SOUTHERN REGION GRMP
SITE INSPECTION FORM

SITE NUMBER AND NAME: **S057 Exshaw Rockfall, Sites A & B**	HIGHWAY & KM: 1A:02 km 12.034	PREVIOUS INSPECTION DATE: July 6, 2020	INSPECTION DATE: **May 17, 2022**
LEGAL DESCRIPTION: 13-22-24-09 W5M	NAD 83 COORDINATES: UTM 11 Northing 5658509 Easting 627178	RISK ASSESMENT: Site A: PF: 11 CF: 2 TOTAL: 22 Site B: PF: 12 CF: 3 TOTAL: 36	
AVERAGE ANNUAL DAILY TRAFFIC: 844 (west) & 770 (east) (Reference No. 50100258)		CONTRACTOR MAINTENANCE AREA (CMA): 27	

SUMMARY OF SITE INSTRUMENTATION: There is no instrumentation at the S057 site. LAST READING DATE: N/A	INSPECTED BY: Chris Morgan (KCB) Laura Assaad (KCB) Renato Macciotta (KCB) Roger Skirrow (AT) Alex Frotten (AT)
PRIMARY SITE ISSUE: Two rock cut slopes with bedding planes dipping towards the highway. The sites have shallow to non-existent catchment ditches and rockfalls can reach the highway.	
APPROXIMATE DIMENSIONS: Site A – approximately 210 m long and up to 15 m high; Site B – approximately 300 m long and up to 12 m high.	
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	N/A – none observed		X
Slope Movement		X	Bedrock slopes with ongoing rockfall into the existing shallow catchment ditches.		X
Erosion		X	N/A – none observed		X
Seepage		X	N/A – none observed		X
Culvert Distress		X	N/A – none observed		X
Rockfall	X		Recent rockfalls up to 3.5 m^3 contained within the ditch		X

COMMENTS

General:

- The existing shallow ditches at both sites appear to be effective but should be cleaned out regularly.
- A utility box was noted on the north side of the road, with utility cables running along the ditch.

Site A (km 12.52 to km 12.34):

- The bedrock is sedimentary (limestone or siltstone) with open joints and visible bedding planes (dipping towards the highway at approximately 40°) (Photo 1). There is the potential for sliding failure but unlikely to rebound onto the road.
- The ditch is relatively flat and rockfall debris (up to boulders in size) were observed in the ditch. The larger debris (boulders) were observed during the 2020 inspection (Photo 2).
- Fresh (i.e., unweathered) rockfall debris (up to 0.70 m x 0.30 m x 0.50 m) were noted in the ditch, suggesting rockfalls are ongoing. Multiple rocks with open fractures were noted at the brow of the rock slope.
- No significant changes were observed at the site during the 2022 inspection.

Site B (km 12.26 to km 11.91):

- Bedrock is sedimentary and similar to Site A (limestone or siltstone) with open joints and visible bedding planes (dipping towards the highway at approximately 50°), mid-sized blocks visible with potential to roll onto the road. The bedrock at the northwest end of Site B is highly fractured and has irregular bedding (Photo 3). At the east end the bedrock is massive and less fractured. Subrounded rocks were observed to be weathering out of the soil mantle at the brow of the slope during the inspection. Root jacking due to the presence of trees and shrubs may be contributing to additional rockfalls.
- Ditch is relatively flat and contained multiple gravel and cobble sized debris. The ditch appeared to have been recently graded (Photo 4).
- Rockfalls are active and fresh rockfall debris (up to 1.2 m x 0.60 m x 0.70 m) was noted in the ditch bottom (Photo 5), with smaller debris on the highway surface. Rockfall observed was primarily subangular to angular. Multiple potential loose blocks were visible in the rock mass.
- Site B appears to be more active than Site A.

Maintenance/Repair/Monitoring Recommendations:

- The site should be inspected regularly by AT's MCI and rockfall debris in the ditch should be regularly removed.
- The site should continue to be inspected as part of the Southern Region GRMP Section B inspections.
- Excavation of rockfall catchment ditches adjacent to the highway and spot bolting of blocks which appear unstable or pose a wedge failure risk. A trajectory model could be used to assess the size of lock block wall required to contain the rockfalls. A lock block wall or high-tension cable barrier (HTCB) should be considered pending the results of the trajectory model. A wildlife and road safety assessment would be need completed to assess the impact from the installation of a lock block wall or HTCB at the site.

