

<b>SITE NUMBER AND NAME:</b> NC092 – Cattlepass Culvert BF 80823	<b>HIGHWAY AND KM:</b> 37:02, km 23.855	<b>PREVIOUS INSPECTION:</b> June 14, 2022	<b>CURRENT INSPECTION:</b> June 1, 2023
<b>LEGAL DESCRIPTION:</b> NE 33-54-27-W4M	<b>NAD83 COORDINATES:</b> UTM12U 5955908N, 307552E		<b>RISK ASSESSMENT:</b> PF: 10 CF: 6 Total: 60
<b>AVERAGE ANNUAL DAILY TRAFFIC (AADT):</b> 2610 (2022)		<b>CONTRACTOR MAINTENANCE AREA (CMA):</b> 510	

<b>SUMMARY OF INSTRUMENTATION:</b> No instrumentation installed at this site. <b>LAST READING DATE:</b> N/A	<b>INSPECTED BY:</b> Stantec: Leslie Cho and Sonja Pharand TEC: Rocky Wang, Amy Driessen, Dean Kokotyn, and Pramaya Kannel
<b>PRIMARY SITE ISSUE:</b> Two slope failures south of Highway 37 bisected by a cattlepass culvert.	
<b>APPROXIMATE DIMENSIONS:</b> 25 m wide by 12 m long x 3.5 m deep	
<b>DATE OF ANY REMEDIAL ACTION:</b> No remedial action completed to date	

ITEM	CONDITIONS EXIST		DESCRIPTION AND LOCATION	NOTICEABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress	X		Transverse cracking at both ends of slump. Some loss of lateral support for guardrails.		X
Slope Movement	X		Retreating slump south of HWY37 on both sides of cattlepass culvert. Scarps and tension cracking.		X
Erosion		X			
Seepage		X			
Culvert Distress	X		Sag ~3 m to 4 m into south end of cattlepass culvert		X

<b>COMMENTS</b>
<ul style="list-style-type: none"> <li>Both slumps appeared to have little to no change compared to the 2022 inspection. The scarp west of the cattlepass was about 2.0 m high and the scarp east of the cattlepass up to about 2.5 m high. Scarp at east extent next to the pavement remains approximately 0.3 m high (Photos 1 to 5).</li> <li>Tension cracks were observed on the west side of the west scarp and on the west side of the culvert opening, near the top of the culvert. Both appeared unchanged since last visit.</li> <li>There does not appear to be additional loss of lateral soil support at the guardrails.</li> <li>The height of the toe bulge was about 600 mm high (Photo 1).</li> <li>A sag was observed about 3 m to 4 m inside the south end of the cattle pass culvert since 2021. The sag location appeared to be approximately in line with the two scarps and is potentially separated at the joint.</li> <li>In past site inspections, the farmer east of the site informed us that the cattle gate periodically will not open or close due to landslide activity. He occasionally regrades the landslide to maintain functionality of the gate. New posts were installed in 2020-2021 on the west side of the south end of the cattlepass culvert. The wooden posts were significantly leaning in 2021 and was repaired in 2022. Regrading on the east side of the cattlepass may have been completed as part of fence repair. The toe appears to have been cut back in an</li> </ul>

area 1.7 m wide and long, and 0.7 m high. No signs of recent grading were observed during the current site inspection.

- At the time of the site visit, pavement crack sealing operations were in progress.
- A longitudinal crack in the EBL was observed above the culvert and was mostly patched during the site visit. The crack extends past the patch on both sides and is approximately 5 mm wide (Photo 6).
- The transverse crack previously observed above the eastern scarp has extended across the remainder of the WBL.
- The north guardrail was damaged on the east end, and the south guardrail was damaged on the west end. The posts on either side have been damaged beyond repair, and sections of rail are missing.
- A black utility cable (likely Telus) continues to be observed running east-west through the landslide


