

Site Number	Location	Name	Hwy	km
SH036	HWY 679:06	Prairie Echo	679:06	8.2
<b>Legal Description:</b>		<b>UTM Co-ordinates</b>		
4-26-76-16 W5		11U E 539207	N	6162495

<b>Current Monitoring:</b>	18-Sep-2024	<b>Previous Monitoring</b>	16-May-2024
<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 Inclinometers (SIs):</b> SI23-1	<b>Pneumatic Piezometers (PN):</b>	<b>Vibration Wire Piezometers (VW):</b> VW23-1 VW23-2 VW23-3	<b>Standpipe Piezometers (SP):</b>
<b>Load Cell (LC):</b>	<b>Strain Gauges:</b>	<b>SAA:</b>	<b>Others:</b>

Readout Equipment Used			
<b>Slope Inclinometers: RST</b> Digital Inclinometer probe with 2 ft. wheelbase and RST Pocket PC readout	<b>Pneumatic Piezometers:</b>	<b>Vibration Wire Piezometers:</b> GEOKON GK-404 vibrating wire readout	<b>Standpipe Piezometers:</b>
<b>Load Cell:</b>	<b>Strain Gauges:</b>	<b>SAA:</b>	<b>Others:</b>
<b>Notes:</b>			

Discussion	
<b>Zones of New Movement:</b>	None
<b>Interpretation of Monitoring Results:</b>	<p>SI23-1 showed a cumulative movement of 67.6 mm over a well defined movement zone between 6.1 m to 8.6 m depth with a rate of movement of 70.0 mm/yr since the previous readings on May 16, 2024. The movement rate has been elevated over the last three readings compared to the previous trend.</p> <p>Vibrating wire piezometer VW23-1 is located near the shear zone in SI23-1. It continues to show artesian groundwater conditions of about 3.3 m above ground surface. VW23-2 also shows artesian groundwater conditions of about 2.3 m above ground surface. VW23-1 and VW23-2 showed increases in groundwater levels of 0.07 m and 0.08 m, respectively, compared to the May 16, 2024, readings. VW23-3 also showed artesian conditions about 2.5 m above ground surface prior to being damaged.</p>
<b>Future Work:</b>	The instruments should be read again in the spring of 2025. The movement rate in SI23-1 should be monitored to confirm if it is still elevated. Long term monitoring post-construction is recommended.
<b>Instrumentation Repairs:</b>	No instrument repairs are required at this time.

<b>Additional Comments:</b>	Additional readings should be taken just prior to, and during, construction of the mitigation project. Special care will be required to avoid damage to the remaining instruments during construction.
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<b>Attachments:</b>	<ul style="list-style-type: none"> <li>• Table SH036-1 Fall 2024 – HWY 679:06 Prairie Echo, Slope Incliner Reading Instrumentation Summary</li> <li>• Table SH036-2 Fall 2024 – HWY 679:06 Prairie Echo, Vibrating Wire Piezometer Instrumentation Reading Summary</li> <li>• Statement of Limitations sand Conditions</li> <li>• APPENDIX A – SH036 FALL 2024 <ul style="list-style-type: none"> <li>○ Field Inspector’s report</li> <li>○ Site Plan Showing Approximate Instrument Locations (Drawing No.32121 SH036-1)</li> <li>○ SI Reading Plots</li> <li>○ Figure SH036-1 (Piezometric Elevations)</li> <li>○ Figure SH036-2 (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 SH036-1: Fall 2024 – Hwy 679:06 Prairie Echo Slope Inclinometer Instrumentation Reading Summary**

Date Monitored: September 18, 2024

<b>INSTRUMENT #</b>	<b>DATE INITIALIZED</b>	<b>TOTAL CUMULATIVE RESULTANT MOVEMENT AT NOTED DEPTH SINCE INITIAL READING (mm)</b>	<b>MAXIMUM RATE OF MOVEMENT (mm/yr)</b>	<b>CURRENT STATUS</b>	<b>DATE OF PREVIOUS READING</b>	<b>INCREMENTAL MOVEMENT SINCE PREVIOUS READING (mm)</b>	<b>RATE OF MOVEMENT (mm/yr)</b>	<b>CHANGE IN RATE OF MOVEMENT SINCE PREVIOUS READING (mm/yr)</b>
SI23-1	January 10, 2023	67.6 mm over 6.1 m to 8.6 m depth in 172° direction	101.7 mm/yr in January 2023	Operational	May 16, 2024	23.9	70.0	41.5

Drawing 32121-SH036-1 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.

