

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



Site Number	Location	Name	Hwy	km
PH030	Judah Hill	Lookout Slides	744:04	57.43
Legal Description		UTM Co-ordinates		
SE¼ 20-083-21 W5M		11V E 483194	N 6229425	

	Date	PF	CF	Total
<b>Previous Inspection:</b>	10-June-2020	10	4	40
<b>Current Inspection:</b>	6-July-2021	10	4	40
<b>Road WAADT:</b>	600		<b>Year:</b>	2020
<b>Inspected By:</b>	Tyler Clay, TEL Ed Szmata, TRANS Max Shannon, TRANS		Don Proudfoot, TEL Kristen Tappenden, TRANS Erwin Kurz, TRANS	
<b>Report Attachments:</b>	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Plans <span style="margin-left: 100px;"><input type="checkbox"/> Maintenance Items</span>			

<b>Primary Site Issue:</b>	<p>Several old slides on the steep slope west of the Sagitawa Lookout and north on Hwy 744:04.</p> <p>Highway was closed from May 2013 to January 2014, due to the occurrence of the Sunshine Landslide further north. Highway section through the area was realigned as part of Contract CON0015153 in 2015/2016 due to a landslide located near SI10-3 that retrogressed into the SBL in June 2015. A temporary detour had to be built in the NBL ditch and the traffic was re-instated on the new/current alignment in mid-November 2015.</p> <p>Failures in the sideslope are retrogressing toward the re-aligned road north of the Lookout slide.</p>		
<b>Dimensions:</b>	Three slide areas each 15 m to 40 m wide.		
<b>Maintenance:</b>	Alignment repaved in 2016.		
<b>Observations:</b>	<b>Description</b>	<b>Worsened?</b>	
<input checked="" type="checkbox"/> Pavement Distress	Longitudinal cracking previously noted east of the north slide (km 57.65) appeared to have extended a bit further south but otherwise did not appear significantly different from the 2020 condition (Photos 4 and 7). Pavement condition was good north of km 57.65.	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/> Slope Movement	No changes observed at Slide 4 (Photo 1). Minor retrogression and some flank expansion observed at Slides 2 and 3. Slide 2 main scarp offset 1.3 m from the guardrail and upper slide area was well vegetated (Photos 2 and 3). The landslide scarp in the highway sideslope about 4.5 m downslope of the SBL guardrail at km 57.65 appears to be actively moving and a scarp has formed in the previously observed tension crack with increased dropdown (Photos 5 and 6); resulting in approximately	<input checked="" type="checkbox"/>	

	0.7 m of retrogression since 2020. Scarp is offset 2.5 m from the guardrail.	
<input checked="" type="checkbox"/> Erosion	An erosion gully was noted approximately 40 m south of Slide 4 at the southern end of the site (Photo 8).	<input type="checkbox"/>
<input type="checkbox"/> Seepage		<input type="checkbox"/>
<input type="checkbox"/> Bridge/Culvert Distress		<input type="checkbox"/>
<input type="checkbox"/> Other		<input type="checkbox"/>

<b>Instrumentation:</b>	
<p>Inclinometers and piezometers were installed in early March 2010 at Slide 1 and at additional slides further to the north along Hwy 744/Judah Hill. SI10-3 could no longer be read at the end of the summer of 2015 and was subsequently found sheared in August 2015 following a landslide failure.</p> <p>As part of the bi-annual reading program, the operational instruments were read on July 10, 2021.</p>	
SI10-1, SI10-2, and SI10-3	<p>SI10-1 showed a rate of movement of 0.3 mm/yr over 1.4 m to 6.3 m depth and no discernible movement over 14.2 m to 15.4 m depth since the fall of 2020 readings.</p> <p>SI10-2 showed a rate of movement of 0.8 mm/yr over 0.4 m to 4.1 m depth and a rate of movement over 2.0 mm/yr over 4.1 m to 8.3 m depth since the fall of 2020 readings.</p> <p>Average annual movement rates in both SI's have been typically at or below 2 mm/yr and relatively consistent since installation in 2010. Total cumulative movement in both SI's is below 25 mm.</p> <p>Prior to its loss (sheared at 2.8 m depth), SI10-3 had three zones of movement from 2.7 m to 10.7 m and appeared to be most active in the upper 6 m where movement rates had increased to 47.3 mm/yr from the Fall 2014 to the Spring 2015 readings and up to 264 mm/yr in the subsequent readings taken during the summer of 2015.</p>
PN10-1 and PN10-2	<p>Since the fall of 2020 readings, pneumatic piezometer PN10-1 showed a decrease in groundwater level of 1.29 m, while PN10-2 showed an increase in groundwater level of 0.01 m. The current groundwater level in PN10-1 is the lowest measured in the instrument since September 2011, and likely is reflective of the dry weather conditions this spring around the site.</p>
<b>Assessment:</b>	
<p>The existing slides occurred on steep slopes (36° to 38°) and are similar in appearance to the Heart River slides. The previous repairs at Slide 1 (shredded tire fill wedge) appear to be effective, although there may be some ongoing movement in the backscarp causing minor pavement distress.</p> <p>The October 2015 landslide at SI10-3 was remediated as part of Contract CON0015153 with a realignment of the affected highway section into the backslope further to the east. The extent of the realignment was limited by the presence of the ATCO natural gas pipeline right-of way which flanked the highway alignment along the NBL. It is now understood that ATCO has since abandoned which in turn will provide some additional space for future realignments, if required.</p>	

