SOUTHERN REGION GRMP
SITE INSPECTION FORM

SITE NUMBER AND NAME: **S055 East of Gleichen**	HIGHWAY & KM: 901X, 9.2 km east of 547	PREVIOUS INSPECTION DATE: July 7, 2021	INSPECTION DATE: **May 12, 2023**
LEGAL DESCRIPTION: 02-12-022-22 W4M	NAD 83 COORDINATES: UTM 12 Northing 5634864 Easting 364825	RISK ASSESMENT Slide: PF: 9 CF: 2 TOTAL: 18 Erosion: PF: 5 CF: 2 TOTAL: 10	
AVERAGE ANNUAL DAILY TRAFFIC (AADT): 300 (west), (Ref. No. 109170)		CONTRACTOR MAINTENANCE AREA (CMA): 30	

SUMMARY OF SITE INSTRUMENTATION: None LAST READING DATE: N/A	INSPECTED BY: Chris Grapel (KCB) Peter Roy (KCB) Roger Skirrow (AT) Alex Frotten (AT)

PRIMARY SITE ISSUE: A runoff erosion gully on the north side of the highway and slope instability on the south side. Repair activities were completed in 2018, however the slope drain became blocked in spring 2019 due to grass buildup on the fine mesh screen (aperture size of 15 mm) fitted to the pipe inlet, leading to overtopping of the ditch block and erosion of the repaired surfaces. The erosion gully and slope drain on the north side were repaired in late 2019, including replacement of the inlet trash rack.

In 2020, instability was observed in the slope reconstruction on the south side of the highway. Sloughing was visible at the toe of the repaired zone.

APPROXIMATE DIMENSIONS: Highway embankment constructed on south flowing creek, approximately 15 m high. The embankment side slope on the north side is approximately 2H:1V. The southern side slope is steeper than the north side.

DATE OF ANY REMEDIAL ACTION: Repair to the slope failure on south side was completed in November 2018 by excavating the slide mass and replacing it with compacted gravel fill. Repair of the erosion gully on the north side was completed in December 2018 using a slope drain.

ITEM	**CONDITION EXISTS**		**DESCRIPTION AND LOCATION**	**NOTICABLE CHANGE FROM LAST INSPECTION**	
	YES	NO		YES	NO
Pavement Distress		X	Gravel road. No signs of cracking or distress on the highway surface.		X
Slope Movement	X		Slide repairs completed in 2018 south of highway. In 2020, it was noted that the repair has partially failed.		X
Erosion	X		Erosion rills up to 50 mm deep on the south side, where slope not vegetated. Erosion in ditch on north side.		X
Seepage	X		Washed out section of vegetation and granular fill on the south side of the highway near the fence line, thought to be due to seepage or saturation of fill due to infiltration.		X
Culvert Distress	X		Slope drain washout north of highway led to sediment build-up at the inlet to the 900 mm diameter highways culvert downstream of the slope drain, and restriction of flow through the culvert under the CP Rail line.		X

COMMENTS

Construction was carried out in winter 2018 to repair an erosion gully and slope instability. The slope drain installed north of the highway became obstructed in spring 2019 leading to erosion and undermining of the HDPE pipe. The MC completed slope drain repairs in late 2019.

North Side of Highway

Vegetation is well established across large portions of the repair. Erosion rills 5 to 50 mm deep were noted in 2021 where vegetation coverage was poor. The fence onto private property was not crossed during the 2023 inspection. The lower portion of the slope drain is covered with straw matting to promote vegetation growth, and the outlet is covered with riprap (150 mm minus) to minimize deflection during outflows.

During the 2023 site visit the ditch was dry. Localized ditch erosion upstream of the slope drain inlet was visible. Erosion rills were up to 150 mm deep and 0.5 m wide.

In 2020 it was estimated that outflows from the HDPE slope drain were less than flow in the ditch, possibly due to leakage. Site observations in 2021 noted that the final joint at the downstream end of the HDPE pipe had separated, leading to leakage at the joint, minor erosion of riprap, and settlement of the geotextile on the south side of the pipe. There was no change observed in the 2023 inspection based on the drone video.

The v-ditch from the slope drain outlet has been partially eroded but is still functional. A steel culvert beneath the highway at the toe of the embankment remains infilled with sediment as a result of the spring 2019 ditch block overtopping. The sediment plug restricts flows to the south, which also impedes flow from the CSP culvert under the CP Rail line.

South Side of Highway

On the south side of the highway, sloughing of the 2018 granular repair continues. It appears that surface runoff is contributing to ground saturation, and that the granular fill is acting as a preferential flow pathway. Granular backfill has failed at the toe of the repaired zone, near to the fence line. The head scarp of the sloughing is located 2.8 m upslope from the fence line and is approximately 2.5 m wide by 1 m high.