**Table SH036-2: Fall 2024 – Hwy 679:06 Prairie Echo Vibrating Wire Piezometer Instrumentation Reading Summary**

Date Monitored: September 18, 2024

INSTRUMENT #	DATE INITIALIZED	TIP ELEV. (m)	GROUND ELEV. (m)	CURRENT STATUS	HIGHEST MEASURED WATER ELEVATION (m)	CURRENT WATER ELEVATION (m)	PREVIOUS WATER ELEVATION (MAY 16, 2024) (m)	CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)
VW23-1 (158202)	January 6, 2023	606.75	615.75	Operational	619.41 on March 8, 2023	619.08	619.01	0.07
VW23-2 (158210)	January 6, 2023	607.44	613.54	Operational	615.93 on June 11, 2023	615.85	615.77	0.08
VW23-3 (157856)	January 7, 2023	610.68	619.98	Destroyed	624.24 on January 13, 2023	N/A	622.51	N/A

Drawing 32121-SH036-1 in Appendix A provides a sketch of the approximate locations of the monitoring instrumentation for this site.

Notes:

VW – vibrating wire piezometer.

BGS - below ground surface.



## STATEMENT OF LIMITATIONS AND CONDITIONS

### 1. STANDARD OF CARE

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

**FALL 2024**

**APPENDIX A  
DATA PRESENTATION**

**SITE SH036: HWY 679:06, PRAIRIE ECHO**

**ALBERTA TRANSPORTATION AND ECONOMIC CORRIDORS  
PEACE REGION (PEACE RIVER DISTRICT)  
INSTRUMENTATION MONITORING FIELD SUMMARY (SH036)  
FALL 2024**

<b>Location:</b> Prairie Echo (HWY 679:06 C1 8.18) <b>File Number:</b> 32121 <b>Probe:</b> RST Set 5R <b>Cable:</b> RST Set 5R	<b>Readout:</b> GK 404, S/N 364 <b>Casing Diameter:</b> 2.75" <b>Temp:</b> 22 <b>Read by:</b> NKR/NRM
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**SLOPE INCLINOMETER (SI) READINGS**

SI#	GPS Location (UTM 11)		Date	Stickup (m)	Depth from top of casing (ft)	Magn. North A+ Groove degree	Current Bottom Depth Readings				Probe/ Reel #	Size (")	Remarks
	Easting	Northing					A+	A-	B+	B-			
SI23-1	539207	6162495	18-Sep-24	0.88	48 to 2	182	651	-640	92	-103	5R	2.75	

