

<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 28, 2021	<b>CURRENT INSPECTION:</b> June 14, 2022
<b>LEGAL DESCRIPTION:</b> NE 33-54-27-W4M	<b>NAD83 COORDINATES:</b> UTM12U 5955908N, 307552E		<b>RISK ASSESSMENT:</b> PF: 10 CF: 5 Total: 50
<b>AVERAGE ANNUAL DAILY TRAFFIC (AADT):</b> 2740 (2021)		<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, Sonja Pharand AT: Rocky Wang, Amy Driessen
<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. Fresh scarps. Leaning posts on west side of south end of culvert.	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>Slumps appear to have remained the same size as previous visit with the scarp west of the cattlepass about 2.0 m high and the scarp east of the cattlepass about 1.5 m high. Some fresh scarps observed near the crest on west side of cattlepass. Fresh scarp at east extent next to the pavement is approximately 0.3 m high.</li> <li>There does not appear to be additional loss of lateral soil support at the guardrails.</li> <li>Toe bulge was about 600 mm high.</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 may potentially be separated at the joints.</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 but have been repaired. Regrading on the east side of the cattlepass may have been completed. The toe appears to have been cut back in an area 1.7 m wide and long, and 0.7 m high.</li> <li>The highway surface currently does not appear to be affected by the slope failure.</li> <li>A black utility cable (likely Telus) was observed running east-west through the landslide.</li> </ul>

- Thick vegetative growth obscured observations of previous open ground cracks.

**RECOMMENDATIONS**

- The MCI should continue to monitor the highway surface and guardrails until remediation can be undertaken.
- 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 \$300,000 to \$400,000, 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 \$200,000 to \$300,000, excluding engineering costs.
  - Both options will need to consider the Telus line 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.

**PREPARED BY:** Sonja Pharand, E.I.T.

**PREPARED BY:** Leslie Cho, M.Eng.,  
P.Eng.

**REVIEWED BY:** Xiteng Liu, M.Sc.,  
P.Eng., PMP



2022 Site Inspection Photos at NC092



**Photo 1:** Slump across cattlepass culvert. Looking northwest



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

2022 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.

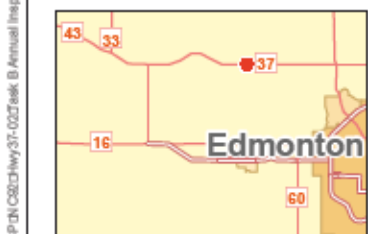
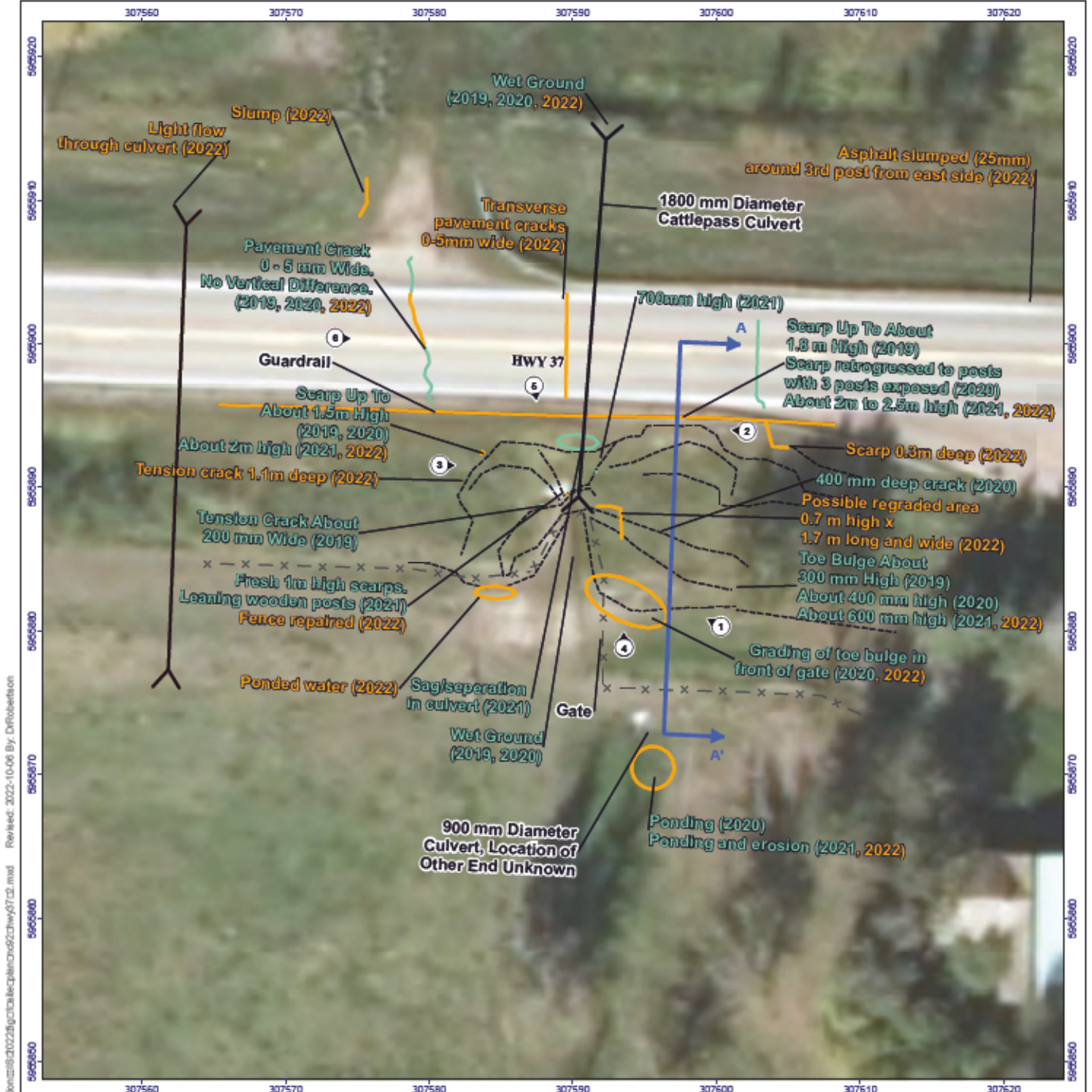
2022 Site Inspection Photos at NC092










