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

SITE NUMBER AND NAME: **GP026 Ditch Erosion South of Grande Cache**	HIGHWAY & KM: 40:34, 30.254	PREVIOUS INSPECTION DATE: June 13, 2023	INSPECTION DATE: **June 2, 2025**
LEGAL DESCRIPTION: NW/NE 34-56-08-W6M	NAD 83 COORDINATES: UTM 11 Northing 5973019 Easting 362260	RISK ASSESSMENT: PF: 10 CF: 2 TOTAL: 20	
AVERAGE ANNUAL DAILY TRAFFIC (AADT): 1,660 (west) & 1,520 (east) (Reference No. 70000983, 2024)		CONTRACT MAINTENANCE AREA (CMA): 504	

SUMMARY OF SITE INSTRUMENTATION:	INSPECTED BY:
There is no instrumentation at the GP026 site. LAST READING DATE: N/A	Chris Gräpel (KCB) Courtney Mulhall (KCB) Babatunde Awokunle (TEC) Rocky Wang (TEC)

PRIMARY SITE ISSUE: Erosion feature in north (westbound) ditch of Hwy 40:34 just south of Grande Cache, downslope/east of a previous erosion repair completed in 2006 as described below. On south (eastbound) side of Hwy 40:34, there is a deep erosion gully below the twinned culvert outlets and erosion channels downstream of both the twinned and single culvert outlets.

APPROXIMATE DIMENSIONS: Erosion feature in north highway ditch approximately 450 m long, up to 2 m wide, and up to 1 m deep with a near-vertical side slope on the south (highway) side of ditch. Ditch grade is steep (approximately 5% to 10%).

DATE OF ANY REMEDIAL ACTION: Repaired in 2006 and 2024 as described below.

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress	X		None observed at time of 2025 inspection, but erosion features on the north highway shoulder continue to retrogress towards and in some locations have reached edge of pavement.		X
Slope Movement		X	None observed at time of 2025 inspection.		X
Erosion	X		Erosion ongoing in north highway ditch. Erosion is exacerbated by surface water flow over edge of pavement onto gravel shoulder. Erosion also observed below and downstream of culvert outlets.	X	
Seepage		X	None observed at time of 2025 inspection.		X
Culvert Distress		X	Twinned culvert outlets hanging above erosion gully on south side of highway.		X

COMMENTS

Previous Remedial Actions:

- An erosion feature in the north highway ditch was repaired in 2006 by placing riprap on a woven geotextile separating medium. The riprap was conglomerate from a nearby quarry and has since experienced various degrees of breakdown due to the matrix material for the conglomerate being sandstone with variable resistance to freeze-thaw particle breakdown. Sometime afterwards limestone or greywacke riprap from a nearby quarry was placed on the 2006 repair to augment the riprap armoring where conglomerate riprap had deteriorated due to freeze-thaw action. The eastern extent of the 2006 repair was approximately at WP032 (Photo 1).

- TEC's Highway Maintenance Contractor (HMC), graded the north highway ditch, installed a turf reinforcement mat (TRM), and installed approximately 13 above-grade riprap check dams in spring 2024 (Photo 5). The repair extent was approximately 200 m, roughly between WP029 and WP030. Within this repaired area, bedrock outcrops were previously observed in the ditch channel near the west end, gravelly soils near the middle, and soils near the east end. The check dams include some particles of conglomerate that will likely experience breakdown similar to the riprap placed during 2006 repairs.

Visual Observations:

