ALBERTA TRANSPORTATION AND ECONOMIC CORRIDORS GRMP
PEACE REGION
(GRANDE PRAIRIE DISTRICT - NORTH)
INSTRUMENTATION MONITORING - FALL 2025

Site Number	Location	Name	Hwy	km
PH077	HWY 726:02 km 9.91, 10.30	East of Hines Creek Bridge	682:02	Km 12.5 to 12.8
Legal Description: 10-35-81-5 W6		**UTM Co-ordinates**		
		11U E 396680	N 6214978	

Current Monitoring:	30-Sep-2025	**Previous Monitoring**	14-June-2025
Instruments Read By:	Mr. Niraj Regmi. G.I.T. and Mr. Angelo Castillo, of Thurber		

Instruments Read During This Site Visit			
Slope Inclinometers (SIs): TH24-02, TH24-04, TH24-06, TH24-09 TH24-10, TH24-11	**Pneumatic Piezometers (PN):** N/A	**Vibrating Wire Piezometers (VW):** TH24-01 to TH24-12	**Standpipe Piezometers (SP):** N/A
Load Cell (LC): N/A	**Strain Gauges:** N/A	**SAAs:** N/A	**Others:** N/A

Readout Equipment Used			
Slope Inclinometers: Two RST Digital Inclinometer probes with 2 ft. wheelbases and RST Pocket PC readouts	**Pneumatic Piezometers:** N/A	**Vibrating Wire Piezometers:** Geokon GK 404 vibrating wire readout	**Standpipe Piezometers:** N/A
Load Cell: N/A	**Strain Gauges:** N/A	**SAAs:** N/A	**Others:** N/A
Notes:			

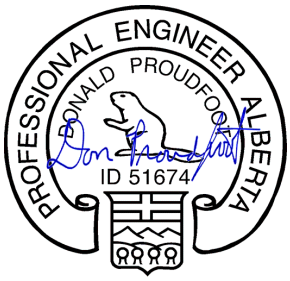
Discussion	
Zones of New Movement:	A potential zone of new movement was previously observed in SI TH24-09 over 21.1 m to 23.0 m depth. However, these deflections are thought to be caused by sagging of the SI casing in the test hole due to poor grouting. This zone should be carefully reviewed over the next few readings. A potential zone of movement has been identified in TH24-10 over a depth of 1.7 to 7.3 m depth.
Interpretation of Monitoring Results:	Slope inclinometer TH24-02 showed that the reading taken on February 24, 2024 was not consistent with the other readings taken from this SI; thus, this erratic reading was removed from the plot. Comparing the current readings to the readings taken June 14, 2025, the SI showed rates of movement of 2.6 mm/yr over 0.4 to 2.2 m depth, a movement rate lower than the previous reading. Slope inclinometer TH24-04 showed a rate of movement of 2.0 mm/yr over 0 m to 1.1 m depth, corresponding to a decrease in the rate of movement of 19.5 mm/yr since the June 14, 2025 reading. Slope inclinometer TH24-06 showed a rate of movement over 0.1 m to 1.9 m depth of 2.2 mm/yr since the June 14, 2025 reading. Slope inclinometer TH24-09 is showing no established movement zone. Future readings are needed to confirm.

	TH24-10 shows a zone of movement over 1.2 to 7.3 m depth. There has been 7.1 mm of movement over this depth since the SI was installed in June of 2024 and the current rate of movement is 12.2 mm/yr, representing an increase in rate of 11.6 mm/year since the spring of 2025. Slope inclinometer TH24-11 showed a rate of movement of 7.1 mm/yr over 1.2 m to 6.7 m depth, corresponding to an increase in the rate of movement of 4.4 mm/yr since the June 13, 2025 reading. TH24-02, 04 and 06 showed decreases in rates of movement since their last readings. TH24-10 and 11 showed increases in the rate of movement, considering the same period. These movement zones and the average annual rate of movement should be confirmed over the following few sets of readings. Most of the vibrating wire piezometers generally showed relatively small changes in groundwater level compared to the spring of 2025, except for TH24-03 which registered a decrease of 1.10 m in groundwater level and TH24-12, which registered a decrease of 3.37 m in groundwater level. Other piezometer readings ranged from a maximum decrease of 0.36 m in TH24-04 to a maximum increase of 0.06 m in TH24-08. TH24-06 and TH24-08 showed the highest groundwater level readings to date of 476.03 m and 493.45 m, respectively. TH24-12 showed a large decrease in groundwater level since June 14, 2025.
Future Work:	The instruments should be read again in the spring of 2026. The movement zones in the SIs should be confirmed when there are more readings to analyze.
Instrumentation Repairs:	No instrument repairs are required at this time.
Additional Comments:	

Attachments:	▪ Table PH077-1 Fall 2025 – HWY 686:02 East of Hines Creek Bridge, Slope Inclinometer Instrumentation Reading Summary ▪ Table PH077-2 Fall 2025 – HWY 686:02 East of Hines Creek Bridge, Vibrating Wire Piezometer Instrumentation Reading Summary ▪ Statement for Use and Interpretation of Report. ▪ APPENDIX A - PH077-1 FALL report □ Site Plan Showing Approximate Instrument Locations (Drawings No. 32123 PH077-1) □ SI Reading Plots □ Figure PH077-1 (Piezometric Depths) □ Figure PH077-2 (Piezometric Elevations)

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.
Partner, Senior Geotechnical Engineer



November 21, 2025

PERMIT TO PRACTICE
THURBER ENGINEERING LTD.
RM SIGNATURE: Don Proudfoot
RM APEGA ID #: 51674
DATE: November 21, 2025
PERMIT NUMBER: P005186
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

Fernanda Imamura Ph.D.
Geotechnical Engineer-in-Training

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Table PH077-1: Fall 2025 – HWY 686:02 East of Hines Creek Bridge Slope Inclinometer Instrumentation Reading Summary

Date Monitored: September 30, 2025

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)
TH24-02	July 6, 2024	4.9 mm over 0.4 m to 2.2 m depth in 225° direction	5.9 mm/yr In June 2025	Active	June 14, 2025	0.8	2.6	-3.4
TH24-04	July 6, 2024	16.5 mm over 0 m to 1.1 m depth in 240° direction	35.3 mm/yr In February 2025	Active	June 14, 2025	0.6	2.0	-19.5
TH24-06	July 6, 2024	11.5 mm over 0.1 m to 1.9 m depth in 228° direction	41.7 mm/yr In February 2025	Active	June 14, 2025	0.6	2.2	-13.2
TH24-09	July 6, 2024	No Discernible Movement zone	No Discernible Movement	Active	June 14, 2025	No Discernible Movement	N/A	N/A
TH24-10	July 6, 2024	7.2 mm over 1.2 m to 7.3 m depth in 250° direction	12.2 mm/yr In September 2025	Active	June 14, 2025	3.6	12.2	11.6
TH24-11	July 6, 2024	6.4 mm over 1.2 m to 6.7 m depth in 240° direction	18.0 mm/yr In February 2025	Active	June 14, 2025	2.1	7.1	4.4

Drawing 32123-PH077-1 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site

(1) Reading taken in February 24, 2025 appears to be erratic. June 14, 2025 reading compared with September 25, 2024.

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Table PH077-2: Fall 2025 – HWY 686:02 East of Hines Creek Bridge Vibrating Wire Piezometer Instrumentation Reading Summary

Date Monitored: September 30, 2025

INSTRUMENT	DATE INITIALIZED	TIP ELEV. (m)	GROUND ELEV. (m)	CURRENT STATUS	HIGHEST MEASURED WATER LEVEL BGS (m)	CURRENT GROUNDWATER DEPTH (mBGS)	PREVIOUS GROUNDWATER DEPTH (mBGS)	CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)
TH24-01	July 5, 2024	473.51	486.13	Active	9.56 mBGS on July 5, 2024	10.48	10.35	-0.13
TH24-02	June 27, 2024	468.83	486.25	Active	11.59 mBGS on August 2, 2024	11.63	11.68	0.05
TH24-03	July 5, 2024	469.79	487.17	Active	9.37 mBGS on June 14, 2025	10.47	9.37	-1.10
TH24-04	July 6, 2024	466.03	487.87	Active	10.54 mBGS on June 14, 2025	10.90	10.54	-0.36
TH24-05	July 6, 2024	471.50	489.46	Active	10.06 mBGS on June 14, 2025	10.26	10.06	-0.20
TH24-06	July 6, 2024	468.84	490.22	Active	14.20 mBGS on September 30, 2025	14.20	14.25	0.05
TH24-07	July 6, 2024	484.73	498.41	Active	13.51 mBGS on August 2, 2024	13.69	13.62	-0.07
TH24-08	July 6, 2024	482.79	500.55	Active	7.10 mBGS on September 30, 2025	7.10	7.16	0.06

Drawing 32123-PH077-1 in Appendix A provide sketches of the approximate locations of the monitoring instrumentation for this site

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Table PH077-2 Continued - Fall 2025 – HWY 686:02 East of Hines Creek Bridge Vibrating Wire Piezometer Instrumentation Reading Summary

Date Monitored: September 30, 2025

INSTRUMENT	DATE INITIALIZED	TIP ELEV. (m)	GROUND ELEV. (m)	CURRENT STATUS	HIGHEST MEASURED WATER LEVEL BGS (m)	CURRENT GROUNDWATER DEPTH (mBGS)	PREVIOUS GROUNDWATER DEPTH (mBGS)	CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)
TH24-09	July 6, 2024	473.57	494.41	Active	0.15 mBGS on September 25, 2024	0.49	0.19	-0.30
TH24-10	July 6, 2024	470.42	492.51	Active	4.11 mBGS on July 6, 2024	4.51	4.39	-0.12
TH24-11	July 6, 2024	466.16	488.07	Active	12.34 mBGS on June 14, 2025	12.35	12.34	-0.01
TH24-12	July 6, 2024	500.18	512.74	Active	2.07 mBGS on June 14, 2025	5.44	2.07	-3.37

Drawing 32123-PH077-1 in
Appendix A provide sketches of the approximate locations of the monitoring instrumentation for this site

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STATEMENT FOR USE AND INTERPRETATION OF REPORT

1. STANDARD OF CARE

This Report has been prepared in a manner consistent with that degree of care and skill ordinarily exercised by members of the same profession currently practicing under similar circumstances at the same time and in the same or similar locality and in compliance with all applicable laws.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment, including this Statement For Use and Interpretation of Report, 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, AS DESCRIBED ABOVE. THURBER IS NOT RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TOTHE WHOLE OF THE 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 for the development, design objectives, and/or purposes described to Thurber by the Client. **NO OTHER PARTY MAY USE OR RELY ON THE REPORT OR ANY PORTION THEREOF FOR OTHER THAN THE CLIENT'S BENEFIT IN CONNECTION WITH THE PURPOSES DESCRIBED IN THE REPORT**. Any use which a third party makes of the Report is the sole responsibility of such third party and is always subject to this Statement for Use and Interpretation of Report. Thurber accepts no liability or responsibility for damages suffered by any third party resulting from use of the Report for purposes outside the reasonable contemplation of Thurber at the time it was prepared or in any manner unintended by Thurber.

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 is inherently judgement-based. 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 parties making use of such documents or records with or without our express written consent need to 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 parties. Some conditions are subject to change over time and those making use of the Report need to be aware of this possibility and understand that the Report only presents the interpreted conditions at the sampled points at the time of sampling. If special concerns exist, or the Client has special considerations or requirements, the Client must 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 based on conditions in evidence at the time of site inspections and based on 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 resulting from misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other parties 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 is recommended to 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 need to 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 to confirm and document that the site conditions do not materially differ from those 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. 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 other parties 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, unless such decisions expressly form part of the stated purpose of the Report as described in Paragraph 3.