This report is an instrument of service of Klohn Crippen Berger (KCB). The report has been prepared for the exclusive use of Alberta Transportation (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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September 27 2022
I.D. # 58463

Chris Gräpel, M.Eng., P.Eng.
Senior Civil Engineer, Associate

PERMIT TO PRACTICE
KLOHN CRIPPEN BERGER LTD.

RM SIGNATURE: _____

RM APEGA ID #: 187607

DATE: 28 Sep. 2022

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

Legend

- GPS Track (May 17, 2022)
- Flow Direction

NOTES:
1. HORIZONTAL DATUM: NAD83
2. GRID ZONE: UTM ZONE 11N
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
S057 - Exshaw Rockfall
Hwy 1A:02, km 12.034

SCALE	PROJECT No.	FIG No.
1:2,500	A05116A03	1

File: Z:\A\CGY\Alberta\A05116A03 ABT Southern Region GRMP\400 Drawings\2022\Section B\ArcGIS Pro Figures\S057.aprx Date: Time: Creator: : aharrison

Inspection Photographs

Photo 1 **The bedrock at Sites A and B is dipping at approximately 40° and 50°, respectively, towards the highway. Photo taken May 17, 2022, facing north.**

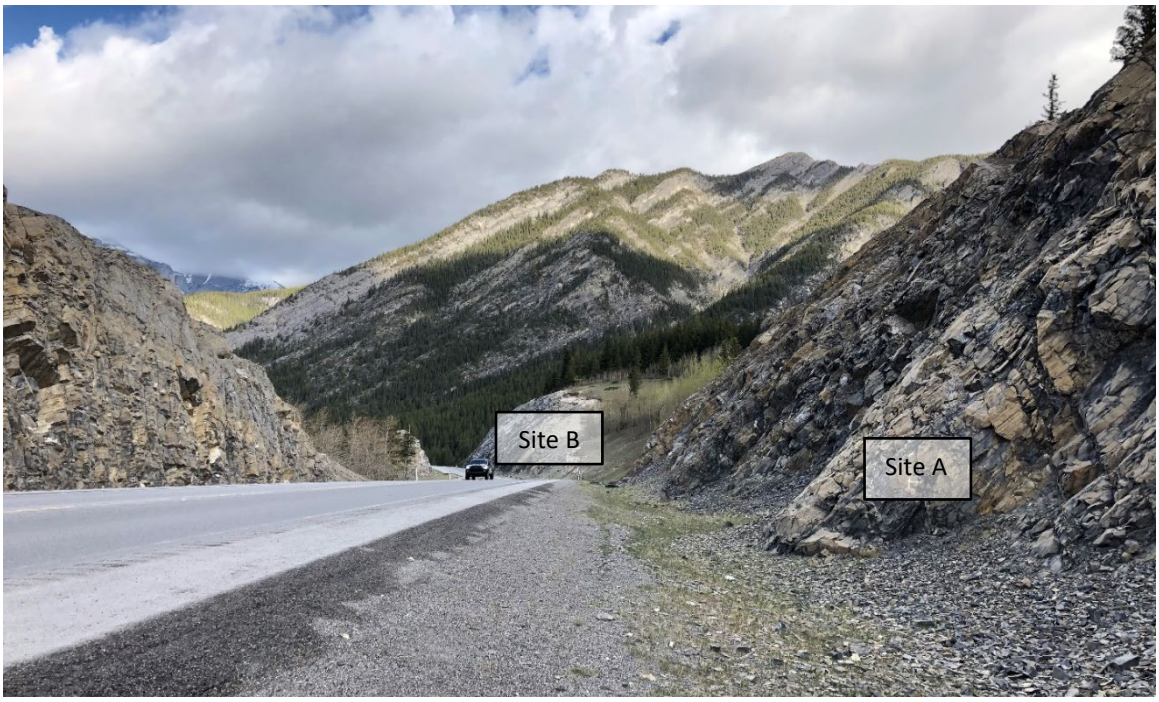

Photo 2 **The north (westbound) ditch at Site A is relatively flat and some rockfall debris was observed at the toe of the slope (larger debris indicated by red arrow). Photo taken May 17, 2022, facing southeast.**

Photo 3 **Northwest end of Site A. Photo taken May 17, 2022, facing north.**

Photo 4 **Northwest end of Site B. Photo taken May 17, 2022, facing north.**

Photo 5 **Rockfall debris up to 3.5 m^3 in the ditch of Site B. Photo taken May 17, 2022, facing northwest.**