- Within the 2006 repair area (upslope/west of WP032), the conglomerate riprap has experienced some breakdown, but has also become vegetated (Photo 1).
- Erosion is ongoing in the north highway ditch, extending south of the section repaired in 2006 and on either side of the section repaired in 2024 (approximately between WP032 and WP028, Photos 2, 6, and 8). Erosion is exacerbated by surface water flow over edge of pavement onto gravel shoulder.
- Erosion features on the north highway shoulder continue to retrogress towards edge of pavement (some are already at edge of pavement, approximately 1 m from the nearest lane) despite previously being filled in at some locations (Photos 6 and 7).
- Within the 2024 repair area (approximately between WP029 and WP030), an erosion feature has begun to form at the bottom of the V-shaped ditch between the highway embankment slope and backslope (Photo 5), at the edge of the TRM. Also, the above-grade riprap check dams are a potential roadside hazard, and sediment is beginning to build up behind some of them.
- Twinned 1,040-mm diameter culverts cross the highway at WP028 (Photo 8). Beneath the highway, the culverts transition from smooth-walled steel pipe (SWSP) at the inlets to corrugated steel pipe (CSP) at the outlets. Based on visual inspection, the culvert grade increases substantially after the transition from SWTP to CSP. The culvert outlets on the south side of the highway are hanging above an approximately 5-m deep erosion gully that has developed below the culvert outlets (Photo 9). An erosion channel had also developed downstream of the culvert outlets (Photo 10), extending at least 50 m into the forested slope.
- A single 600-mm diameter SWSP culvert crosses the highway at WP030 (Photo 2). Flows appear to bypass the culvert inlet on the north side of the highway due to erosion in the ditch channel. An erosion channel has developed downstream of the culvert outlet on the south side of the highway (Photos 3 and 4), extending at least 150 m into the forested slope (WP031). At some locations, the erosion channel is approximately 2.0 m wide and 1.5 m deep, and cuts near vertically into bedrock. Just downstream of the culvert inlets, a small-diameter black cable is exposed in the erosion channel.
- An additional site visit was completed by KCB on July 23, 2025. During the site visit, it was observed that the erosion channels downstream of both the twinned and single culvert extend through the forested slope almost to the toe of the slope, but do not cross the lower road towards Victor Lake.

Maintenance/Repair/Monitoring Recommendations:

- In the spring of 2025, KCB completed an environmental evaluation (EE) and preliminary engineering for ditch repairs at the site, including the section previously repaired in 2024. At TEC's request, KCB will complete detailed design and prepare a tender for the selected design option: removing the existing above-grade check dams, regrading the ditch, installing below-grade check dams, and armouring the ditch with riprap. Estimated cost: approximately $1,400,000 to $1,650,000 based on a repair length of 1,150 m (approximately between WP028 and WP032), and the price of hard, durable limestone that is not likely to be locally available. The final repair length will be determined during detailed design. The cost for riprap could be considerably lower if TEC considers the use of locally available greywacke for this repair. The use of greywacke and concerns about variability in particle durability could potentially be addressed through special provisions within the tender which could include inspection and testing quality control / quality assurance (QA/QC) during production and placement, and an extended warranty period. Repair of the eroded culvert outlets on the south side of the highway will be also included in the project scope. The repair may be tendered together with GP041 highway ditch erosion repairs.