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

FALL 2025

APPENDIX A
DATA PRESENTATION

SITE PH077: HWY 686:02, EAST OF HINES CREEK BRIDGE

ALBERTA TRANSPORTATION AND ECONOMIC CORRIDORS
PEACE REGION (GRANDE PRAIRIE - NORTH DISTRICT)
INSTRUMENTATION MONITORING FIELD SUMMARY (PH077)
FALL 2025

Location:	East of Hines Creek Bridge (HWY 682:02 km 12.5 to km 12.8)	**Readout:**	GK404 SN 364
File Number:	32121	**Casing Size**	2.75"
Probe:	RST SET 8R	**Temp:**	10
Cable:	RST SET 8R	**Read by:**	NKR/AFC

SLOPE INCLINOMETER (SI) READINGS

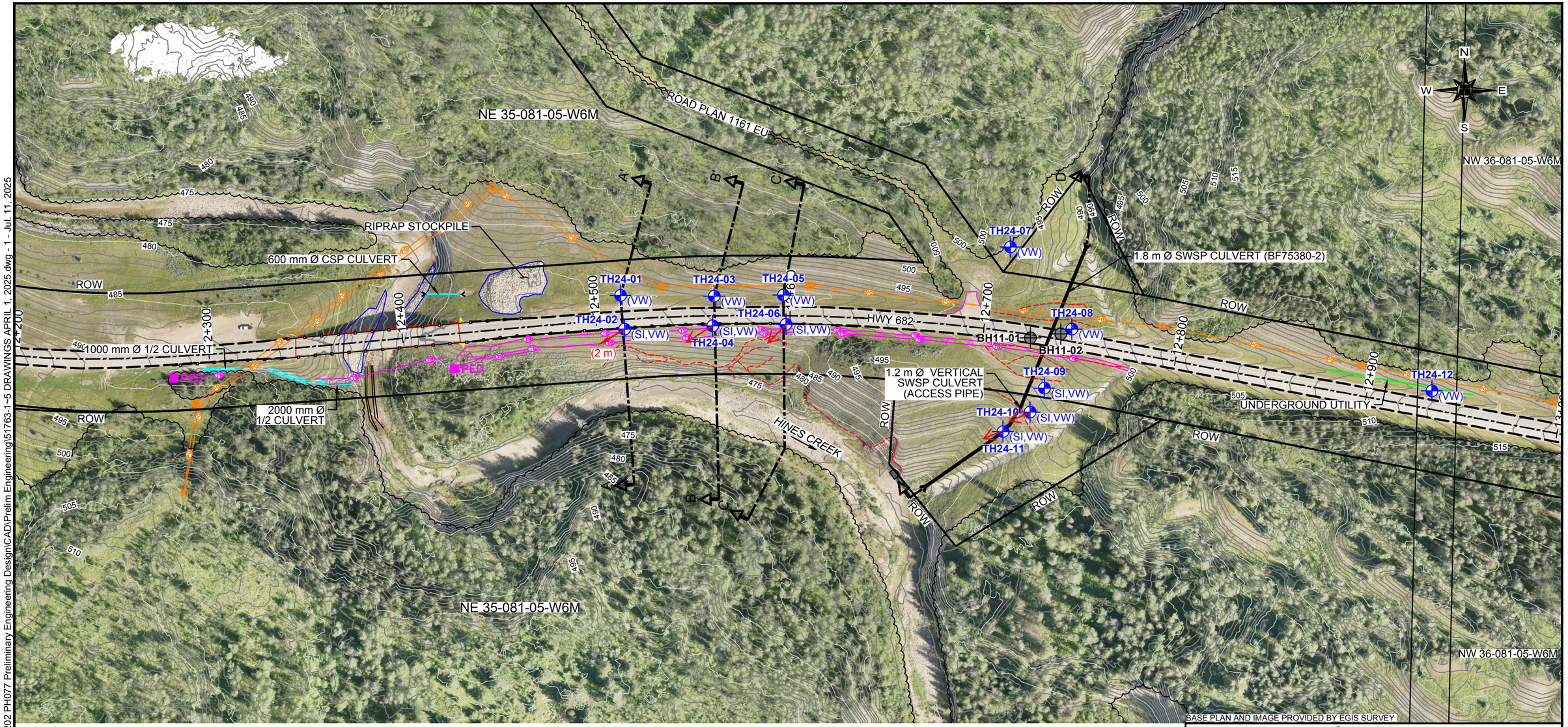
SI#	GPS Location (UTM 11)		Date	Stickup (m)	Depth from top of casing (ft)	Azimuth of A+ Groove	Current Bottom Depth Readings				Probe/ Reel #	Size (")	Remarks
	Easting (m)	Northing (m)					A+	A-	B+	B-			
TH24-02	396680	6214978	30-Sep-25	1.12	68 to 2	205	-175	187	614	-608	8R/8R	2.75"	
TH24-04	396724	6214979	30-Sep-25	1.07	82 to 2	230	-185	202	-79	90	8R/8R	2.75"	
TH24-06	396762	6214978	30-Sep-25	0.83	80 to 2	198	-650	663	82	-65	8R/8R	2.75"	
TH24-09	396897	6214946	30-Sep-25	0.59	118 to 2	276	-242	255	1846	-1852	8R/8R	2.75"	
TH24-10	396889	6214933	30-Sep-25	0.92	84 to 2	275	-179	147	353	-349	8R/8R	2.75"	
TH24-11	396874	6214921	30-Sep-25	0.9	82 to 2	250	362	-364	2440	-2423	8R/8R	2.75"	

VIBRATING WIRE PIEZOMETER READINGS

PN#	GPS Location (UTM 11)		Date	Reading	Identification
	Easting (m)	Northing (m)		Reading (B unit/°C)	Number
TH24-01	396681	6214993	30-Sep-25	8506.1/6.1	VW183650
TH24-02	396680	6214978	30-Sep-25	8039.7/6.4	VW183648
TH24-03	396726	6214996	30-Sep-25	8162.2/6.1	VW183642
TH24-04	396724	6214979	30-Sep-25	7981.3/6.3	VW185238
TH24-05	396762	6214992	30-Sep-25	7776.6/6.2	VW183655
TH24-06	396762	6214978	30-Sep-25	8495.5/6.2	VW185237
TH24-07	396878	6215022	30-Sep-25	8529.8/4.9	VW184428
TH24-08	396911	6214976	30-Sep-25	7771.2/4.7	VW183654
TH24-09	396897	6214946	30-Sep-25	7778.9/4.7	VW185399
TH24-10	396889	6214933	30-Sep-25	7690.3/4.5	VW185245
TH24-11	396874	6214921	30-Sep-25	8312.3/4.5	VW185234
TH24-12	397095	6214943	30-Sep-25	8132.4/5.1	VW183658

INSPECTOR REPORT

Azimuth of all the SI measured downslope direction.
Previous tech were reading upslope and the notch on top of Si were cut in random direction
ALL the si were read in downslope direction for uniformity.
see photograph of the si .
SI24-10 Probe sitting at 83'9". We shoud read from 82 ft .



LEGEND

- TREE LINE
- TEST HOLE LOCATION
- (SI) SLOPE INCLINOMETER
- (VW) VIBRATING WIRE PIEZOMETER
- 2011 TEST HOLE LOCATION
- SCARP CRACK (APPROXIMATE)
- EDGE OF HIGHWAY PAVEMENT
- (2 m) POSSIBLE MOVEMENT DIRECTION IN SI AND BASE OF MOVEMNT DEPTH (m)
- POWER POLE
- OVERHEAD POWER LINE
- PED TELUS PEDESTAL
- UNDERGROUND TELUS LINE
- GUARDRAIL
- CULVERT
- ROW RIGHT - OF - WAY

0 20 40 60 80 100 120m

SCALE 1:2000

Alberta Transportation

PH077-1: EAST SIDE OF HINES CREEK BRIDGE
HWY 682:02, KM 12.6 TO KM 12.7
PRELIMINARY ENGINEERING

SITE PLAN SHOWING APPROXIMATE TEST HOLE LOCATIONS

DWG No. 51763-1

DRAWN BY	ML
DESIGNED BY	NPW
APPROVED BY	DWP
SCALE	1:2000
DATE	JULY 2025
FILE No.	51763

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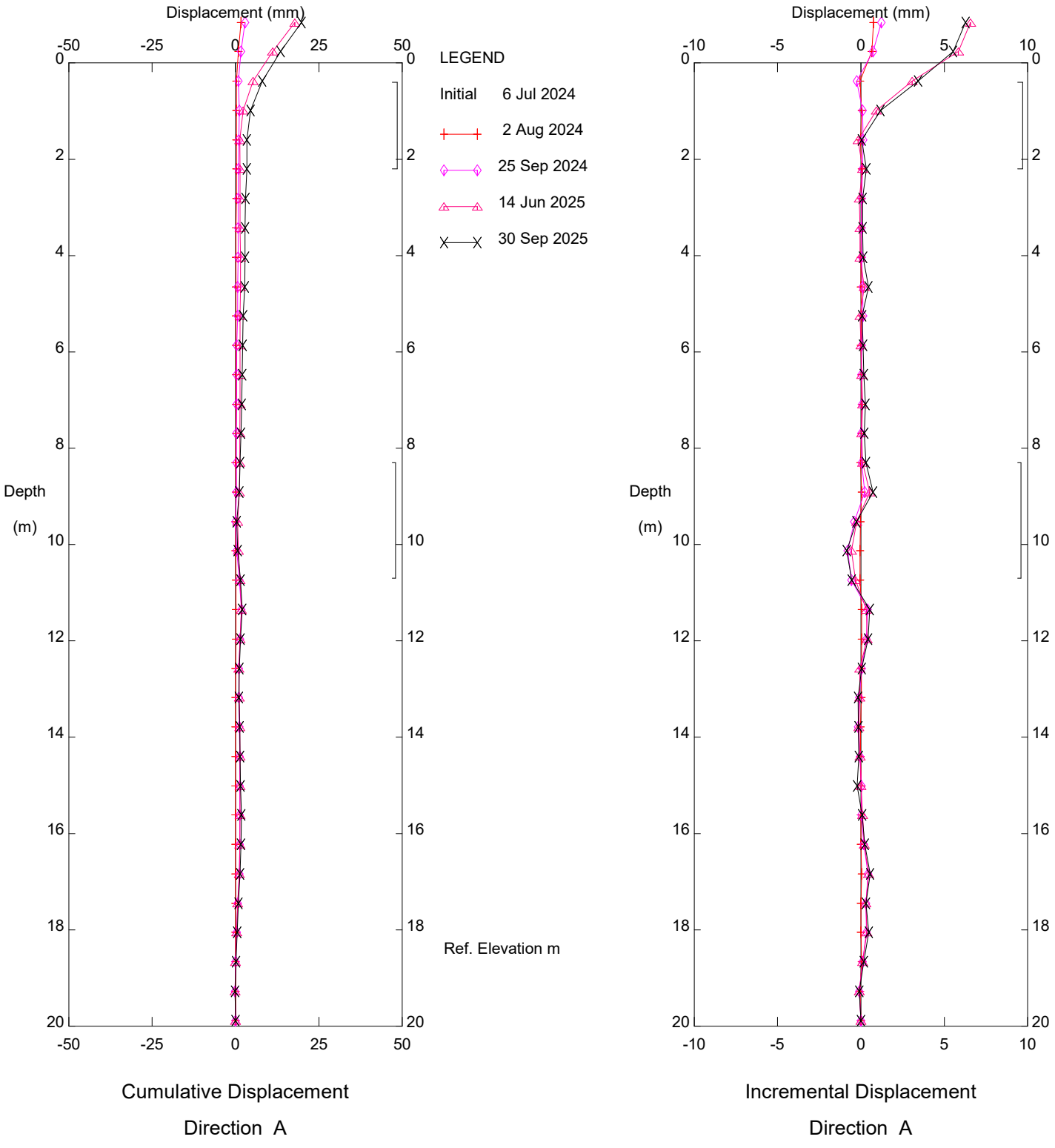

