SOUTHERN REGION GRMP
SITE INSPECTION FORM

SITE NUMBER AND NAME:	HIGHWAY & KM:	PREVIOUS INSPECTION DATE:	INSPECTION DATE:
S020 Highwood House Rockfall Hazard	541:02, 0.817	May 28, 2024	**May 27, 2025**

LEGAL DESCRIPTION:	NAD 83 COORDINATES:	RISK ASSESSMENT:
04-33-016-05 W5M	UTM 11 Northing 5584038 Easting 667795	Rockfall: PF: 14 CF: 5 TOTAL: 70

AVERAGE ANNUAL DAILY TRAFFIC (AADT):	CONTRACTOR MAINTENANCE AREA (CMA):
260 (west), 260 (east), (Ref. No. 59130)	520

SUMMARY OF SITE INSTRUMENTATION:	INSPECTED BY:
None LAST READING DATE: N/A	Chris Gräpel (KCB) Jorge Rodriguez (KCB) Renato Macciotta (U of A) Alex Frotten (TEC) Rishi Adhikari (TEC) Maury Siddons (TEC)

PRIMARY SITE ISSUE: Rockfall from the rock cutting, large rock block potentially unstable (west end), and soil debris flows due to surface water runoff erosion (gullying) from the brow of the slope.

APPROXIMATE DIMENSIONS: The site is approximately 180 m in length and over 40 m high.

DATE OF ANY REMEDIAL ACTION: Ditches cleaned periodically. Rockfall debris has accumulated along the ditch of the westbound lane, and it appears that it was cleaned out last year for large rock blocks, but the debris fan remained.

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress	X		No new rock strike marks on pavement were observed; track marks from heavy equipment on pavement have been observed in the past from rockfall removal activities.		X
Slope Movement		X	Bedrock slopes with ongoing rockfall into the existing catchment ditches		X
Erosion	X		Weathering coal and shale sub-vertical beds interlayers with less weathered mudstone and sandstone, runoff erosion from brow (gullying). No significant changes.		X
Seepage		X			X
Culvert Distress		X			X
Rockfall	X		Rockfall debris continues to accumulate in the ditch, forming debris fans. The ditch has not been cleaned out this season, according to the MCI.	X	

COMMENTS

General:

- In June 2024, KCB completed a rockfall site investigation to identify rockfall sources, assess the size and location of rockfall particles, and map the orientation of bedrock discontinuities. In May 2025, KCB submitted the final design recommendations to mitigate the rockfall hazard at the site, which included rock scaling work, the installation of a rockfall barrier, and cleaning the ditch from rockfall debris.
- A final tender package for the construction of the project was submitted to TEC in August 2025 and is pending advertisement.
- During the 2025 inspection, the Issue for Tender (IFT) drawings for the mitigation work at the S020 site, were discussed with TEC and the HMC.
    - Due to the potential for the barrier to overturn during snow clearing operations, especially with wet snow, TEC will instruct the Highway Maintenance Contractor to impose speed restrictions and to plow snow across the road rather than against the future guardrail.
- Additionally, debris accumulated behind the rockfall fence will need to be cleared using a skid steer.

S020:

- Overall, no significant changes to the site were observed when compared to 2024.
- Most rockfalls that occurred between the 2024 and 2025 inspections appeared to have been retained in the ditch; however, anecdotal evidence from HMC and MCI has indicated that large rockfalls have reached and crossed the highway in the past.
- Rockfall debris observed in the ditch during the 2025 inspection; however, no new large particles were found. The observed large particles were reported in the 2024 inspection.
- Loose blocks and boulders up to 0.5 m x 0.5 m x 0.5 m present along the top of the rock slope. Some rocks embedded in the soil at the brow of slope and are being eroded and may eventually fall. There is a large boulder of 130 cu.m. at the western end of the slope's crest, and a 6 cu.m. boulder mid-slope, both perched at the crest.
- During the 2025 inspection, small gravel-sized particles were observed across the road. A few particles were found behind the guardrail, with the largest near the pavement edge measuring 0.3 meters in diameter.
- No significant changes in the extent of soil erosion at the brow of the slope since 2024 were observed during the site inspection. Surface runoff down the slope is leading to erosion and washout of material, which is being deposited in fans at the base of the slope.
- There is an open shear plane near the brow of the slope adjacent to one of the coal seams at the center of the slope. Previous site inspection photos and site investigation from 2024 shown that the shear plane has not change recently.
- Pine trees are present above the rock slope and adjacent to the slope. The trees appear to be Limber Pine or Whitebark Pine.

Maintenance/Repair/Monitoring Recommendations:

Short-Term

- Continue to monitor the site and clean out the ditch regularly to maintain storage capacity for future rockfalls.
- The collaborative work between the University of Alberta (UofA) and KCB as part of the research project continues the annual photogrammetric survey and 3D surface modelling to monitor potential changes in slope performance and inform existing estimates of annual failure volumes and relative frequency of rockfall events.

Long-Term

- Execute S020 rockfall mitigation design, which includes:
  - Rock face scaling, including check scaling of loose blocks (for safety), clearance of trees and loose debris from the brow of the slope, and removal of the large potentially unstable rock blocks on the upper portion of the rock slope (possibly requiring drilling and blasting).
  - Place a rock of a rockfall barrier along the edge of pavement to protect road users.
  - Place a “F”-Shape barrier along the edge of pavement to avoid blocks from rolling into the highway.

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

PERMIT TO PRACTICE
KLOHN CRIPPEN BERGER LTD.

RM SIGNATURE: _____

RM APEGA ID #: 187607

DATE: 10 Oct. 2025

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

Legend

- Top of Slope
- Flow Direction

0 50 Metres

NOTES:
1. HORIZONTAL DATUM: NAD83
2. GRID ZONE: UTM ZONE 11N
3. IMAGE SOURCE: MAXAR 2025

CLIENT: Alberta

Klohn Crippen Berger

PROJECT: SOUTHERN REGION GEOHAZARD RISK MANAGEMENT PROGRAM

TITLE: Site Plan
S020 - Highwood House Rockfall Hazard
Hwy 541:02, km 0.817

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

File: Z:\AICGY\Alberta\A05116A03 ABT Southern Region GRMP\400 Drawings\2025\02_Pro_File\Section B\ABT_SouthernRegion_SectionB.aprx Date: 2025-09-05 3:00 PM Creator: NMirhadi

Photo 1 **Rock slope cut with a vertical height of about 35 metres, featuring continuous joints and extensive soil erosion at the brow on the west side of the site. Also note the large overhang at the crest of the slope on the west end of the site. Photo was taken facing north on May 27, 2025.**

Photo 2 **Active rockfall - debris fans and small rocks in the ditch towards the west end of the site. Photo was taken facing north on May 27, 2025.**

Photo 3 **Active rockfall - debris fans and small rocks in the ditch towards the east end of the site. Photo taken facing east on May 27, 2025.**

Photo 4 **Rock blocks found across the highway. Photo taken facing northwest on May 27, 2025.**