



THURBER ENGINEERING LTD.

November 22, 2022

File No.: 32123

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 – FALL 2022**

SECTION C

SITE GP004A: HWY 49:06, BURNT RIVER BRIDGE

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

One slope inclinometer (SI-16) and one pneumatic piezometer (PN-15) were read at the Hwy 49:06 Burnt River Bridge site on October 3, 2022 by Mr. Niraj Regmi, G.I.T. and Mr. Kyle Croymans, both of Thurber Engineering Ltd. PN-13 was removed from this set of readings after not functioning for multiple reading events.

The SI was read using an RST Digital Inclinometer probe with a 2 ft. wheelbase and a RST Pocket PC readout. Inclinometer reading depths were defined as per cable markings with respect to the top of the inclinometer casing. The pneumatic piezometers were read using a RST C108 pneumatic piezometer readout.

2. DATA PRESENTATION

2.1 General

SI plots for A and B directions are included in Appendix A. Where movement has been recorded, the resultant plot (X direction, if applicable) and rate of movement have also been provided. Pneumatic piezometer plots are also provided in Appendix A.



Slope inclinometer and piezometer reading summary tables are provided below.

2.2 Zones of Movement

Zones of new movement were not observed in SI-16 since the previous readings in the spring of 2022.

Zones of movements are summarized in Table GP004A-1 below. Table GP004A-1 also provides a historical account of the total movement, the depth of movement and the maximum rate of movement that has occurred in the SIs since initialization.



**TABLE GP004A-1
FALL 2022 – HWY 49:06, BURNT RIVER BRIDGE
SLOPE INCLINOMETER INSTRUMENTATION READING SUMMARY**

Date Monitored: October 3, 2022

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)
SI-16	September 24, 1998	61.4 mm over 19.4 m to 29.7 m depth in 333° direction	42.3 in October 2016	Operational	June 23, 2022	No discernible movement	N/A	-1.5

Drawing 32123-GP004A in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site



**TABLE GP004A-2
FALL 2022 – HWY 49:06, BURNT RIVER BRIDGE
PNEUMATIC PIEZOMETER INSTRUMENTATION READING SUMMARY**

Date Monitored: October 3, 2022

INSTRUMENT #	DATE INITIALIZED	TIP DEPTH (m)	GROUND ELEV. (m)	CURRENT STATUS	HIGHEST MEASURED WATER LEVEL BGS (m)	MEASURED PORE PRESSURE (kPa)	CURRENT WATER LEVEL BGS (m)	PREVIOUS WATER LEVEL BGS (m)	CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)
PN-13	September 24, 1998	14.0	-	Malfunctioning	-0.29* in June 2017	N/A	N/A	N/A	N/A
PN-15	September 24, 1998	23.8	-	Operational	3.50 in August 2013	192.7	4.15	4.13	-0.02

Drawing 32123-GP004A in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site

* Denotes above-ground (artesian) groundwater level

Note: BGS = Below Ground Surface



3. INTERPRETATION OF MONITORING RESULTS

Slope inclinometer SI-16 showed no discernible movement since the spring of 2022 readings. SI-16 has shown movement in a northwest direction towards the slope over previous reading cycles. Based on the readings, it is possible that SI-16 is not installed deep enough to capture a deeper slide surface at the site.

Pneumatic piezometer PN-15 showed a decrease in groundwater levels of 0.02 m since the spring of 2022 readings. Pneumatic piezometer results are summarized in Table GP004A-1-2 and are plotted in Figure GP004A-1 in Appendix A.

4. RECOMMENDATIONS

4.1 Future Work

The instruments should be read again in the spring of 2023.

4.2 Instrumentation Repairs

No instrument repairs are required at this time.



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.
Don Proudfoot, M.Eng., 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-GP004A)
 - SI Reading Plots
 - Figure GP004A-1 (Piezometric Depths)



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**

FALL 2022

**APPENDIX A
DATA PRESENTATION**

SITE GP004A: HWY 49:06, BURNT RIVER BRIDGE

**ALBERTA TRANSPORTATION
PEACE REGION (GRANDE PRAIRIE - NORTH DISTRICT)
INSTRUMENTATION MONITORING FIELD SUMMARY (GP004A)
FALL 2022**

Location: Burnt River Bridge (HWY 49:06 C1 10.586) File Number: 32123 Probe: RST SI Set 8R Cable: RST SI Set 8R	Readout: RST PN C108 Unit 1 Casing Size: 3.34" Temp: 14 Read by: KTC/NKR
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SLOPE INCLINOMETER (SI) READINGS