Cumulative Displacement

Direction A

Incremental Displacement

Direction A

51763 PH077, Inclinometer TH24-02

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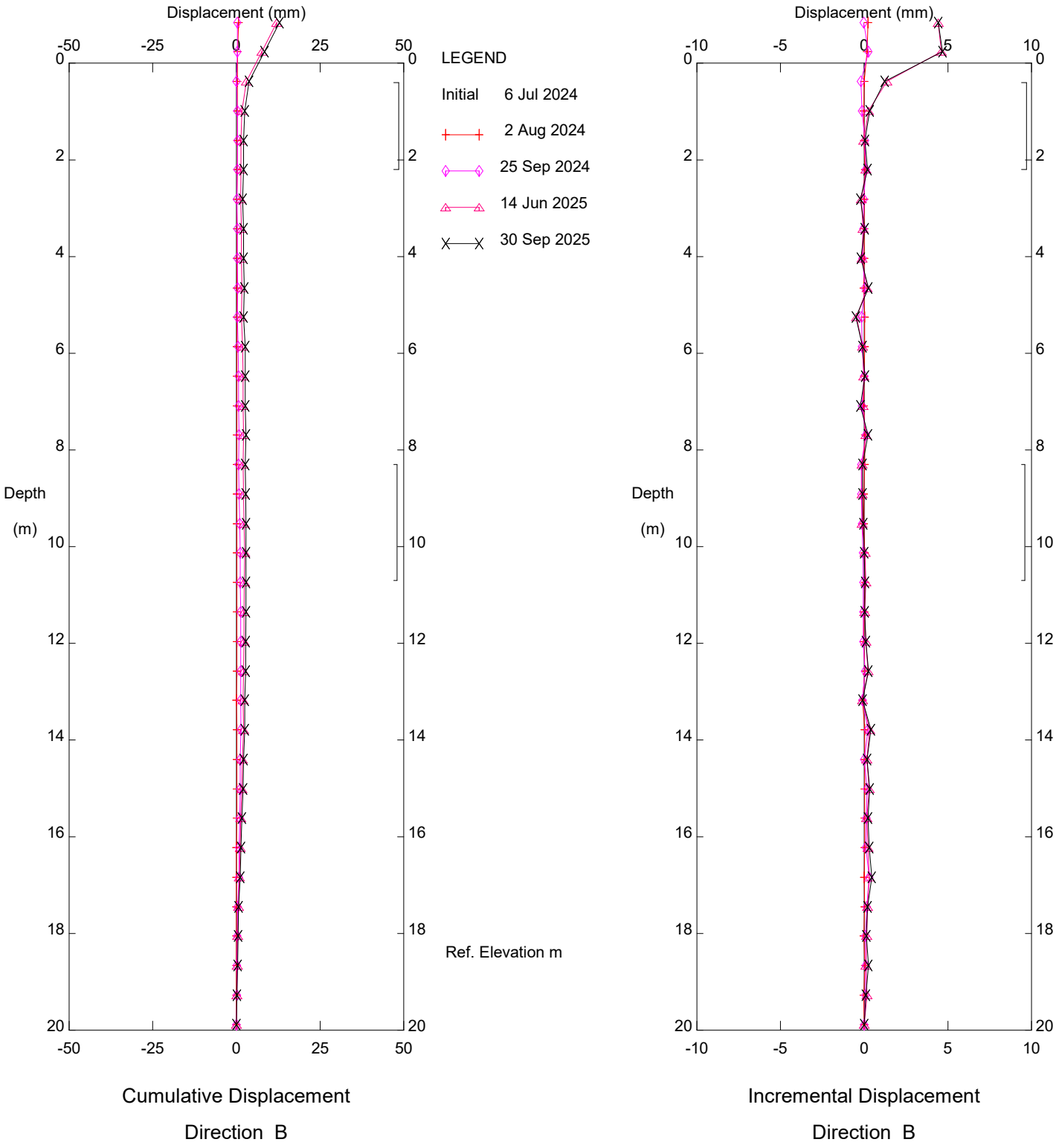

Cumulative Displacement

Direction B

Incremental Displacement

Direction B

51763 PH077, Inclinometer TH24-02

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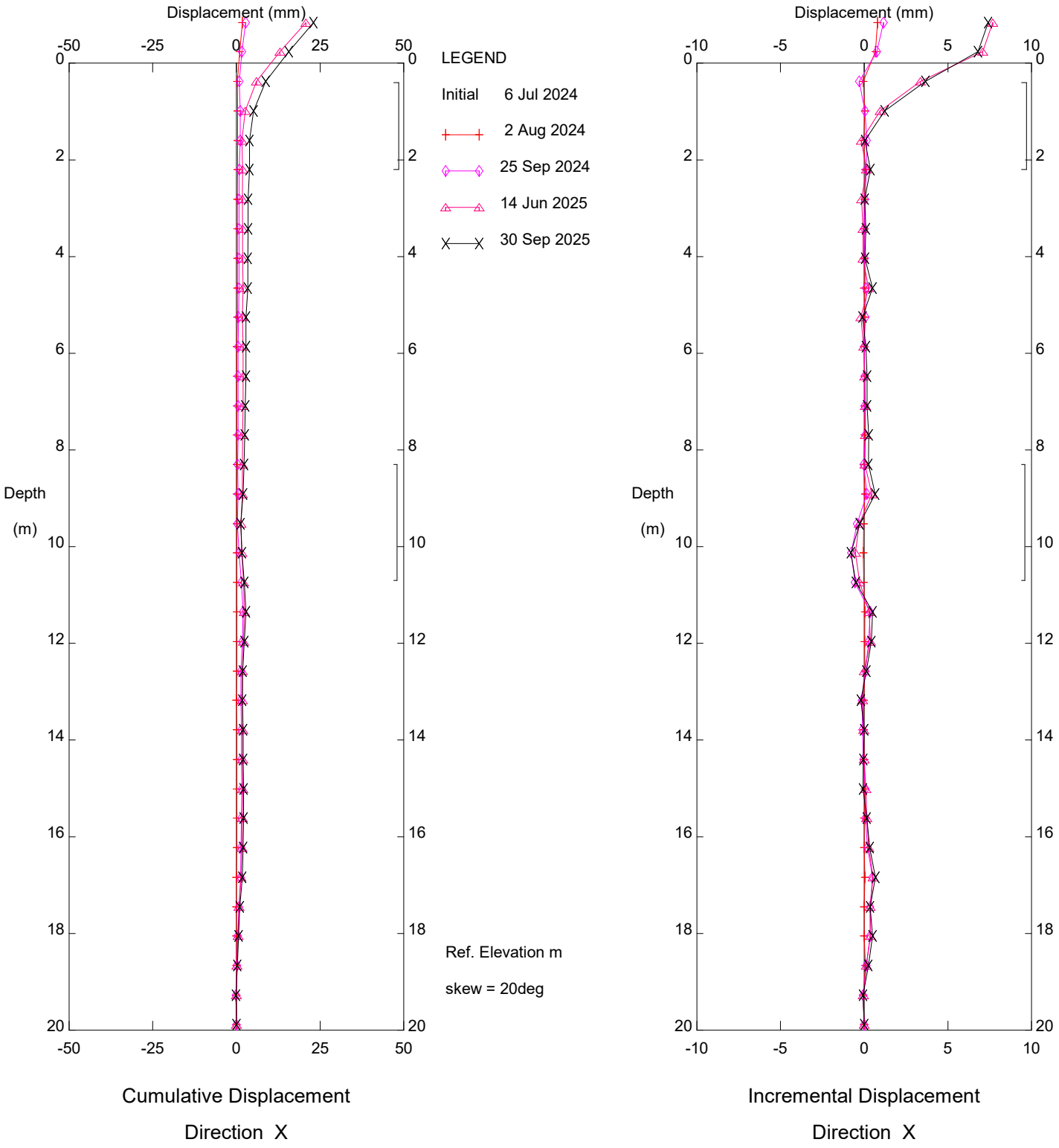

Cumulative Displacement

Direction X

Incremental Displacement

Direction X

51763 PH077, Inclinometer TH24-02

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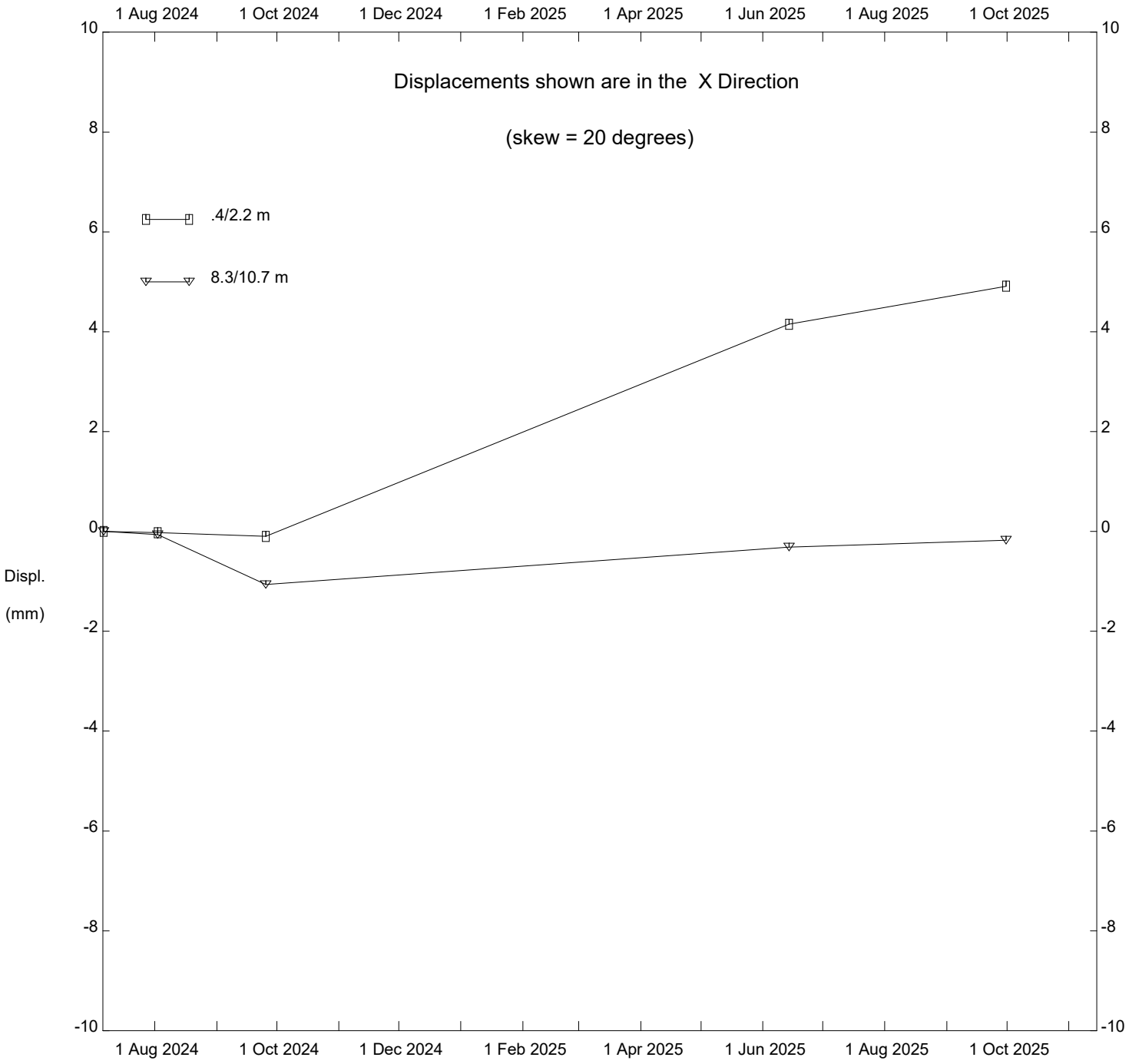

51763 PH077, Inclinometer TH24-02

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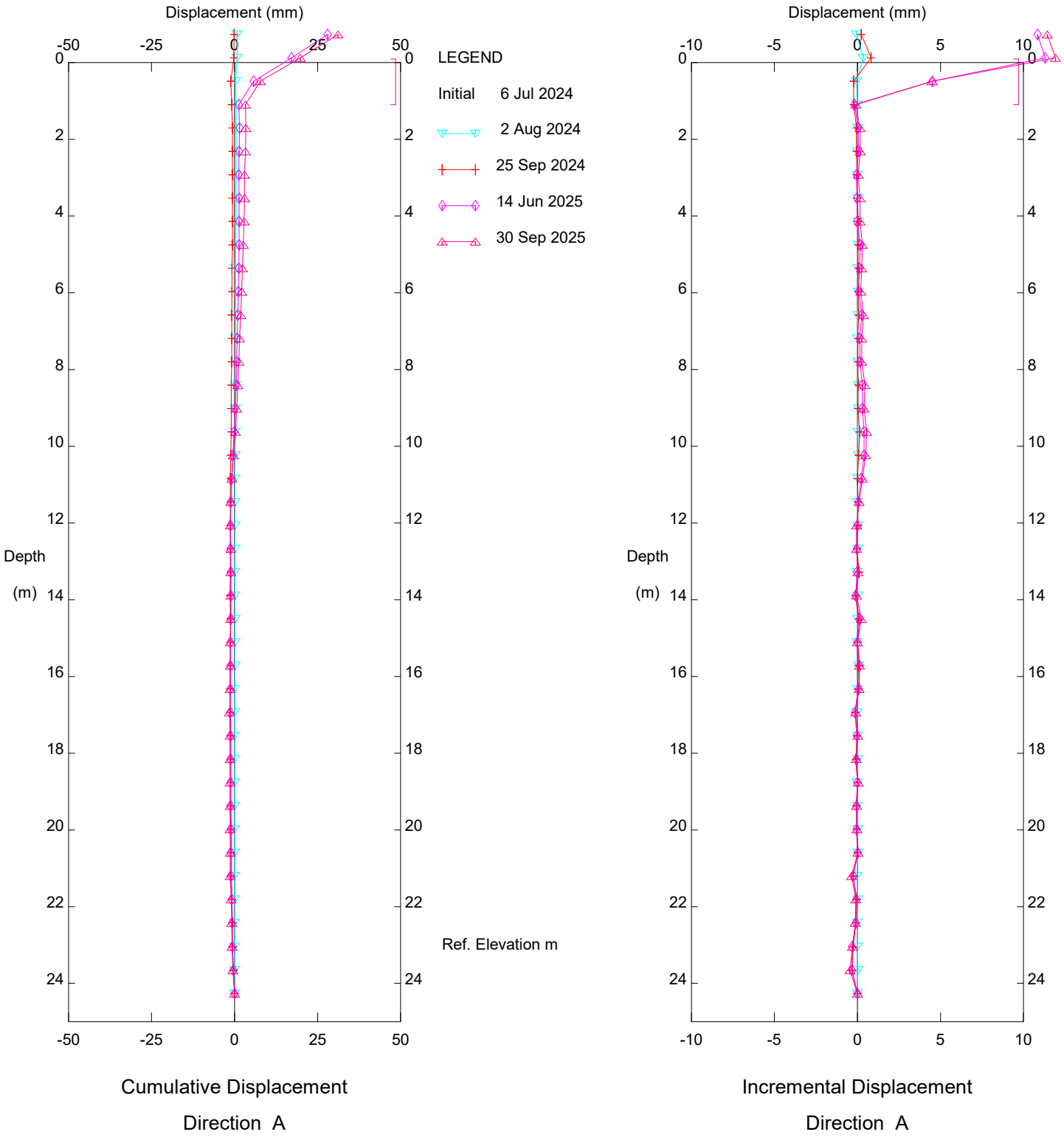

