

Site Number	Location	Name	Hwy	km
PH006	North of Paddle Prairie	Tompkins Landing	697:02	Km 17.5
<b>Legal Description:</b>		<b>UTM Co-ordinates</b>		
12-30-103-19 W5		11U E 491173.98	N	6425582.21

<b>Current Monitoring:</b>	24-May-2024	<b>Previous Monitoring</b>	18-Jun-2023
<b>Instruments Read By:</b>	Mr. Niraj Regmi, G.I.T., and Mr. Nixson Mationg, of Thurber		

Instruments Read During This Site Visit			
<b>Slope Inclometers (SIs):</b> SI-1, SI-5 and SI-13	<b>Pneumatic Piezometers (PN):</b> PN02-3	<b>Vibration Wire Piezometers (VW):</b> N/A	<b>Standpipe Piezometers (SP):</b> N/A
<b>Load Cell (LC):</b> N/A	<b>Strain Gauges:</b> N/A	<b>SAA's:</b> N/A	<b>Others:</b>

Readout Equipment Used			
<b>Slope Inclometers:</b> Two RST Digital Inclometer probes with 2 ft. wheelbases and RST Pocket PC readouts	<b>Pneumatic Piezometers:</b> RST C108	<b>Vibration Wire Piezometers:</b>	<b>Standpipe Piezometers:</b>
<b>Load Cell:</b>	<b>Strain Gauges:</b>	<b>SAA's:</b>	<b>Others:</b>
<b>Note:</b>			

Discussion	
<b>Zones of New Movement:</b>	None
<b>Interpretation of Monitoring Results:</b>	<p>Slope indicator SI-1 was found to have been blocked or sheared at approximately 3 m below ground surface.</p> <p>SI-5 showed a movement rate of 7.7 mm/yr over 0.1 m to 11.1 m depth since the spring of 2023 readings. This rate is consistent with a long term trendline of the movement rate since 1999. Of noted there are long periods of time where movement rates exceeds or fall short of the long term trendline. Since the fall of 2020 the movement rate is about 19 mm/yr.</p> <p>Slope inclinometer SI13 showed a rate of movement of 20.4 mm/yr over 1.7 m to 14.5 m depth compared to the overall rate of 13.1 mm/year. From installation in 1998 to the spring of 2020, the overall movement rate was 10.4 mm/yr. Since the fall of 2020, the overall rate has accelerated to 24.8 mm/yr. This accelerated movement coincides with the acceleration observed in SI-5 and an increase in groundwater level as noted below.</p> <p>Based on previous instrument readings and site observations, it appears that the two operational SIs at this site were installed too shallow to intercept the main slip surface of the slide but are, nonetheless, moving significantly within the overall slide blocks.</p>

	The groundwater level decreased in pneumatic piezometer PN02-3 by 0.25 m since the spring of 2023. PN02-3 has shown a trend of increasing groundwater levels since the fall of 2020 readings; however, the current readings are still within the historic range of the instrument.
<b>Future Work:</b>	SI-1 was found to have been blocked or sheared at approximately 3 m below ground surface. SI-1 should be skipped until repaired.  The instruments should be read again during the spring of 2025.
<b>Instrumentation Repairs:</b>	SI-1 and PN02-5 are damaged and would require significant additional cost to investigate and repair. If TEC requests Thurber can refine a cost estimate for investigation and repair of the damaged instruments at this site.
<b>Additional Comments:</b>	

<b>Attachments:</b>	<ul style="list-style-type: none"> <li>▪ Table PH006-1 Spring 2024 – HWY 697:02 Tompkins Landing, Slope Inclinator Instrumentation Reading Summary</li> <li>▪ Table PH006-2 Spring 2024 – HWY 697:02 Tompkins Landing, Pneumatic Piezometer Instrumentation Reading Summary</li> <li>▪ Statement of Limitations and Conditions</li> <li>▪ APPENDIX A - PH006-1 SPRING 2024 <ul style="list-style-type: none"> <li>□ Field Inspector's report</li> <li>□ Site Plan Showing Approximate Instrument Locations (Drawing No.32121 PH006)</li> <li>□ SI Reading Plots</li> <li>□ Figure PH006-1 (Piezometric Depths)</li> </ul> </li> </ul>
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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.  
Roger Skirrow, M.Sc., P. Eng.  
Senior Geotechnical Engineer

Lucas Green, P.Eng.  
Geotechnical Engineer

**Table PH006-1 Spring 2024 – Hwy 697:02, Tompkins Landing Slope Inclinator Instrumentation Reading Summary**

Date Monitored: May 24, 2024

<b>INSTRUMENT #</b>	<b>DATE INITIALIZED</b>	<b>TOTAL CUMULATIVE MOVEMENT AND DEPTH OF MOVEMENT TO DATE (mm)</b>	<b>MAXIMUM RATE OF MOVEMENT (mm/yr)</b>	<b>CURRENT STATUS OF SI</b>	<b>DATE OF PREVIOUS READING</b>	<b>INCREMENTAL MOVEMENT SINCE PREVIOUS READING (mm)</b>	<b>CURRENT RATE OF MOVEMENT (mm/yr)</b>	<b>CHANGE IN RATE OF MOVEMENT SINCE PREVIOUS READING (mm/yr)</b>
SI-1	Aug. 21, 1990	No discernible movement	N/A	Blocked / Sheared	June 18, 2023	N/A	N/A	N/A
SI-2	Aug. 21, 1990	Not Known	Not Known	Destroyed (2004)	May 24, 2004	N/A	N/A	N/A
SI-5	Apr. 28, 1996	434.7 mm over 0.1 m to 11.1 m depth in 105° direction	116.9 mm/yr in May 1998	Operational	June 18, 2023	7.7	8.3	-16.6
SI-12	April 11, 1998	53.4 mm over 6.7 m to 8.5 m depth in 100° direction	28.0 mm/yr in Oct. 1998	Sheared at 7.9 m (2022)	July 12, 2021	N/A	N/A	N/A
		14.6 mm over 11.5 m to 12.8 m depth in 100° direction	8.4 mm/yr in Oct. 1998			N/A	N/A	N/A
SI-13	Oct. 2, 1998	337.2 mm over 1.7 m to 14.5 m depth in 113° direction	64.5 mm/yr in October 2020	Operational	June 18, 2023	19.0	20.4	-15.6

Drawing 32121-PH006 in Appendix A provides a sketch of the approximate locations of the monitoring instrumentation for this site.

