CENTRAL REGION GRMP
SITE INSPECTION FORM

SITE NUMBER AND NAME: **Unnumbered site – H11 Shunda Creek Rock Fall Site**	HIGHWAY & KM: H11:06, 6.17	PREVIOUS INSPECTION DATE:N/A	INSPECTION DATE: **June 27, 2023**
LEGAL DESCRIPTION: 16-36-40-15 W5	NAD 83 COORDINATES: UTM 11 Northing 5816109 Easting 566557	RISK ASSESSMENT: PF: 11 CF: 2 TOTAL: 22	
AVERAGE ANNUAL DAILY TRAFFIC (AADT): 1,380 (west) & 1,340 (east) (Ref No. 7000875 & 70000507)		CONTRACT MAINTENANCE AREA (CMA): 514	

SUMMARY OF SITE INSTRUMENTATION: There is no instrumentation at the site. LAST READING DATE: N/A	INSPECTED BY: Chris Gräpel (KCB) James Lyons (KCB) Tony Penney (TEC) Rishi Adhikari (TEC) Pramaya Kannel (TEC)
PRIMARY SITE ISSUE: The site is a rockfall geohazard site along Hwy 11:06. The rock slope is on the north side of the highway and rockfall particles are accumulating in the north (westbound) ditch.	
APPROXIMATE DIMENSIONS: The rock slope is approximately 8 m to 10 m in height with an overall slope of approximately 75%. The rock slope is approximately 525 m long.	
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 – no pavement distress was observed during the 2023 inspection.	N/A	
Slope Movement	X		Rock fall debris is accumulated in the north (westbound) ditch from the north rock slope.	N/A	
Erosion	X		There is minor erosion at the brow of the rock slope where the overburden is overhanging the slope.	N/A	
Seepage		X	N/A – no seepage was observed during the 2023 inspection.	N/A	
Culvert Distress		X	N/A – no culverts were observed during the 2023 inspection.	N/A	

COMMENTS
The height of the rock slope north of Hwy 11 is approximately 8 m to 10 m.
The entire rock slope along this length of Hwy 11:06 is approximately 370 m in length. However, only the east 180 m was inspected during the 2023 inspection (Photo 1 and 2) as the west portion of the rock slope was not as tall and appeared more stable.
Rockfall hazard signs were observed on either side of the site.
There appears to be a bench at the crest of the rock slope, with more slope above the bench.
KCB has observed rockfall particles on the in the north (westbound) ditch near the shoulder of the highway (Photo 3). The public have been stopping at this location to pick up rocks for personal use.
There are talus deposits in the ditch over the eastern half of the slope (east of Waypoint 363), with rock particles filling the ditch in places and rock fall particles on the shoulder of the highway (Photos 1 through 3).
Rockfall particles in the ditch at Waypoint 364 are mostly cobbles and small boulders with an average size of approximately 0.2 m and a maximum size of approximately 1.0 m diameter (Photo 3). The larger particles are generally platy (i.e., much wider and longer than they are thick)
The rockslope on the eastern third (approximately) of the slope appears to be bedrock overlain with a coarse-grained till with cobbles and boulders (Photo 4). The talus deposits of cobbles and boulders in the ditch appear to be from the till but could also be from bedrock near the brow of the slope where exposed fractured bedrock with open joints is present approximately 8 m up the slope.
There are trees at the brow of the slope, and they are leaning. Further undermining of the trees will eventually cause them to topple, releasing more material from the brow of the slope.
At Waypoint 365, the discontinuity spacing becomes tighter, approximately 0.3 m (Photo 5).
The eastern third of the slope is sloped at approximately 75% and the western two thirds of the slope is standing near vertical and consists of bedrock with closely to widely spaced discontinuities (Photo 5 and 6). The bedrock appears to be sedimentary with bedding planes slope at approximately 5 degrees to 10 degrees as exposed on the slope face. Discontinuity orientation measurements were not taken.
The bedrock in the western two thirds of the slope is generally massive but with closer spaced discontinuities near the brow of the slope.
The ditch below the western two thirds of the slope is generally empty with a few particles at the ditch bottom (Photo 7). In general, the ditch appears to be fairly wide and deep for the rockslope, estimated to be 5.0 m wide and 1.2 m to 1.5 m deep.
Pavement damage was not observed, nor were there any rockfall particles observed across the highway behind the south (eastbound) guardrail (Photo 8). However, tall vegetation during the time of the inspection may have obscured rockfall particles across the highway behind the guardrail.
The talus slopes filling the ditch will impede highway drainage and make it more likely for rockfall particles to roll or bounce onto the highway.
In the western half of the slope, the rock slope is a near vertical bedrock cut.

Maintenance/Repair/Monitoring Recommendations:

Short-term:

- The site should regularly be inspected by TEC's Maintenance Contract Inspector (MCI).
- The debris and rock fall in the north (westbound) highway ditched should be removed regularly by TEC's Highway Maintenance Contractor (HMC) to maintain the ditch capacity. Continued buildup of rockfall materials will eventually allow rockfall particles to reach the road. As a preliminary start, TEC should plan to clean out the ditch once every two years and monitor how quickly the ditch refills with particles. Ditch cleaning should not excavate the toe of the slope, as excavating the toe will increase the frequency of rockfall and ditch infilling. TEC operations should verify that there are no buried services in the ditch before starting ditch cleaning.

