

**ALBERTA TRANSPORTATION AND
ECONOMIC CORRIDORS
GEOHAZARD ASSESSMENT PROGRAM
PEACE REGION –GRANDE PRAIRIE DISTRICT - NORTH
2025 INSPECTION REPORT**



Site Number	Location	Name	Hwy	km
GP35	Hwy 733:04	Bad Heart River North	733:04	8.938
Legal Description		UTM Coordinates (NAD 83)		
LSD-1-33-75-3 W6M		E 412,161	N 6,155,446	

	Date	PF	CF	Total
Previous Inspection:	12-July-2021	9	6	54
Current Inspection:	5-May-2025	11	6	66
Road AADT:	740		Year:	2024
Inspected by:	Robert Senior, TEC Chris Newman, TEC Tom Patey, TEC Don Proudfoot, Thurber Nicole Wilder, Thurber			
Report Attachments:	<input checked="" type="checkbox"/> Photographs	<input checked="" type="checkbox"/> Plans	<input type="checkbox"/> Maintenance Items	

Primary Site Issue:	<p>Sliding movements of Hwy 733:04 along the north valley slope of Bad Heart River Valley. The roadway is located within an active landslide area and previously the site was identified by having an upper slide area and a lower slide area which were active since the early 1980's.</p> <p>Based on the recent observations of ground subsidence and head scarp cracking over the period between 2010 and 2025, it appears that the upper and lower slides have gradually coalesced into one major slide.</p> <p>Slide can be classified as slow movement based on the rate of movement.</p>		
Dimensions:	<p>The upper slide was initially estimated to be about 80 m long and the lower slide was estimated to be about 150 m long along the roadway alignment. The extents along the valley slope for both could not be defined and require further investigation.</p> <p>The upper and lower slides appear to have merged and developed into a large slide about 380 m in length along roadway alignment. There is currently approximately 300 m of roadway showing cracks through the recent overlay.</p>		
Maintenance:	ACP patching and crack sealing takes place every 1 to 2 years. An ACP overlay and guardrail was placed through the site in summer of 2024. TEC mentioned the cracks were sealed in October 2024.		
Observations:	Description	Worsened?	
<input checked="" type="checkbox"/> Pavement Distress	Cracks and dips on the pavement within the landslide impact area with cracks open to 40 mm wide and differential drop up to 20 mm were observed during the 2025 inspection. The pavement had an ACP overlay in 2024 and these same scarp cracks have reflected through.	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/> Slope Movement	The lower (south) and upper (north) slides have merged into a larger slide. A backscarp crack was observed extending along the northwest ditch . andwas also more defined than during the previous visit.	<input checked="" type="checkbox"/>	

<input checked="" type="checkbox"/> Erosion	A drainage gully was observed just south of the 500 mm diameter CSP culvert during previous inspections and had worsened into an erosion gully in 2020. The gully appeared in similar condition in 2025 and remains 6 m from the culvert outlet.	<input type="checkbox"/>
<input checked="" type="checkbox"/> Seepage	A gully which channels runoff flow from the farmland in the north to the slide area exists approximately 50 northeast of site. Some ponded water was observed at the base of this gully. A spring with rusty water emitting from it was observed in the northwest ditch.	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Bridge/Culvert Distress	The existing centerline culvert (about 600 mm in diameter) appeared to be filled with water at the time of inspection and the culvert was partially obstructed by overgrown vegetation at inlet and outlet locations.	<input checked="" type="checkbox"/>
<input type="checkbox"/> Other		<input type="checkbox"/>
<p>Instrumentation: Previous reports indicated that 5 slope inclinometers (SI) and 3 standpipe piezometer (PZ) were installed at this site. Results of the slope movement monitoring from SI readings indicated that the depth of slip surface varied from 7 m to 12 m below the existing ground surface. The instruments at this site are no longer operational and are not being read anymore.</p> <p>Assessment: No major slope movement was observed at this site; however, ongoing slope creep is occurring since cracks have shown through the new overlay. Further details of the background information about this site can be obtained from the previous reports in the site Geohazard Binder and are not repeated herein.</p> <p>The ongoing creep movements appear to be occurring at this site since 1998. To keep the roadway surface in a relatively good driving condition, TEC has been milling and patching the pavement every 1 to 2 years. The addition of several asphalt overlays in the past had steepened the shoulder of the northbound lane; however, gravel was placed on the south side of the road in this location and a guardrail was installed to protect traffic.</p>		
<p>Recommendations:</p> <p>Short Term : As TEC has been doing over the years, as a short-term mitigation measure, it is recommended that sealing of pavement cracks and patching of roadway be undertaken in the slide impacted area. The differential drops along the backscarp should be milled to improve driving conditions. The site should continue to be monitored to provide a history and trend of potential slide activity.</p> <p>The inlet and outlet areas of the existing 600 mm centreline culvert should be cleared of vegetation and debris to improve its performance. The erosion gully should be monitored for retrogression. The possible tension crack and scour should be backfilled with clay material to minimize the surface water infiltration.</p> <p>The north ditch was wet, with a spring present and may be ponding due to the backscarp pinching the ditch. A subdrain could be installed below the ditch and the ditch re-graded to allow for better subsurface drainage and unimpeded ditch water flow.</p> <p>Longer Term: A mid to long term remediation measure could consist of realigning the highway into the backslope to move it away from the active landslide. Some sideslope flattening could also be completed at that time to unload the active landslide area.</p>		<p>Ballpark Cost</p> <p>Maintenance (currently about \$100,000 every year)</p> <p>\$70,000</p> <p>\$100,000</p>