Cumulative Displacement

Direction A

Incremental Displacement

Direction A

51763 PH077, Inclinometer TH24-04

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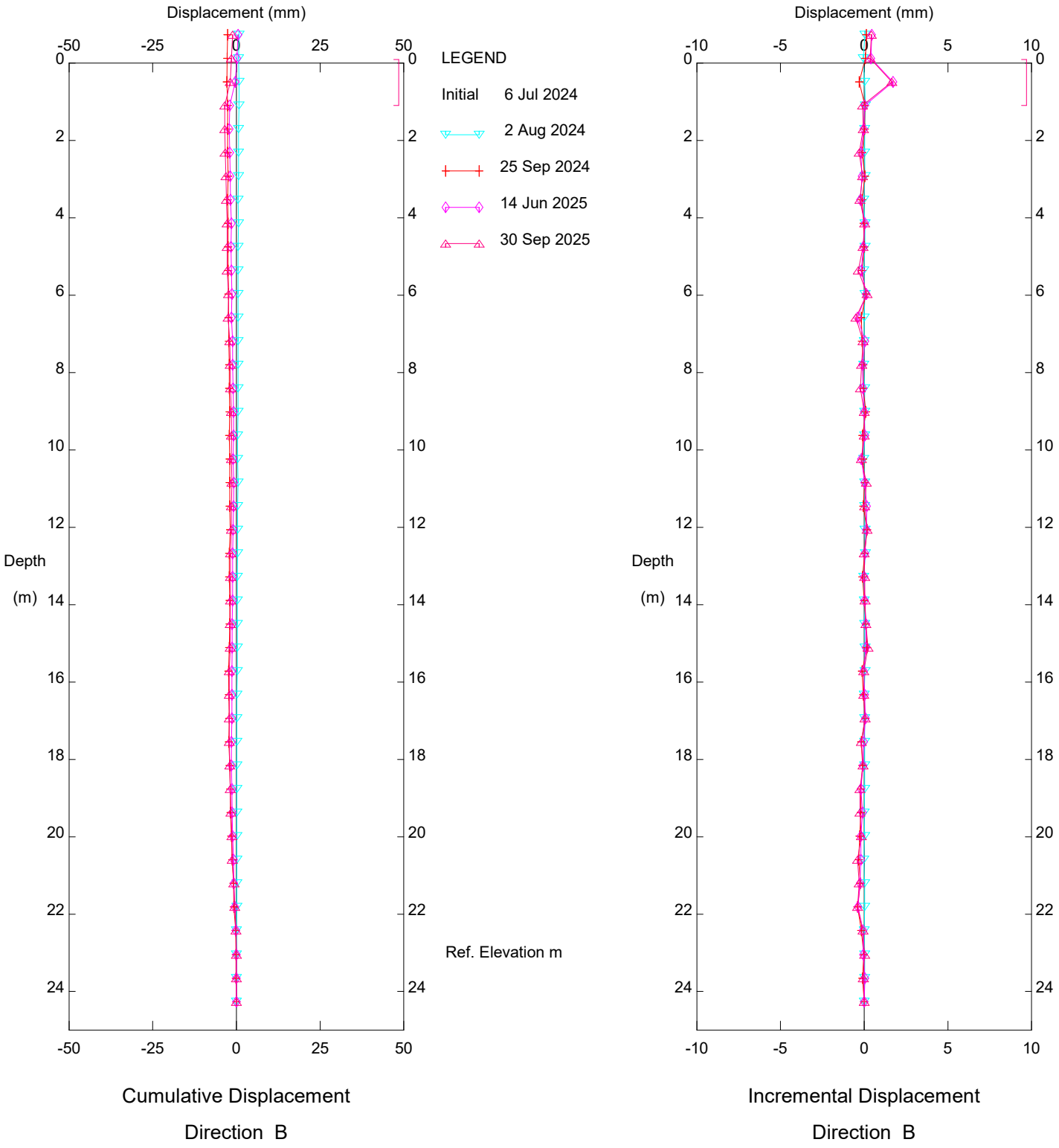

Cumulative Displacement

Direction B

Incremental Displacement

Direction B

51763 PH077, Inclinometer TH24-04

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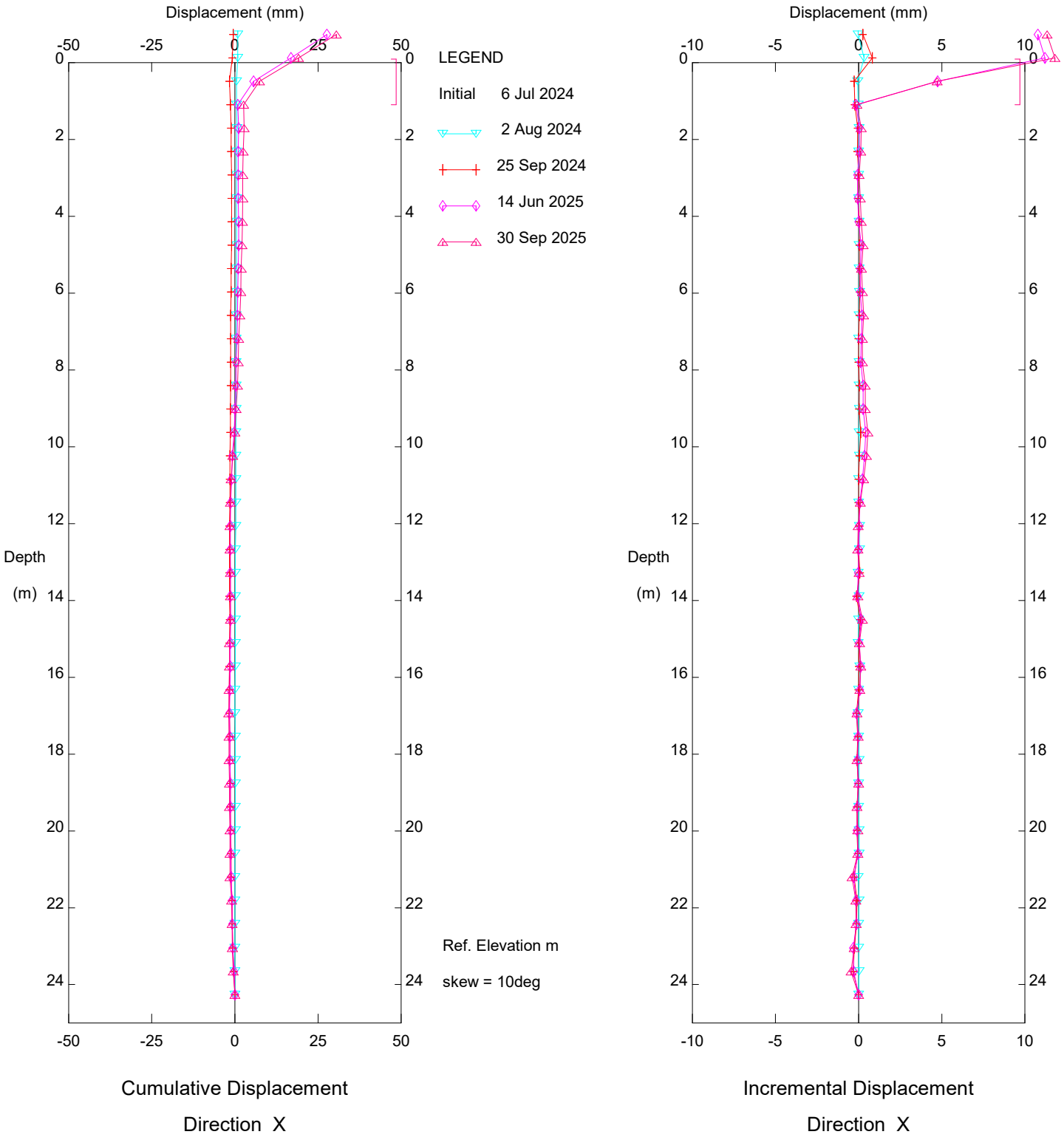

Cumulative Displacement

Direction X

Incremental Displacement

Direction X

51763 PH077, Inclinometer TH24-04

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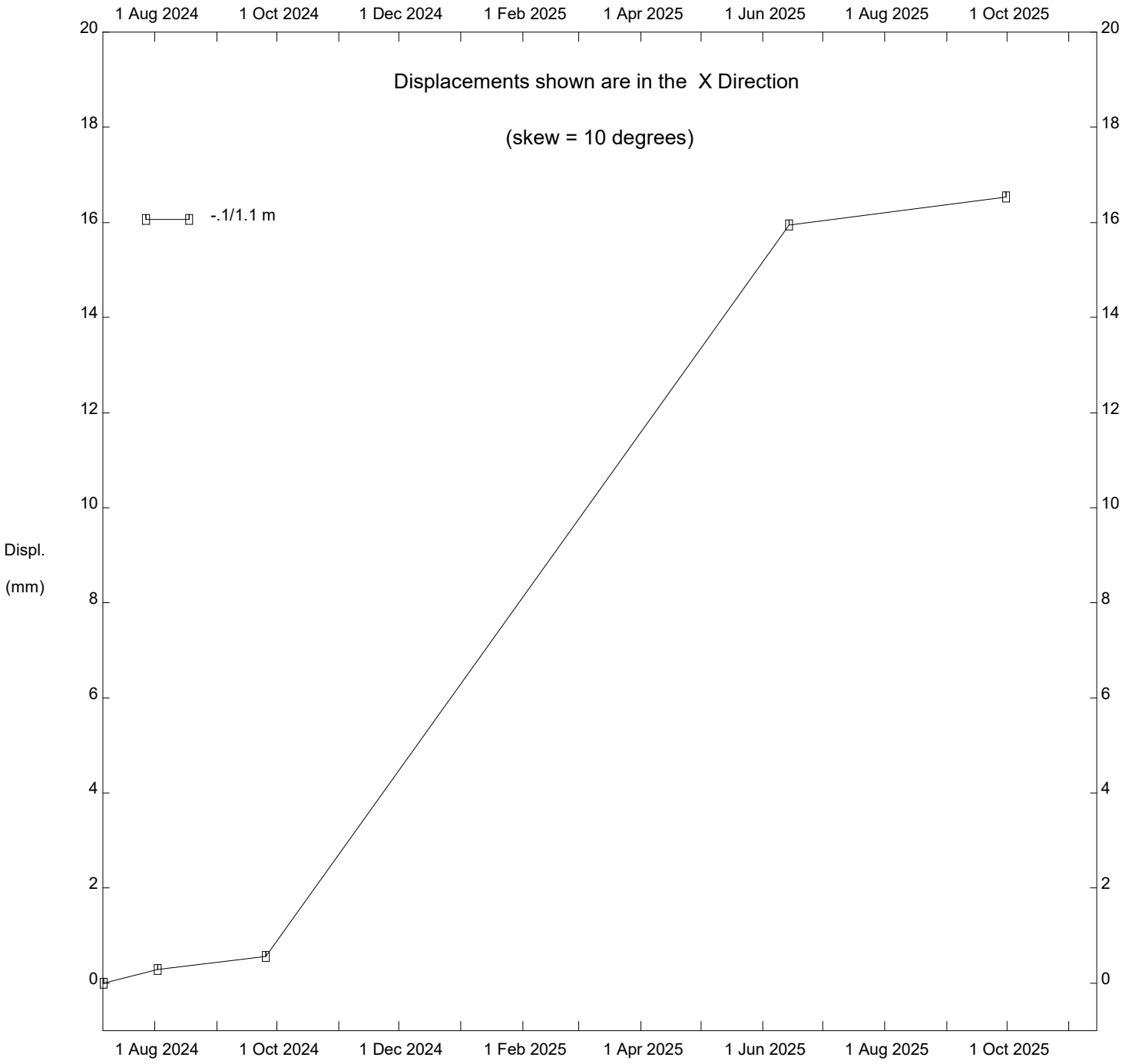