**Table PH006-1 – Continued Spring 2024 – Hwy 697:02, Tompkins Landing Slope Inclinator Instrumentation Reading Summary**

Date Monitored: Not Monitored

<b>INSTRUMENT #</b>	<b>DATE INITIALIZED</b>	<b>TOTAL CUMULATIVE MOVEMENT AND DEPTH OF MOVEMENT TO DATE (mm)</b>	<b>MAXIMUM RATE OF MOVEMENT (mm/yr)</b>	<b>CURRENT STATUS OF SI</b>	<b>DATE OF PREVIOUS READING</b>	<b>INCREMENTAL MOVEMENT SINCE PREVIOUS READING (mm)</b>	<b>CURRENT RATE OF MOVEMENT (mm/yr)</b>	<b>CHANGE IN RATE OF MOVEMENT SINCE PREVIOUS READING (mm/yr)</b>
SI02-1	Sept. 25, 2002	45.4 mm over 13.4m to 15.8m depth in 74° direction	38 mm/yr between May and Oct. 2006	Destroyed (2007)	Oct. 6, 2007	N/A	N/A	N/A
SI02-2	Sept. 25, 2002	4.1 mm over 8.5 m to 11.6 m depth in 93° direction	2.8 mm/yr Between Sept. 2003 and May 2004	Sheared Off at 2.8 m (2004)	Oct. 13, 2004	N/A	N/A	N/A
SI02-3	Sept. 25, 2002	28.8 mm over 20.5 m to 21.9 m depth in 71° direction	9.3 mm/yr between Oct. 2007 and May, 2008	Sheared Off at 21.0 m (2008)	May 26, 2008	N/A	N/A	N/A
SI02-4	Sept. 25, 2002	44.5 mm over 12.8 m to 14.0 m depth in 99° direction	31.2 mm/yr between May and Oct. 2005	Sheared Off at 13.1 m (2006)	May 24, 2006	N/A	N/A	N/A
SI02-5	Sept. 25, 2002	109.1 mm over 17.1 m to 18.9 m depth in 90° direction	99.7 mm/yr between May and Oct. 2006	Sheared Off at 17.1 m (2007)	Oct. 6, 2007	N/A	N/A	N/A

Drawing 32121-PH006 in Appendix A provides a sketch of the approximate locations of the monitoring instrumentation for this site.

**Table PH006-2 Spring 2024 – Hwy 697:02, Tompkins Landing Pneumatic Piezometer Instrumentation Reading Summary**

Date Monitored: May 24, 2024

<b>INSTRUMENT #</b>	<b>DATE INITIALIZED</b>	<b>TIP DEPTH (m)</b>	<b>GROUND ELEV. (m)</b>	<b>CURRENT STATUS</b>	<b>HIGHEST MEASURED WATER LEVEL BGS (m)</b>	<b>MEASURED PORE PRESSURE (kPa)</b>	<b>CURRENT WATER LEVEL BGS (m)</b>	<b>PREVIOUS WATER LEVEL BGS (m)</b>	<b>CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)</b>
<i>PN02-1 (27707)</i>	<i>May 26, 2003</i>	<i>11.0</i>	<i>N/A</i>	<i>Destroyed (2008)</i>	<i>1.28 on May 26, 2008</i>	<i>N/A</i>	<i>N/A</i>	<i>1.28 (May 26, 2008)</i>	<i>N/A</i>
<i>PN02-3 (27708)</i>	<i>May 26, 2003</i>	<i>20.0</i>	<i>N/A</i>	<i>Active</i>	<i>4.81 on Oct. 15, 2006</i>	<i>132.8</i>	<i>6.46</i>	<i>6.21</i>	<i>-0.25</i>
<i>PN02-4 (27709)</i>	<i>May 26, 2003</i>	<i>15.8</i>	<i>N/A</i>	<i>Damaged (2006)</i>	<i>14.02 on May 26, 2003</i>	<i>N/A</i>	<i>N/A</i>	<i>15.55 (Oct. 25, 2005)</i>	<i>N/A</i>
<i>PN02-5 (27706)</i>	<i>May 26, 2003</i>	<i>20.7</i>	<i>N/A</i>	<i>Damaged (2021)</i>	<i>10.99 on June 15, 2020</i>	<i>N/A</i>	<i>N/A</i>	<i>10.99 (June 15, 2020)</i>	<i>N/A</i>

Drawing 32121-PH006 in Appendix A provides a sketch of the approximate locations of the monitoring instrumentation for this site.

Notes:

- PN - pneumatic piezometer.
- BGS - below ground surface.



## 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.

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### 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.

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**THURBER** ENGINEERING LTD.

**ALBERTA TRANSPORTATION AND ECONOMIC CORRIDORS GRMP (CON0022164)  
PEACE REGION (PEACE RIVER DISTRICT)  
INSTRUMENTATION MONITORING RESULTS**

**SPRING 2024**

**APPENDIX A  
DATA PRESENTATION**

**SITE PH006: HWY 697:02, TOMPKINS LANDING**

**ALBERTA TRANSPORTATION AND ECONOMIC CORRIDORS  
PEACE REGION (PEACE RIVER DISTRICT)  
INSTRUMENTATION MONITORING FIELD SUMMARY (PH006)  
SPRING 2024**

<b>Location:</b> Tompkins Landing (HWY 697:02 C1 17.451)	<b>Readout:</b> RST PN C108 Unit 4
<b>File Number:</b> 32121	<b>Extension:</b> 3.34"
<b>Probe:</b> RST SI SET 8R	<b>Temp:</b> 17
<b>Cable:</b> RST SI SET 8R	<b>Read by:</b> NRM/NKR

**SLOPE INCLINOMETER (SI) READINGS**

SI#	GPS Location (UTM 11)		Date	Stickup (m)	Depth from top of casing (ft)	Magn. North A+ Groove	Current Bottom Depth Readings				Probe/ Reel #	Size (")	Remarks
	Easting (m)	Northing (m)					A+	A-	B+	B-			
SI-1	491173.98	6425582.21	24-May-24	0.85	36 to 2	83	1097	-1081	-1097	1082	5R/5R	3.34	*
SI-5	491205.48	6425567.22	24-May-24	1.10	38 to 2	94	1486	-1472	-891	885	8R/8R	3.34	**
SI-13	491191.55	6425500.45	24-May-24	0.70	48 to 2	55	854	-849	335	-342	8R/8R	3.34	