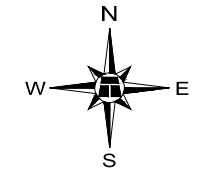
SI#	GPS Location (UTM 11)		Date	Stickup (m)	Depth from top of casing (ft)	Azimuth of A+ Groove	Current Bottom Depth Readings				Probe/ Reel #	Remarks
	Easting (m)	Northing (m)					A+	A-	B+	B-		
SI-16	403183.13	6178764.13	03-Oct-22	0.46	98 to 2	167	2178	-2171	-3595	3596	8R/8R	*

PNEUMATIC PIEZOMETER (PN) READINGS


PN#	GPS Location (UTM 11)		Date	Reading (kPa)	Identification Number
	Easting (m)	Northing (m)			
PN-15	403213.94	6178816.02	03-Oct-22	192.7	49333

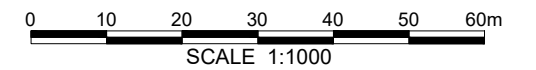
INSPECTOR REPORT

* SI-16 is hard to pull from 94-92' and 74-70' depth. Use dummy probe readings
Both PN laying on grass, needs stickup protector



LEGEND

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



PEACE REGION
(GRANDE PRAIRIE DISTRICT - NORTH)

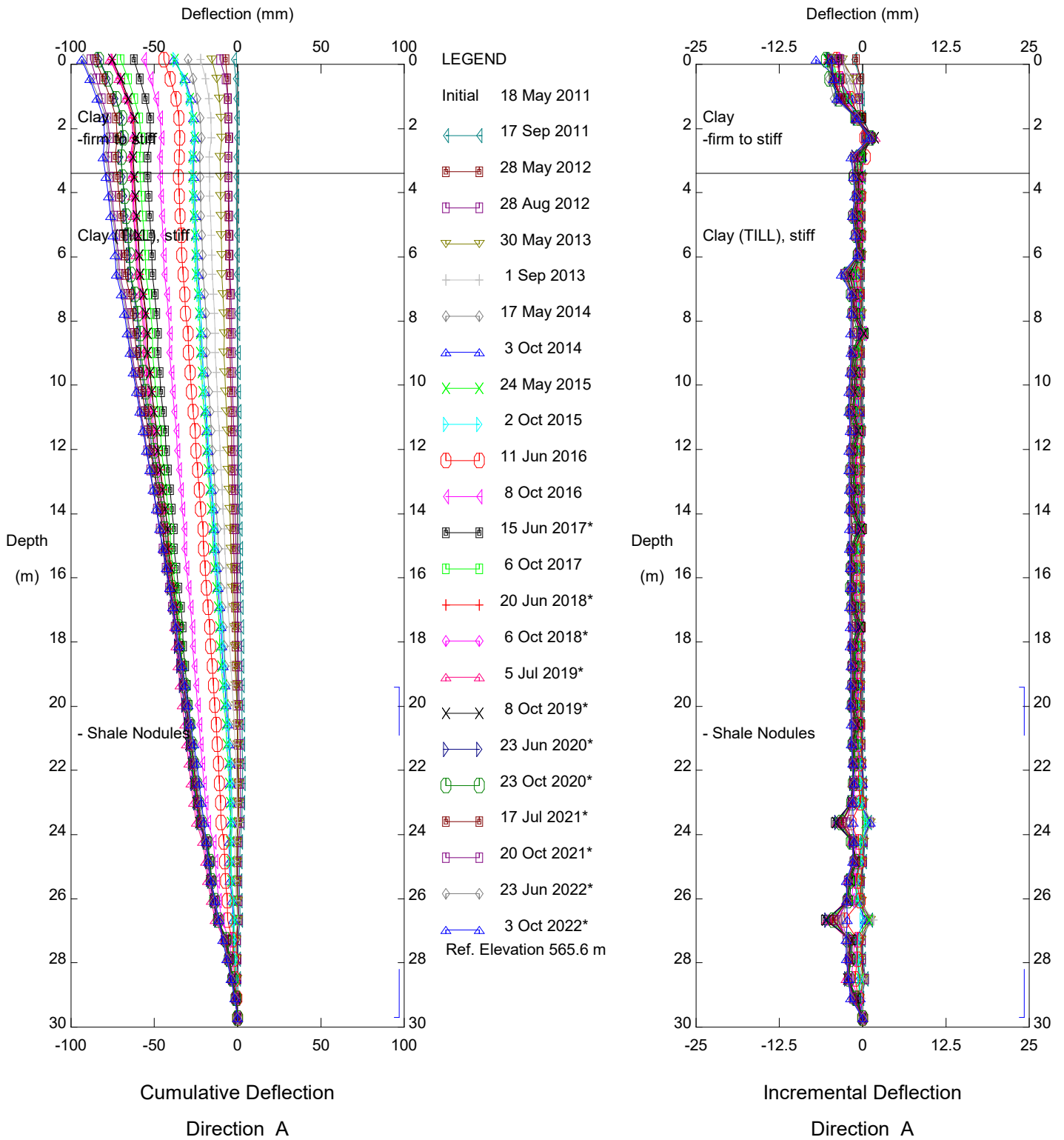
GP004A: HWY 49:06 BURNT RIVER BRIDGE
INSTRUMENT LOCATIONS

