



THURBER ENGINEERING LTD.

September 21, 2021

File No.: 32123, Task C

Alberta Transportation
Provincial Building
9621-96 Avenue
Peace River, Alberta
T8S 1T4

Attention: Mr. Ed Szmata

**ALBERTA TRANSPORTATION GRMP (CON0022165)
PEACE REGION (GRANDE PRAIRIE DISTRICT – NORTH)
INSTRUMENTATION MONITORING RESULTS – SPRING 2021**

SECTION C

SITE PH010: HWY 726:02, EUREKA RIVER

Dear Mr. Szmata:

This report provides the results of the bi-annual geotechnical instrumentation monitoring for the above-mentioned site as part of Alberta Transportation's Geohazard Risk Management Program for Peace Region Grande Prairie District – North (CON0022165).

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.

1. FIELD PROGRAM AND INSTRUMENTATION STATUS

The Hwy 726:02 Eureka River site was visited on July 16, 2021 by Mr. Niraj Regmi, G.I.T. and Mr. Long Le, both of Thurber Engineering Ltd. During the previous site visit in the fall of 2020, SI08-4 was damaged by a lawnmower; however, pneumatic piezometer PN08-4 was able to be read. During the current site visit, it was found that the casing protector for PN08-4 was struck again by a mower, causing the air line to be pinched inside the casing protector; hence, no reading could be taken for this instrument.

2. DATA PRESENTATION

2.1 General

Historic SI and piezometer readings are summarized in the tables below. These tables also include instruments that are no longer included in the GRMP monitoring program for reference.

Pneumatic piezometer readings, current to the fall of 2020, are also provided in Appendix A for reference.



2.2 Zones of Movement

Zones of historical SI movement are summarized in Table PH010-1 at the end of this report. This table also provides a historical account of the total movement, the depth of movement and the maximum rate of movement that has occurred at this site since the initialization of the slope inclinometers.



**TABLE PH010-1
 SPRING 2021 – HWY 726:02 EUREKA RIVER
 SLOPE INCLINOMETER INSTRUMENTATION READING SUMMARY**

Date Monitored: July 16, 2021

INSTRUMENT #	DATE INITIALIZED	TOTAL CUMULATIVE RESULTANT MOVEMENT AND DEPTH OF MOVEMENT TO DATE (mm)	MAXIMUM RATE OF MOVEMENT (mm/yr)	CURRENT STATUS OF SI	DATE OF PREVIOUS READING	INCREMENTAL MOVEMENT SINCE PREVIOUS READING (mm)	CURRENT RATE OF MOVEMENT (mm/yr)	CHANGE IN RATE OF MOVEMENT SINCE PREVIOUS READING (mm/yr)
SI98-1	Mar. 8, 1998	6.4 mm over 13.1 to 14.3 m depth in 40° direction	-	Destroyed	Oct. 16, 2006	N/A	N/A	N/A
SI98-2	Oct. 13, 2000 set as the initial reading	378.2 mm over 0.3 m to 2.7 m depth in 42° direction	140.8 mm/yr in Sept. 2001	Sheared at 3 m	January 9, 2010	N/A	N/A	N/A
SI02-1	Sept. 24, 2002	Not Known	Not Known	Sheared at 15 m	Sept. 27, 2003	N/A	N/A	N/A
SI02-2	Sept. 24, 2002	Not Known	Not Known	Dummy probe got stuck at top of SI casing	Sept. 27, 2003	N/A	N/A	N/A
SI02-3	Sept. 24, 2002	7.8 mm over 1.8 to 3.0 m depth in 60° direction	16.5 mm/yr in May 2006	Destroyed	September 24, 2011	N/A	N/A	N/A
		96.3 mm over 7.9 to 11.0 m depth in 45° direction	32.4 mm/yr in Sept. 2011			N/A	N/A	N/A
SI08-4	Jan. 20, 2008	40.1 mm over 7.1 m to 8.9 m depth in 32° direction	8.5 mm/yr in October 2019	Damaged	October 4, 2019	N/A	N/A	N/A

Drawing 32123-PH010 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site



**TABLE PH010-2
 SPRING 2021 – HWY 726:02 EUREKA RIVER
 PNEUMATIC PIEZOMETER INSTRUMENTATION READING SUMMARY**

Date Monitored: July 16, 2021

INSTRUMENT #	DATE INITIALIZED	TIP DEPTH (m)	GROUND ELEV. (m)	CURRENT STATUS	HIGHEST MEASURED GROUNDWATER LEVEL BGS (m)	MEASURED PORE PRESSURE (kPa)	CURRENT GROUNDWATER LEVEL BGS (m)	PREVIOUS GROUNDWATER LEVEL BGS (m)	CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)
<i>PN02-1a (27712)</i>	<i>N/A</i>	<i>10.0</i>	<i>N/A</i>	<i>Damaged</i>	<i>3.78 on Oct. 9, 2007</i>	<i>N/A</i>	<i>N/A</i>	<i>3.78 (Oct. 9, 2007)</i>	<i>N/A</i>
<i>PN02-1 (27710)</i>	<i>N/A</i>	<i>19.0</i>	<i>N/A</i>	<i>Damaged</i>	<i>15.13 on May 25, 2007</i>	<i>N/A</i>	<i>N/A</i>	<i>15.23 (Oct. 9, 2007)</i>	<i>N/A</i>
<i>PN02-2 (27711)</i>	<i>N/A</i>	<i>14.5</i>	<i>N/A</i>	<i>Damaged</i>	<i>13.79 on Sept. 27, 2003</i>	<i>N/A</i>	<i>N/A</i>	<i>14.40 (Sep. 24, 2011)</i>	<i>N/A</i>
<i>PN08-4</i>	<i>N/A</i>	<i>12.4</i>	<i>605.0</i>	<i>Operational</i>	<i>10.31 on June 13, 2012</i>	<i>N/A</i>	<i>N/A</i>	<i>11.45 (Oct. 18, 2020)</i>	<i>N/A</i>