51763 PH077, Inclinometer TH24-04

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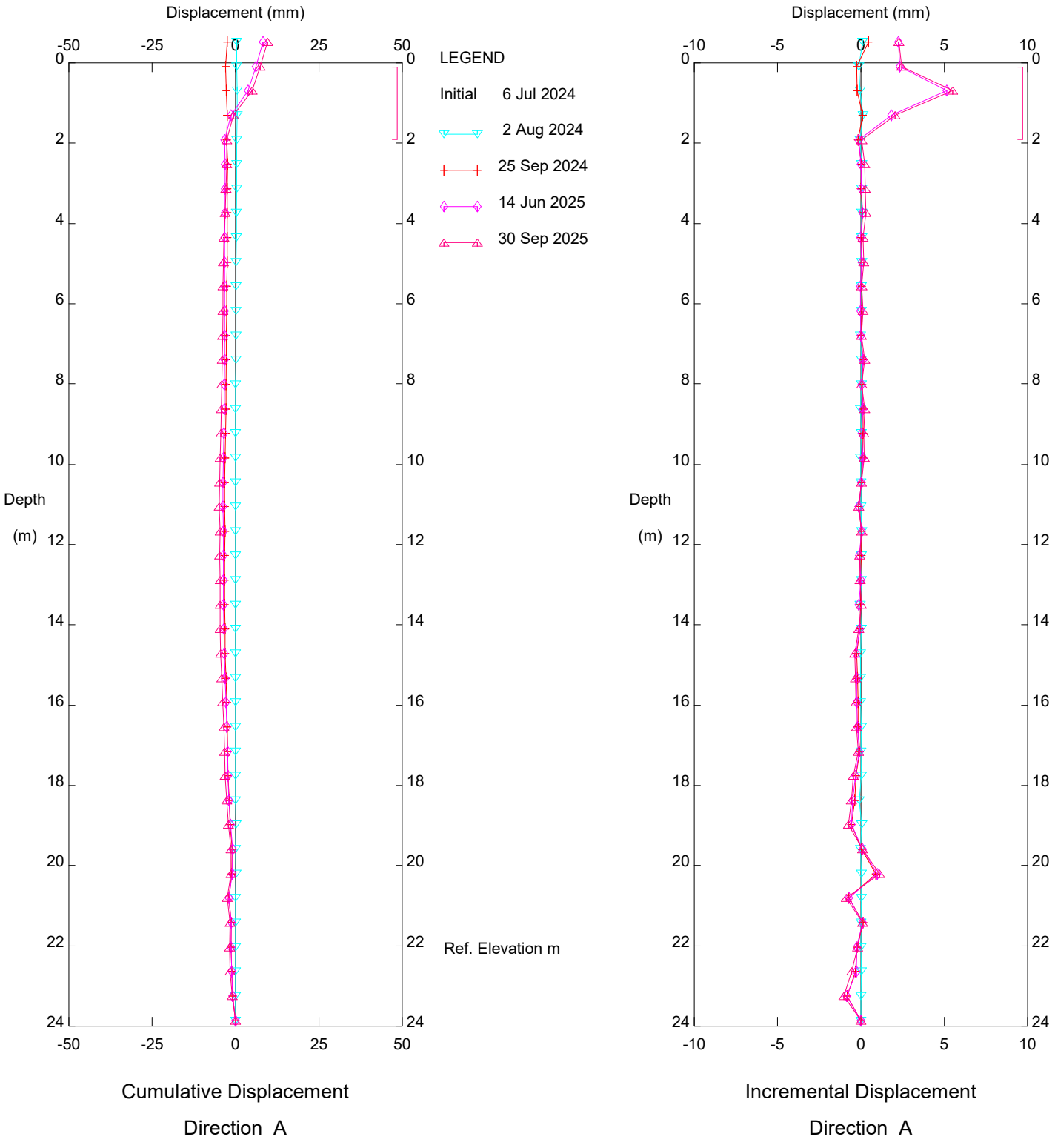

Cumulative Displacement

Direction A

Incremental Displacement

Direction A

51763 PH077, Inclinometer TH24-06

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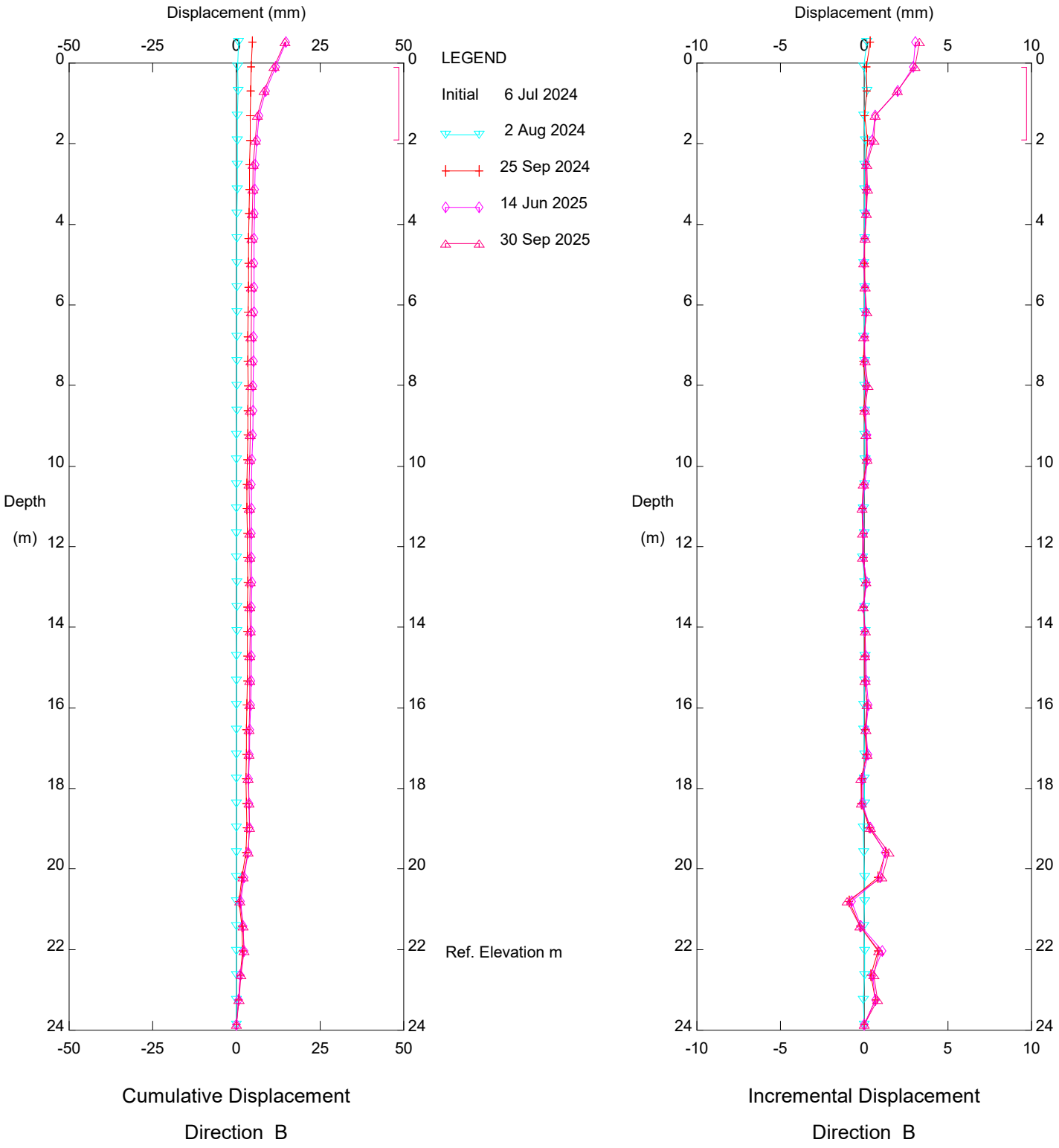

Cumulative Displacement

Direction B

Incremental Displacement

Direction B

51763 PH077, Inclinometer TH24-06

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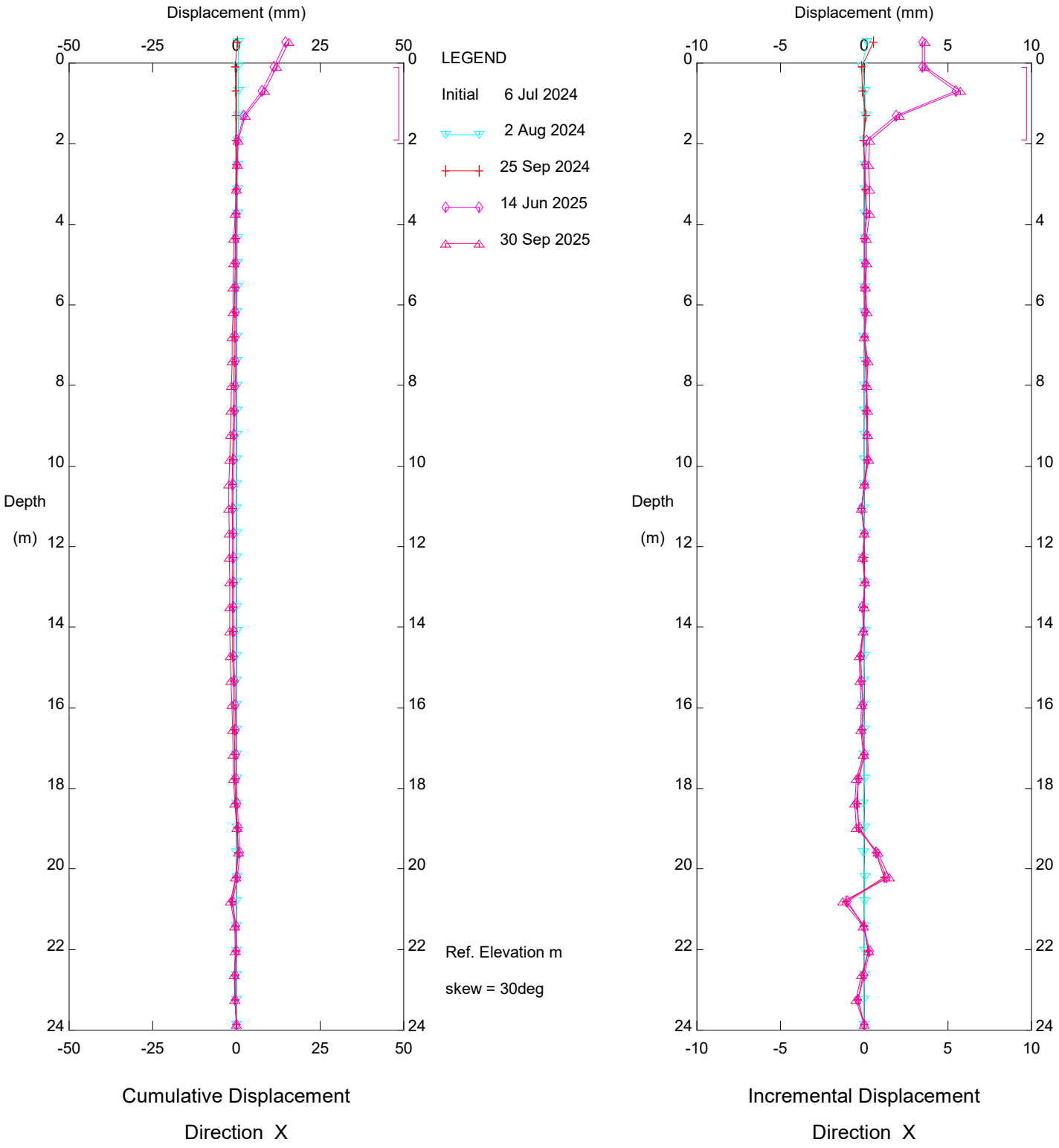
Thurber Engineering - Edmonton