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2025 Oct. 15
ID#153449

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

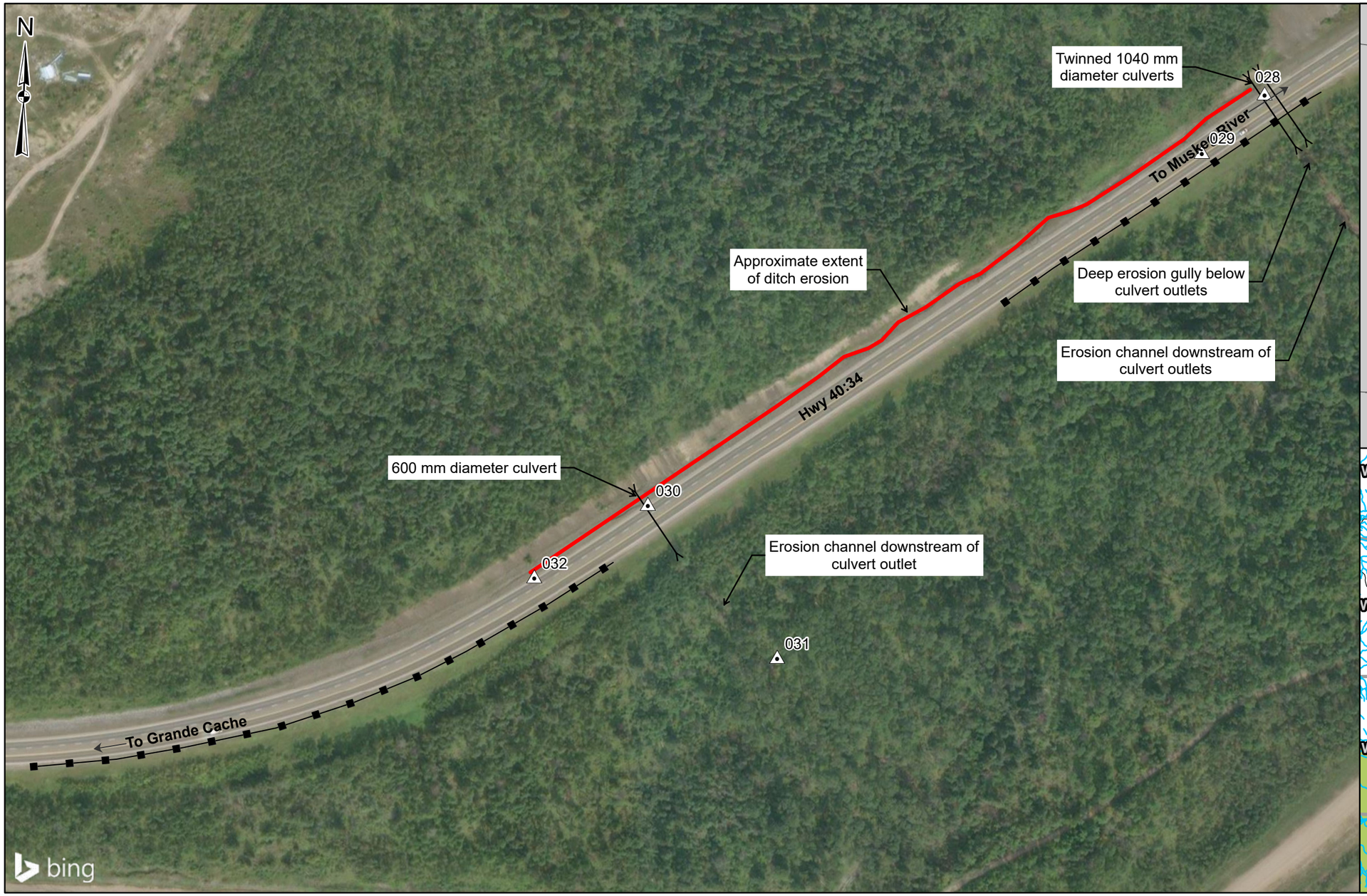
PERMIT TO PRACTICE
KLOHN CRIPPEN BERGER LTD.

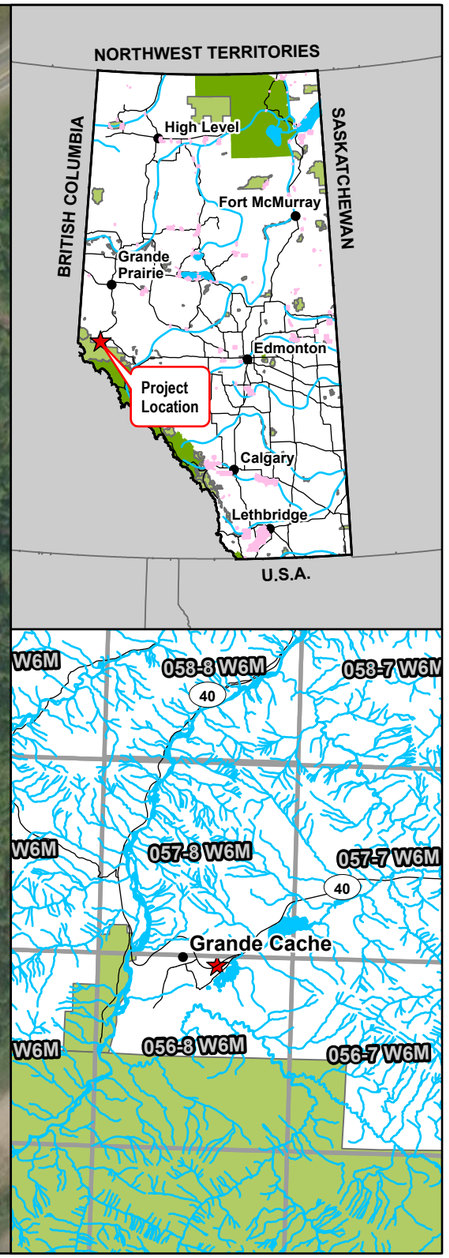
RM SIGNATURE: _____

RM APEGA ID #: 187607

DATE: 15 Oct. 2025

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





Legend

- GPS Waypoint (June 02, 2025)
- Ditch Erosion
- Guardrail
- Culvert

0 100 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
GP026 - Ditch Erosion South of Grande Cache
Hwy 40:34, km 30.254