#### RECOMMENDATIONS

- The MCI should continue to monitor the highway surface and guardrails until remediation can be undertaken.
- For the new guardrail posts, the MCI should consider augering holes for their installation over pushing/pounding new posts to reduce vibrations within the landslide mass. The posts installed above the slump could also be replaced with deeper posts to provide additional lateral support to the rails in the event that they are struck by a vehicle, increasing the overall safety performance of the guardrail at this location.
- The MCI should discuss possible solutions with the farmer to maintain functionality of the gate but to refrain from further grading work at the toe of the landslide. Loss of soil support at the toe can trigger additional slope movements.
- In the short-term, fill can be placed at the base of the slope failure to act as a temporary buttress. The nearby Calahoo pit may be a potential source of granular material for this purpose.
- Long-term remediation may include the following:
  - Soil nailing: The embankment side slope can be rebuilt and stabilized with soil nails. A shotcrete facing is not necessary and can help save on construction costs. The high-level cost for removal and replacement with soil nailing is \$320,000 to \$420,000, excluding engineering costs.
  - Removal and replace: The slide mass could be excavated, and the embankment side slope rebuilt with granular fill. Fill used for temporary buttressing may be salvaged for this purpose. The high-level cost for removal and replacement is \$210,000 to \$320,000, excluding engineering costs.
  - Both options will need to consider the Telus line previously observed in the landslide. A gas line marker was also observed on the west side of the residential access and may complicate the above remediation strategies.
- Site inspections should be completed annually.



NORTH CENTRAL REGION GRMP  
EDSON / STONY PLAIN  
SITE INSPECTION FORM



<b>PREPARED BY:</b> Sonja Pharand, P.Eng.	<b>PREPARED BY:</b> Leslie Cho, M.Eng., P.Eng.
	