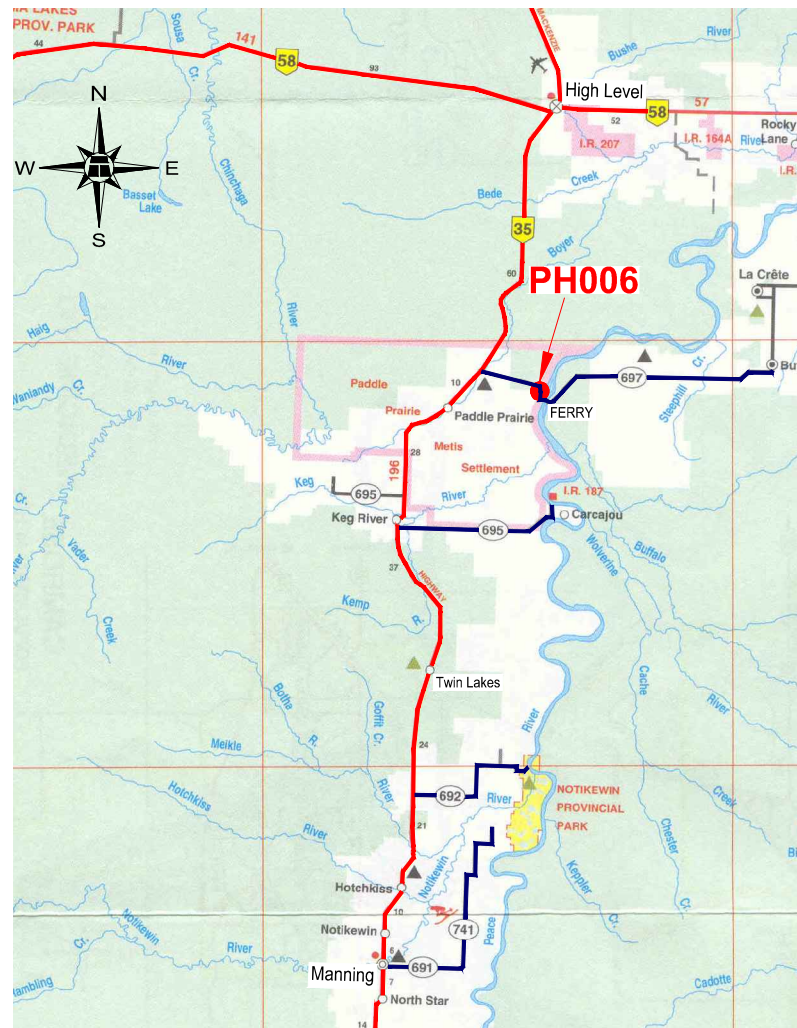
**PNEUMATIC PIEZOMETER READINGS**

PN#	GPS Location (UTM 11)		Date	Reading (kPa)	Identification Number
	Easting (m)	Northing (m)			
PN02-3	491129.53	6425541.45	24-May-24	132.8	27708
PN02-5	491201.52	6425541.29			27706

**INSPECTOR REPORT**

** SI-5 - Stop 6 inches below 38 feet when lowering the probe, otherwise the probe may get stuck.
* Repaired SI-1 stickup, when started reading, probe wont go past 9.0ft, something may have fallen in while broken.
PN02-5 Broken by lawn mower, Pn airline pinched inside casing protector , and casing protector is sunk 4 ft in the ground - skip in Spring 2024





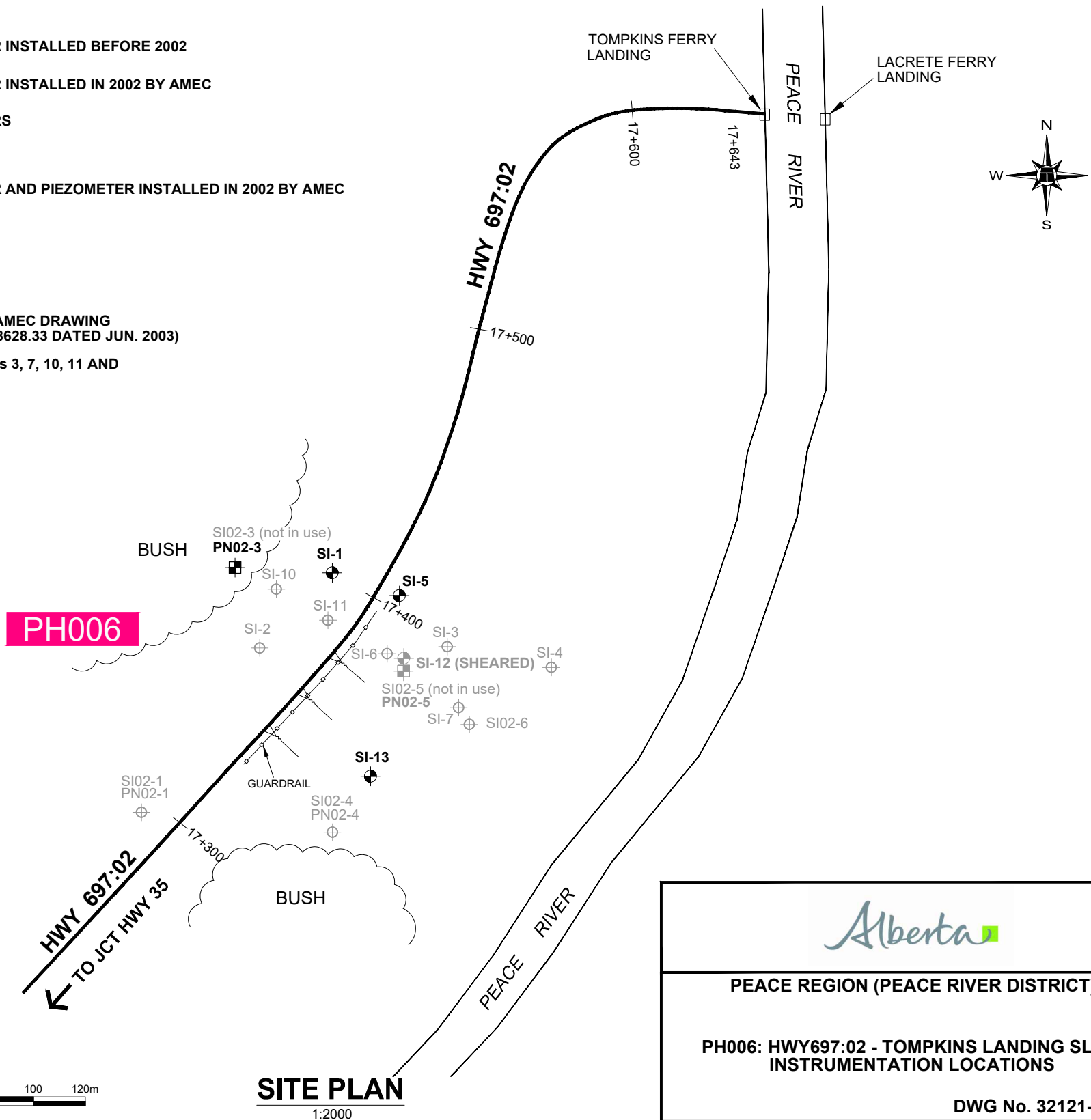
**SITE MAP**  
NOT TO SCALE

**LEGEND :**

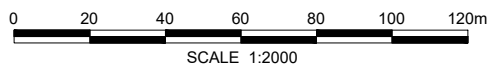
- SI-1 SLOPE INCLINOMETER INSTALLED BEFORE 2002
- SI02-3 SLOPE INCLINOMETER INSTALLED IN 2002 BY AMEC
- SI-3 SLOPE INCLINOMETERS (not in use)
- SI02-3 PN02-3 SLOPE INCLINOMETER AND PIEZOMETER INSTALLED IN 2002 BY AMEC