Tension cracking was noted midslope on the east and west flanks of the repaired area during the 2020 inspection, minimal change was noted during the 2023 inspection. The failed material is displacing the fence downslope. Vegetation coverage has not changed significantly when compared to 2021 observations.

Recommendations:

- North side: Clean out the two CSP culverts at the toe of the slope and restore full functionality to provide highway drainage, and to permit drainage from agricultural land north of the CP Rail line.
- North side: Monitor leakage due to separated slope drain joint.
- North side: Install geofabric at the inlet to the slope drain to direct all ditch flow into the HDPE pipe. A custom “boot” is recommended around the HDPE pipe to provide a full seal around the pipe.
- South side: Improve highway drainage, construct a berm or regrade the highway surface to avoid runoff concentrating at the 2018 repair location (which represents a low point on the south side of the highway).
- South side: Monitor sloughing at the location of the 2018 repair, and adjacent areas of sloughing which are visible but were not a part of the 2018 repair. The embankment on the south side of the highway is steep and future slope stabilization may be required. Due to the steepness, active ground anchoring solutions should be considered.

The site should be inspected every two years.

by members of the same profession for projects of a similar nature at the time and place the services were rendered. KCB makes no warranty, express or implied.

Use of or reliance upon this instrument of service by the Client is subject to the following conditions:

(i) The report is to be read in full, with sections or parts of the report relied upon in the context of the whole report.

(ii) 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.

(iii) 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.

(iv) KCB should be consulted regarding the interpretation or application of the findings and recommendations in the report.

(v) This report is electronically signed and sealed and its electronic form is considered the original. A printed version of the original can be relied upon as a true copy when supplied by the author or when printed from its original electronic file.

PROFESSIONAL ENGINEER PETER J. ROY ALBERTA

13 Oct. 2023
ID 141695

Peter Roy., P.Eng.
Civil Engineer

PERMIT TO PRACTICE
KLOHN CRIPPEN BERGER LTD.

RM SIGNATURE: Pamela Jones

RM APEGA ID #: 187607

DATE: 13 Oct. 2023

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

Legend

- Failure Material
- Tension Crack
- Fence
- Culvert
- Main Scarp

0 50 Metres

NOTES:
1. HORIZONTAL DATUM: NAD83
2. GRID ZONE: UTM ZONE 12N
3. IMAGE SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS AND THE GIS USER COMMUNITY.

CLIENT: Alberta

Klohn Crippen Berger

PROJECT: SOUTHERN REGION GEOHAZARD RISK MANAGEMENT PROGRAM

TITLE: Site Plan
S055 - East of Gleichen Slide
Hwy 1:14, km 40.353

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

File: Z:\AC\GY\Alberta\A05116A03 ABT Southern Region GRMP\400 Drawings\2023\01_ProFile\Section B\ABT_Southern_SectionB_230713\ABT_Southern_SectionB_230717.aprx Date: Time: Creator: : aharrison

