

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



Site Number	Location	Name	Hwy	km
PH054	Peace River	Shaftesbury Trail North Sites	684:02	28.95
Legal Description		UTM Co-ordinates (NAD 83)		
SE-30-83-21-5		11U N 6 230 850	E 481 490	

	Date	PF	CF	Total Risk
<b>Previous Inspection:</b>	July 5, 2007	7	1	7 – (Relative to hwy.)
<b>Current Inspection:</b>	May 18, 2023	7	2	14 – (Relative to hwy.)
<b>Road AADT:</b>	1560		<b>Year:</b>	2022
<b>Inspected By:</b>	Don Proudfoot, Tyler Clay (Thurber) Max Shannon, Rocky Wang, Pramaya Kannel (AT)			
<b>Report Attachments:</b>	<input type="checkbox"/> Photographs <input checked="" type="checkbox"/> Plans <input checked="" type="checkbox"/> Maintenance Items			

<b>Primary Site Issue:</b>	Rapid flow of mud, water and debris (mainly trees) onto the properties below the slope during periods of long duration heavy rainfall		
<b>Dimensions:</b>	The steep slope section at the site location is about 30 m long parallel to the highway and 10 m wide perpendicular in the downslope direction. The valley slope is about 12 m high with an overall inclination of 53 degrees. The upper 1.5 m in soil is inclined at 32 degrees and the lower 10.5 m in bedrock is inclined at 57 degrees with some slide debris piled up at the toe. The crest of the active slope is 12 m away from the guardrail of the road.		
<b>History and Date of any Remediation:</b>	A callout inspection was completed in 2007 when mud water and debris had come down the slope into the backyard of a residence.		
<b>Maintenance:</b>	unknown		
<b>Observations:</b>	<b>Description</b>	<b>Worse?</b>	
<input type="checkbox"/> Pavement Distress	none	<input type="checkbox"/>	
<input checked="" type="checkbox"/> Slope Movement	The private yard was not entered during the visit but it appears that there might some occasional sloughing of material to the base of the slope.	<input type="checkbox"/>	
<input checked="" type="checkbox"/> Erosion	The face of the sandstone slope has an eroded appearance as seen in photo.	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/> Seepage	Some slow seepage is suspected to be occurring from the slope, although the water table being monitored in the piezometer in the bedrock is currently close or slightly below the base of slope.	<input type="checkbox"/>	
<input type="checkbox"/> Bridge/Culvert Distress		<input type="checkbox"/>	
<input type="checkbox"/> Other		<input type="checkbox"/>	
<b>Subsurface Conditions and Instrumentation:</b>			
<p>A test hole (TH20-4) was drilled in 2020 between the crest of the slope and the highway and indicated subsurface conditions consisting of 1.5 m of gravel and clay colluvium overlying 1.5 m of clay shale bedrock overlying sandstone bedrock.</p> <p>A slope inclinometer (SI20-4) and a vibrating wire piezometer (VWP20-4) were installed in the test hole. The SI has shown no movement since installation. The piezometer, with its tip located in the deeper sandstone layer, shows a water table that fluctuates seasonally between elev. 316.5 (spring) and 315.0 m (fall).</p>			

**Assessment:**

It appears that periods of heavy rain have led to some local sloughing of the soil and trees overlying the sandstone slope. Ongoing runoff on the slope has also carved out some of the weaker zones in the face of the sandstone slope creating some harder zone that could break off and topple or skid to the base of slope. The soil cover is relatively thin and the sloughing that is occurring is relatively far from the highway such that the risk that this slope imposes on the highway stability is currently low. However, the ongoing sloughing is likely creating a nuisance to the home owners.

**Recommendations:****Monitoring**

It is recommended to keep this site on the geohazard monitoring program and to also continue to monitor the nearby SI and piezometer, although the frequency of inspections and readings could be reduced compared to the other more critical sites. The site should also be inspected by TEC's maintenance contract inspector following any periods of long heavy rainfall.

**Remediation**

Slope flattening would require clearing of existing vegetation which would be counterproductive to the stability of the upper slope. However it is suggested that the surface drainage in the area be reviewed to see if any surface water that reports to the slope could be directed using a curb and gutter back to the new drop culvert that is located about 40 m south of this site to convey the water in a more controlled manner down the slope. Some controlled scaling of the rock face to remove loose material and creating a small containment berm or "no go" zone at a prescribed setback distance from the toe of slope in the backyard would reduce the risk of the hazard to the home owners.

**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.  
Partner | Senior Geotechnical Engineer

Tarek Abdelaziz, P.Eng.  
Partner | Senior 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.