**NOTES :**

1. BASE PLAN TAKEN FROM AMEC DRAWING (FIGURE 1 - PROJECT EG08628.33 DATED JUN. 2003)
2. SLOPE INCLINOMETERS SI's 3, 7, 10, 11 AND SI02-6 WERE DESTROYED

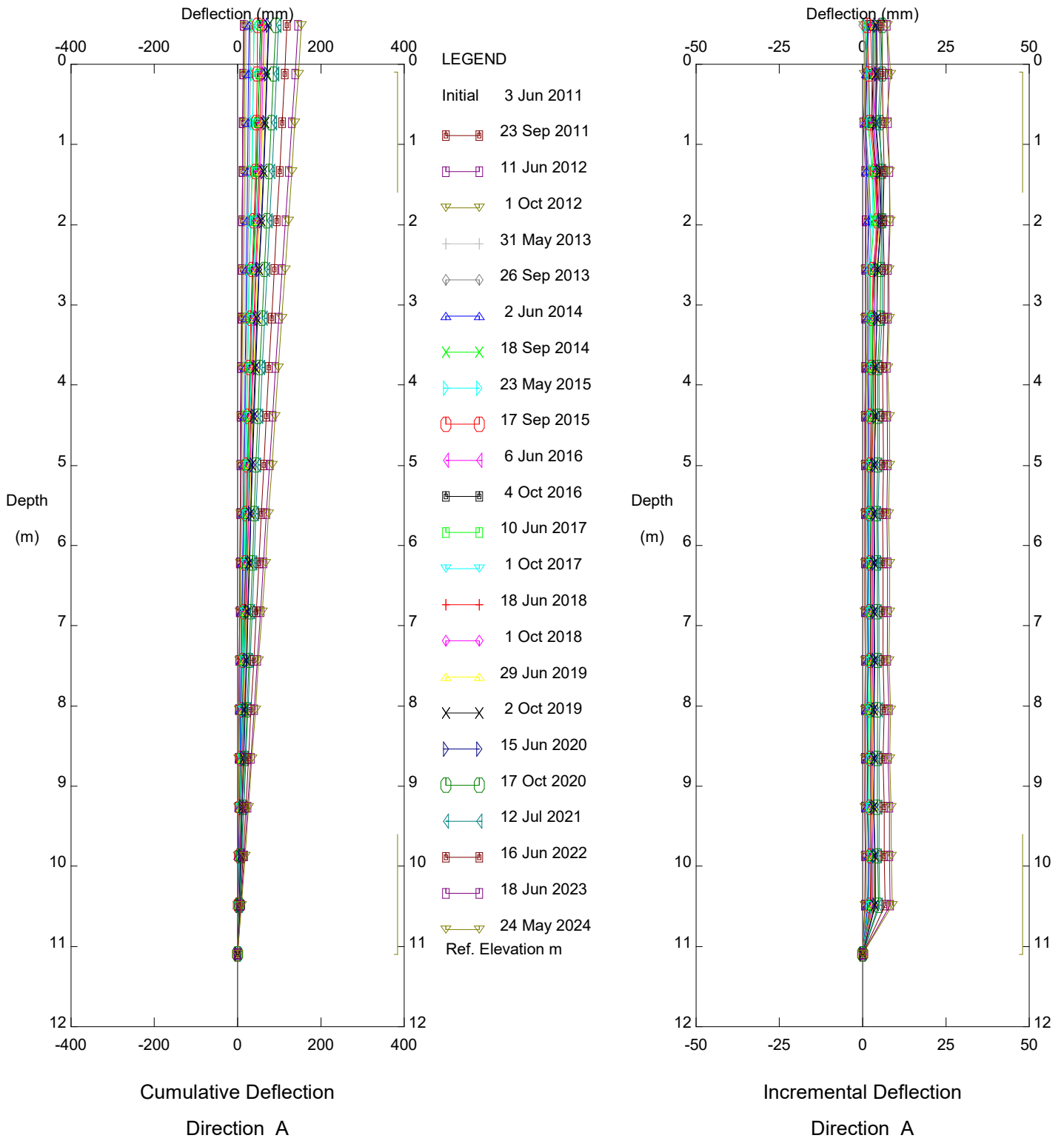


**SITE PLAN**  
1:2000



<b>PEACE REGION (PEACE RIVER DISTRICT)</b>	
<b>PH006: HWY697:02 - TOMPKINS LANDING SLIDE INSTRUMENTATION LOCATIONS</b>	
<b>DWG No. 32121-PH006</b>	
<small>DRAWN BY</small> ML	
<small>DESIGNED BY</small> BWN	
<small>APPROVED BY</small> DWP	
<small>SCALE</small> AS SHOWN	
<small>LAST UPDATED</small> JULY 2022	
<small>FILE No.</small> 32121	