Closure

It is a condition of this letter report that Thurber's performance of its professional services will be subject to the attached Statement for Use and Interpretation of Report.

Yours very truly,
Thurber Engineering Ltd.
Don Proudfoot, P.Eng.
Partner | Senior Geotechnical Engineer

Nicole Wilder, M.Eng., P.Eng.
Associate | Geotechnical Engineer

STATEMENT FOR USE AND INTERPRETATION OF REPORT

1. STANDARD OF CARE

This Report has been prepared in a manner consistent with that degree of care and skill ordinarily exercised by members of the same profession currently practicing under similar circumstances at the same time and in the same or similar locality and in compliance with all applicable laws.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment, including this Statement For Use and Interpretation of Report, are a part of the Report, which is of a summary nature and is not intended to stand alone without reference to the instructions given to Thurber by the Client, communications between Thurber and the Client, and any other reports, proposals or documents prepared by Thurber for the Client relative to the specific site described herein, all of which together constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT, AS DESCRIBED ABOVE. THURBER IS NOT RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE OF THE REPORT.

3. BASIS OF REPORT

The Report has been prepared for the specific site, development, design objectives, and purposes that were described to Thurber by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the Report, subject to the limitations provided herein, are only valid to the extent that the Report expressly addresses proposed development, design objectives and purposes, and then only to the extent that there has been no material alteration to or variation from any of the said descriptions provided to Thurber, unless Thurber is specifically requested by the Client to review and revise the Report in light of such alteration or variation.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client for the development, design objectives, and/or purposes described to Thurber by the Client. **NO OTHER PARTY MAY USE OR RELY ON THE REPORT OR ANY PORTION THEREOF FOR OTHER THAN THE CLIENT'S BENEFIT IN CONNECTION WITH THE PURPOSES DESCRIBED IN THE REPORT.** Any use which a third party makes of the Report is the sole responsibility of such third party and is always subject to this Statement for Use and Interpretation of Report. Thurber accepts no liability or responsibility for damages suffered by any third party resulting from use of the Report for purposes outside the reasonable contemplation of Thurber at the time it was prepared or in any manner unintended by Thurber.