### 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 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.

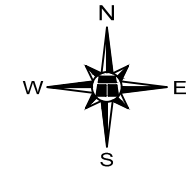
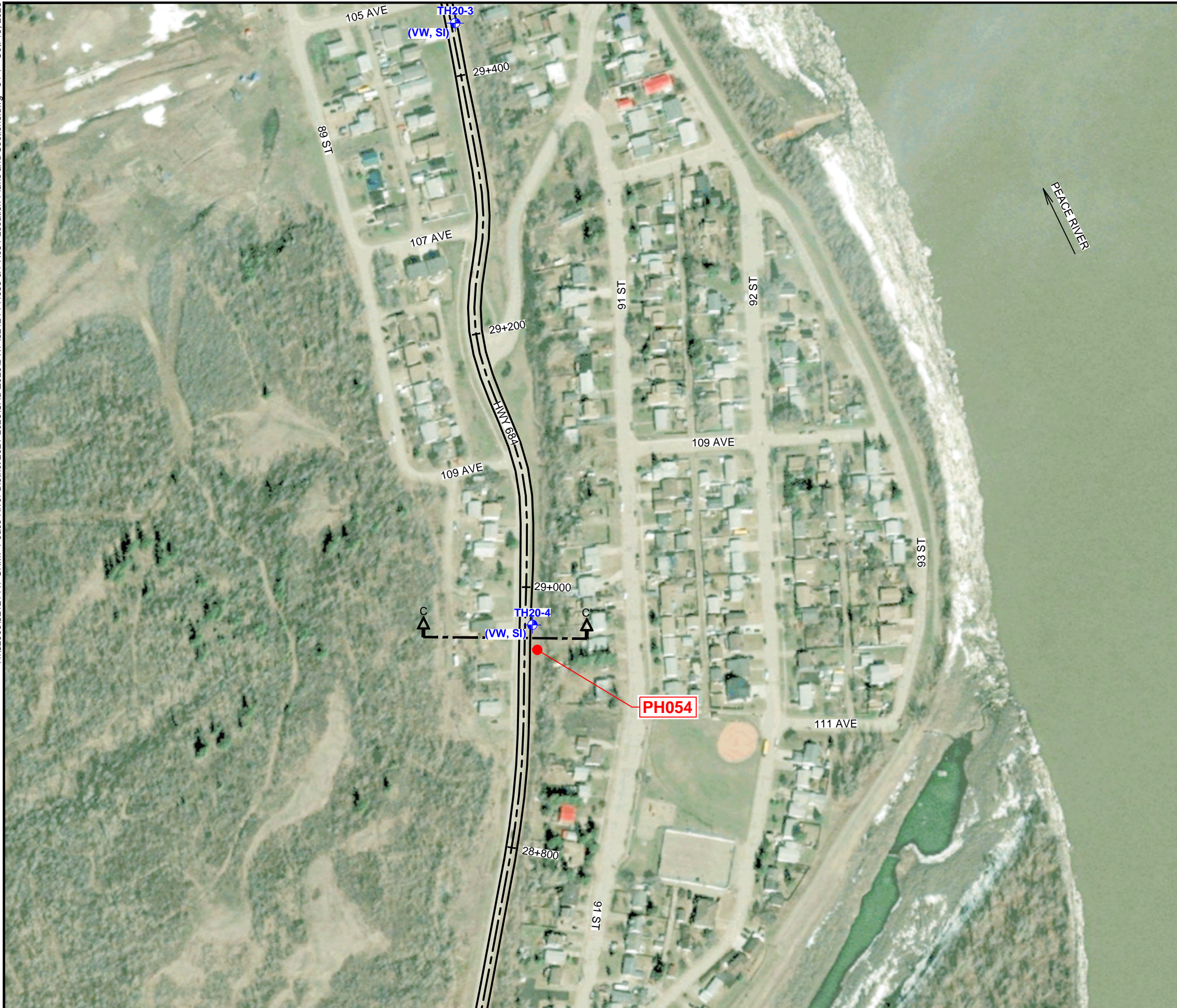
### 6. RELEASE OF POLLUTANTS OR HAZARDOUS SUBSTANCES

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

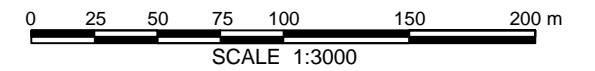
The information, interpretations and conclusions in the Report are based on Thurber's interpretation of conditions revealed through limited investigation conducted within a defined scope of services. Thurber does not accept responsibility for independent conclusions, interpretations, interpolations and/or 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.

H:\32000\32121 AT GRMP Peace River District 2021-2025\CAD\2023\DWG\32121 PH053 & PH054 Location Plans and Sections.dwg - 54-1 - Oct. 13, 2023



**LEGEND**

-  APPROXIMATE TEST HOLE LOCATION
-  VIBRATING WIRE PIEZOMETER
-  SLOPE INCLINOMETER
-  GEOHAZARD SITE NUMBER
-  CROSS-SECTION