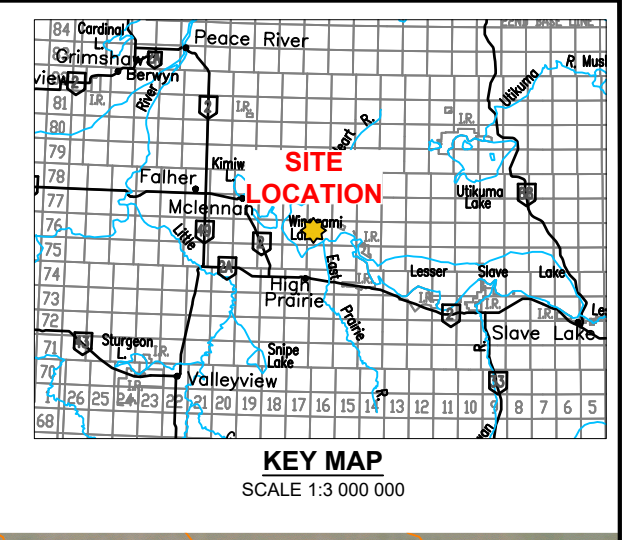
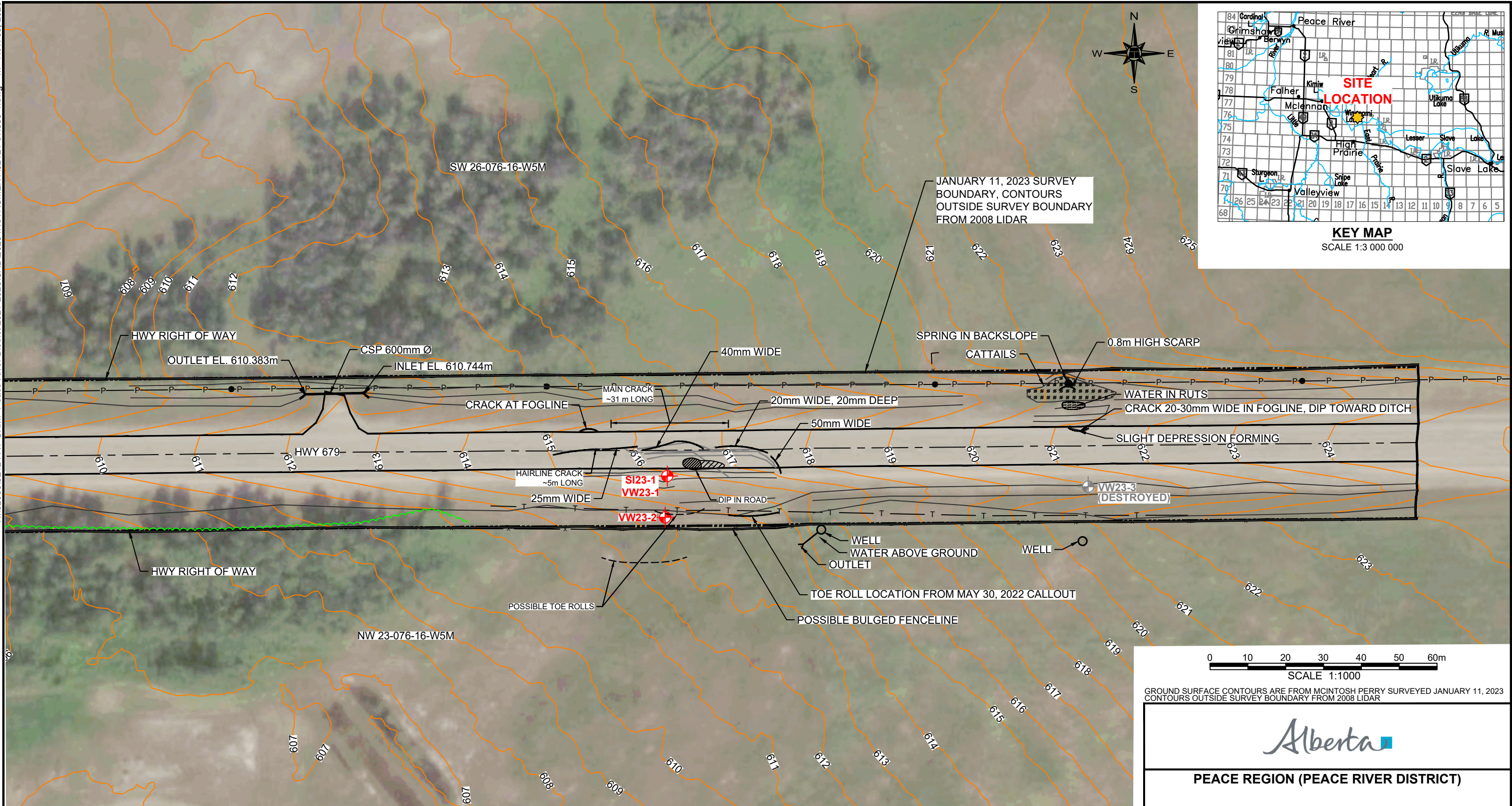
**VIBRATING WIRE PIEZOMETER (VW) READINGS**

VW#	GPS Location (UTM 12)		Date	Reading (B)	Temp (°C)	Identification Number
	Easting	Northing				
SI23-1	539207	6162495	18-Sep-24	7769.6	6.2	158202
TH23-2	539207	6162484	18-Sep-24	8235	5.6	158210
TH23-3	539318	6162492				157856

**DAILY INSPECTOR REPORT**

<b>Damaged, Large hole where VW is supposed to be, filled with water</b>

H:\32000\32121 AT GRMP Peace River District 2021-2025\CAD\2023 INSTRUMENT\32121-SH036-1.dwg - 1n - Nov. 09. 2023