DWG No. 32123-GP004A

DRAWN BY	ML
DESIGNED BY	BWN
APPROVED BY	RVC
SCALE	1:1000
DATE	JULY 2022
FILE No.	32123



Thurber Engineering Ltd.

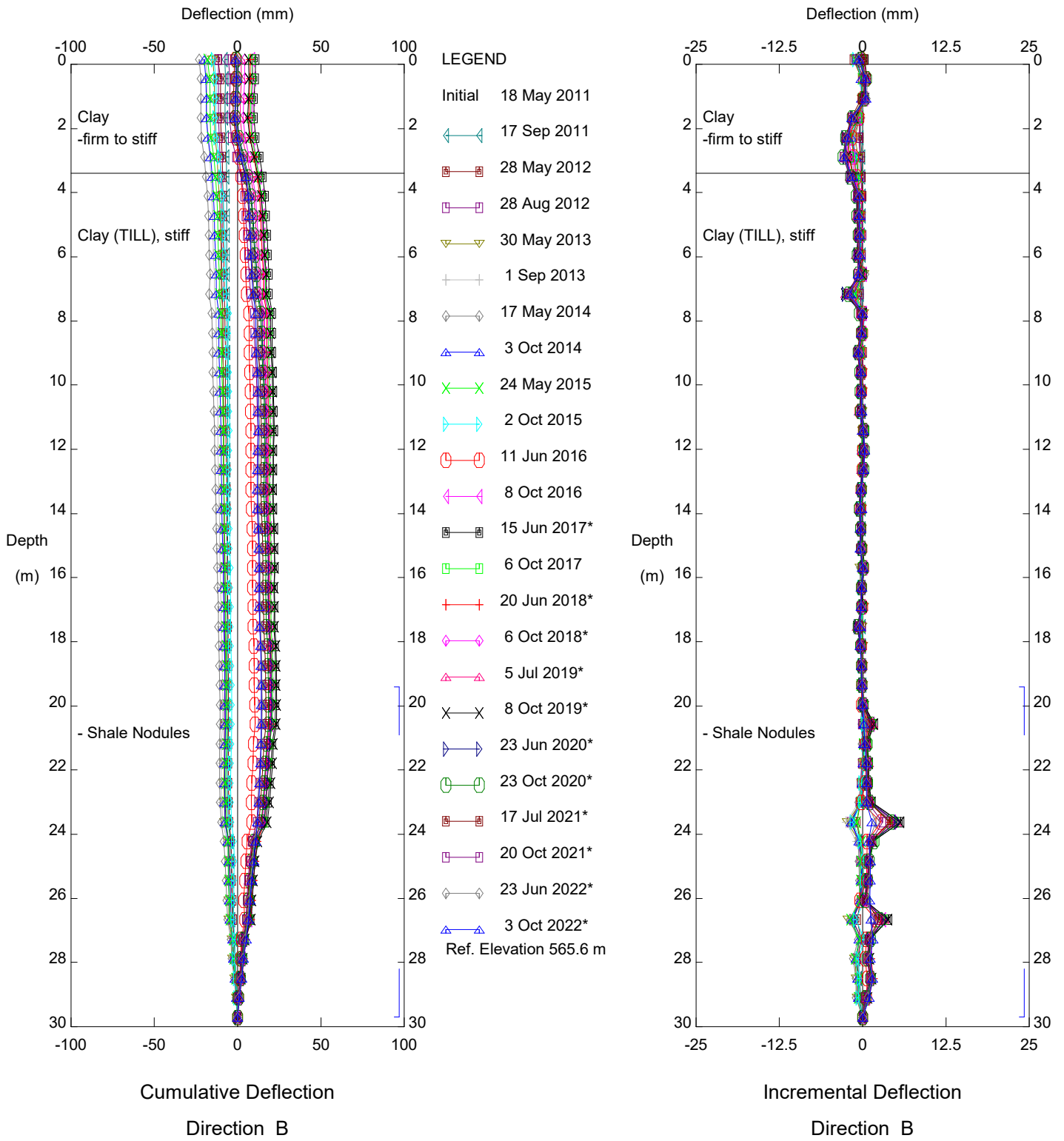


GP004A Burnt River West Approach, Inclinator SI-16

Alberta Transportation

Sets marked * include zero shift and/or rotation corrections.