There is continuing slide activity in slides 2 and 3, and in the newly regraded highway sideslope below the SBL at km 57.64, possibly in response to surface and groundwater drainage. There is further slide development at the previously observed tension crack and the crack in the pavement have been observed to be slowly expanding at the km 57.65 slide. The slide could potentially reach the guardrail within a few years if large increments of retrogression or erosion occur following particularly wet seasons (the spring of 2021 was noted to be drier relative to previous years). The operating SI near this area (SI10-2) appears to be outside of the main movement zone.

**Recommendations:**

**Cost**

The slide activity in the highway embankment sideslope and overall performance of the newly implemented surface drainage measures should be regularly monitored by the Maintenance Contractor in the meantime.

Maintenance  
Inspection

The landslide at km 57.65 is expected to continue to move and retrogress toward the new highway alignment. A tied back pile wall should be considered to protect the new alignment from this feature. The wall will need to be in the order of 35 m to 40 m wide with two rows of tie-back anchors.

\$1.5-3M

Sub-excavation of the slide mass and replacement with shredded tire light weight fill could be considered as a shorter-term, cheaper solution.

\$300,000

**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

Tyler Clay, P.Eng.  
Geological Engineer



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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.

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- 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.

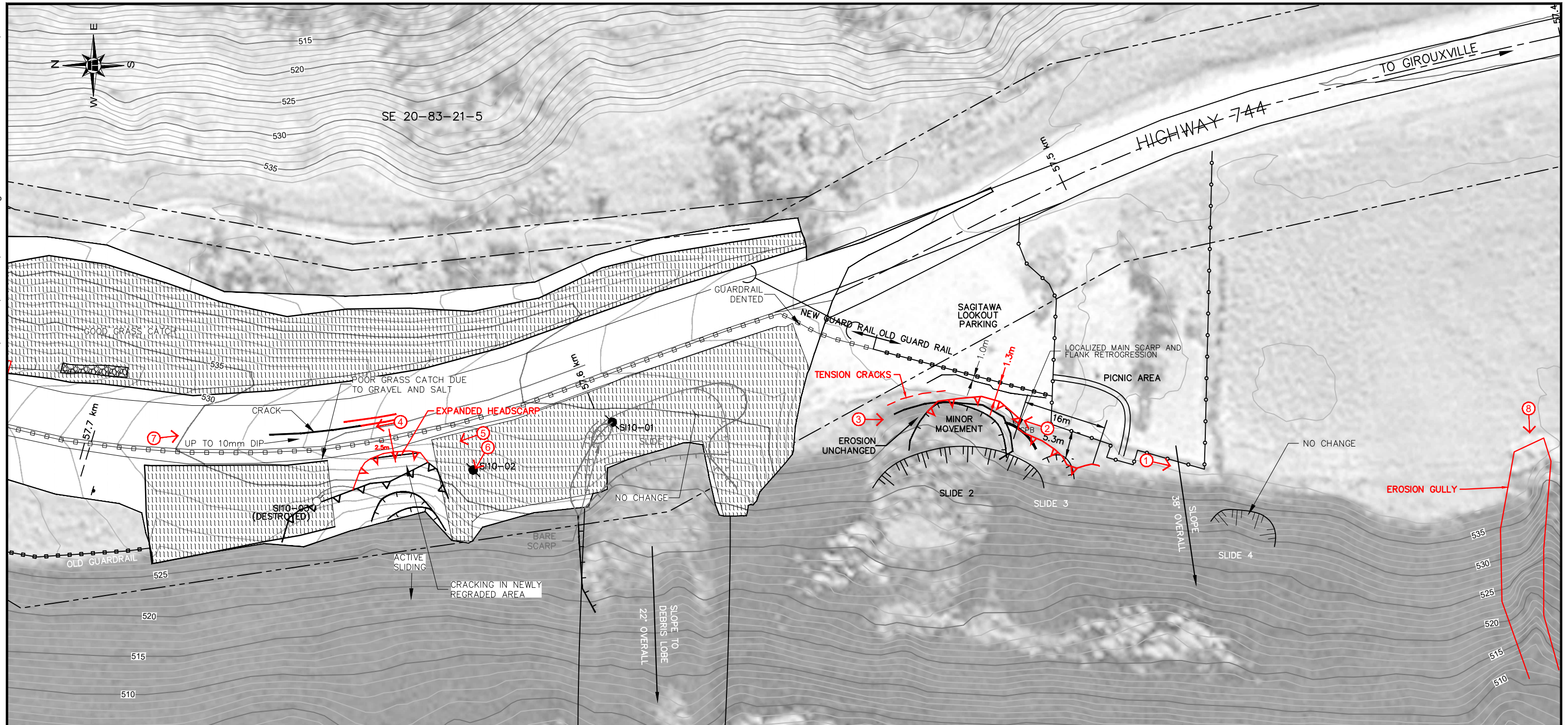
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H:\32000\32121 AT GRMP Peace River District 2021-2025\CAD\2021\TTC\32121-PH030-1, PH033-1, PH033-2.dwg - PH30 LOOKOUT SLIDES - Oct. 06, 2021



LEGEND:  
 ● SLOPE INDICATOR  