**Photo 5:** Repaired fence and farmer's road. Looking south.



**Photo 6:** Highway surface at slump location. Looking east.



-  Photo Number and Direction
-  Previous Observation
-  2022 Observation
-  Break Line
-  Fence
-  Culvert
-  Cross Section Location



Project Location: NE-33-054-27-WMM, Alberta  
 Prepared by DR on 2023-09-28  
 Quality Review by LC on 2023-09-28  
 Independent Review by XL on 2023-09-28

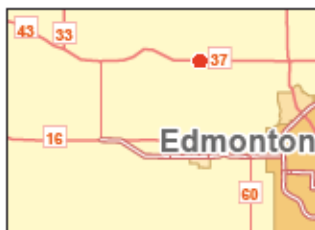
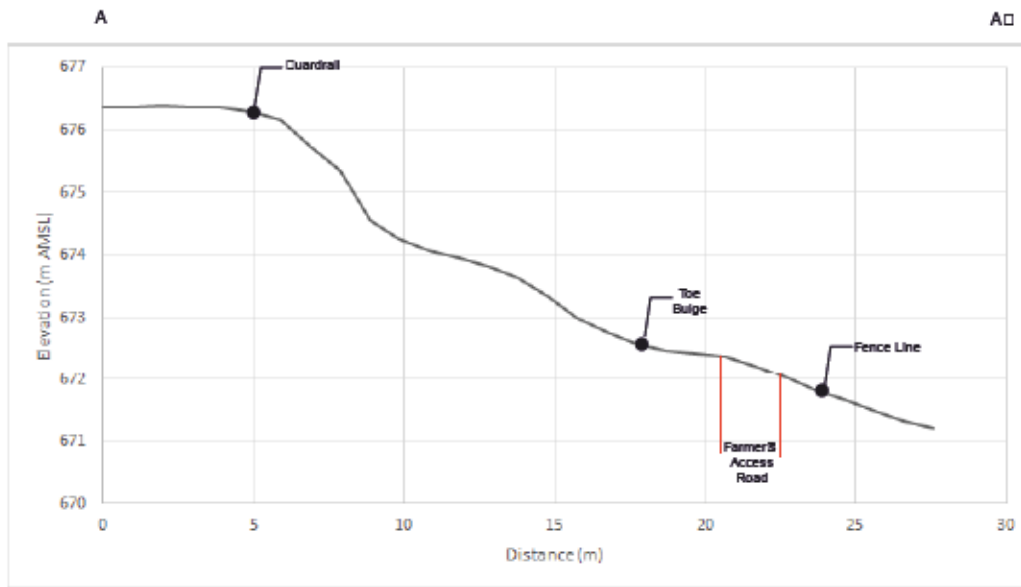
Client/Project: Alberta Transportation  
 Geohazard Monitoring Program  
 NC92 - Highway 37:2 East of RR272

Figure No.: 1  
 Title: Site Plan

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Cross Section A - AD



- Previous Observation
- 2022 Observation
- - - Break Line
- x - - - Fence
- Culvert
- Cross Section Location

**Notes**  
 1. Coordinate System: NAD 1983 UTM Zone 12N  
 2. Base features: Esri, Department of Natural Resources Canada, All rights reserved.  
 3. Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.



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 128316222

Geohazard Monitoring Program  
 NC92 - Highway 37:2 East of RR272

Figure No. 2

Title  
 Ground Profile of Section A - A'