

**ALBERTA TRANSPORTATION
GEOHAZARD ASSESSMENT PROGRAM
PEACE REGION (PEACE RIVER DISTRICT)
2023 INSPECTION**



Site Number	Location	Name	Hwy	km
SH030-1	West of High Prairie	East of Gunns Creek	2A:54	17.56 – 17.82
Legal Description		UTM Co-ordinates		
NE&SE32-73-19-W5M		11U E 508,043		N 6,135,622

	Date	PF	CF	Total
Previous Inspection:	29-Jun-2021	3	3	9 (west)
Current Inspection:	6-Jun-2023	3	2	6 (west)
Road AADT:	700		Year:	2022
Inspected By:	Kristen Tappenden, TEC Max Shannon, TEC		Ken Froese, Thurber Mark Gallego, Thurber	
Report Attachments:	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Plans <input type="checkbox"/> Maintenance Items			

Primary Site Issue:	Longitudinal cracking and slumping of EBL lane and shoulder.	
Dimensions:	<p>Section 1: 48 m and 15 m long shallow slides on either side of a 900 mm culvert at the east end of site.</p> <p>Section 2: 110 m long section with cracking and minor settlement about 60 m further west of Section 1 shallow slides (about 135 m west of culvert).</p>	
Date of Remediation:	<p>Section 1: 2017 – 137 m of EBL at culvert sites rebuilt with gravel fill and paved.</p> <p>Section 2: 2020 – 185 m of EBL was excavated and rebuilt with gravel fill and paved. A clay cap was placed on sideslope of gravel fill. TRM was placed along the south ditch.</p> <p>An asphalt overlay was placed on the highway after the landslide repairs had been completed.</p>	
Maintenance:	<p>Section 1: Fall 2017 – Patching on EBL of west site.</p> <p>Section 2: 2018 – Minor patching.</p>	
Observations (Section 2):	Description	Worsened?
<input checked="" type="checkbox"/> Pavement Distress	New transverse cracks have appeared; one of the cracks is over the SWSP culvert.	<input checked="" type="checkbox"/>
<input type="checkbox"/> Slope Movement	No new movements observed during 2023 inspection.	<input type="checkbox"/>
<input type="checkbox"/> Erosion		<input type="checkbox"/>
<input type="checkbox"/> Seepage	South ditch was dry during 2021 inspection.	<input type="checkbox"/>
<input checked="" type="checkbox"/> Bridge/Culvert Distress	762 mm culvert (km 17.612) at east end of area in a good condition.	<input type="checkbox"/>
<input type="checkbox"/> Other		<input type="checkbox"/>
Instrumentation:		
None		

Assessment:

There had not been a history of landslide activity at this location until June 2016; however, there was higher-than-average rainfall in the weeks preceding signs of instability. It is likely that the embankment or foundation soils became saturated reducing the strength of the material allowing failure. At the time of June 2016 call-out inspection, the slide west of the culvert in Section 1 had been temporarily filled with 50 mm gravel. It was recommended that a gravel wedge with shear key be constructed using the Contractor currently working on the SH026 slide repair located in a valley crossing about 0.6 km further west. Although a toe berm would have been as effective and less expensive, there was not time to acquire additional right-of-way. It is understood that this repair was completed in late fall of 2016 with final paving completed in the spring of 2017.

During the 2017 inspection, it was noted that there was additional longitudinal cracking along Section 2 about 60 m further west of the newly-paved area. A toe bulge was also identified over a portion of this area. It is likely that the mechanism of failure was like the area at the culvert; however, there may be some local strength variability in the embankment or foundation soils that delayed movement. It should be noted that the fields in the vicinity of this area are flat-lying and the drainage is poor due to low grades along the ditches. An additional round of localized patching was undertaken in Fall 2017; however, some of the cracks had reflected through. By 2019, some potholes and pop-outs had formed, the cracks had increased in length, width, and frequency, and some differential movement was occurring.

In 2019, the site was drilled as part of engineering design (see Thurber Project 22188). The test holes drilled through the highway (locations shown on the drawings) encountered between 1.5 m (TH19-1) and 2.8 m (TH19-2) of gravel and clay fill overlying stiff, high plastic native clay to the depth of investigation (10.4 m below ground surface).

In 2020, the site was remediated by excavating the EBL, cutting a shear key near the toe of the highway embankment, and backfilling the excavation with granular material. Non-woven geotextile was placed prior to backfilling with granular material. The embankment was extended to the south to flatten the sideslope to 5.5H:1V and a clay cap was placed on the sideslope. The highway was repaved and disturbed areas along the sideslope and the ditch were topsoiled and seeded and TRM was placed along the south ditch.

There were no significant changes observed during the 2023 inspection, suggesting that the remedial measures have suitably stabilized the treated area.

Recommendations:

This site has been scheduled for inspection twice on the current contract. The site can be dropped from the GRMP since there were no significant changes observed during the 2021 and 2023 inspections.

