culvert will need to be installed at a skew angle from the highway to achieve positive drainage. The culvert should be thicker with stronger corrugation due to the limited cover available. A ditch block should be constructed downstream (east) of the culvert inlet to direct flow into the culvert inlet.

This report is an instrument of service of Klohn Crippen Berger (KCB). The report has been prepared for the exclusive use of Alberta Transportation and Economic Corridors (Client) for the specific application to the Southern Region Geohazard Risk Management Program (Contract No. CON0022161) and it may not be relied upon by any other party without KCB's written consent.

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1. The report is to be read in full, with sections or parts of the report relied upon in the context of the whole report.
2. The observations, findings and conclusions in this report are based on observed factual data and conditions that existed at the time of the work and should not be relied upon to precisely represent conditions at any other time.
3. The report is based on information provided to KCB by the Client or by other parties on behalf of the client (Client-supplied information). KCB has not verified the correctness or accuracy of such information and makes no representations regarding its correctness or accuracy. KCB shall not be responsible to the Client for the consequences of any error or omission contained in Client-supplied information.
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PROFESSIONAL ENGINEER ALBERTA
JORGE RODRIGUEZ NAVARRO
ID 222669
2025 Oct. 10
LICENSED TO PRACTICE

Jorge Rodriguez, Ph.D., M.Sc., P.Eng.
Geotechnical Engineer

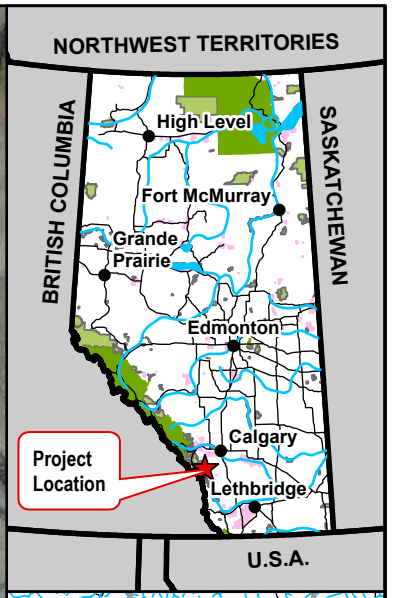
**PERMIT TO PRACTICE**
**KLOHN CRIPPEN BERGER LTD.**

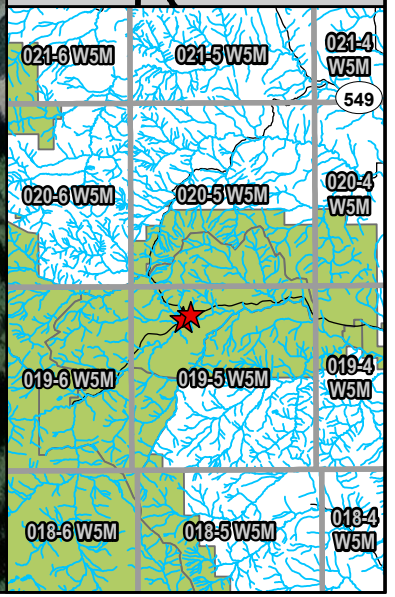
RM SIGNATURE: Pamela Jones

RM APEGA ID #: 187607

DATE: 10 Oct. 2025

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


**Legend**

- Vibrating Wire Piezometer (VW)
- Flow Direction
- Erosion Extent

0 50 Metres

NOTES:
1. HORIZONTAL DATUM: NAD83
2. GRID ZONE: UTM ZONE 11N
3. IMAGE SOURCE: MAXAR 2025
4. BH24-01 AND VW24-01 WERE COMPLETED AND INSTALLED, RESPECTIVLEY ON MAY 14, 2024.

CLIENT: Alberta

Klohn Crippen Berger

PROJECT: SOUTHERN REGION GEOHAZARD RISK MANAGEMENT PROGRAM

TITLE: Site Plan
S056-1 - West of Gorge Creek
Hwy 25002:02, km 7.693

| SCALE | PROJECT No. | FIG No. |
|---|---|---|
| 1:1,500 | A05116A03 | 1 |

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# Appendix I
# Inspection Photographs

**Photo 1** **Erosion located downslope (south) of the highway is within 1 m of the edge of the driving lane, and the south ditch has been undermined. The degree of erosion appears similar to during the 2024 Section B Inspection. Photo taken May 27, 2025, facing east.**

**Photo 2** **Near-vertical erosion face near the edge of the highway. Erosion is beginning to undermine the guardrail posts and on is partially hanging (indicated be red rectangle). Photo taken May 27, 2025, facing northeast.**

**Photo 3** **Flow path of water conveyed by the south (eastbound) ditch through the area of erosion. Seepage observed near the base of the erosion feature (indicated by red arrow). Photo taken May 27, 2025, facing northwest.**

**Photo 4** **Erosion as viewed from the edge of the south lane. Photo taken May 27, 2025, facing south.**

**Photo 5** **East extent of the site. Photo taken May 27, 2025, facing east.**

**Photo 6** **Midslope extent of the erosion where the erosion feature narrows to approximately 3 m to 5 m wide. A relatively shallow erosion gully extends downstream towards Sheep River. Photo taken May 27, 2025, facing north.**

**Photo 7** **Wooden stake (indicated by red circle) used to estimate the rate of erosion between inspections was approximately 1.5 m from the edge of the erosion gully. Photo taken May 27, 2025, facing west.**

**Photo 8** **North backslope near the west extent of the site. No evidence of shallow bedrock was observed. Photo taken May 27, 2025, facing west.**