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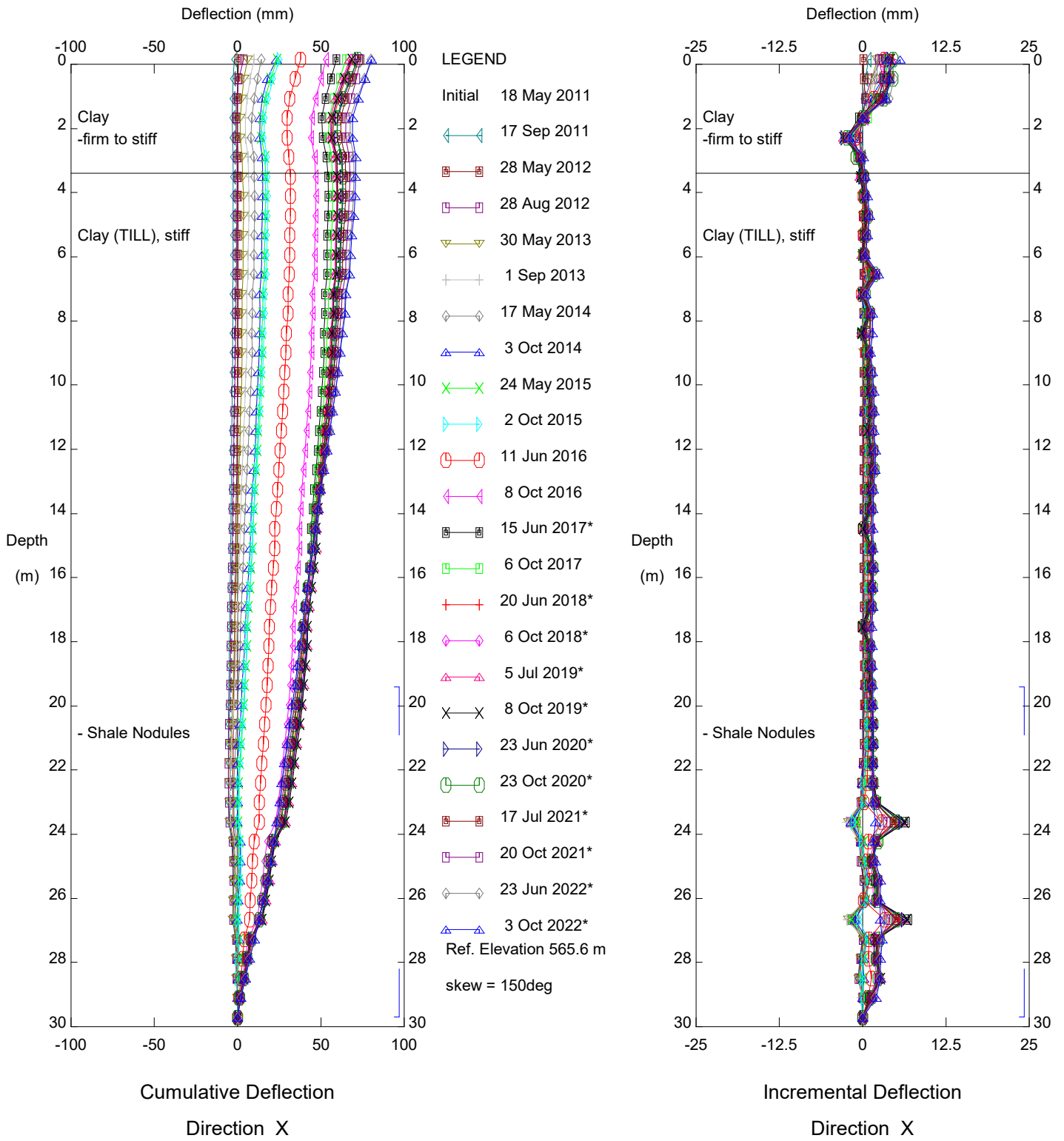


GP004A Burnt River West Approach, Inclinometer SI-16

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Sets marked * include zero shift and/or rotation corrections.