**LEGEND**

	CRACK (APPROXIMATE)		OVERHEAD POWER LINE
	APPROXIMATE TEST HOLE LOCATION		GAS LINE
	SLOPE INCLINOMETER		GROUND SURFACE CONTOUR (CONTOUR INTERVAL = 1m)
	VIBRATING WIRE PIEZOMETER		TREE LINE
	TELUS LINE		POWER POLE
	FENCE LINE		

0 10 20 30 40 50 60m  
 SCALE 1:1000  
 GROUND SURFACE CONTOURS ARE FROM MCINTOSH PERRY SURVEYED JANUARY 11, 2023  
 CONTOURS OUTSIDE SURVEY BOUNDARY FROM 2008 LIDAR

*Alberta*

**PEACE REGION (PEACE RIVER DISTRICT)**

**SH036: HWY 679:06 km 8.18 TO km 8.24 PRAIRIE ECHO  
 SITE PLAN SHOWING APPROXIMATE  
 INSTRUMENT LOCATIONS**

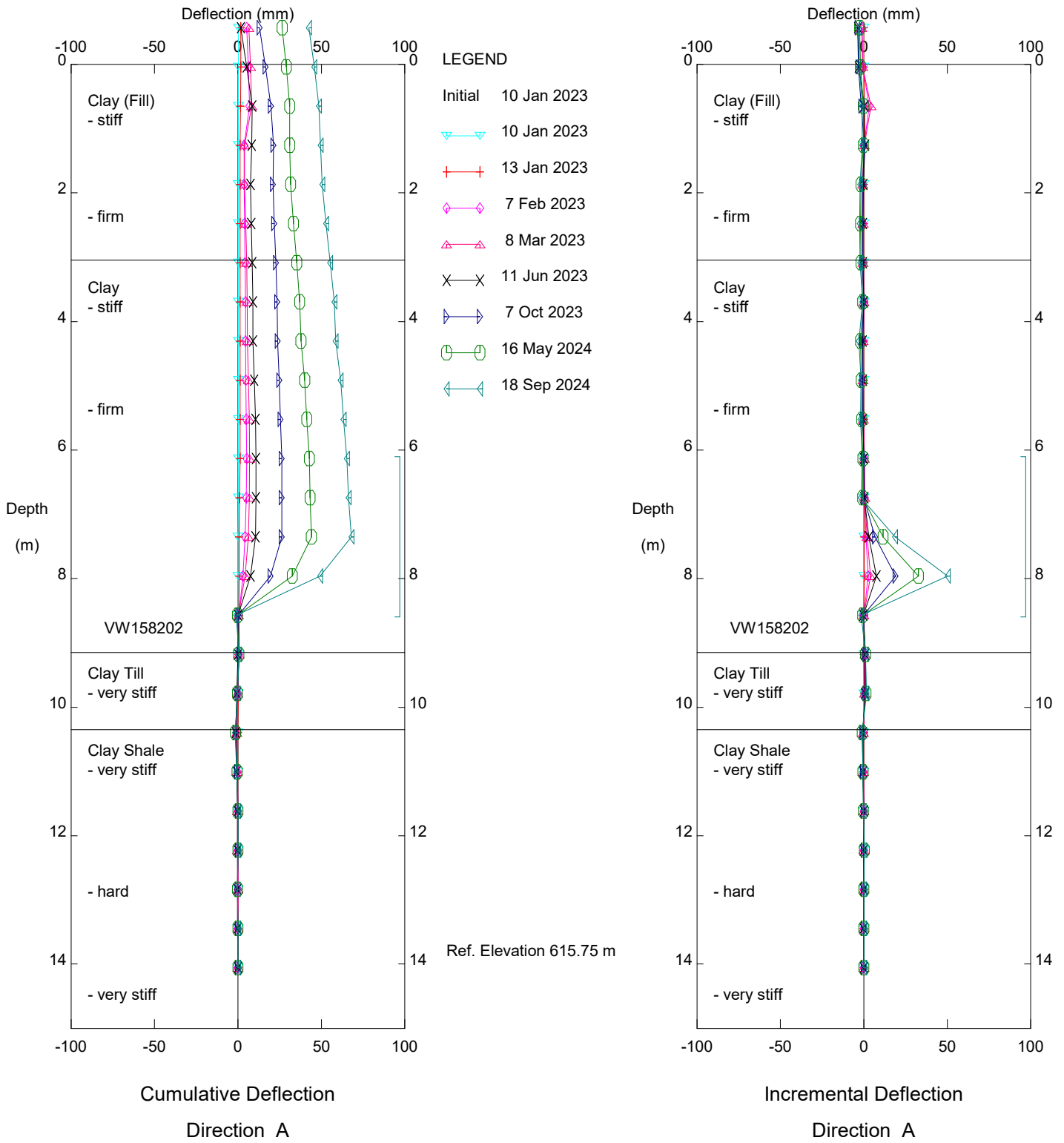
**DWG NO. 32121-SH036-1**

DRAWN BY	ML
DESIGNED BY	NFR
APPROVED BY	DWP
SCALE	1:1000
DATE	NOVEMBER 2023
FILE No.	32121

**THURBER ENGINEERING LTD.**



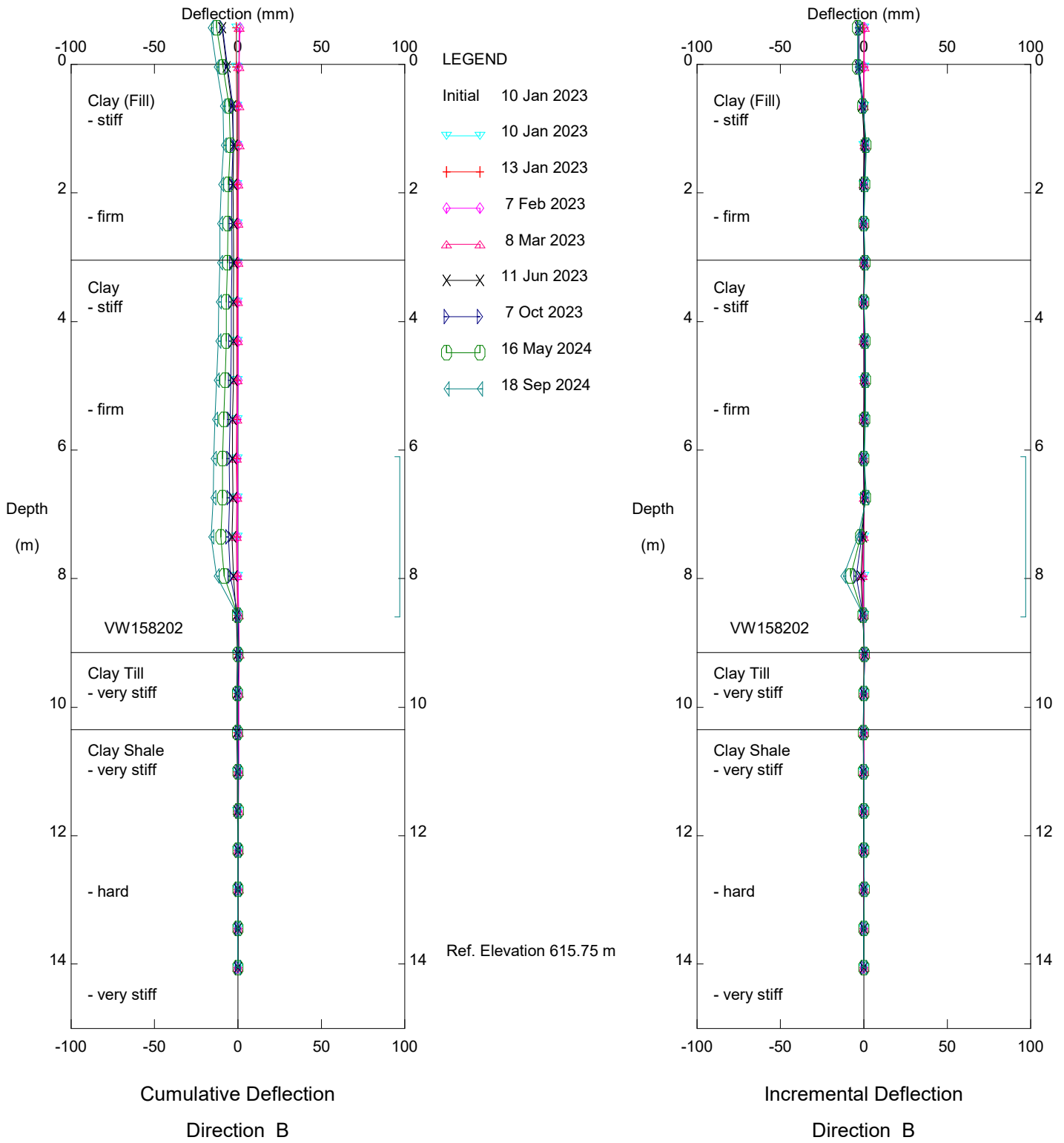
Thurber Engineering Ltd.