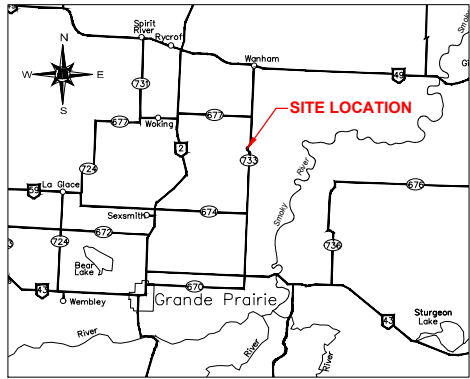
5. INTERPRETATION OF THE REPORT

- a) **Nature and Exactness of Soil and Contaminant Description:** Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors is inherently judgement-based. Comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel may fail to locate some conditions. All investigations utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and the Client and all other parties making use of such documents or records with or without our express written consent need to be aware of this risk and the Report is delivered subject to the express condition that such risk is accepted by the Client and such other parties. Some conditions are subject to change over time and those making use of the Report need to be aware of this possibility and understand that the Report only presents the interpreted conditions at the sampled points at the time of sampling. If special concerns exist, or the Client has special considerations or requirements, the Client must disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.
- b) **Reliance on Provided Information:** The evaluation and conclusions contained in the Report have been prepared based on conditions in evidence at the time of site inspections and based on information provided to Thurber. Thurber has relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, Thurber does not accept responsibility for any deficiency, misstatement or inaccuracy contained in the Report resulting from misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other parties providing information relied on by Thurber. Thurber is entitled to rely on such representations, information and instructions and is not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.
- c) **Design Services:** The Report may form part of design and construction documents for information purposes even though it may have been issued prior to final design being completed. Thurber is recommended to be retained to review final design, project plans and related documents prior to construction to confirm that they are consistent with the intent of the Report. Any differences that may exist between the Report's recommendations and the final design need to be reported to Thurber immediately so that Thurber can address potential conflicts.
- d) **Construction Services:** During construction Thurber should be retained to provide field reviews. Field reviews consist of performing sufficient and timely observations of encountered conditions to confirm and document that the site conditions do not materially differ from those conditions considered in the preparation of the report. Adequate field reviews are necessary for Thurber to provide letters of assurance, in accordance with the requirements of many regulatory authorities.

