

**SITE INSPECTION FORM**

<b>SITE NUMBER AND NAME:</b> GP055 Hwy 674 Embankment Slide North of Sexsmith		<b>HIGHWAY &amp; KM:</b> 674:02, 15.150	<b>PREVIOUS INSPECTION DATE:</b> June 13, 2023	<b>INSPECTION DATE:</b> <b>June 11, 2024</b>
<b>LEGAL DESCRIPTION:</b> SW 03-74-04-W6M	<b>NAD 83 COORDINATES:</b> UTM Northing Easting 11 6137500 403034		<b>RISK ASSESSMENT:</b> PF: 10 CF: 5 TOTAL: 50	
<b>AVERAGE ANNUAL DAILY TRAFFIC (AADT):</b> 1,100 (east) & 540 (west) (Reference No. 29750 and 30730, 2023)			<b>CONTRACT MAINTENANCE AREA (CMA):</b> 504	

<b>SUMMARY OF SITE INSTRUMENTATION:</b>  Operable: One slope inclinometer (SI), and four vibrating wire piezometers (VWPs) installed in 2022.  LAST READING DATE: June 5, 2023	<b>INSPECTED BY:</b> Chris Gräpel (KCB) Courtney Mulhall (KCB) Robert Senior (TEC) Rishi Adhikari (TEC) Babatunde Awokunle (TEC) Sacha Soltys (TEC) Darrell Westhaver (TEC)
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**PRIMARY SITE ISSUE:** Slide in highway embankment fill on south side of Hwy 674:02 due to a high groundwater table that primarily affects eastbound lane of highway. At the site, the highway crosses a low narrow valley (approximately 4 m deep and 10 m wide at base).

**APPROXIMATE DIMENSIONS:** North side of highway embankment approximately 5 m high sloped at approximately 3H:1V, and south side approximately 2 m high sloped at approximately 4H:1V. Slide is approximately 7 m wide at centerline and 15 m wide at eastbound shoulder of Hwy 674:02.

**DATE OF ANY REMEDIAL ACTION:** 2018 – highway embankment partially reconstructed with a shallow sub-excavation (approximately 1.0 m to 1.8 m deep) and replaced with gravel. A similar repair may have also been completed in the mid-1980s. Ongoing pavement patching, including a patch completed the week before the inspection. Repair to be completed in fall 2024 (see repair description below).

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress	X		Cracking and settlement in pavement surface, including pavement patch completed week before inspection, as described below.	X	
Slope Movement	X		Cracking and settlement along slide scarp in eastbound lane (Photos 1 to 3) and along slide flanks on south highway embankment slope (Photo 4). Previous SI data indicates discrete movement between high plastic clay and intermediate plastic clay till at an approximate depth of 6.6 m below ground surface at a rate of approximately 75 mm/year, which is consistent with the need for frequent patching.	X	
Erosion		X	None observed at time of 2024 inspection.		X
Seepage	X		None observed at time of 2024 inspection.		X
Culvert Distress		X	No culverts observed by KCB, but smooth-walled steel pipe has showed no signs of distress during previous inspections.		X

<b>COMMENTS</b>
Pavement is approximately 1.5 m to 2.0 m thick with near-vertical shoulders (Photo 2).
Slide scarp and flanks are well-defined and extend from highway centerline to the eastbound shoulder and down the south slope of the highway embankment to the downstream toe where there is a well-defined toe roll (Photos 1 through 5). Pavement cracks up to approximately 20 mm to 40 mm wide and differential settlement were observed along the slide scarp. The slide scarp has previously been observed in the westbound lane of Hwy 674:02 by the maintenance contract inspector (MCI) between pavement patches. The well-defined slide scarp, flanks, and toe roll indicate the slide has formed a near-complete or complete three-dimensional failure surface which supports observations that the slide has retrogressed past the highway centerline and movements are getting worse with time.
A 900-mm-diameter smooth-walled steel-pipe culvert appears to have been drilled into place on the east abutment of the highway embankment.
Riprap is present at the south toe of the highway embankment, potentially indicating the location of a former culvert. However, KCB has not observed a culvert inlet or outlet on either side of the highway embankment.
As discussed in our 2020 preliminary engineering report (PER) for the site, a high groundwater table appears to be present at the site as indicated by standing water in a dugout immediately southwest of the site (Photo 5), a reported spring nearby on hydrogeological maps, anecdotal information on livestock sinking into the valley bottom, and pore pressures above ground surface being recorded in the piezometers possibly indicating artesian pressures in the underlying clay till. High groundwater levels and upward gradients likely created adverse foundation conditions which, without drainage, appear to have destabilized the highway embankment.
<p><u>Maintenance/Repair/Monitoring Recommendations:</u></p> <ul style="list-style-type: none"> <li>• Land has been acquired by TEC, tendering is in progress, and repair work is scheduled for fall 2024. The repair will consist of:               <ul style="list-style-type: none"> <li>• construction of a toe berm with geogrid-reinforced fill to flatten the slope;</li> <li>• three drainpipes installed within the fill that span the length of the toe berm foundation, from the toe of the existing slope to the toe of the new slope; and</li> <li>• construction of a shear key below the toe berm, at the toe of the existing slope, with geogrid-reinforced fill.</li> </ul> </li> </ul> <p>This work will also include extension of the existing culvert through the east abutment of the highway embankment. Estimated cost: approximately \$400,000 to \$600,000.</p>