Cumulative Displacement

Direction X

Incremental Displacement

Direction X

51763 PH077, Inclinometer TH24-06

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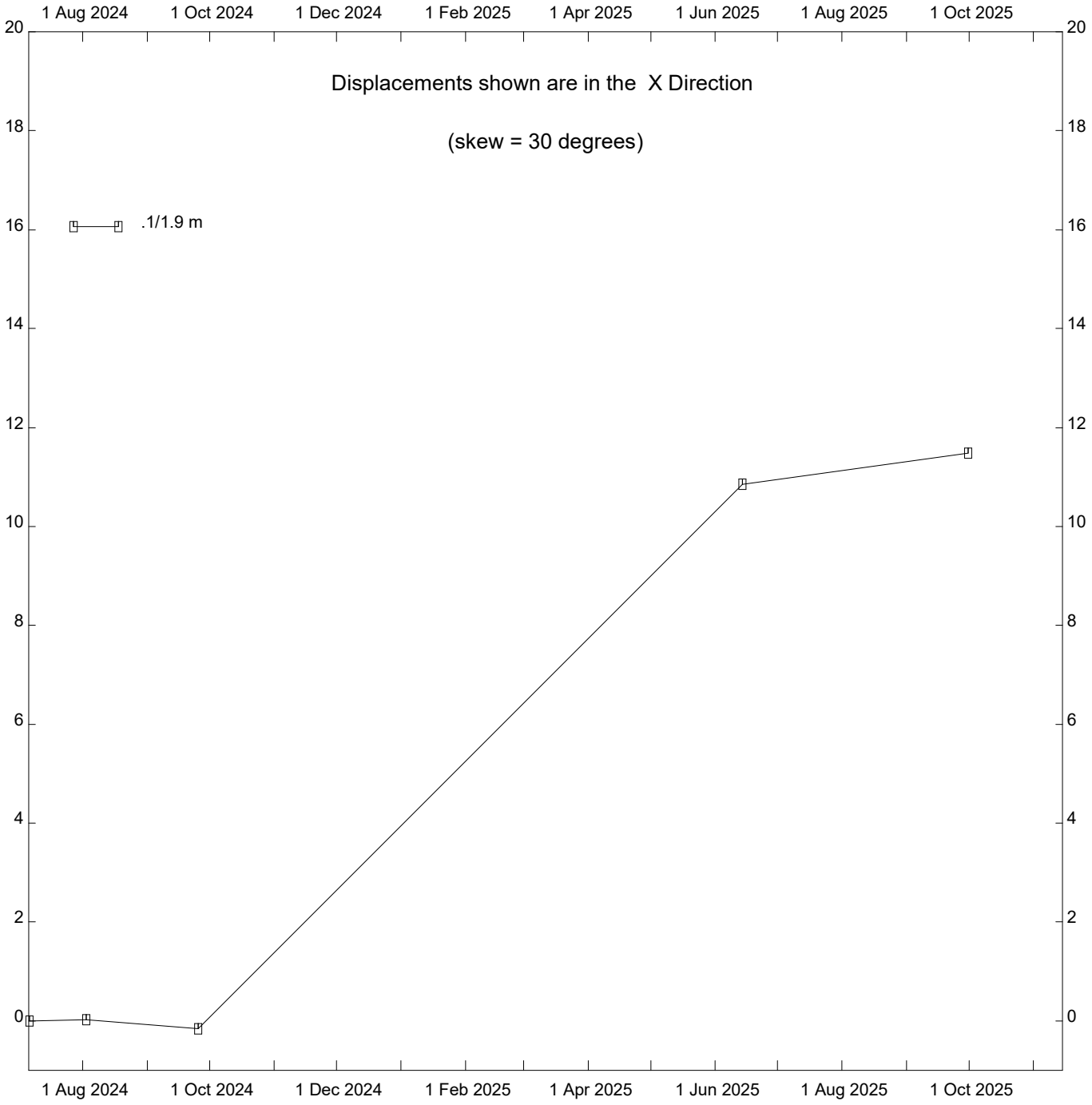
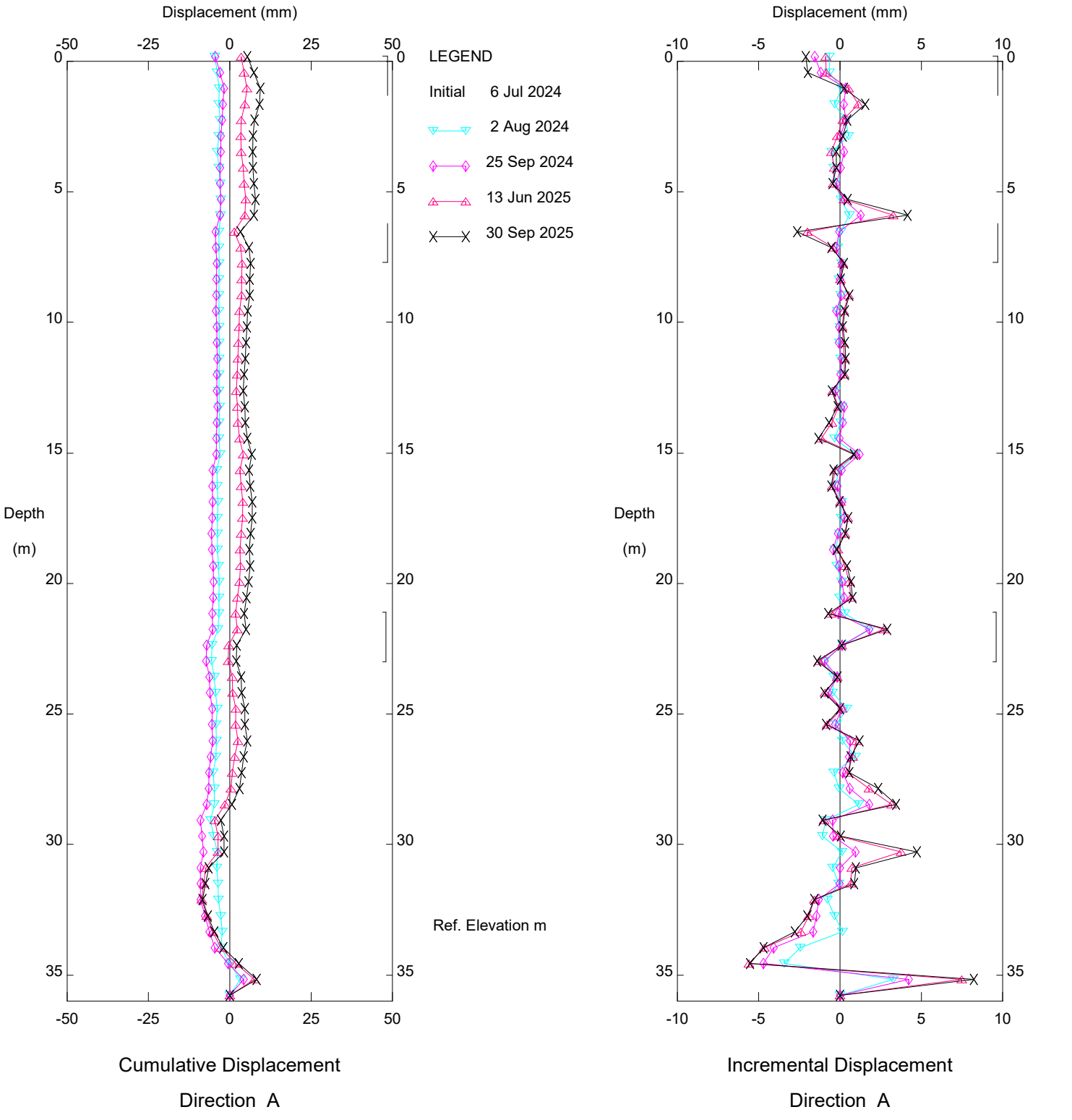
Thurber Engineering - Edmonton



51763 PH077, Inclinometer TH24-06

Thurber Engineering - Edmonton



51763 PH077, Inclinometer TH24-09

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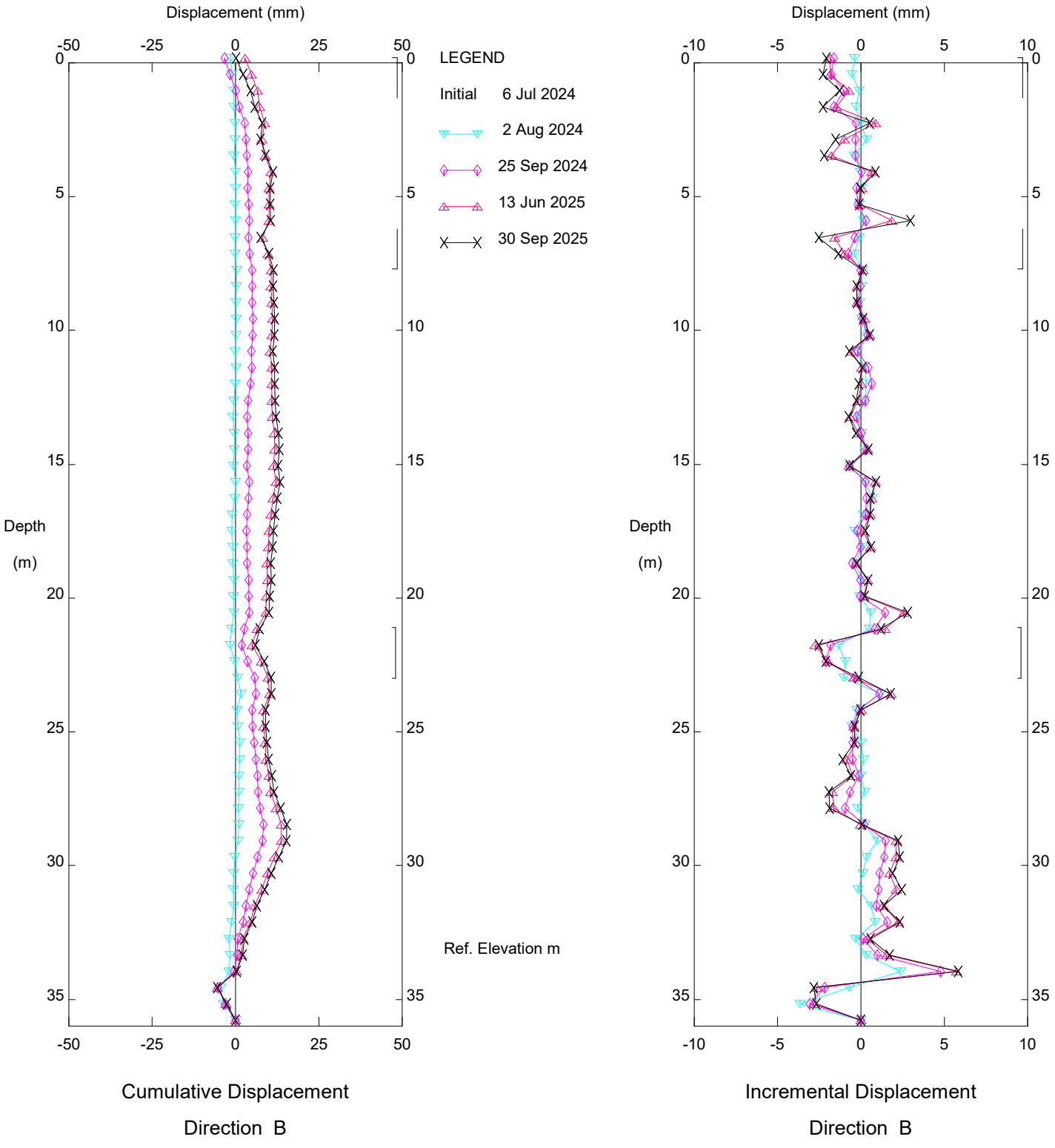
Thurber Engineering - Edmonton



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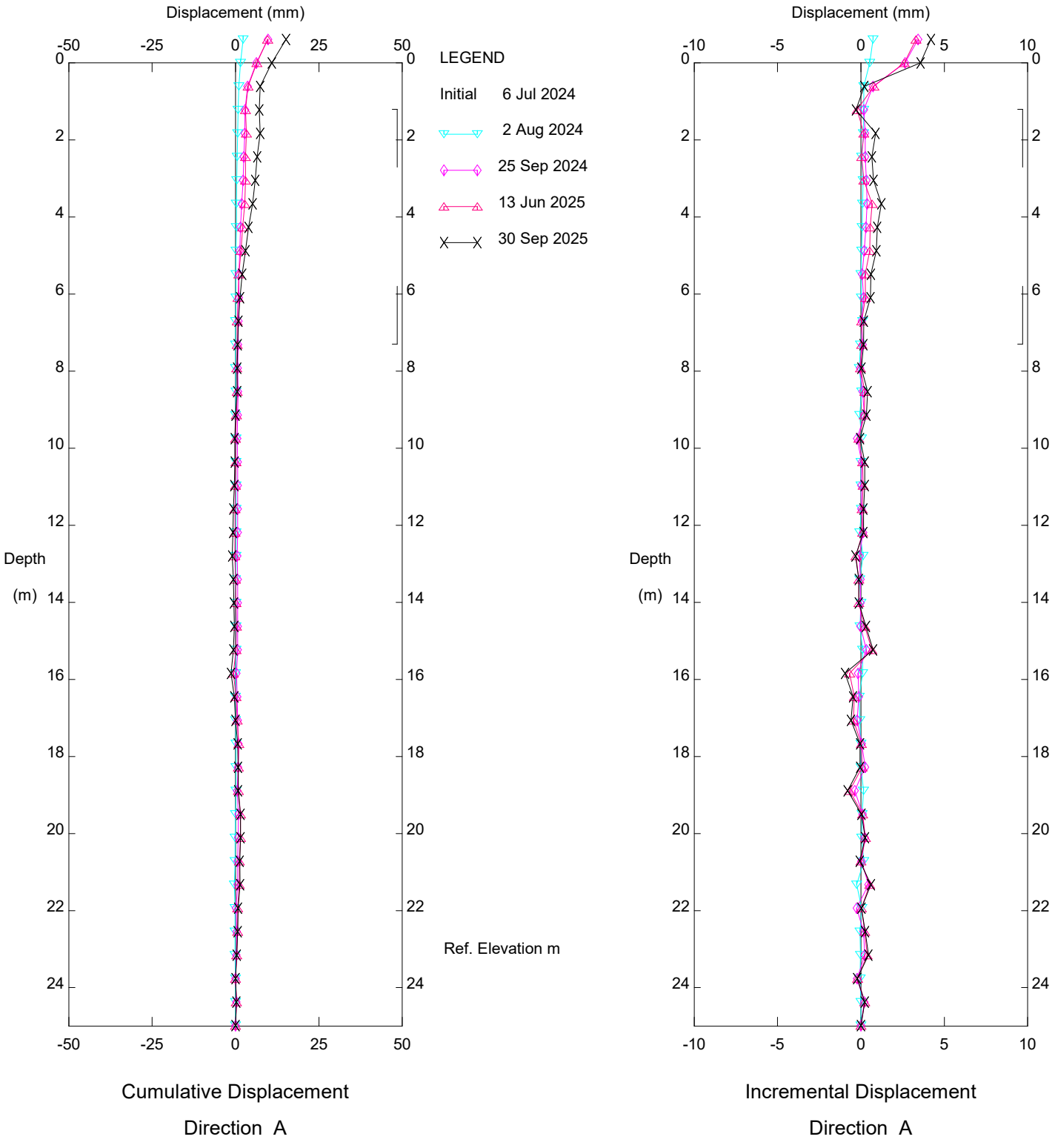
Thurber Engineering - Edmonton