Photo 1 **Overview of the site. Photo taken facing west on May 12, 2023.**

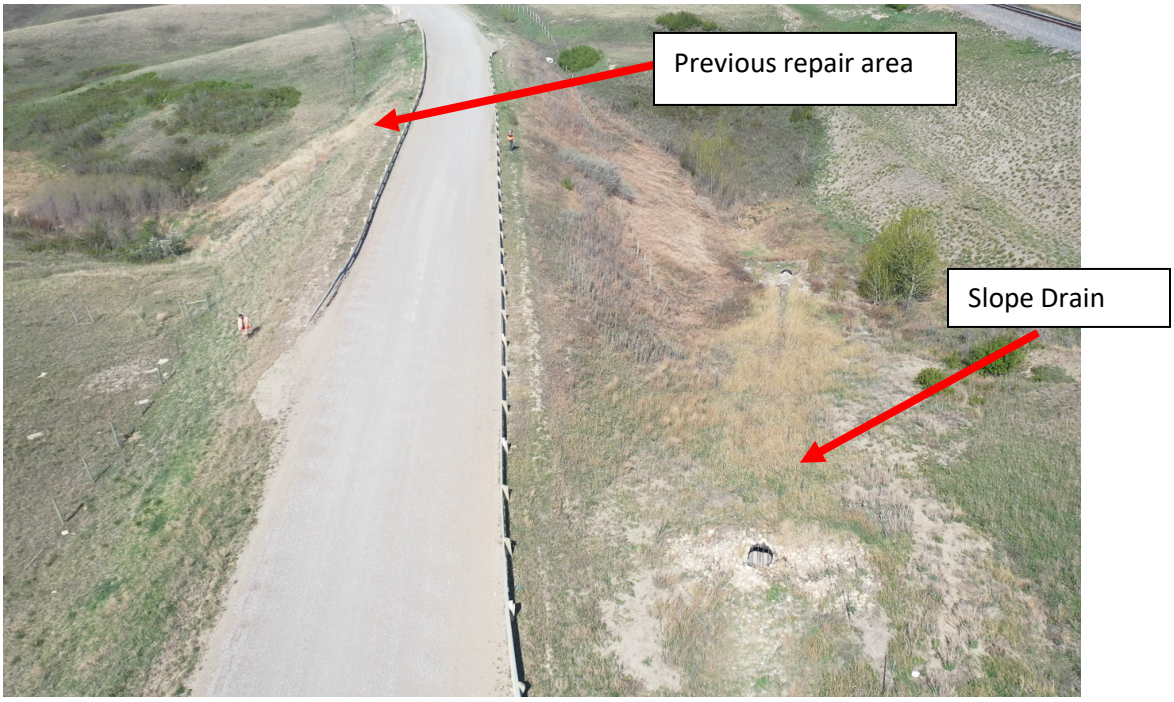

Photo 2 **North side of highway – slope drain. Note exposed pipe at two locations. Photo taken facing west on May 12, 2023.**

Photo 3 **North side of highway – slope drain. Note exposed pipe at two locations. Photo taken facing east on May 12, 2023.**

Photo 4 **North side of highway – Ditch erosion and slope drain inlet. Photo taken facing west on May 12, 2023.**

Photo 5 **South side of highway – Slope failure at repair area. Red circle notes previous repair area. Photo taken facing east on May 12, 2023.**

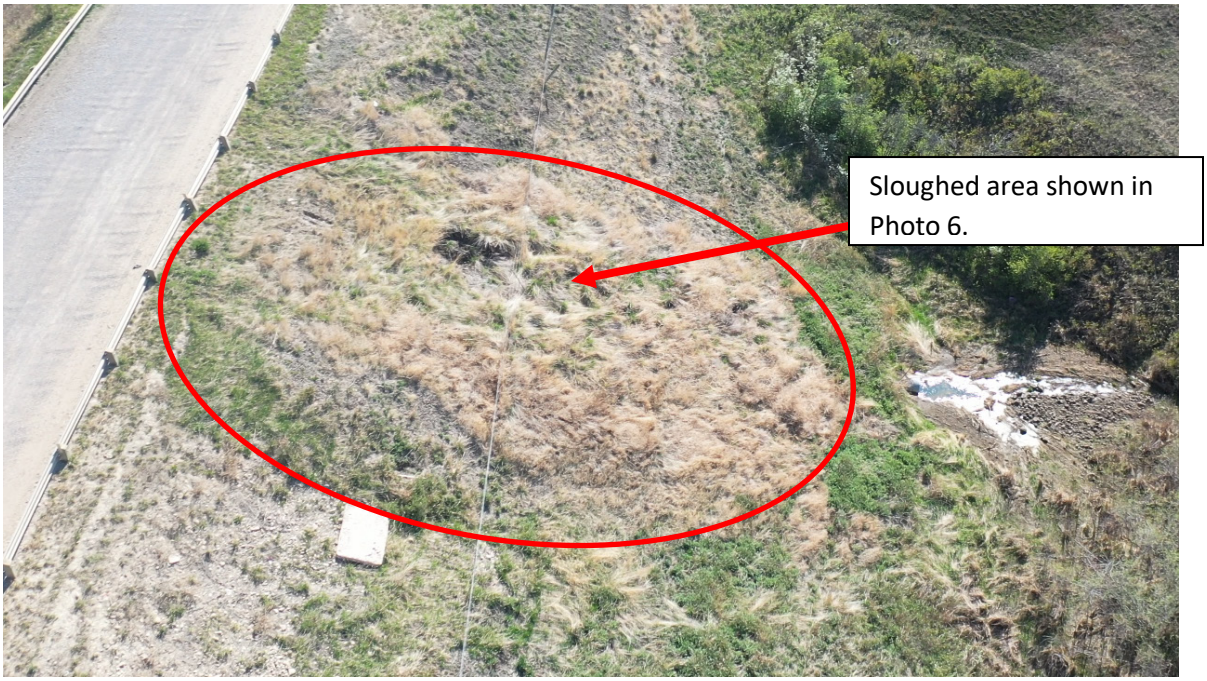

Photo 6 **South side of highway – Visible granular fill and displaced vegetation near fence line of the repaired section. Photo taken facing west on May 12, 2023.**