

**ALBERTA TRANSPORTATION  
GEOHAZARD ASSESSMENT PROGRAM  
PEACE REGION (PEACE RIVER DISTRICT)  
2021 INSPECTION**



<b>Site Number</b>	<b>Location</b>	<b>Name</b>	<b>Hwy</b>	<b>km</b>
SH008-1	2 km E of Watino Bridge	Watino East Hill	49:08	18.80-19.05
<b>Legal Description</b>		<b>UTM Co-ordinates</b>		
NE26-77-24-W5M		11U E 462,307	N	6,173,153

	<b>Date</b>	<b>PF</b>	<b>CF</b>	<b>Total</b>
<b>Previous Inspection:</b>	3-Jun-2020	12	2	24
<b>Current Inspection:</b>	28-Jun-2021	10	2	20
<b>Road AADT:</b>	790		<b>Year:</b>	2020
<b>Inspected By:</b>	Rocky Wang, TRANS Ed Szmata, TRANS Max Shannon, TRANS Chase Millegen, TRANS		Barry Meays, Thurber Mark Gallego, Thurber	
<b>Report Attachments:</b>	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Plans <input type="checkbox"/> Maintenance Items			

<b>Primary Site Issue:</b>	Rotational, retrogressive failures in 10 m high backslope.	
<b>Dimensions:</b>	250 m length of backslope slumping on south side of highway.	
<b>Date of Remediation:</b>	1993: Highway re-routed to this current alignment. 1994: Assessment of subdrains in north slope found them to be working well. 1999: Design undertaken for French drains in south backslope slump area but not constructed. 2001: Gravel placed to buttress upper portion of Slump A and lower portion of Slump C and placed 3 m wide riprap lining in ditch. 2003: Rip-rap-lined channel constructed on lower half of Slump B. 2020: Pavement overlay placed on valley hill section of highway through this site.	
<b>Maintenance:</b>	2004: Additional stone added to south ditch east of Slump C. 2006: Rip-rap placed in north ditch. 2015: Slumped material in the south ditch removed. 2019: Site regraded to open up south ditch; north sideslope also regraded	
<b>Observations:</b>	<b>Description</b>	<b>Worsened?</b>
<input type="checkbox"/> Pavement Distress		<input type="checkbox"/>
<input checked="" type="checkbox"/> Slope Movement	Four separate slump blocks in the south backslope.	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Erosion	Slumped material removed from the ditch, leaving bare soil exposed.	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Seepage	Seepage noted in the backslope and accumulating in grabens.	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Bridge/Culvert Distress	Outlet of drainage pipe partially obstructed.	<input type="checkbox"/>
<input checked="" type="checkbox"/> Other	Two pipelines are located immediately south of the backslope.	<input type="checkbox"/>

**Instrumentation:**

None.

**Assessment:**

This site is located at the crest of the Smoky River valley; however, the backslope slumping appears to be the result of seepage from exposed sandy/silty layers in the backslope rather than deep-seated instability due to valley movements. At the present time, there is no impact to the highway surface as the depth of failure is contained within the height of the backslope. South slopes to the west and east of this localized area are apparently stable although not quite as high; the north slope is of a similar height and also appears stable. This may indicate that the direction of horizontal groundwater flow is a contributing factor, as well as a shaded north facing slope that stays wetter than the south facing one.

In the spring of 2019, the maintenance contractor excavated the toe rolls to improve ditch drainage. The material was wasted higher up on the slopes. The contractor also added two swales on the slope to assist with drainage from the sag ponds further up the slope. The grading work obscured some of the slide features and may also contribute to local instability at the toe due to the overall steepening of the lower portion of the backslope. However, it solved the ditch drainage issue. In 2020, there was deterioration of the toe of this regrading with some sloughing and erosion observed, however the site hadn't gotten worse in 2021. The upper portions of the fill are starting to revegetate.

An underground utility locate was undertaken in 2018 to identify the locations of the pipelines at the top of the slope. The TransCanada pipeline (TCPL) was closest at an offset 3.9 m south of Pin A1 and 0.1 m south of Pin B3. The East Peace Gas Co-op natural gas line is located further south of the TCPL line.

Overall, there does not appear to be significant changes since the 2020 inspection perhaps due to the overall drier weather this year.