 ○ SLOPE INDICATOR  
 ○➔ DIRECTION AND NUMBER OF PHOTO



NOTES:  
 1 LOCATION DATA RECORDED USING HAND HELD GPS RECEIVER. ALL LOCATIONS ARE APPROXIMATE AND ARE FOR ILLUSTRATIVE PURPOSES ONLY.  
 2 JULY 6, 2021 OBSERVATIONS SHOWN IN RED.



PEACE REGION (PEACE RIVER DISTRICT)

PH030 LOOKOUT SLIDES  
 2021 SITE INSPECTION PLAN

DWG No. 32121-PH030-1-1

DRAWN BY	KLW
DESIGNED BY	TTC
APPROVED BY	DWP
SCALE	1:750
DATE	OCTOBER 2021
FILE No.	32121





**Photo 1.**  
Looking southwest from above Slide 2 towards Slide 4 (No change since 2020).



**Photo 2.**  
Looking northeast along backscarp of Slide 2 which is 1.3 m from the parking lot guardrail. Some minor localized main scarp retrogression, flank retrogression and additional pavement cracking since 2020.



**Photo 3.**  
Looking southwest towards the upper part of Slides 2 and 3. Some minor retrogression and movement in the flanks and movement of the disturbed slide mass since 2020. Disturbed slide mass area is well vegetated.



**Photo 4.**  
Looking northwest along from SBL of Hwy 744:04 at km 57.6 at south end of realignment done in 2015-2016. Minor longitudinal cracking that is largely unchanged since 2020.



**Photo 5.**  
 Looking north from downslope of the SBL of Hwy 744:04 at km 57.63. Increased dropdown within the disturbed slide mass. Headscarp has expanded to the previously observed tension crack location with 0.7 m of additional retrogression since 2020, offset from the guardrail is now at 2.5 m.



**Photo 6.**  
 Looking northwest from downslope of the SBL of Hwy 744:04 at km 57.63. Additional downslope movement apparent within disturbed slide mass.





**Photo 7.**  
Looking south along SBL of Hwy 744:04 at km 57.68. Some additional minor longitudinal cracking noted in the NBL.



**Photo 8.**  
Looking at the top an erosion gully located at the southern edge of the site, approximately 50 m south of the Slide 4 area. Gully is offset approximately 70 m west of the highway.