PEACE REGION
(GRANDE PRAIRIE DISTRICT – SOUTH) GRMP
SITE INSPECTION FORM

SITE NUMBER AND NAME: **GP053-1, -2, & -3 Rock Slope North of McIntyre Mine**	HIGHWAY & KM: 40:36, 16.295 to 17.161	PREVIOUS INSPECTION DATE: June 10, 2024	INSPECTION DATE: **June 2, 2025**
LEGAL DESCRIPTION: **West** SE 15-58-08-W6M **East** NW-14-58-08-W6M	NAD 83 COORDINATES: UTM Northing Easting 11 5986971 362772 11 5987248 363835	RISK ASSESSMENT: PF: 12 CF: 5 TOTAL: 60	
AVERAGE ANNUAL DAILY TRAFFIC (AADT): 840 (east) & 840 (west) (Reference No. 70000788, 2024)		CONTRACT MAINTENANCE AREA (CMA): 504	

SUMMARY OF SITE INSTRUMENTATION:	INSPECTED BY:
There is no instrumentation at the GP053 site, but instruments are installed at the GP008 slide site within the limits of the rockfall corridor. LAST READING DATE: N/A	Chris Gräpel (KCB) Courtney Mulhall (KCB) Babatunde Awokunle (TEC) Rocky Wang (TEC)

PRIMARY SITE ISSUE: Series of rockfall hazards from the rock slope along/above the west (southbound) side of Hwy 40:36. Talus deposits and rockfall particles from the rock slope constrict the north highway ditch, and falling rocks are a traffic hazard. This site is located along the west valley slope of the Smoky River and is the rockfall component of the former GP008 site is now for road surface slumping and slides only.

APPROXIMATE DIMENSIONS: Corridor is approximately 1.0 km long. Highway ditch geometry varies from v-notched up to 4 m wide, up to 1.5 m deep with 2H:1V to 3H:1V side slopes.

GP053-I: Rock slope is approximately 200 m long and 39 m high above pavement surface with an approximate cut angle of 50° from horizontal with a mid-slope ledge/bench.

GP053-II: Rock slope is approximately 500 m long and 5 m to 20 m high above pavement surface with an approximate cut angle of 35° to 50° from horizontal.

GP053-III: Rock slope is approximately 100 m long and 4 m to 10 m high above pavement surfaces with an approximate cut angle of 22° from horizontal.

DATE OF ANY REMEDIAL ACTION: Ongoing ditch cleaning and removal of rockfall particles from pavement surface. As well as patching and paving (more so due to GP008 slides along the same section of highway).

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress	X		Majority of pavement distress along corridor due to GP008 slide movements. No change in pavement distress from rockfall hazards observed.		X
Slope Movement	X		Previously fallen rockfall particles (up to 1.0 m x 1.0 m x 1.0 m) and talus materials between toe of slope and pavement edge on west side of highway, including a few larger particles (approximately 0.3 m x 0.3 m x 0.3 m) near or within 1 m of pavement edge.		X
Erosion	X		Differential weathering, freeze thaw, ice jacking, and seepage eroding rock mass. Some erosion along crest of slope.		X
Seepage		X	None observed at time of 2025 inspection.		X
Culvert Distress	X		Culvert inlets crushed and/or partially blocked by rockfall particles in north highway ditch.		X

COMMENTS
Review of air photos from the early 1980s indicates the GP053 rock slope and highway were constructed downslope/south of a pre-existing mine access road for the former McIntyre Mine (now CST Canada Coal Ltd.), which is still present. Mine development upslope/north of the rock slope could be influencing the performance of the slope.
In 1998, gradeline improvements were made along this section of highway which resulted in some of the original rock slopes being excavated further with drill-and-blast methods while other sections were not.
Brow of rock slope has minimal to no soil and some trees (Photos 1 through 3, 8, and 9).
Rock mass consists of bedded and sheared sedimentary rocks, with carbonaceous shale and coal seams which are weathering faster. Faster weathering of the coal results in the undermining of more competent rocks, which results in overhanging blocks and particles with little support that eventually fall (Photo 8), and the deposition of talus cones/slopes at the toe of the coal seams with occasional adjacent lateral rock block piles/cones (Photos 2, 4, and 7). Cubical shaped rockfall particles appear to be rolling and bouncing down the talus cones bringing them closer to the highway (i.e., the talus cones act like chutes for rockfall particles). Whereas flat platy shaped rockfall particles appear to get hung up in the talus.
<u>GP053-I (Photos 1 to 6):</u> • Bedrock structure consists of bedding planes dipping from the south to southwest (dip estimated between 59° to 86°). The rock mass appears to have relatively tight bedding planes, but the rock mass is fractured perpendicular to the bedding planes which generates rockfall events. The bedrock structure changes in the east part of the slope to a gentle fold with dip of approximately 20° (Photo 5), dipping to the southeast towards the highway. • Mid-slope bench that has talus cones/slopes, which could potentially bounce/launch/roll rockfall particles out onto the highway (Photos 1 and 2). A pile of rock blocks was also observed along this bench.
<u>GP053-II (Photos 7 to 10):</u> • Bedrock structure consists of bedding planes dipping into the slope towards the north (dip estimated between 39° to 80°). The rock mass appears to be of similar quality to the GP053-I site, with one location showing more intact and massive bedrock that still shows drill-and-blast-hole “barrels”. • Thick coal seams are present at five locations towards the west side of the site (Photo 7). Debris fans below coal seams have partially or completely filled the ditch, and vegetation has started to grow.
<u>GP053-III:</u> • Bedrock structure is different at this site from the previous sites with bedding planes dipping from the east to southwest (dip estimated between 55° to 60°). The bedding planes vary from a few centimeters thick to over 1 m thick. More fractured or possibly blast damaged zones appear to have been removed, likely during construction, leaving an uneven slope surface. • No changes were observed during the 2025 inspection.
Several hanging rock blocks are observed at the subsites (Photos 8 and 9), with some close to falling.
TEC has previously mentioned that some rock particles make it to the highway, and some are large enough to require a front-end loader to remove.