SCALE	PROJECT No.	FIG No.
1:2,250	A05116A01	1

File: Z:\AEDM\A05116A01 ABT Grande Prairie South GRMP\400 Drawings\GIS\MXD\2025\Section B\GIS\1ABT_GPSouth_SectionB_250703.aprx Date: Time: Creator: : HMananbyan

Inspection Photographs

Photo 1 **Ditch on north side of Hwy 40:34, upstream of WP032. Note deterioration of riprap placed in ditch channel during 2006 repairs. Photo taken June 2, 2025, facing southwest.**

Photo 2 **Ditch on north side of Hwy 40:34. Note deterioration of riprap in ditch channel, and erosion / material in ditch channel that appears to divert flow around single culvert inlet (WP030). Photo taken June 2, 2025, facing northeast.**

Photo 3 **Erosion channel downstream of single culvert outlet on south side of Hwy 40:34. Photo taken June 2, 2025, facing north.**

Photo 4 **Erosion channel downstream of single culvert outlet on south side of Hwy 40:34. Photo taken June 2, 2025, facing southeast near WP031.**

Photo 5 **Ditch on north side of Hwy 40:34. Note turf reinforcement mat (TRM) and check dams installed during repair completed in 2024, and where erosion and water is beginning to bypass the repair in bottom of ditch (circled in white). Photo taken June 2, 2025, facing southwest.**

Photo 6 **Ditch on north side of Hwy 40:34. Note erosion in ditch channel and erosion features along north highway shoulder at edge of pavement. Photo taken June 2, 2025, facing northeast.**

Photo 7 **Surface of Hwy 40:34. Note erosion features along north highway shoulder progressing towards edge of pavement. Photo taken June 2, 2025, facing southwest.**

Photo 8 **Ditch on north side of Hwy 40:34. Note erosion in ditch channel and twinned culvert inlets (WP028). Photo taken June 2, 2025, facing southwest.**

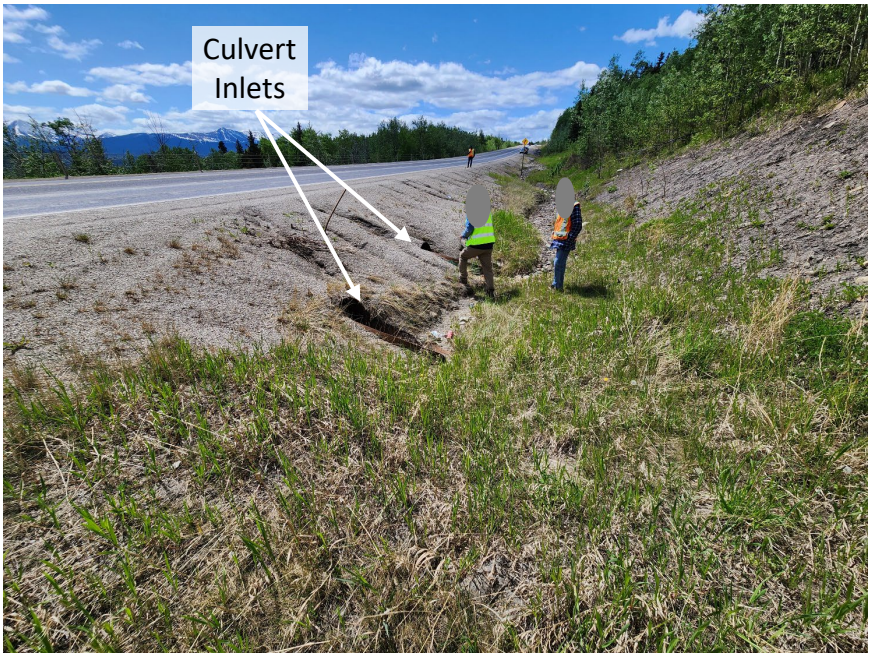


Photo 9 **Erosion gully at twinned culverts outlets on south side of Hwy 40:34. Photo taken June 2, 2025, facing southwest.**

Photo 10 **Erosion channel downstream of twinned culvert outlets on south side of Hwy 40:34. Photo taken June 2, 2025, facing southwest.**