**SITE INSPECTION FORM**

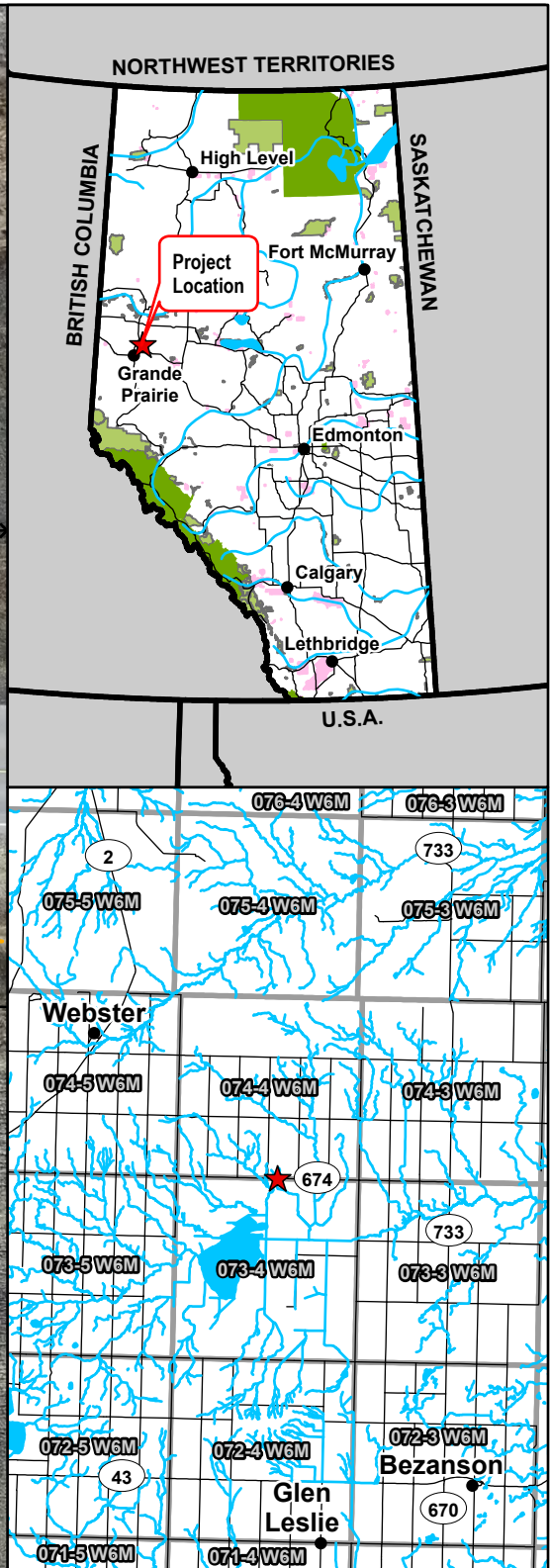
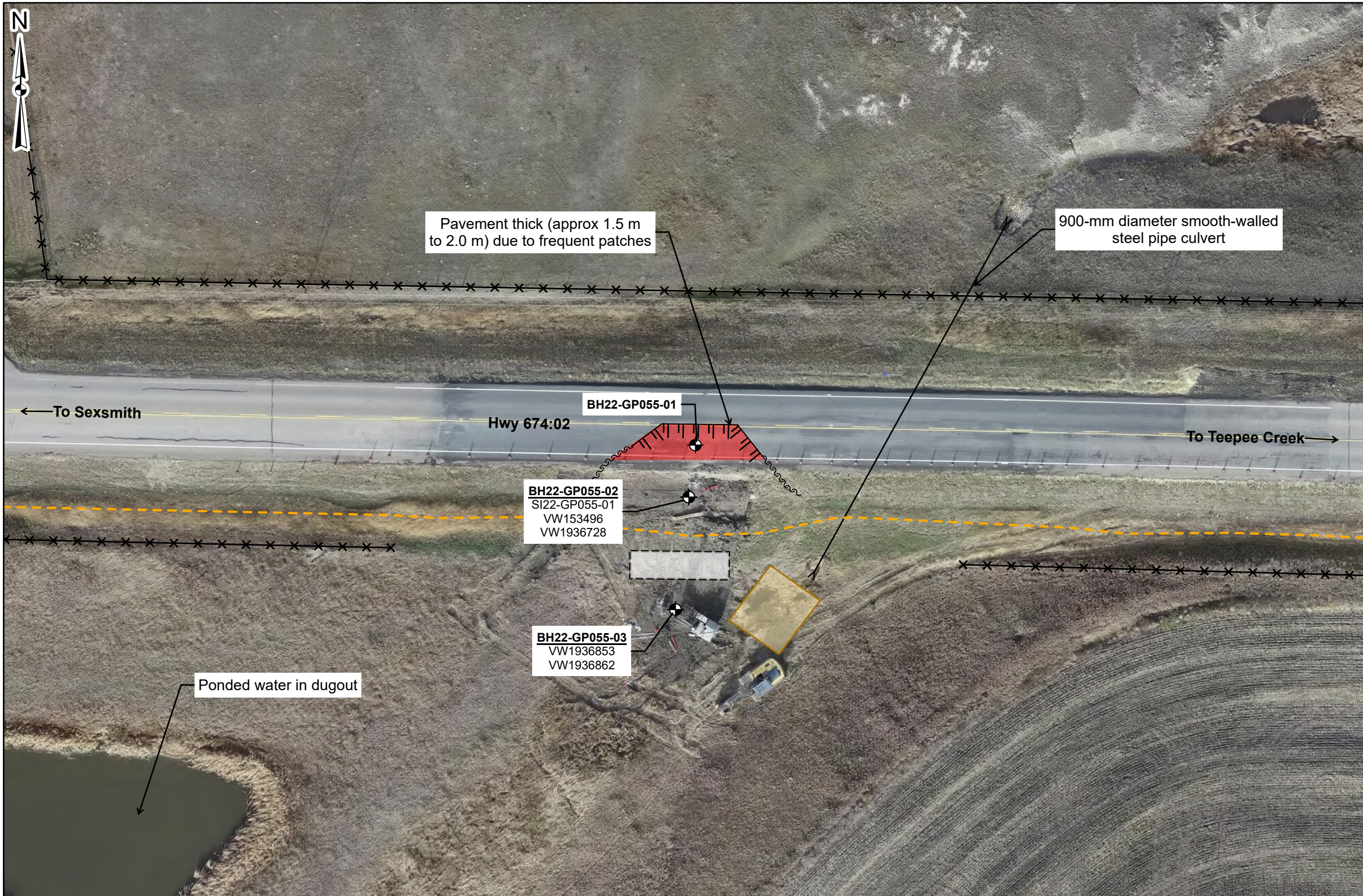
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Courtney Mulhall, M.Sc., P.Eng.  
Geotechnical Engineer