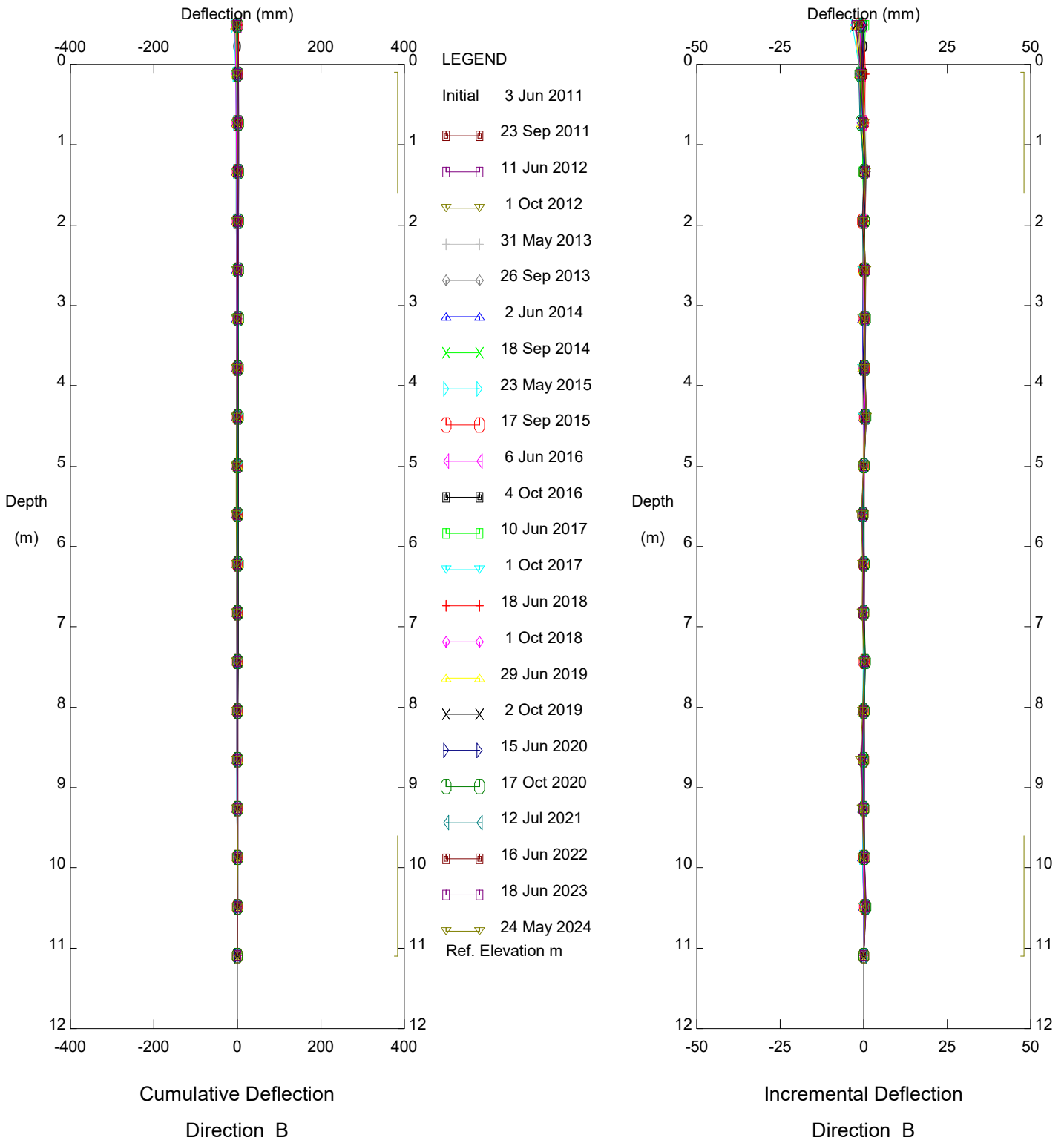
Thurber Engineering Ltd.



HWY 697:02 - STA. 17+360, Inclinator SI-5

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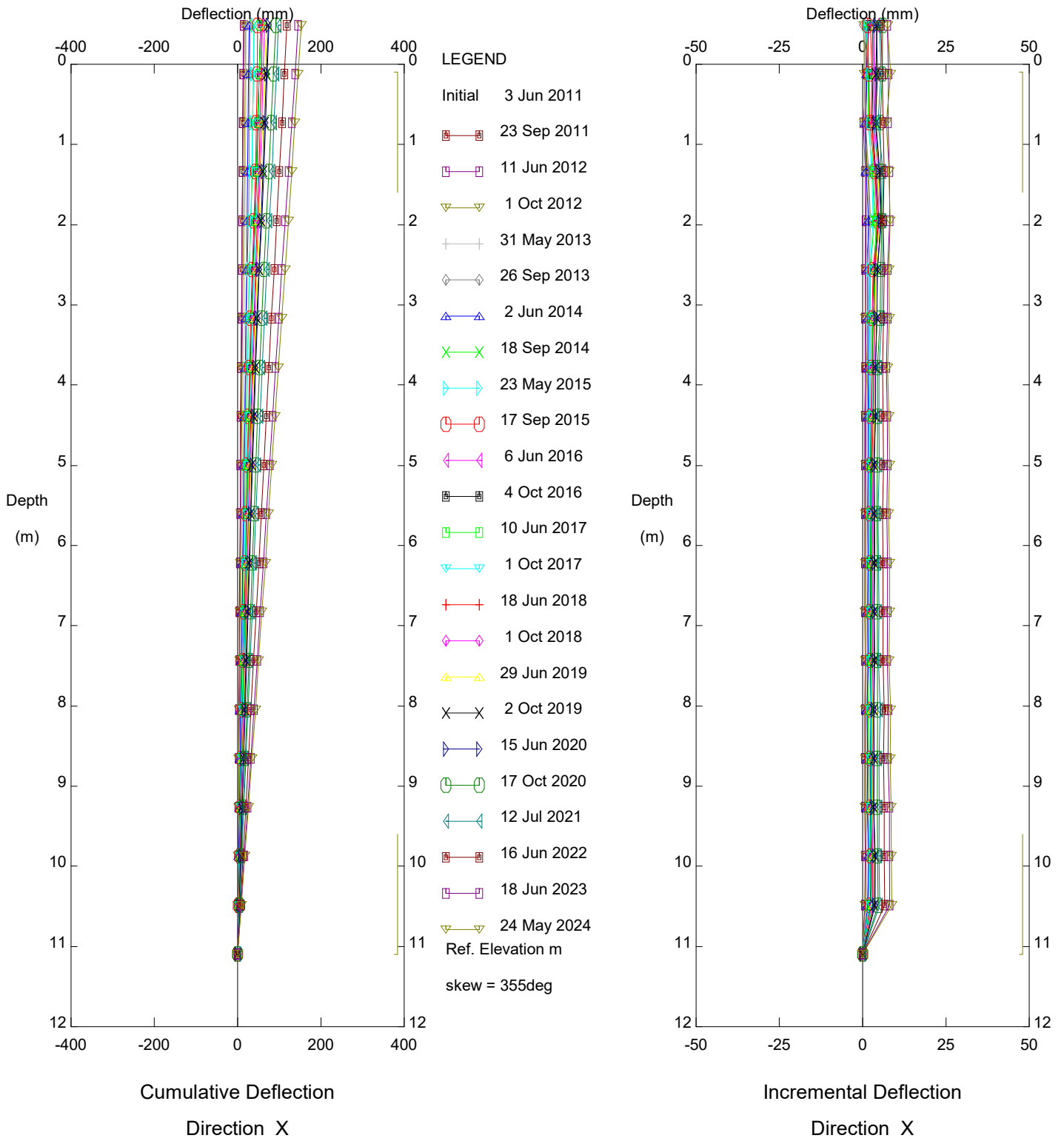
Thurber Engineering Ltd.