Long-term:

- This site should be given a GRMP number and be inspected every two-years as part of the Section B inspections. Depending on the frequency of ditch cleaning and how fast the ditch fills (and a continued lack of incidents at this site), the frequency of site visits could be reduced to once a contract.

This report is an instrument of service of Klohn Crippen Berger Ltd. (KCB). The report has been prepared for the exclusive use of Alberta Transportation and Economic Corridors (Client) for the specific application to the Central Region Geohazard Risk Management Program (Contract No. CON0022160) and it may not be relied upon by any other party without KCB's written consent.

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(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.

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(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 ALBERTA
JAMES LYONS
ID 247708
2023-10-13

James Lyons, P.Eng.
Civil Engineer

PERMIT TO PRACTICE
KLOHN CRIPPEN BERGER LTD.

RM SIGNATURE: _____

RM APEGA ID #: 187607

DATE: 13 Oct. 2023

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

Inspection Photographs

Photo 1 **An aerial photo of the unnumbered site near Shunda Creek along H11:06. Rockfall particles are accumulating in the ditch bottom along the east portion of the site (indicated by red dashed line) with a more intact rock slope towards the west. Photo taken June 27, 2023, facing northwest.**

Photo 2 **An aerial photo of the unnumbered site near Shunda Creek along H11:06. The area where rockfall particles have accumulated in the ditch bottom is indicated by red dashed line (shown in Photo 4). The rock slope towards the west is more intact with significantly less rockfall particles accumulating in the ditch (shown in Photo 3). Photo taken June 27, 2023, facing north.**

Photo 3 **Material from the talus slope is accumulating in the north (westbound) ditch at the east portion of the site. Some rock fall particles are almost encroaching onto the north shoulder. Photo taken June 27, 2023, facing west.**

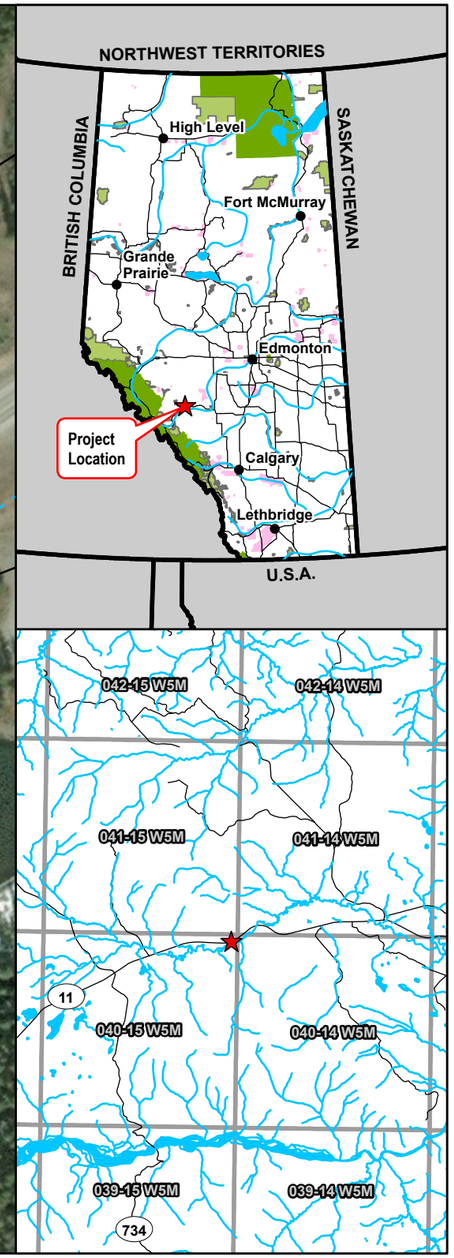
Photo 4 **Overburden overhanging the crest of the slope near the east extent of the site. Photo taken June 27, 2023, facing north.**

Photo 5 **A portion of the rock slope near west extent of the site where the discontinuity spacer becomes tighter (approximately 0.3 m) (Waypoint 365). Photo taken June 27, 2023, facing north.**

Photo 6 **The relatively intact rock slope along the middle and west portion of the site. There is a potentially unstable shelf of rock at the top of the rock slope (indicated by red arrow). Photo taken June 27, 2023, facing north-northeast.**

Photo 7 **Very little rock fall has accumulated in the north (westbound) ditch at the toe of the rock slope. Photo taken June 27, 2023, facing west.**

Photo 8 **The south (eastbound) highway embankment slope is relatively well vegetated and appears to be in good condition. No rockfall particles were observed on the south side of the highway during the 2023 inspection. Photo taken June 27, 2023, facing west.**



Legend

- GPS Waypoint (June 27, 2023)
- Highway Right-of-Way
- Guardrail
- Telus Trench

0 100 Metres

NOTES:
1. HORIZONTAL DATUM: NAD83
2. GRID ZONE: UTM ZONE 11N
3. IMAGE SOURCE: 2023 MICROSOFT CORPORATION, 2023 MAXAR CNES, DISTRIBUTION AIRBUS DS

CLIENT: Alberta

Klohn Crippen Berger

PROJECT: CENTRAL REGION GEOHAZARD RISK MANAGEMENT PROGRAM

TITLE: Site Plan
Unnumbered Site - Shunda Creek
Hwy 11:06, km 6.17

SCALE	PROJECT No.	FIG No.
1:2,000	A05116A02	1

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