Maintenance/Repair/Monitoring Recommendations:

- "Watch for fallen rock" signs already installed on either side of the site, on the east shoulder before the site for northbound traffic and on the west shoulder before the site for southbound traffic. Additional signage (e.g., "watch for fallen rock, no parking) should be installed along the site to further warn motorists of rockfall hazards.
- Clean highway ditch regularly to maintain rockfall storage volume (i.e., keep the ditch as wide and deep as possible to retain material within the ditch) and reduce the potential for material reaching the highway. TEC reported that there are no utilities below the ditch at this site, but AbaData indicates there may be a pipeline (depth unknown) that crosses the highway from south to north near the GP053-I site. Estimated cost for removing debris at the three subsites: approximately $100,000 to $130,000.
- Repair and/or clean-out culvert inlets which are damaged and partially covered by rockfall particles (Photo 6) to maintain ditch flow.
- Tender package for rockfall hazard mitigations:
    - KCB is preparing a tender package for rockfall hazard mitigations at four sites along Hwy 40:36 between km 8.395 and km 17.161, including this site. The mitigation actions for the site are based on a preliminary engineering report (PER) and technical memorandum submitted by KCB in August 2024 and April 2025, respectively and include:
        - A maintenance program that includes rock scaling of loose blocks and cleaning highway ditch of accumulated debris every two years. Estimated cost: approximately $130,000.
        - A 90% rockfall catchment for GP053-01, which includes: rock scaling activities and highway ditch cleaning. Estimated cost: approximately $120,000.
        - A 90% rockfall catchment for GP053-02, which includes: rock scaling activities, highway ditch cleaning, and shotcrete protection over fractured coal seams. Estimated cost: approximately $1.2 Million.
        - A 90% rockfall catchment for GP053-03, which includes: rock scaling activities and highway ditch cleaning. Estimated cost: approximately $30,000.
    - To provide a 95% catchment a drapery mesh would need to be installed at the GP053-01 site and at the west side of the GP053-2 site.
    - The environmental considerations for the proposed mitigation work were included an Environmental Evaluation (EE) and Environmental Risk Assessment (ERA) submitted by KCB in May 2025 and June 2025, respectively. .

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Courtney Mulhall, M.Sc., P.Eng.
Geotechnical Engineer