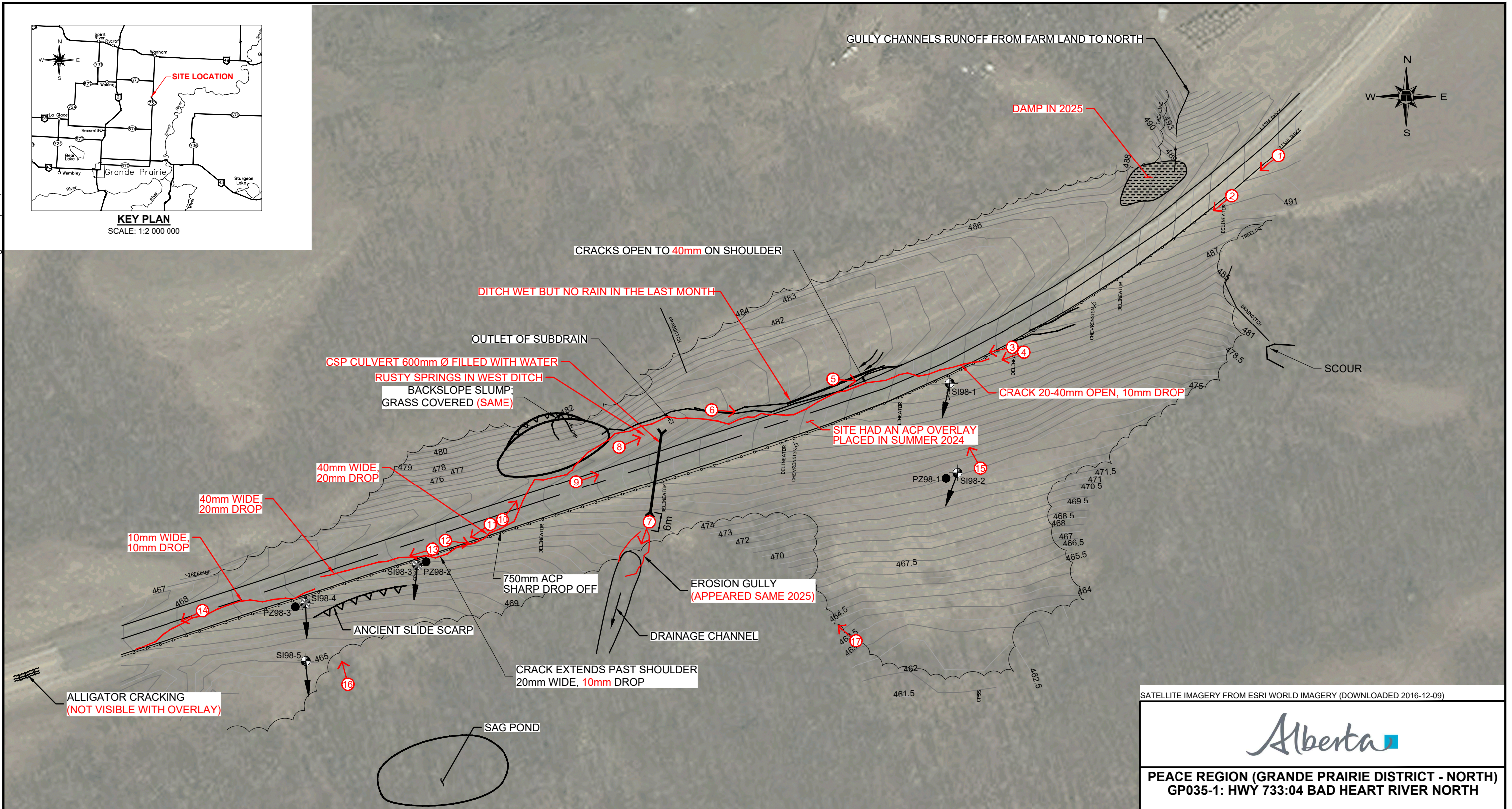
6. INDEPENDENT JUDGEMENTS OF CLIENT

The information, interpretations and conclusions in the Report are based on Thurber's interpretation of conditions revealed through limited investigation conducted within a defined scope of services. Thurber does not accept responsibility for independent conclusions, interpretations, interpolations and/or decisions of the Client, or other parties who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes, but is not limited to, decisions made to develop, purchase, or sell land, unless such decisions expressly form part of the stated purpose of the Report as described in Paragraph 3.

G:\32000\32123 AT GRMP Grande Prairie District North 2021-2025\CAD\2025 GEO HAZARD\NPW\32123-GP035-1.dwg - 1 - Sep. 29, 2025



KEY PLAN
SCALE: 1:2 000 000



SATELLITE IMAGERY FROM ESRI WORLD IMAGERY (DOWNLOADED 2016-12-09)



PEACE REGION (GRANDE PRAIRIE DISTRICT - NORTH)
GP035-1: HWY 733:04 BAD HEART RIVER NORTH

2025 SITE INSPECTION

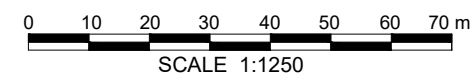
DWG No. 32123-GP035-1

LEGEND

- CRACKS (APPROXIMATE)
- GUARDRAIL (APPROXIMATE)
- PREVIOUS SLOPE INCLINOMETER (NON-OPERATIONAL)
- PREVIOUS STANDPIPE PIEZOMETER (NON-OPERATIONAL)
- DIRECTION AND NUMBER OF PHOTO
- SLOPE INCLINOMETER DAMAGED

NOTES:

1. PREVIOUS OBSERVATIONS SHOWN IN BLACK.
2. MAY 5, 2025 OBSERVATIONS SHOWN IN RED



DRAWN BY	ML
DESIGNED BY	NPW
APPROVED BY	RVC
SCALE	1:1250
DATE	SEPTEMBER 2025
FILE No.	32123





Photo 1. Looking southwest at the east end of the site near the end of the guardrail.



Photo 2. Looking southwest at the end of the guardrail and the undulating road.



Photo 3. Looking southwest at northmost scarp crack showing through overlay.



Photo 4. Looking southwest at where gravel had been placed to flatten steep drop off.



Photo 5. Looking northeast along Hwy 733 at scarp crack



Photo 6. Looking east at scarp crack in the highway ditch with white residue.



Photo 7. Looking south at erosion gully.



Photo 8. Looking east at rusty coloured water in ditch



Photo 9. Looking northeast near the middle of the landslide



Photo 10. Looking north at old backslope slump



Photo 11. Looking southwest at scarp crack showing through overlay



Photo 12. Looking east at scarp crack that was 40 mm wide and had a 20 mm drop.



Photo 13. Looking southwest at scarp crack near the westmost part of the site.



Photo 14. Looking southwest at scarp at the west extent of the site.



Photo 15. Drone looking northwest at the scarp crack at the northeast extent.



Photo 16. Drone looking north at the scarp crack near the west part of the site.



Photo 17. Drone looking northwest at the site and the erosion gully.