Closure

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

Tarek Abdelaziz, Ph.D., P.Eng.
Partner | Senior Geotechnical Engineer

Mark Gallego, M.Eng., P.Eng.
Geotechnical Engineer



STATEMENT OF LIMITATIONS AND CONDITIONS

1. STANDARD OF CARE

This Report has been prepared in accordance with generally accepted engineering or environmental consulting practices in the applicable jurisdiction. No other warranty, expressed or implied, is intended or made.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment 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. THURBER IS NOT RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE 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. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT THURBER'S WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS THURBER MAY EXPRESSLY APPROVE. Ownership in and copyright for the contents of the Report belong to Thurber. Any use which a third party makes of the Report, is the sole responsibility of such third party. Thurber accepts no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without Thurber's express written permission.

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- 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 are judgmental in nature. 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 persons making use of such documents or records with our express written consent should 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 persons. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. If special concerns exist, or the Client has special considerations or requirements, the Client should 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 on the basis of conditions in evidence at the time of site inspections and on the basis of 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 as a result of misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other persons 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 should 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 detailed in the contract documents should 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 in order to confirm and document that the site conditions do not materially differ from those interpreted 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.

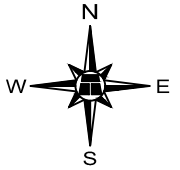
6. RELEASE OF POLLUTANTS OR HAZARDOUS SUBSTANCES

Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause the escape, release or dispersal of those substances. Thurber shall have no liability to the Client under any circumstances, for the escape, release or dispersal of pollutants or hazardous substances, unless such pollutants or hazardous substances have been specifically and accurately identified to Thurber by the Client prior to the commencement of Thurber's professional services.

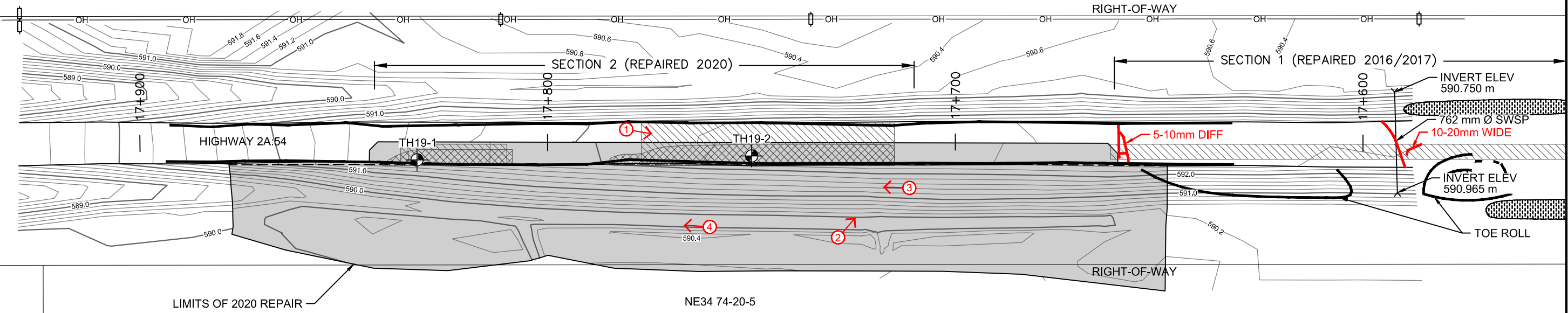
7. INDEPENDENT JUDGEMENTS OF CLIENT

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 others 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.

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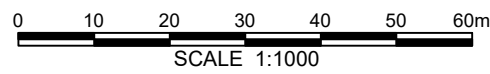


LEGEND

- TEST HOLE LOCATION
- CRACK
- 2018 ACP PATCH
- 2017 ACP PATCH
- OVERHEAD POWER LINE AND POWER POLE
- CULVERT
- DIRECTION AND NUMBER OF PHOTO

NOTES:

1. ORIGINAL SURVEY COMPLETED BY WSP ON FEBRUARY 5, 2019
2. AS-BUILT SURVEY COMPLETED BY WSP ON JULY 25, 2020
3. SIDE SLOPES SLOPE TEXTURED
4. ALL DISTURBED AREAS COVERED WITH SALVAGED TOPSOIL AND SEEDED
5. TRM (TYPE A) PLACED ON DITCH BOTTOM AND CUT SLOPES
6. JUNE 2023 OBSERVATIONS SHOWN IN RED.



PEACE REGION (PEACE RIVER DISTRICT)

**SH030-1: HWY 2A:54 km 17.6 TO km 17.9
2023 SITE INSPECTION PLAN**

DWG No. 32121-SH030-1

DRAWN BY	ML
DESIGNED BY	MG
APPROVED BY	TSA
SCALE	1:1000
DATE	OCTOBER 2023
FILE No.	32121





Photo 1 – Looking east from WBL at middle of the reconstructed portion of EBL.



Photo 2 – Looking northeast at south slope of highway embankment from the south ditch.



Photo 3 – Looking west along south side slope of highway embankment.



Photo 4: Looking west along south ditch where TRM was installed.