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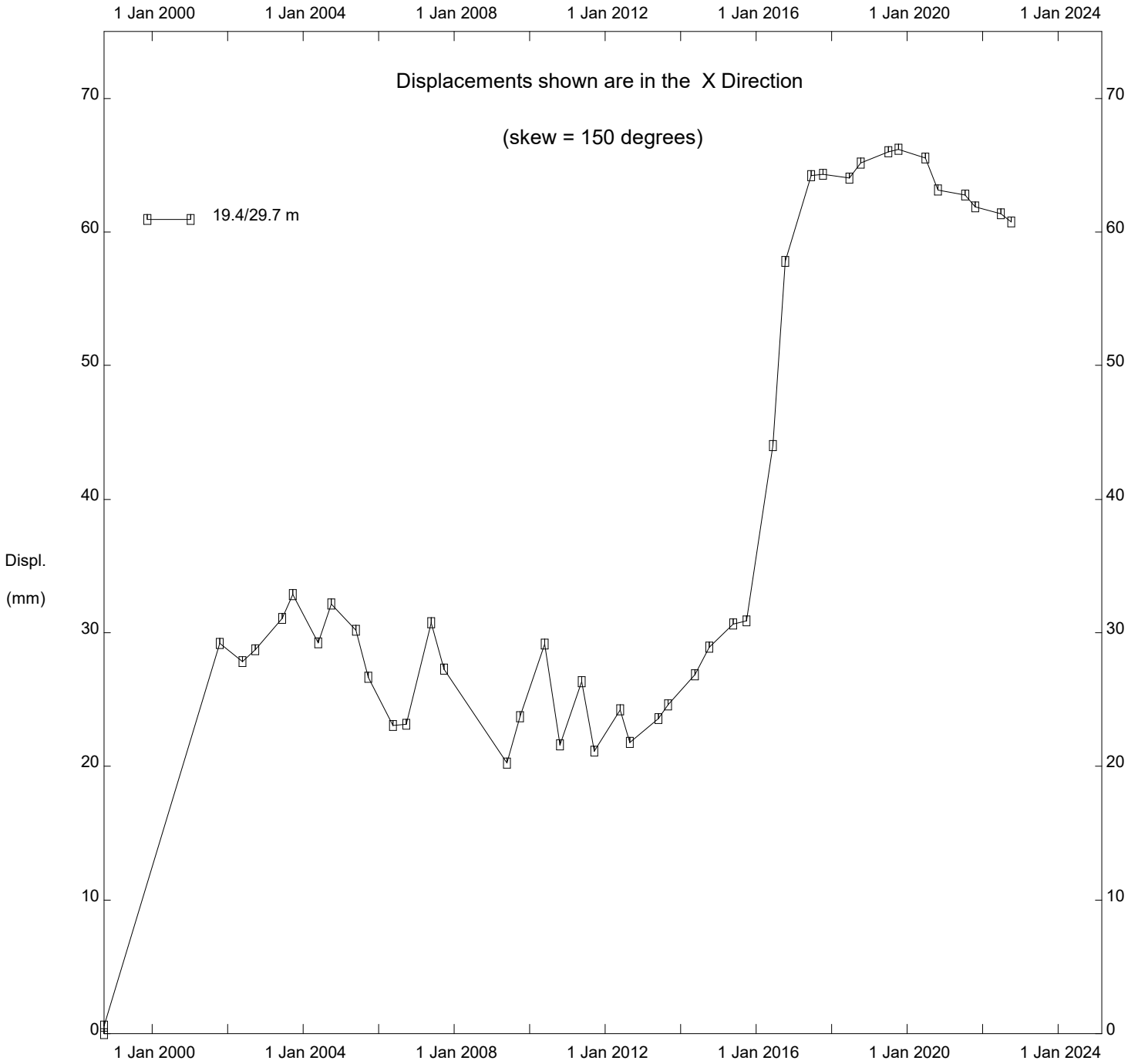


GP004A Burnt River West Approach, Inclinometer SI-16

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Sets marked * include zero shift and/or rotation corrections.

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GP004A Burnt River West Approach, Inclinator SI-16

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**FIGURE GP004A-1
PIEZOMETER DATA FOR HWY 49:06, BURNT RIVER BRIDGE**