Cumulative Displacement

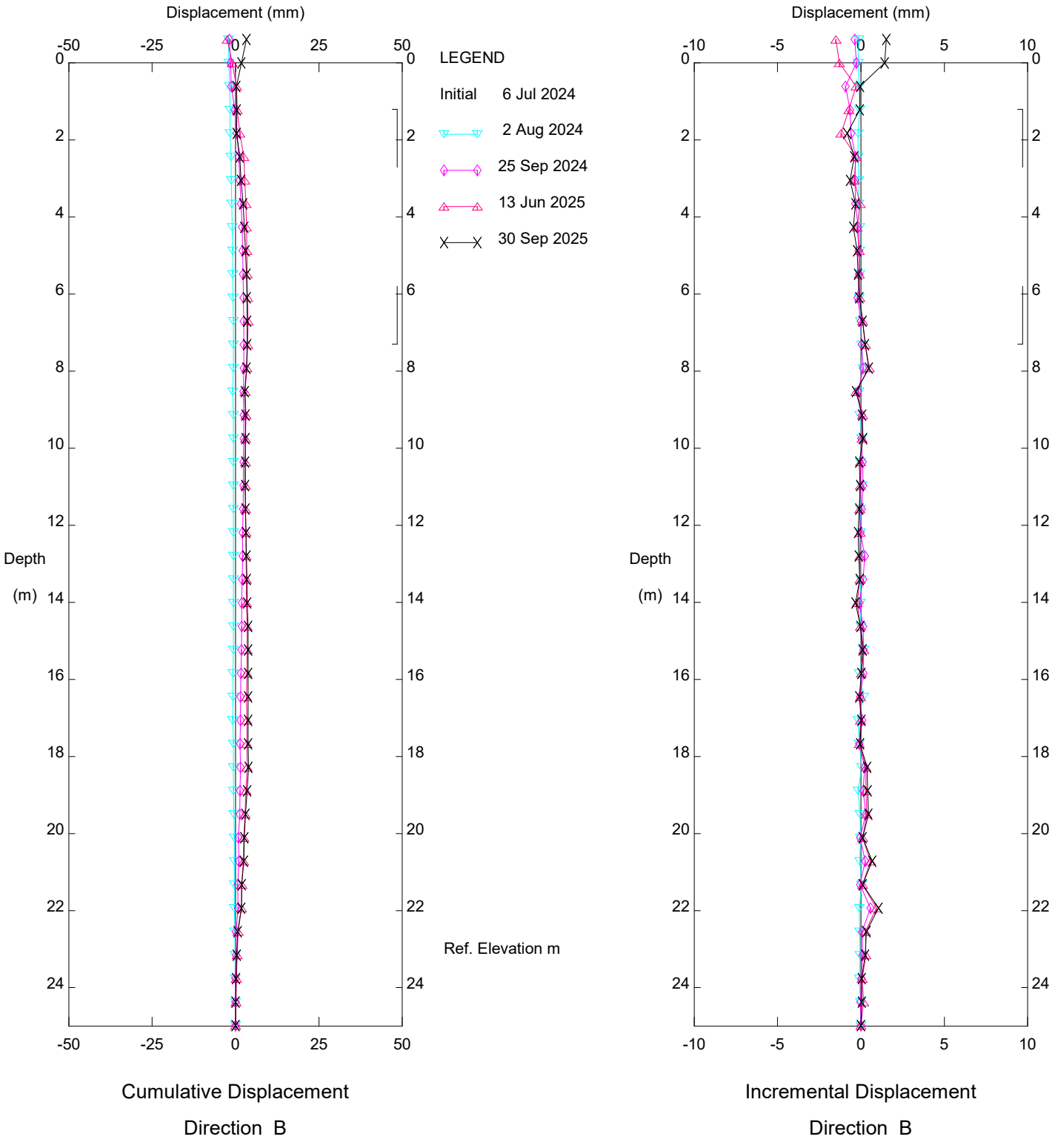
Direction A

Incremental Displacement

Direction A

51763, Inclinometer TH24-10

Thurber Engineering - Edmonton



Cumulative Displacement

Direction B

Incremental Displacement

Direction B

51763, Inclinometer TH24-10

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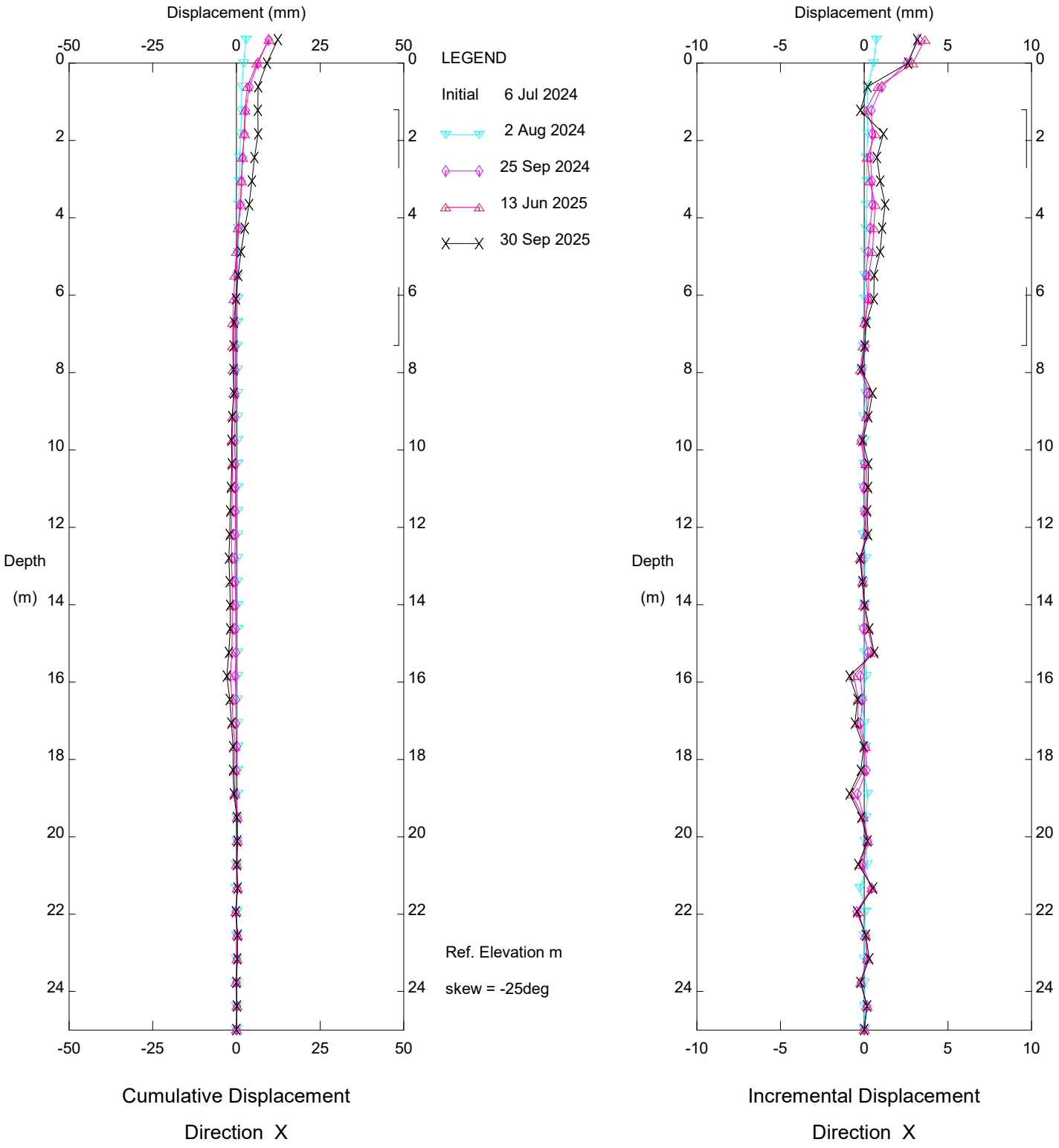
Thurber Engineering - Edmonton