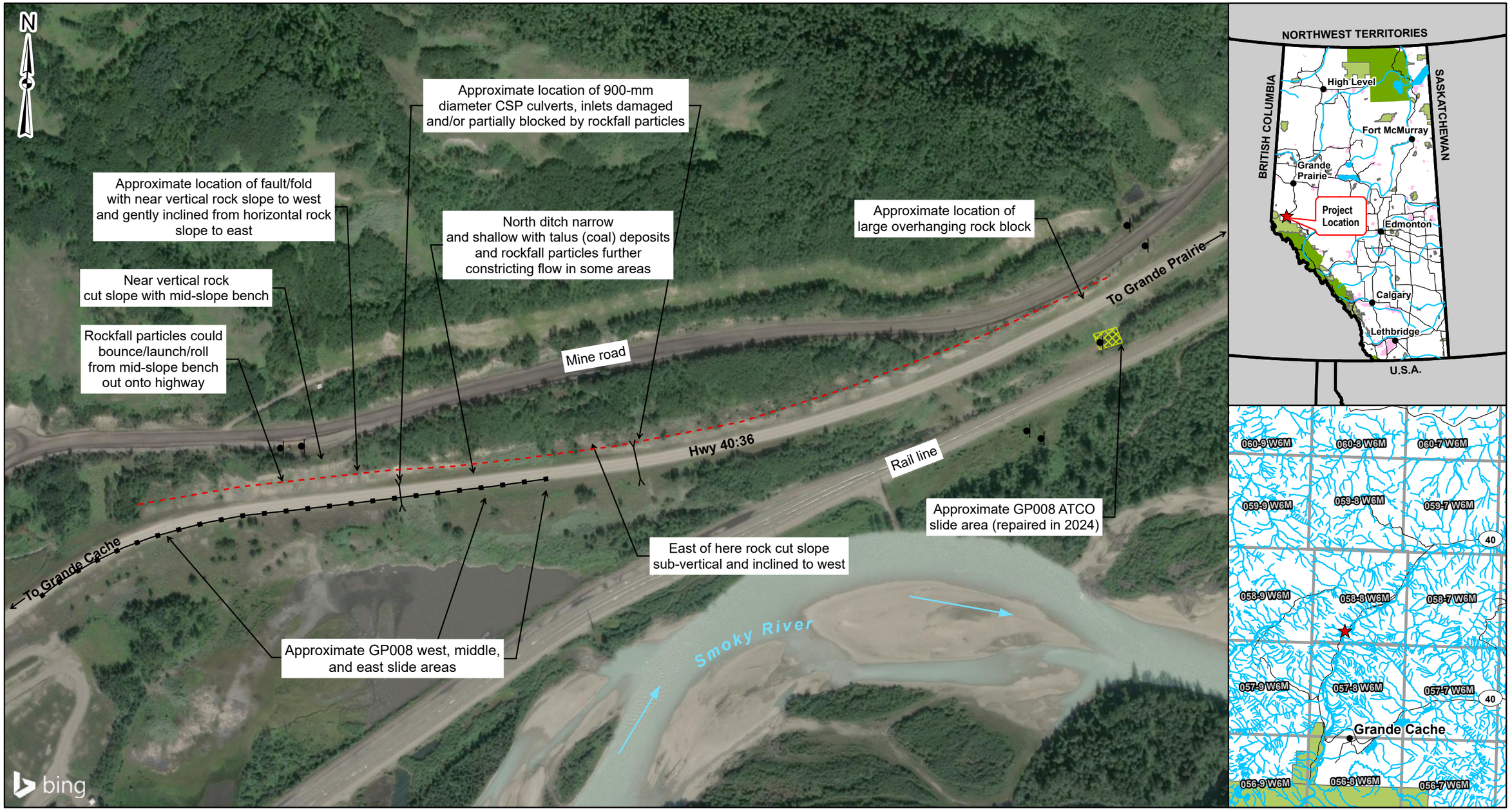
PERMIT TO PRACTICE
KLOHN CRIPPEN BERGER LTD.

RM SIGNATURE: _____

RM APEGA ID #: 187607

DATE: 15 Oct. 2025

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



Legend

- Powerpole
- Flow Direction
- Rockfall Corridor
- Guardrail
- Culvert
- ATCO Slide Area

0 200 Metres

NOTES:
1. HORIZONTAL DATUM: NAD83
2. GRID ZONE: UTM ZONE 11N
3. IMAGE SOURCE: 2025 MICROSOFT CORPORATION, 2025 MAXAR CNES, DISTRIBUTION AIRBUS DS

CLIENT: Alberta

Klohn Crippen Berger

PROJECT: PEACE REGION (GRANDE PRAIRIE DISTRICT-SOUTH) GEOHAZARD RISK MANAGEMENT PROGRAM

TITLE: Site Plan
GP053 - Rock Slope North of McIntyre Mine
Hwy 40:36, km 16.295 to 17.161

SCALE	PROJECT No.	FIG No.
1:4,000	A05116A01	1

File: Z:\AEDM\A05116A01 ABT Grande Prairie South GRMP\400 Drawings\GIS\MXD\2025\Section B\GIS\2AT_GPSouth_SectionB_250703.aprx Date: Time: Creator: : HMarandyan

Inspection Photographs

Photo 1 **Rock slope along north side of Hwy 40:36 at GP053-I site. Note bench which could launch rockfall particles from upper slope. Photo taken June 2, 2025, facing north.**