Hwy 679:06 km 8.18 Prairie Echo, Inclinometer SI23-1

TEC

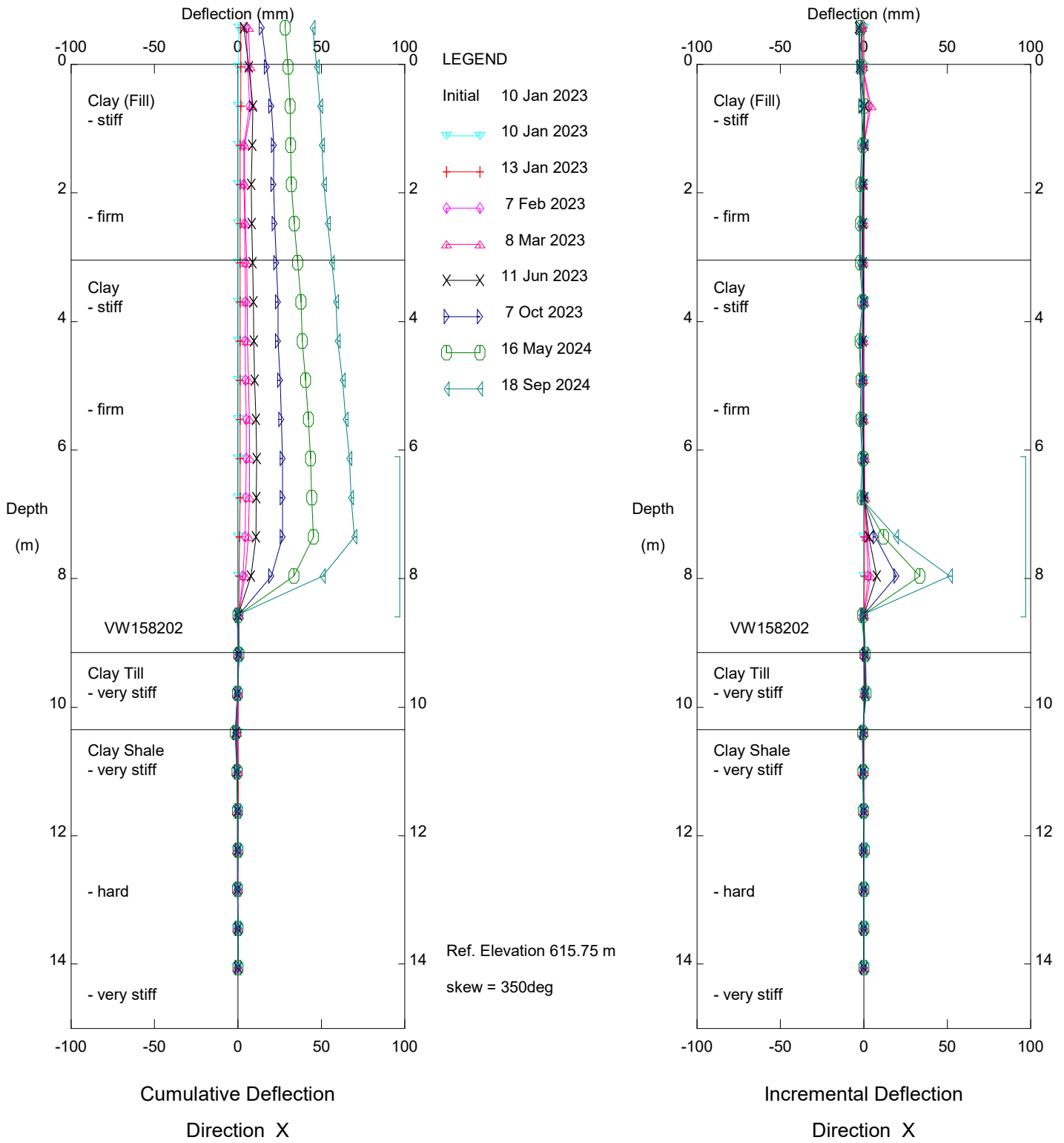
Thurber Engineering Ltd.