HWY 697:02 - STA. 17+360, Inclinometer SI-5

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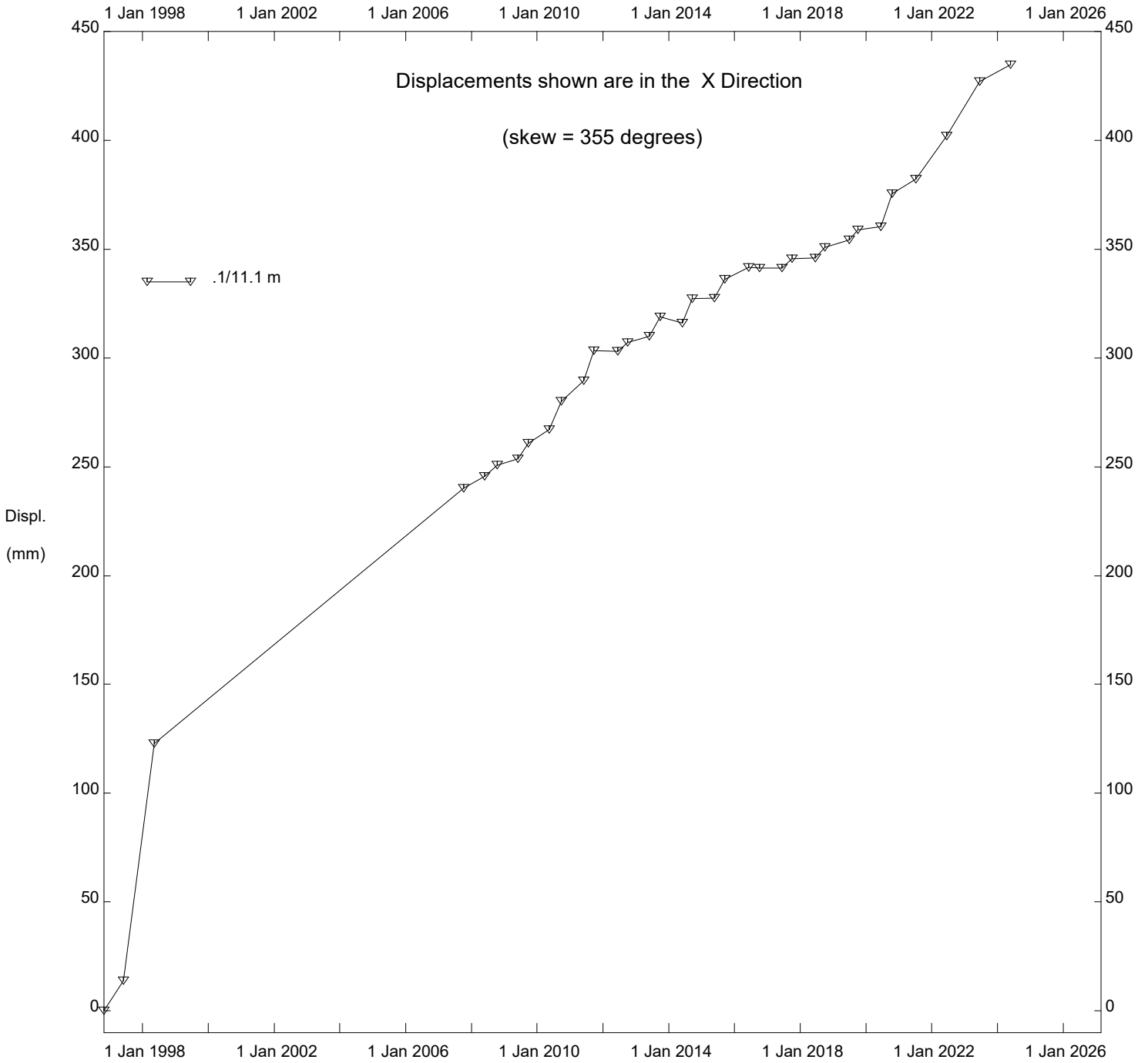
Thurber Engineering Ltd.



HWY 697:02 - STA. 17+360, Inclinator SI-5

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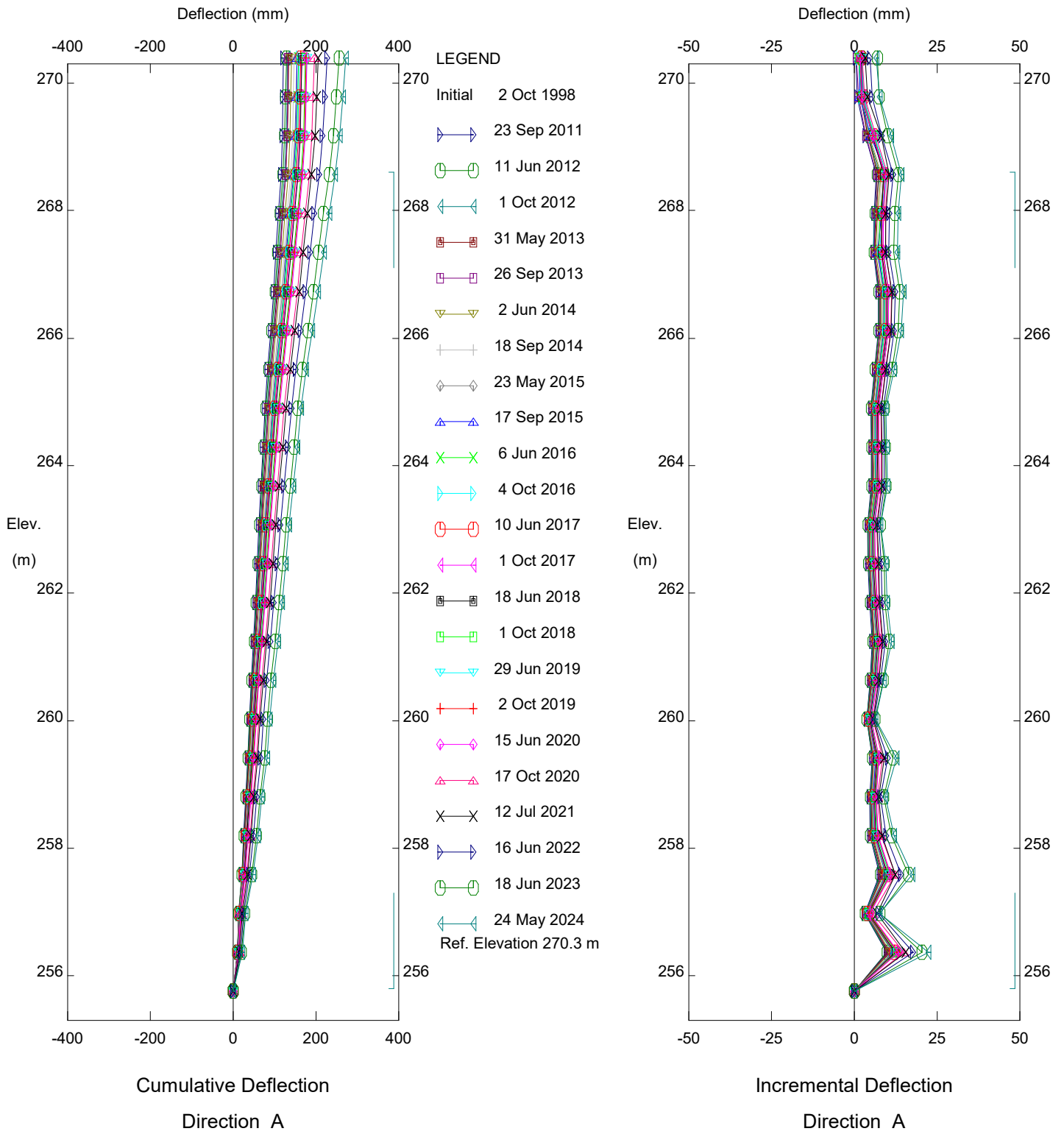
Thurber Engineering Ltd.