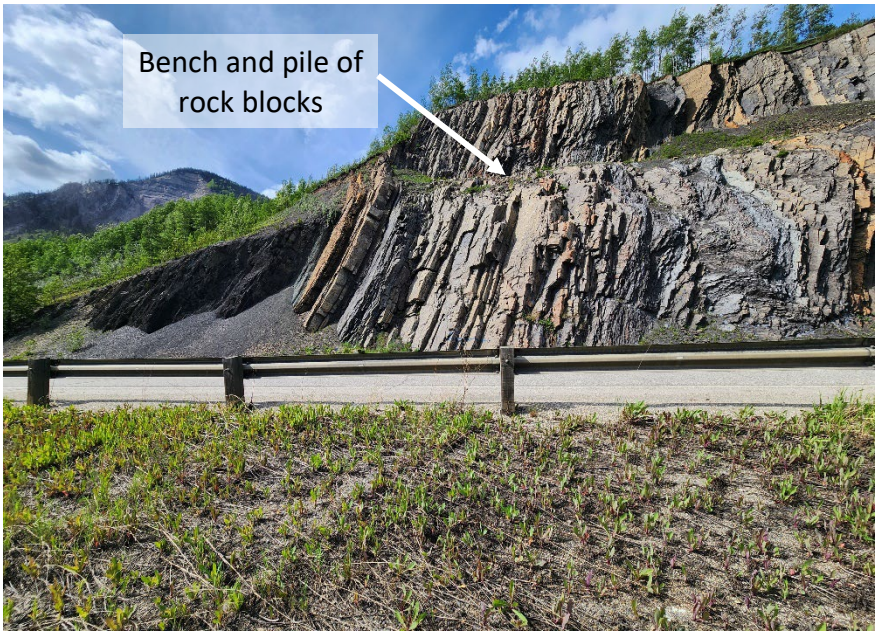


Photo 2 **Rock slope along north side of Hwy 40:36 at GP053-I site. Note bench which could launch rockfall particles from upper slope. Photo taken June 2, 2025, facing northeast.**

Photo 3 **Rock slope along north side of Hwy 40:36 at GP053-I site. Note near-vertical bedding orientation of bedrock. Photo taken June 2, 2025, facing north.**

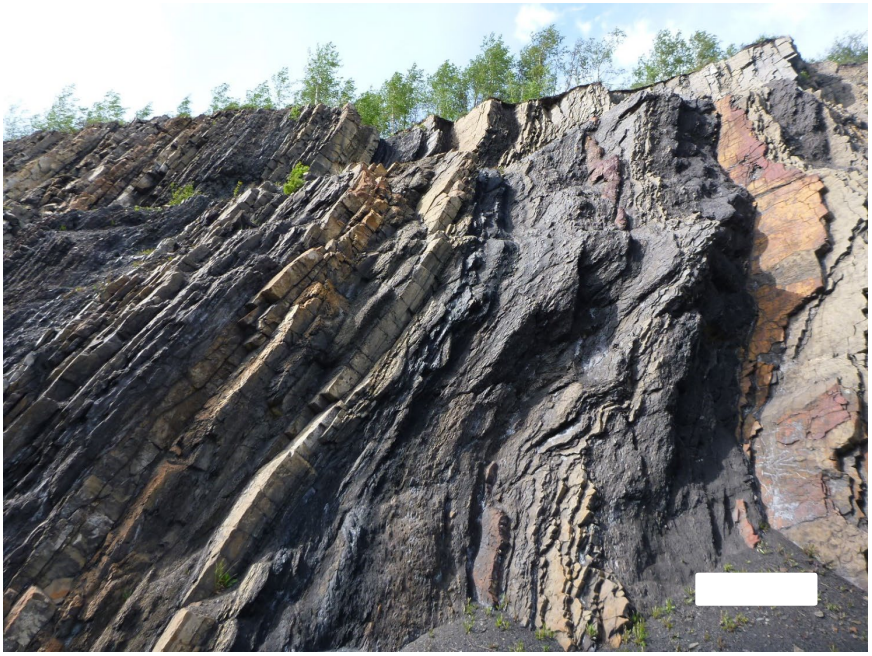


Photo 4 **Rock slope along north side of Hwy 40:36 at GP053-I site. Note talus material mainly from coal seams in highway ditch. Photo taken June 2, 2025, facing northeast.**

Photo 5 **Rock slope along north side of Hwy 40:36 at GP053-I site. Note change in orientation of bedrock structure at fold (circled in white and erosion and hanging rock blocks at crest of slope (some circled in black). Photo taken June 2, 2025, facing northeast.**

Photo 6 **Culvert inlet (circled in white) in west ditch of Hwy 40:36 damaged and partially blocked with rocks. Photo taken June 2, 2025.**

Photo 7 **Rock slope along north side of Hwy 40:36 at GP053-II site. Note talus material mainly from coal seams and rockfall particles in highway ditch. Photos taken June 2, 2025, facing west.**

Photo 8 **Rock slope along north side of Hwy 40:36 at GP053-II site. Note overhanging rock blocks (circled in white). Photo taken June 2, 2025, facing northwest.**

Photo 9 **Rock slope along north side of Hwy 40:36 at GP053-II site. Note large overhanging rock block (circled in white). Photo taken June 2, 2025, facing northwest.**

Photo 10 **Rock slope along north side of Hwy 40:36 at GP053-II site. Photo taken June 2, 2025, facing northeast.**