Drawing 32123-PH010 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site

Notes: PN - pneumatic piezometer; BGS - below ground surface.



3. INTERPRETATION OF MONITORING RESULTS

PN02-2 had previously shown a groundwater level of 11.45 m below ground level when it was last read in the fall of 2020.

4. RECOMMENDATIONS

4.1 Future Work

There are currently no functional instruments at this site, and SI08-4 and PN08-4 will require repair in order to be read again. If AT decides not to repair these instruments, this site should be removed from the GRMP program, unless it is decided to install more instruments at the site to monitor the active slope movements.

The area is experiencing continued slide movements and should be visually monitored by AT personnel and the MCI when possible. As the boundaries of the slide extend across the road, any significant slide movement would cause traffic disruption.

4.2 Instrumentation Repairs

SI08-4 and PN08-4 should be repaired so that readings can resume. SI08-4 is damaged below the ground surface; thus, mechanical excavation will be required to repair it.



5. CLOSURE

We trust this report meets your requirements at present. If you have any questions, please contact the undersigned at your convenience.

Yours very truly,
Thurber Engineering Ltd.
Renato Clementino, Ph.D., P.Eng.
Principal | Senior Geotechnical Engineer

Bruce Nestor, P.Eng.
Geotechnical Engineer
/jf

Attachments:

- Statement of Limitations and Conditions
- Appendix A
 - Field Inspector's report
 - Site Plan Showing Approximate Instrument Locations (Drawing No. 32123-PH010)
 - Figure PH010-1 (Piezometric Depths as of Fall 2020)



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.



**ALBERTA TRANSPORTATION GRMP (CON0022165)
PEACE REGION (GRANDE PRAIRIE DISTRICT – NORTH)
INSTRUMENTATION MONITORING RESULTS**

SPRING 2021

**APPENDIX A
DATA PRESENTATION**

SITE PH010: HWY 726:02, EUREKA RIVER

**ALBERTA TRANSPORTATION
PEACE REGION (GRANDE PRAIRIE - NORTH DISTRICT)
INSTRUMENTATION MONITORING FIELD SUMMARY (PH010)
SPRING 2021**

Location: Eureka River (HWY 726:02 C1 9.647)	Readout: RST PN C108 Unit 6
File Number: 32123	Casing Size: 2.75
Probe:	Temp: 15 Rain
Cable:	Read by: NKR / LL

SLOPE INCLINOMETER (SI) READINGS

SI#	GPS Location (UTM 11)		Date	Stickup (m)	Depth from top of Casing (ft)	Azimuth of A+ Groove	Current Bottom Depth Readings				Probe/ Reel #	Remarks
	Easting (m)	Northing (m)					A+	A-	B+	B-		
SI08-4	368462.62	6258316.67	16-Jul-21	0.55	63 to 5	10	454	-434	317	-311	5R/5R	See comments *

PNEUMATIC PIEZOMETER READINGS



PN#	GPS Location (UTM 11)		Date	Reading (kPa)	Identification Number
	Easting (m)	Northing (m)			
PN08-4	368462.62	6258316.67	16-Jul-21	-	30487

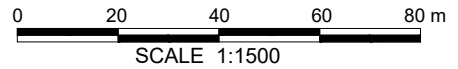
INSPECTOR REPORT

* Bent at ground level. Damaged by lawnmower. Stick up protector is sunk down 4 ft into the ground. If repair required, backhoe will be needed.
Hit by lawn mower again. PN airline pinched inside casing. No reading, see photograph



LEGEND

-  APPROXIMATE INSTRUMENT LOCATION
-  INSTRUMENT NON-OPERATIONAL
- SI SLOPE INCLINOMETER
- PN PNEUMATIC PIEZOMETER



BASE PLAN FROM 2015 ASSESSMENT (15-16-361)

PEACE REGION (GRANDE PRAIRIE DISTRICT - NORTH)

**PH010: HWY 726:02 S. OF WORSLEY; SITES #2 & #4 (EUREKA RIVER, AB)
SITE PLAN SHOWING EXISTING INSTRUMENT LOCATIONS**

FIGURE No. 32123-PH010



DRAWN BY	ML
DESIGNED BY	BWN
APPROVED BY	DWP
SCALE	1:1500
DATE	AUGUST 2021
FILE No.	32123



THURBER ENGINEERING LTD.

**FIGURE PH010-1
PIEZOMETER DATA FOR HWY 726:02, EUREKA RIVER**