Hwy 679:06 km 8.18 Prairie Echo, Inclinometer SI23-1

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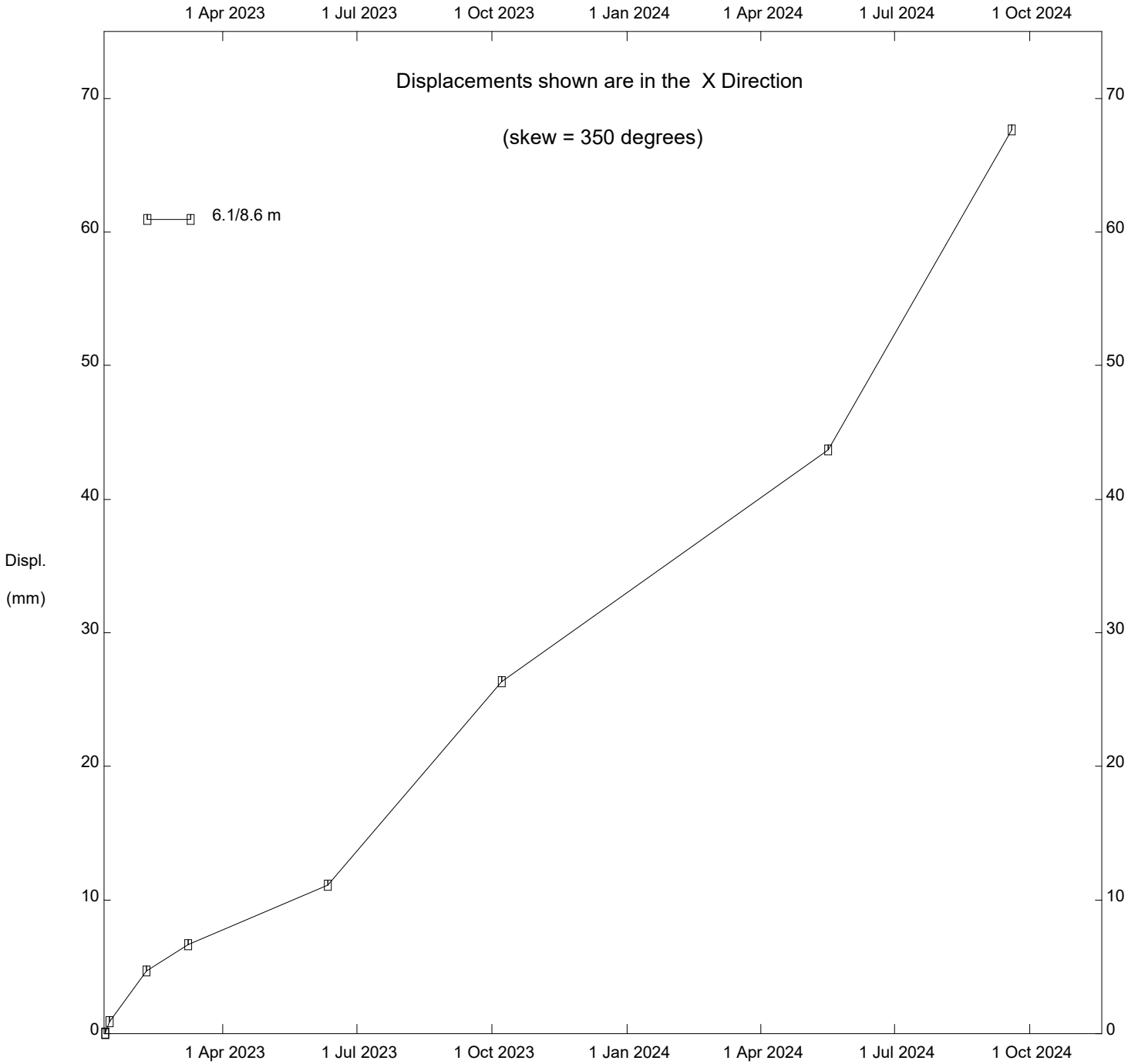
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Hwy 679:06 km 8.18 Prairie Echo, Inclinometer SI23-1