<b>REVIEWED BY:</b> Xiteng Liu, M.Sc., P.Eng., PMP	<b>PERMIT TO PRACTICE</b>

2023 Site Inspection Photos at NC092



**Photo 1:** Slump and toe bulge at east side of cattlepass culvert. Looking northwest



**Photo 2:** Slump across cattlepass culvert. Looking west



2023 Site Inspection Photos at NC092



**Photo 3:** Scarp at west slump. Looking east.



**Photo 4:** Possible regraded area on east side of culvert. Looking north.



2023 Site Inspection Photos at NC092



**Photo 5:** West slump next to culvert entrance. Looking south.

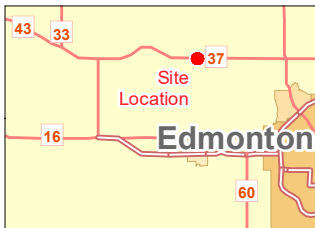
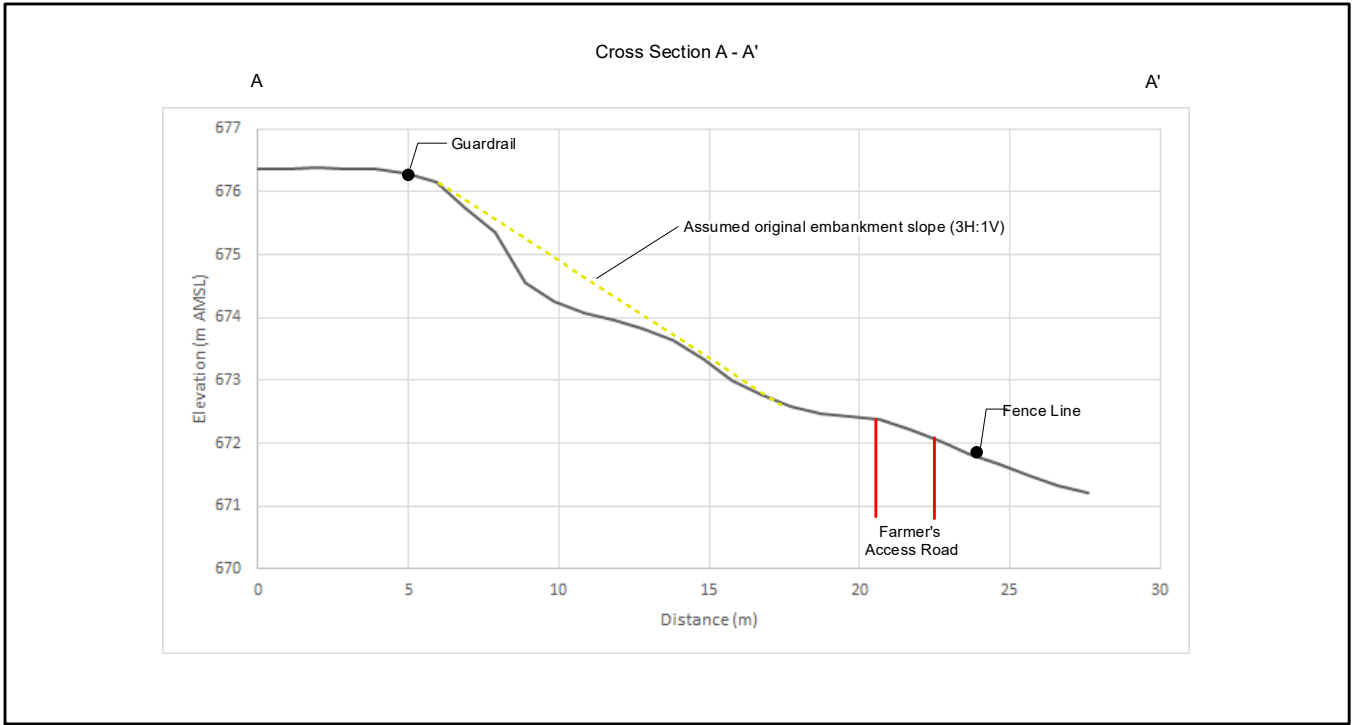
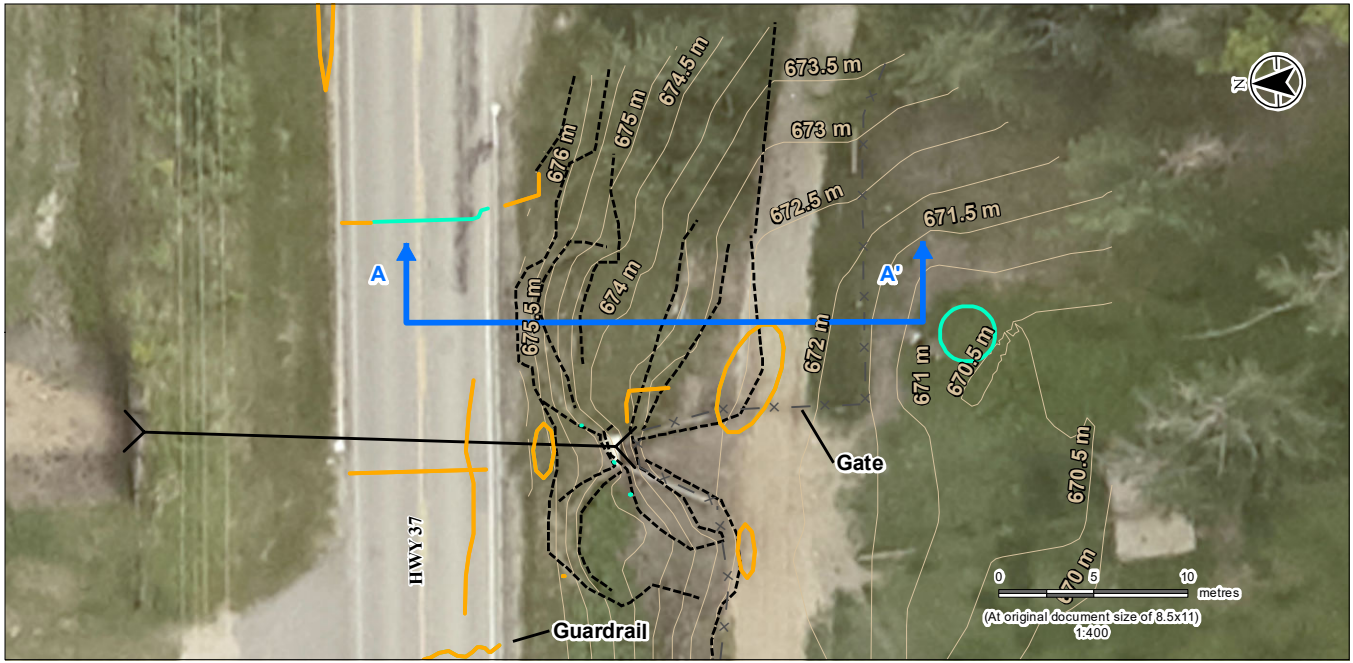


**Photo 6:** Highway surface above culvert. Looking west.





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- Previous Observation
- 2023 Observation
- - - Break Line
- x Fence
- Ground Elevation Contours (m AMSL)
- Culvert
- ↔ Cross-Section Location

**Notes**

- Coordinate System: NAD 1983 UTM Zone 12N
- Base features: Geogratis, ©Department of Natural Resources Canada, All rights reserved.
- Background: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community.
- Contours and Cross-Section Profile: Calculated from Stantec Survey Points (Feb. 2019).

m AMSL metres above mean sea level



**Project Location**  
NE-33-054-27-W4M,  
Alberta

**Prepared by** MK on 2023-07-20  
TR by LC on 2023-08-28  
IR by XL on 2023-08-28

**Client/Project**  
Transportation and Economic Corridors  
Geohazard Monitoring Program  
NC92 - Highway 37:2 East of RR272

123315222

**Figure No.**  
**2**

**Title**  
**Ground Profile of Section A - A'**