HWY 697:02 - STA. 17+360, Inclinator SI-5

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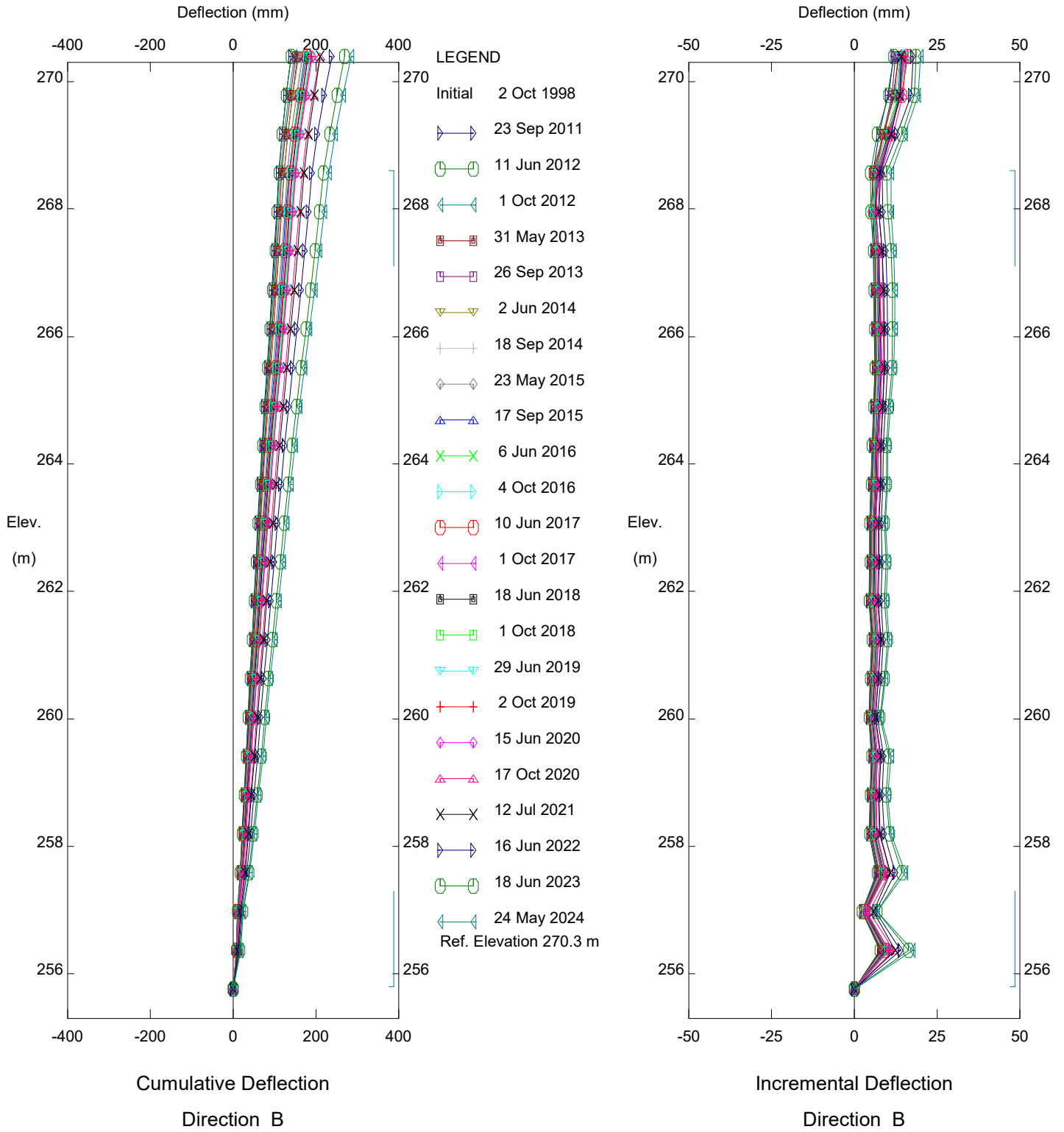
Thurber Engineering Ltd.