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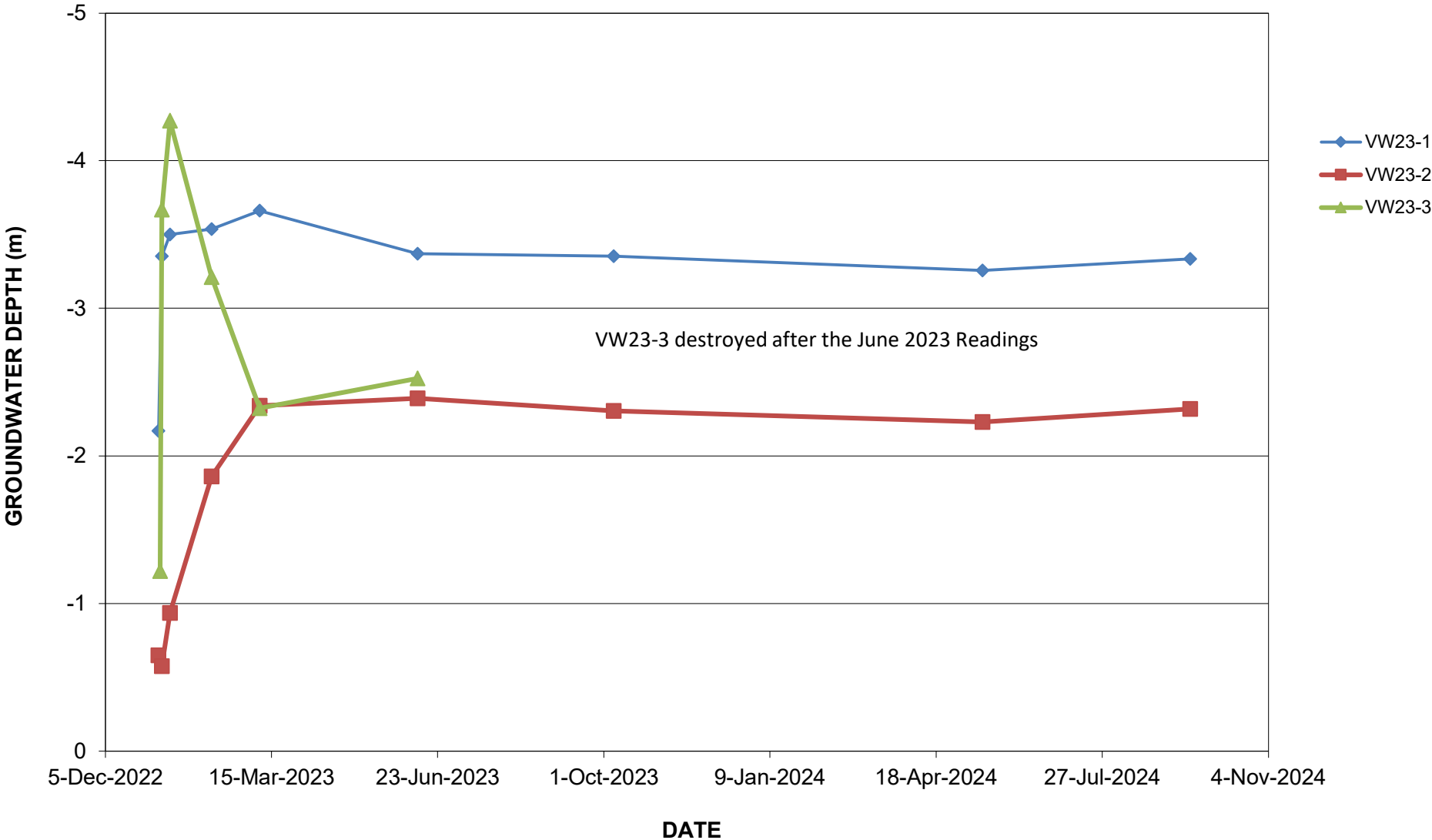
Thurber Engineering Ltd.



Hwy 679:06 km 8.18 Prairie Echo, Inclinator SI23-1

TEC

**FIGURE SH036-1  
PIEZOMETRIC DEPTHS FOR HWY 679:06 PRAIRIE ECHO**



**FIGURE SH036-2**  
**PIEZOMETRIC ELEVATIONS FOR HWY 679:06 PRAIRIE ECHO**