**Legend**

- Borehole/ Instrument
- Scarp
- Crack
- Telus Utility Trench
- Fence
- Culvert
- Settlement
- Test Pit Location
- Ground Depressions



NOTES:  
 1. HORIZONTAL DATUM: NAD83  
 2. GRID ZONE: UTM ZONE 11N  
 3. IMAGE SOURCE: PROVIDED BY CHALLENGER GEOMATICS, CAPTURED OCTOBER 2022

CLIENT

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

TITLE  
 Site Plan  
 GP055 - Slide North of Sexsmith  
 Hwy 674:02, km 15.150

SCALE 1:500 PROJECT No. A05116F01 FIG No. 1

File: Z:\A\EDM\A05116\A01 ABT Grande Prairie South GRMP\400 Drawings\GIS\MXD\2024\Section B\AT\_GP\_South\_SectionB\_241015.aprx Date: Time: Creator: AHarrison

## Inspection Photographs

**Photo 1** Cracking and settlement in eastbound lane of Hwy 674:02. Note scarp area was patched last week. Photo taken June 11, 2024, facing northwest



**Photo 2** Cracking and settlement in eastbound lane of Hwy 674:02. Note near-vertical edge and height of exposed pavement. Photo taken June 11, 2024, facing northeast.



**Photo 3** Cracking in eastbound lane of Hwy 674:02 through recent patch. Photo taken June 11, 2024, facing southeast.



**Photo 4** Cracking along south slope of Hwy 674:02 embankment. Photo taken June 11, 2024, facing north.



**Photo 5** Slope and toe area of slide on south side of Hwy 674:02. Note pond water in dug out southwest of highway embankment and slide. Photo taken June 11, 2024, facing southwest.



**Photo 6** North side of Hwy 674:02. Photos taken June 11, 2024, facing northwest and northeast, respectively.