**Recommendations:****Short-Term:**

- Remove material from the ditch when required to maintain flow but do not place the excavated material back onto the slide mass as it will load the slide. Augment the ditch bottom rip-rap to minimize downcutting and erosion of the recently-graded faces of the slide toe rolls.
- Establish a line of communication with the pipeline owners to determine risk tolerance and minimum setback distance.

**Long-Term:**

- Develop remediation options such as: flattening of the backslope with a buried culvert along the ditch (so that the toe of the slope can be moved to the north), reconstruct the slope with gravel material or select clay with French drains and subdrains, install a groundwater cut-off trench at the top of the slope.

**Ongoing Investigation:**

- This site has been slated for formal inspections twice under the current contract. This seems reasonable as not much change has been observed since the 2020 inspection. However, an extra inspection should be carried out if the MCI notes any significant changes prior to the next scheduled inspection.
- A geotechnical drilling program is recommended if the long-term remediation option(s) are considered.

**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.

Don Proudfoot, P.Eng.  
Principal | Senior Geotechnical Engineer

Mark Gallego, 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.

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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.

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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

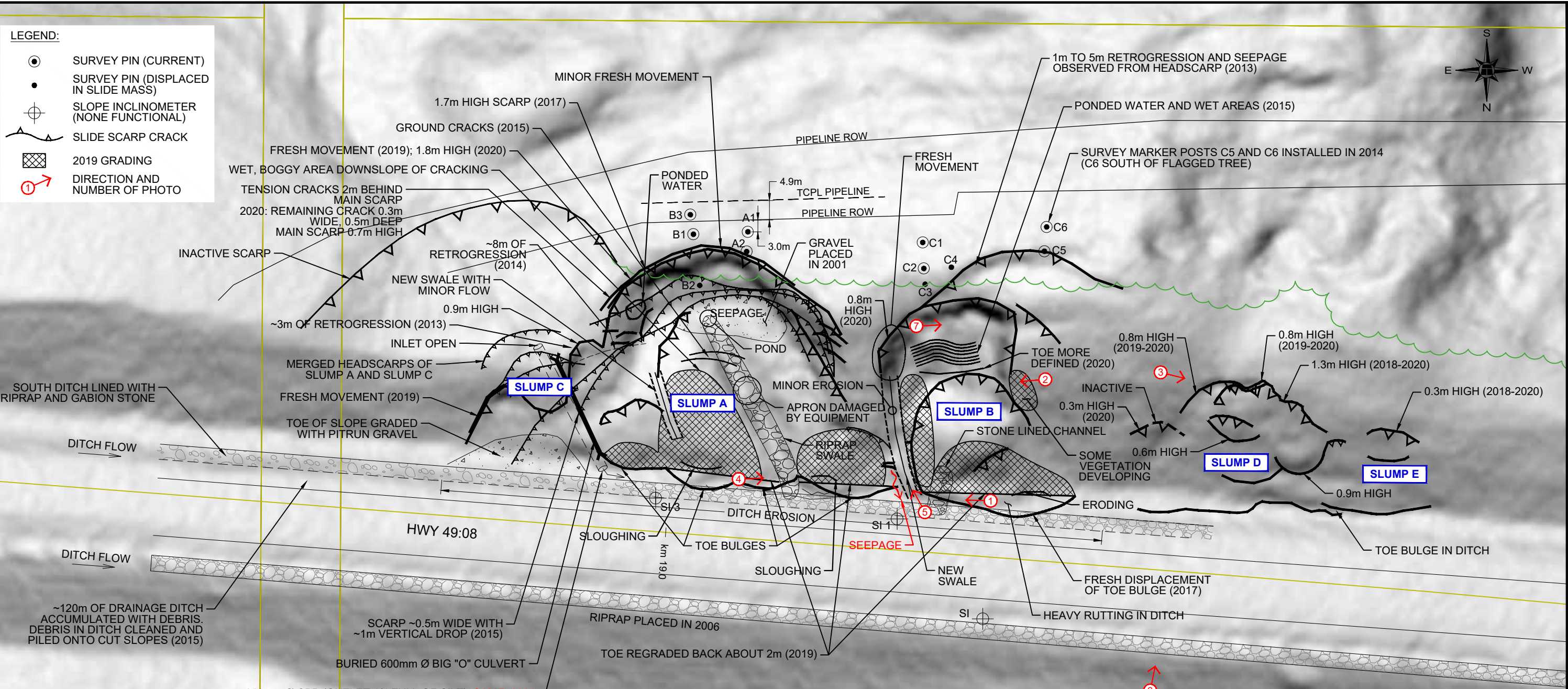
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**LEGEND:**