HWY 697:02 - STA. 17+360, Inclinometer SI-13

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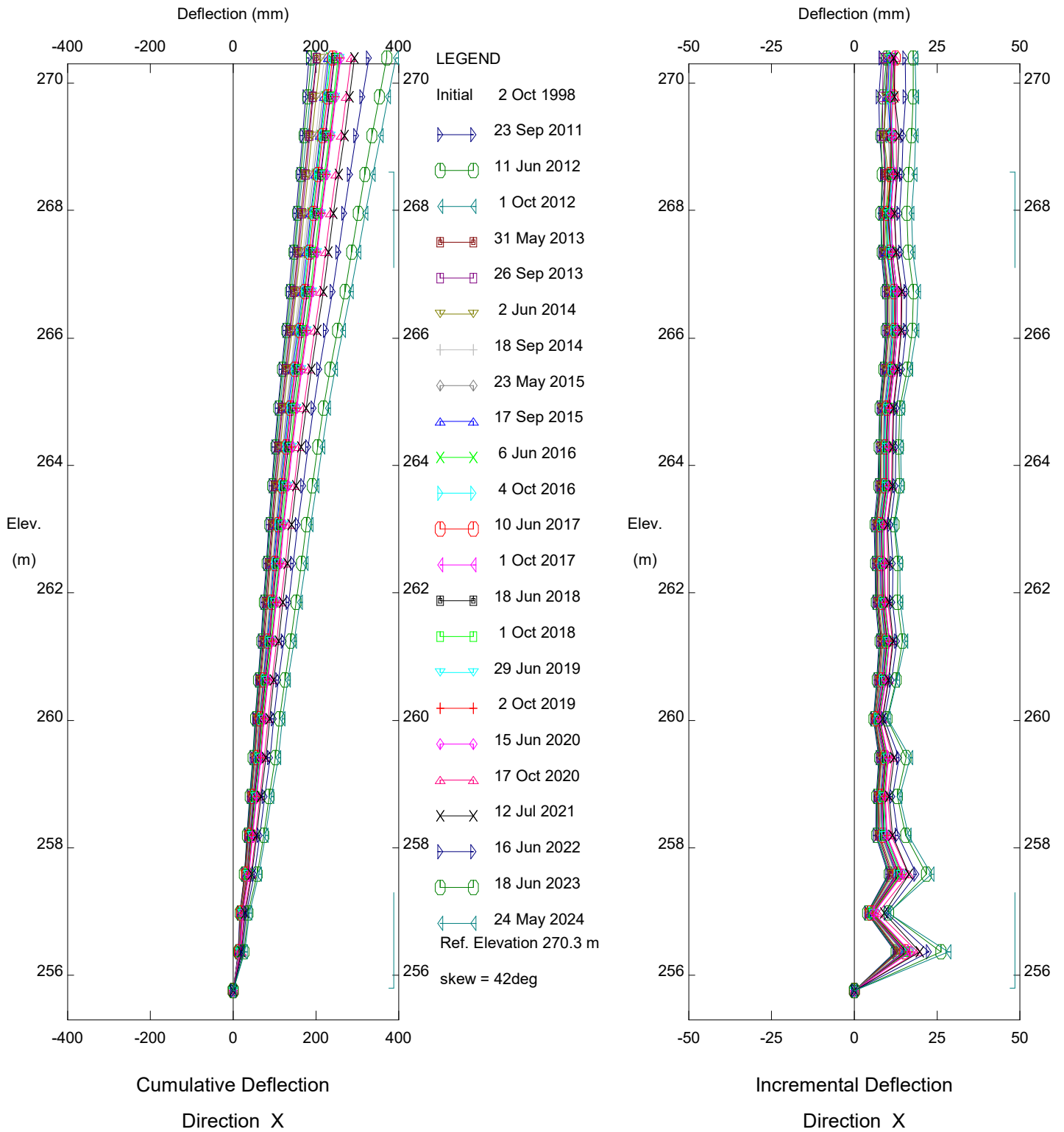
Thurber Engineering Ltd.



HWY 697:02 - STA. 17+360, Inclinometer SI-13

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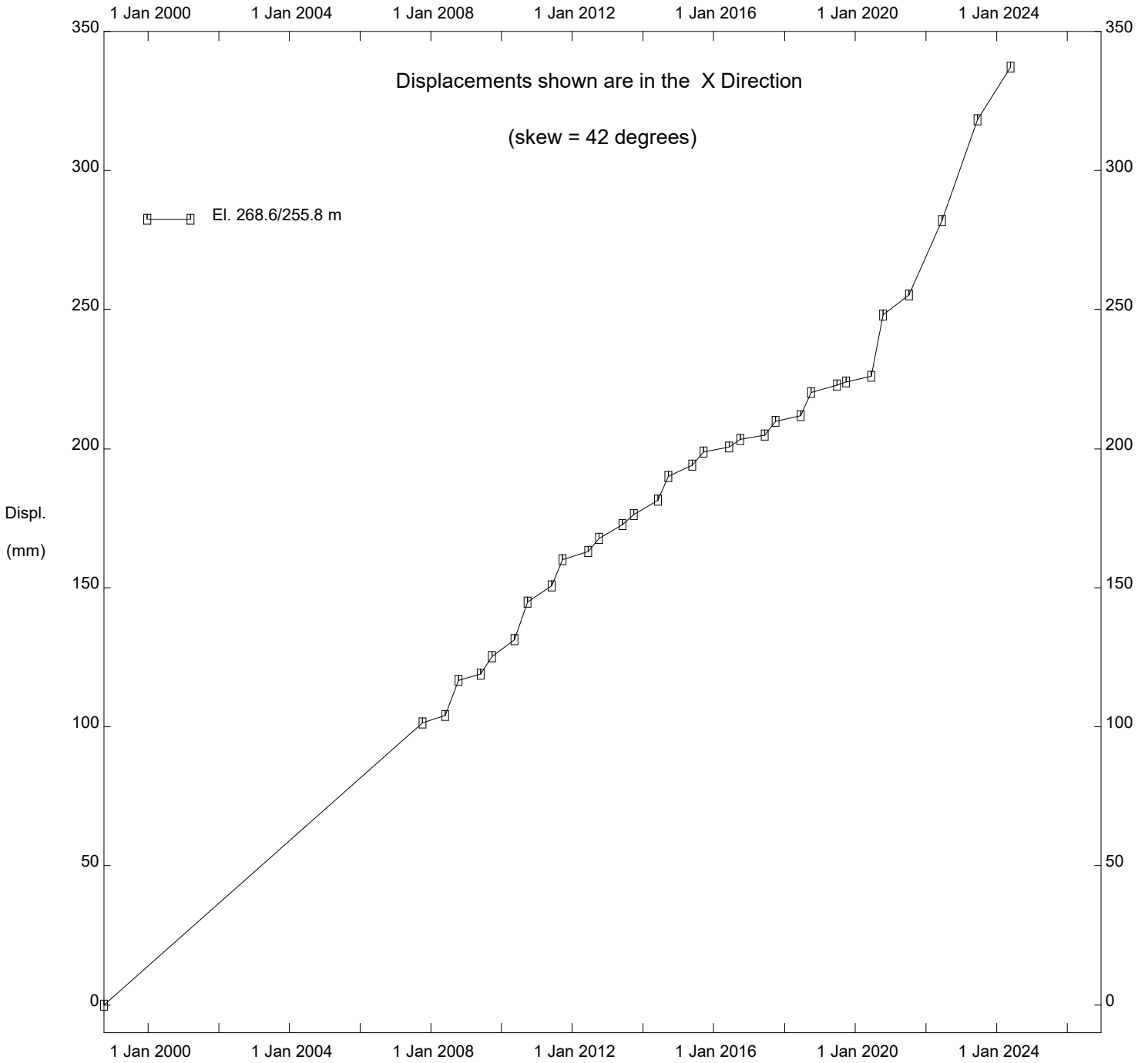


HWY 697:02 - STA. 17+360, Inclinometer SI-13

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HWY 697:02 - STA. 17+360, Inclinometer SI-13

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**FIGURE PH006-1  
PIEZOMETER DATA FOR HWY 697:02 TOMPKINS LANDING**

