

<b>SITE NUMBER AND NAME:</b> <b>GP055 Hwy 674 Embankment</b> <b>Slide North of Sexsmith</b>	<b>HIGHWAY &amp; KM:</b> 674:02, 15.150	<b>PREVIOUS INSPECTION DATE:</b> June 11, 2024	<b>INSPECTION DATE:</b> <b>June 3, 2025</b>
<b>LEGAL DESCRIPTION:</b> SW-03-74-04-W6M NW 34-73-04-W6M	<b>NAD 83 COORDINATES:</b> UTM    Northing    Easting 11       6137500    403034	<b>RISK ASSESSMENT:</b>  PF: 2    CF: 5    TOTAL: 10	
<b>AVERAGE ANNUAL DAILY TRAFFIC (AADT):</b> 1,220 (east) & 590 (west) (Reference No. 29750 and 30730, 2024)		<b>CONTRACT MAINTENANCE AREA (CMA):</b> 504	

<b>SUMMARY OF SITE INSTRUMENTATION:</b>  Operable: Three vibrating wire piezometers (VWPs) installed in 2022.  Inoperable: One slope inclinometer (SI) and one VWP installed in 2022.  LAST READING DATE: April 25, 2025	<b>INSPECTED BY:</b> Chris Gräpel (KCB) Courtney Mulhall (KCB) Babatunde Awokunle (TEC) Rocky Wang (TEC)
<b>PRIMARY SITE ISSUE:</b> Repaired slide in highway embankment fill on south (eastbound) side of Hwy 674:02. Slide due to a high groundwater table that primarily affects eastbound lane of highway. Slide repaired in 2024. At the site, the highway crosses a low narrow valley (approximately 4 m deep and 10 m wide at base).	
<b>APPROXIMATE DIMENSIONS:</b> Repaired slide was approximately 7 m wide at centerline and 15 m wide at eastbound shoulder of Hwy 674:02. South side of highway embankment approximately 5 m high with an approximate slope angle of 7.7H:1V. North side of highway embankment approximately 2 m high with an approximate slope angle of 4H:1V.	
<b>DATE OF ANY REMEDIAL ACTION:</b> 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. Before 2024 repair – Ongoing pavement patching. Fall 2024 (Contract No. CON0024008) – Toe berm constructed on south side of highway with geogrid-reinforced granular fill to flatten the slope from an approximate slope angle of 3H:1V to 7.7H:1V. Repair work also included construction of a shear key with geogrid-reinforced granular fill below the toe berm, installation of perforated drainpipe in the granular fill, extension of the existing culvert through the granular fill, placement of a clay cap and topsoil, and pavement patching.	

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress	X		Cracking and settlement in eastbound lane, but rate appears to have slowed since repair work completed in 2024. Pavement distress has a roughly circular pattern that extends from highway centerline to eastbound shoulder along slide scarp.	X	
Slope Movement		X	Besides pavement distress noted above, no other visual indications of slope or toe berm movement observed at time of 2025 inspection. Previous SI data indicated discrete movement between high plastic clay and intermediate plastic clay till at an approximate depth of 6.6 m below ground surface.	X	
Erosion	X		Erosion channel has formed downstream of extended culvert outlet.	X	
Seepage		X	None observed at time of 2025 inspection.		X

**SITE INSPECTION FORM**

Culvert Distress		X	None observed in 900-mm diameter smooth-walled steel pipe culvert at time of 2025 inspection.		X
<b>COMMENTS</b>					
<p>It was expected by KCB and TEC that some post-construction movement would continue until deformations mobilized the resistance of the toe berm / flattened slope. Visually movements appear to have slowed since repair work completed in 2024.</p>					
<p>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 2), 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, appeared to have destabilized the highway embankment.</p>					
<p>Since the site was repaired in 2024:</p> <ul style="list-style-type: none"> <li>Some cracking and settlement (up to approximately 30 mm and 10 mm, respectively) observed in the eastbound lane (Photos 3 to 4). The contractor who repaired the site in 2024 mentioned to KCB that most of the observed pavement distress occurred shortly after paving in the fall of 2024, and there has been very little subsequent deterioration of the pavement surface since.</li> <li>Besides pavement distress noted above, there were no other visual indications of slope or toe berm movement observed at the time of the 2025 inspection. The toe berm/flattened slope was in good condition (Photos 5 and 6).</li> <li>Vegetation coverage on the flattened slope is poor (Photos 5 and 6). Vegetation appears to be mainly weeds, and dead seed was observed on the bare ground surface.</li> <li>An erosion channel has formed downstream of the smooth-walled steel pipe culvert outlet (Photos 7 to 8). The erosion channel is approximately 10 m long, 0.5 m to 1.0 m deep, and up to 2.0 m wide at top of channel.</li> </ul>					
<p><u>Maintenance/Repair/Monitoring Recommendations:</u></p> <ul style="list-style-type: none"> <li>Complete warranty inspection in fall 2025.</li> <li>Warranty work should include reseeding the site.</li> <li>Pavement patched in October 2024, immediately after construction was completed, and should be patched again now that movements have slowed.</li> <li>Erosion channel downstream of the culvert outlet should be repaired (e.g., regraded then armoured with riprap) to prevent further erosion. Estimated cost: \$10,000 to \$15,000.</li> <li>This site should continue to be inspected by the Maintenance Contract Inspector (MCI) and inspected at least once during the next contract cycle as part of the GP South GRMP Section B inspections. If the repairs continue to perform well, TEC could consider removing the site from the list of active GRMP sites and excluding it from the GP South GRMP Section B inspections. If site conditions were to deteriorate, the site could always be returned to the list of active GRMP sites and inspected again as part of a Section B inspection or Section D call-out inspection.</li> <li>Repair design accounted for high / artesian porewater pressures at the site based on site observations and recorded piezometer data. However, TEC could consider having the piezometers read at this site at least once more during the next contract cycle, as part of the GP South GRMP Section C readings, to confirm pore pressures are not increasing below the highway embankment and toe berm and flows are being conveyed to the downstream toe.</li> </ul>					

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







## Inspection Photographs

- Photo 1** Overview of toe berm constructed in 2024 to repair embankment slide on south side of Hwy 674:02. Note pavement distress and erosion downstream of culvert outlets shown in Photos 3 through 7. UAV photo taken June 3, 2025, facing west.



- Photo 2** Overview of toe berm constructed in 2024 to repair embankment slide on south side of Hwy 674:02. UAV photo taken June 3, 2025, facing northeast.



**Photo 3**      **Cracking and settlement in eastbound lane of Hwy 674:02 through pavement patch placed in October 2024. Photo taken June 3, 2025, facing northeast.**



**Photo 4**      **Cracking in eastbound lane of Hwy 674:02 through pavement patch placed in October 2024. Photo taken June 3, 2025.**





**Photo 5** Slope of toe berm constructed in 2024 on south side of Hwy 674:02. Note poor vegetation cover. Photo taken June 3, 2025, facing south.



**Photo 6** Slope of toe berm constructed in 2024 on south side of Hwy 674:02. Note poor vegetation cover. Photo taken June 3, 2025, facing northeast.



**Photo 7** Erosion channel downstream of culvert outlet extended in 2024. Photo taken June 3, 2025, facing southwest.



**Photo 8** Erosion channel downstream of culvert outlet extended in 2024. Note silt fence being undermined by erosion. Photo taken June 3, 2025, facing southwest.