- SURVEY PIN (CURRENT)
- SURVEY PIN (DISPLACED IN SLIDE MASS)
- ⊕ SLOPE INCLINOMETER (NONE FUNCTIONAL)
- ▲ SLIDE SCARP CRACK
- ▨ 2019 GRADING
- ➔ DIRECTION AND NUMBER OF PHOTO



**NOTES :**

1. FEATURE LOCATIONS ARE APPROXIMATE.
2. PREVIOUS OBSERVATIONS SHOWN IN BLACK.(2013-2015 FROM AMEC FIGURE 1, PROJECT EG10030 PROVIDED BY ALBERTA TRANSPORTATION.)
3. LIDAR PROVIDED BY ALBERTA TRANSPORTATION DATED 2007-2008 AND SHADED FROM WHITE AT 0° TO BLACK AT 30°
4. JUNE 2021 OBSERVATION SHOWN IN RED.
5. DRAWING RESET IN 2017, MANY PREVIOUS OBSERVATIONS REMOVED. SEE 2016 DRAWING FOR THOSE HISTORIC DETAILS.
6. SCARP CRACKS VERIFIED FROM UAV IMAGERY IN 2018.

MARKER	MARKER DISTANCES (m)									SCARP HEIGHT (m)				
	2021	2020	2019	2018	2017	2016	2015	2014	2013	2021	2020	2019	2018	2017
B1 - B2				4.9	-	-	-	-	5.7					
B2 - SCARP				-	-	-	-	-	5.2					
B1 - SCARP	3.2	3.2	3.2	3.3	3.3	3.3	3.4	3.4	-	1.6****	1.6****	1.7	1.9	1.9
B1 - B3* **					5.0	-	-	-	-					
A1 - A2***				5.0	5.4	5.4	6.6	6.6	5.4					
A2 - SCARP	0.8	0.8	0.8	0.8	0.9	0.9	1.2	1.2	2.1	1.3	1.3	1.3	1.3	1.3
C1 - C2				7.8	7.8	7.8	7.8	7.8	7.9					
C2 - C3				-	-	-	-	-	5.1					
C2 - SCARP		2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.3	0.6****	1.1	1.0	0.7	
C3 - SCARP	0.5													
C5 - C6				2.0	2.0	2.0	2.0	2.0	-					
C5 - SCARP		5.7	5.7	5.9	5.9	5.9	5.9	6.0	-	1.0	0.7	0.4	0.3	

\*B2 REBAR PIN SALVAGED AND INSTALLED 5m BEHIND B1 AND RENAMED B3  
 \*\*B3 LOCATED 0.1m NORTH OF TCPL PIPELINE  
 \*\*\*A1 LOCATED 3.9m NORTH OF TCPL PIPELINE  
 \*\*\*\* SCARP HAS RAVELLED SO LESS VERTICAL

0 10 20 30 40 50 60m  
SCALE 1:1000


*Alberta*

**PEACE REGION (PEACE RIVER DISTRICT)**

**SH008-1: HWY 49:08 WATINO EAST HILL SMOKY RIVER  
2021 SITE INSPECTION PLAN**

**DWG No. 32121-SH008-1**

DRAWN BY	KLW
DESIGNED BY	MG
APPROVED BY	DWP
SCALE	1:1000
DATE	OCTOBER 2021
FILE No.	32121



**THURBER ENGINEERING LTD.**





Photo 1 – Looking east at toes of Slumps B and A which were excavated in 2019 to improve ditch flow with the material placed back onto the slide masses.



Photo 2 – Looking southeast at the top of Slump B. Disturbances from 2019 regrading becoming vegetated.





Photo 3 – Looking west at crest of Slump D





Photo 4 – Looking west at the toe of Slump B.



Photo 5: Recent grading (2019) of lower portion of the slope at toe of Slump B becoming vegetated.





Photo 6: Looking southwest at Slump D.





Photo 7: Looking west at top of Slump B.