AIR PHOTO FROM ESRI WORLD IMAGERY EXPORTED ON APRIL 18, 2022



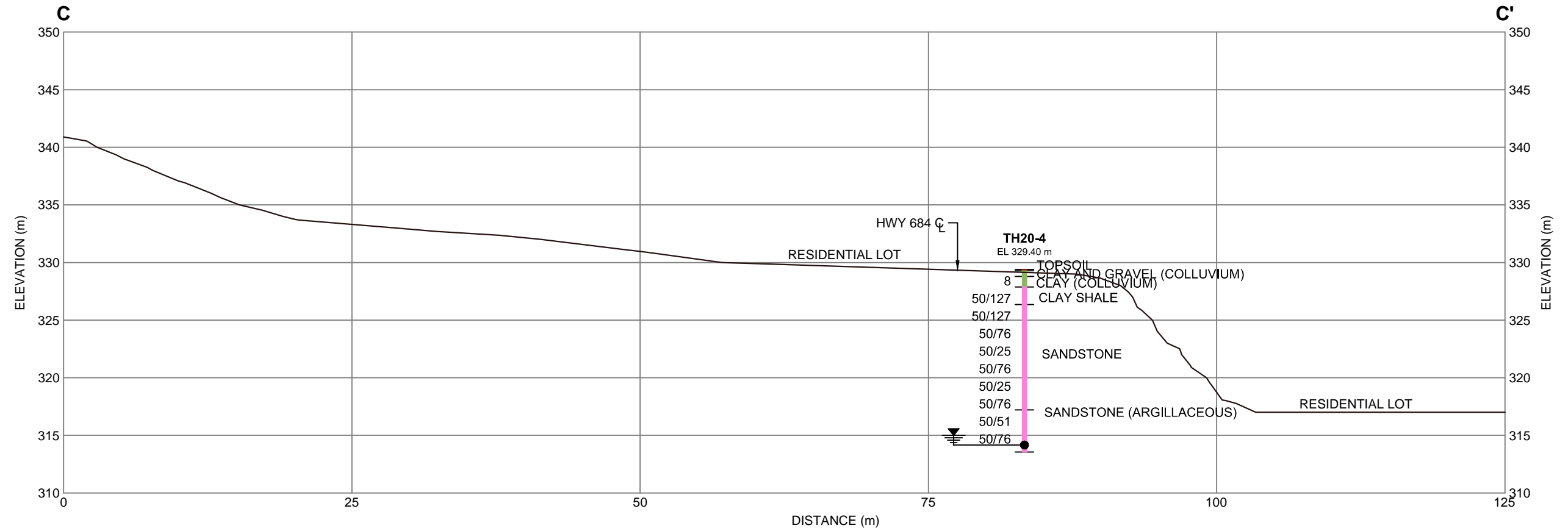
**PEACE REGION (PEACE RIVER DISTRICT)  
PH054 HWY 684:02**

**2023 SITE LOCATION PLAN**

**DWG No. 32121-PH054-1**

DRAWN BY	KLP
DESIGNED BY	DWP
APPROVED BY	TSA
SCALE	1:200
DATE	OCTOBER 2023
FILE No.	32121





**LEGEND**

- 15 SPT N VALUE
- WATER LEVEL IN PIEZOMETER (OCTOBER 11, 2023)
- VIBRATING WIRE PIEZOMETER TIP

**NOTES:**

1. DATA CONCERNING THE VARIOUS STRATA HAVE BEEN OBTAINED AT THE TEST HOLE LOCATIONS ONLY. THE SOIL STRATIGRAPHY BETWEEN TEST HOLES HAS BEEN INFERRED FROM GEOLOGICAL EVIDENCE AND SO MAY VARY FROM THAT SHOWN.
2. CROSS-SECTION CUT FROM 2007 LIDAR WITH 1m GRID ACCURACY.



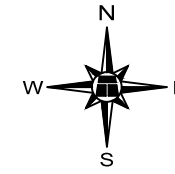
**PEACE REGION (PEACE RIVER DISTRICT)  
PH054 HWY 684:02**

**STRATIGRAPHIC CROSS-SECTION C-C'**

**DWG No. 32121-PH054-2**

DRAWN BY	KLP
DESIGNED BY	DWP
APPROVED BY	TSA
SCALE	1:400
DATE	OCTOBER 2023
FILE No.	32121



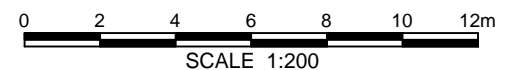


**LEGEND**

- APPROXIMATE CREST OF STEEP SLOPE AS TAKEN FROM LIDAR
- APPROXIMATE TEST HOLE LOCATION
- (VW) VIBRATING WIRE PIEZOMETER
- (SI) SLOPE INCLINOMETER
- 54-1 → PHOTOGRAPH NUMBER AND DIRECTION

**NOTES**

1. FEATURE LOCATIONS ARE APPROXIMATE.
2. MAY 2023 OBSERVATIONS SHOWN IN RED.



ORTHOMOSAIC DERIVED FROM THURBER UAV FLIGHT IN 2023



**PEACE REGION (PEACE RIVER DISTRICT)  
PH054 HWY 684:02**

**DRONE PLAN VIEW OF SITE**

**DWG No. 32121-PH054-3**

DRAWN BY	KLP
DESIGNED BY	DWP
APPROVED BY	TSA
SCALE	1:200
DATE	OCTOBER 2023
FILE No.	32121





**Photo 54-1. Drone photo looking west at location where slope sloughed/eroded in past.**



**Photo 54-2. Closer view of steep eroded slope.**



**Photo 54-3. Looking west toward lower part of eroded sandstone slope.**





**Photo 54-4. Looking east from crest of slope.**



**Photo 54-5. Looking north at the area between highway and the top of slope drop off.**