Cumulative Displacement

Direction X

Incremental Displacement

Direction X

51763, Inclinometer TH24-10

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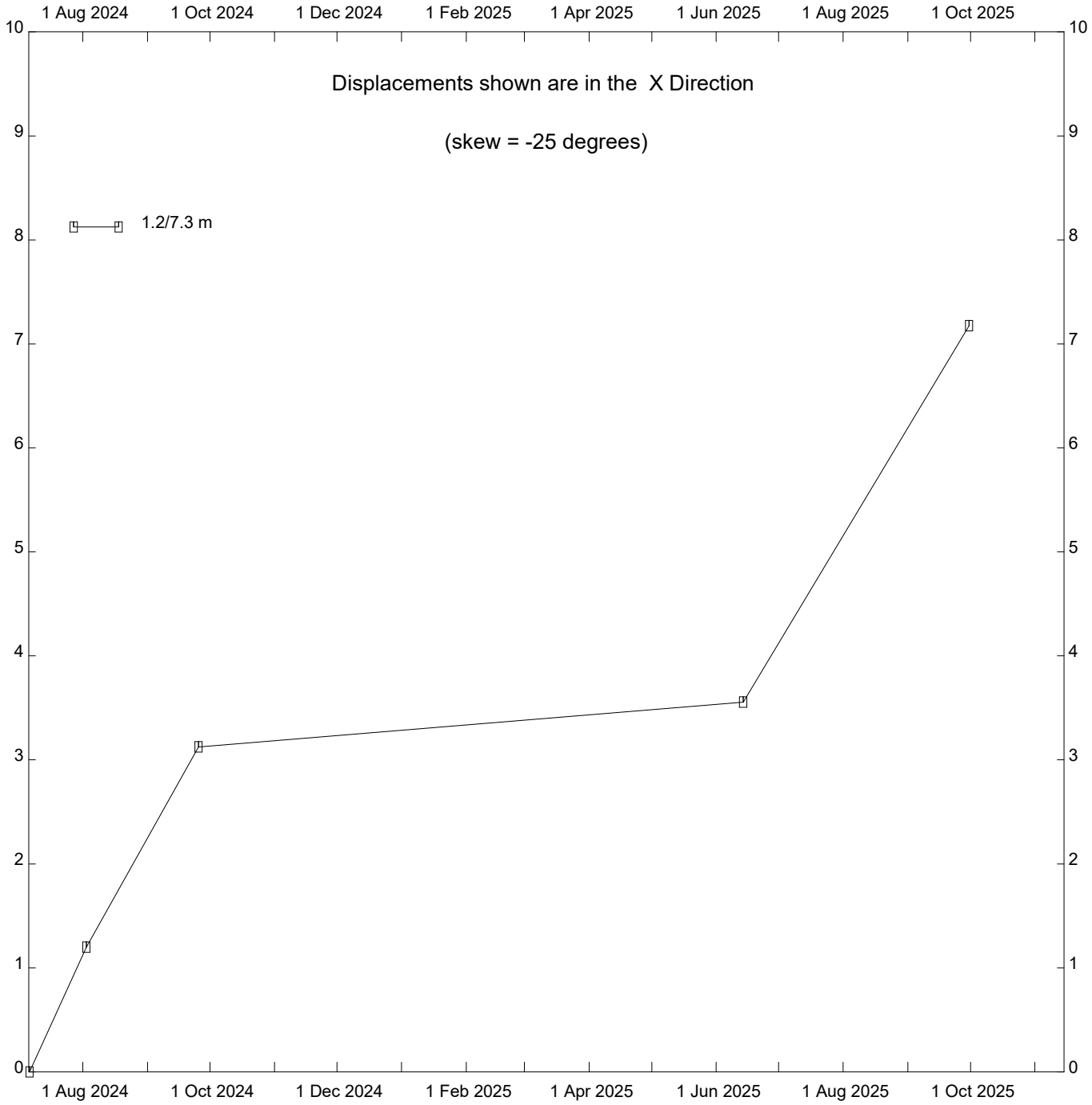
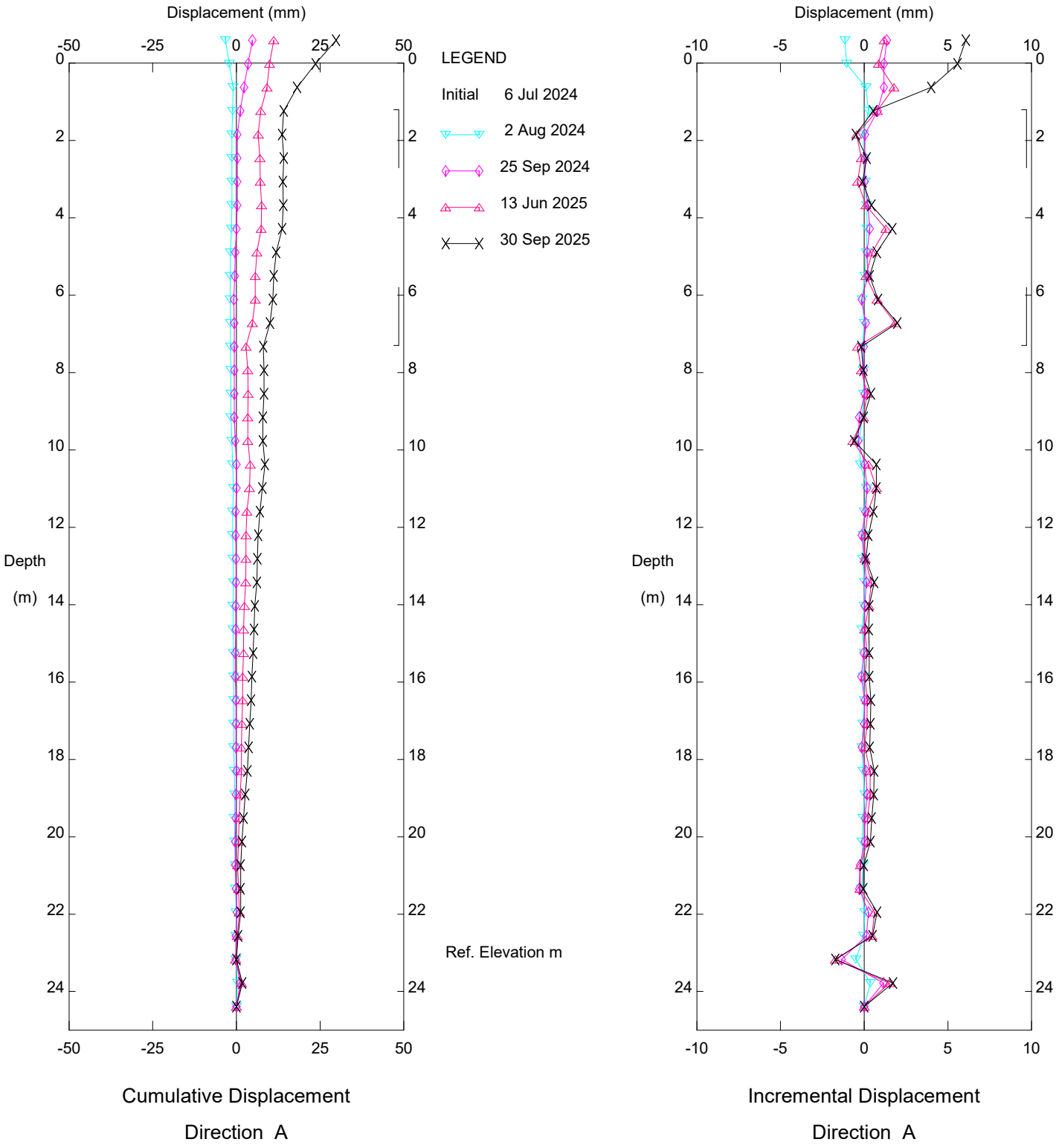
Thurber Engineering - Edmonton



51763, Inclinometer TH24-10

Thurber Engineering - Edmonton



Cumulative Displacement

Direction A

Incremental Displacement

Direction A

51763, Inclinometer TH24-11

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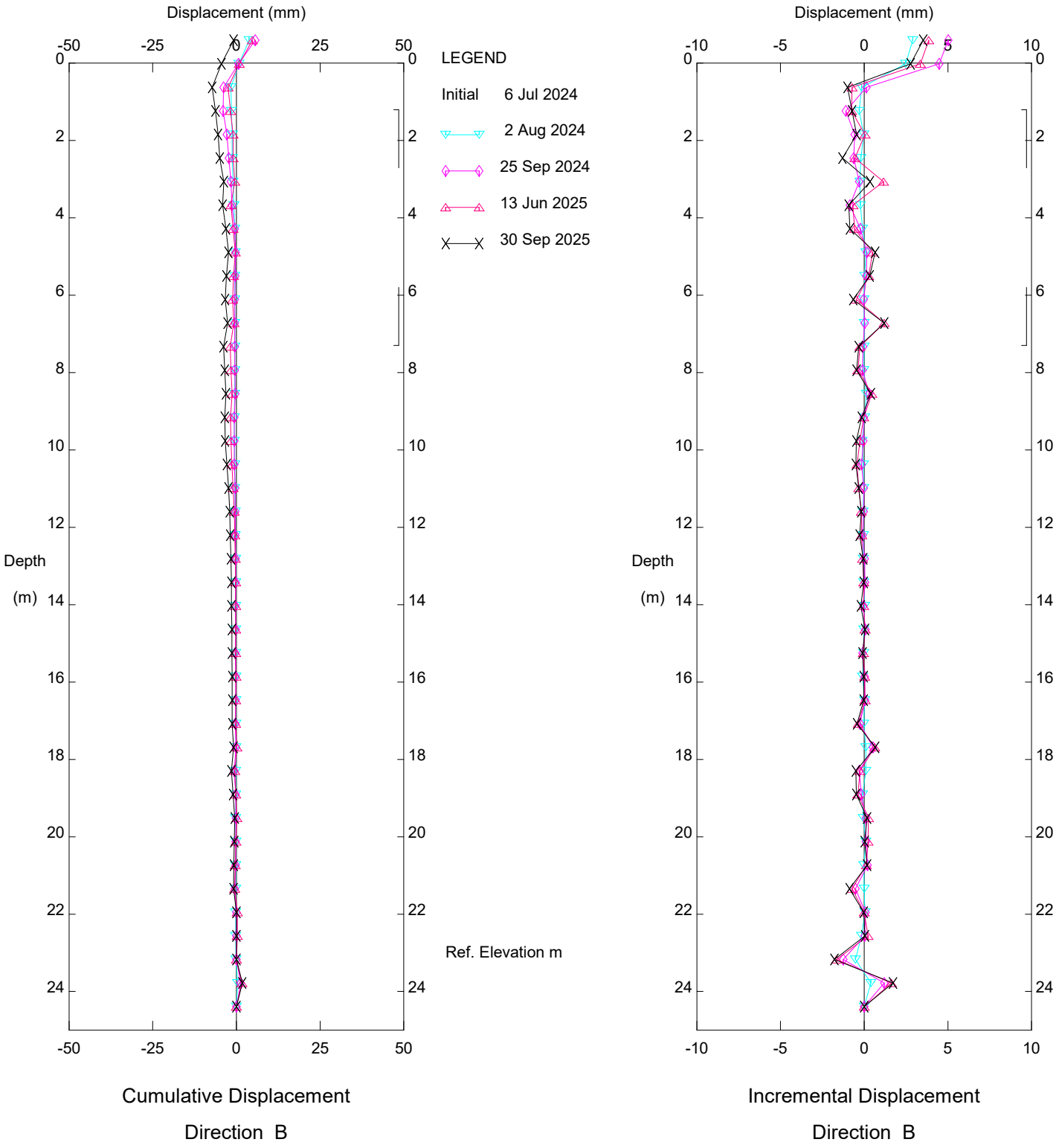

Cumulative Displacement

Direction B

Incremental Displacement

Direction B

51763, Inclinometer TH24-11

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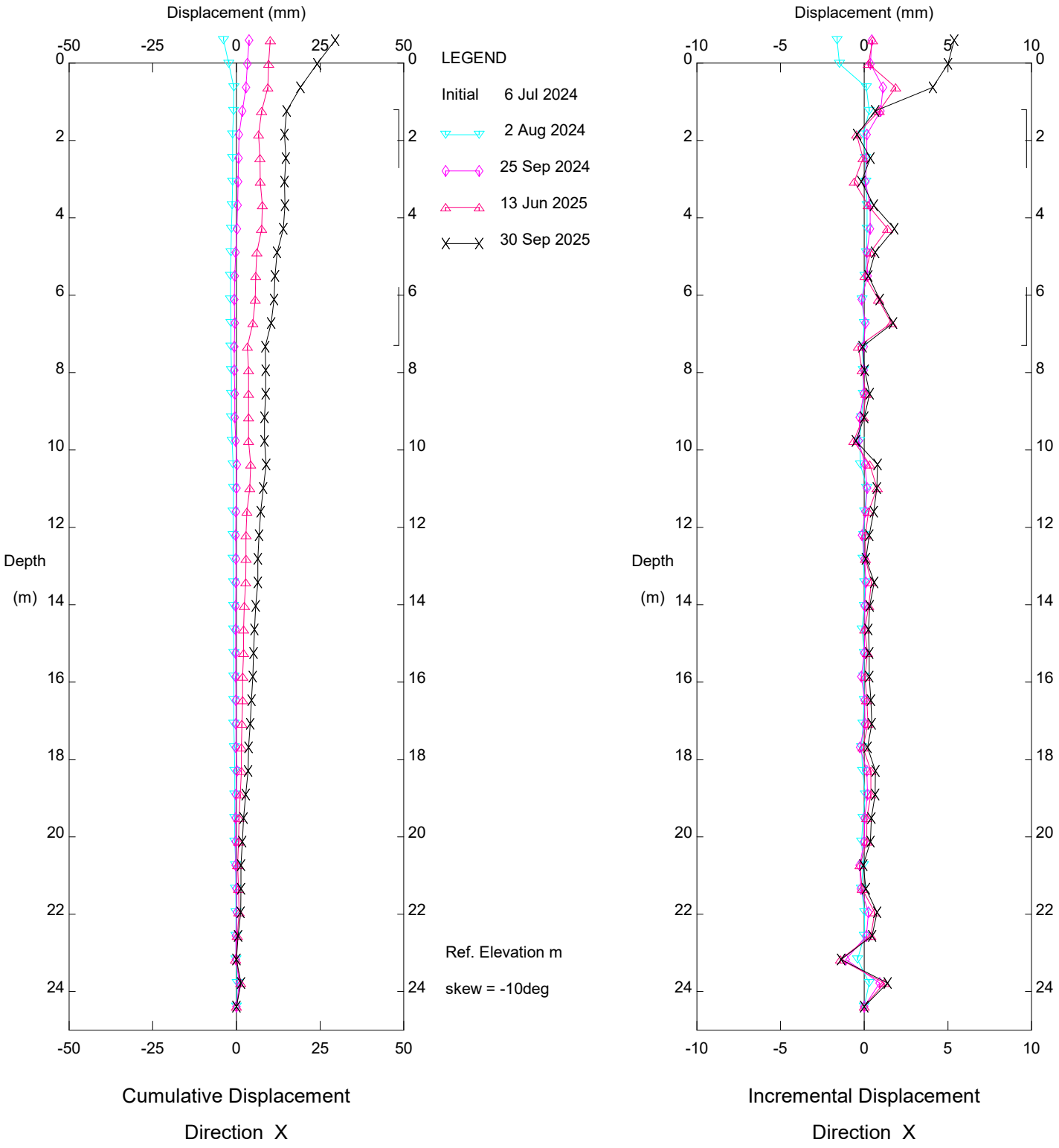
Thurber Engineering - Edmonton



Cumulative Displacement

Direction X

Incremental Displacement

Direction X

51763, Inclinometer TH24-11

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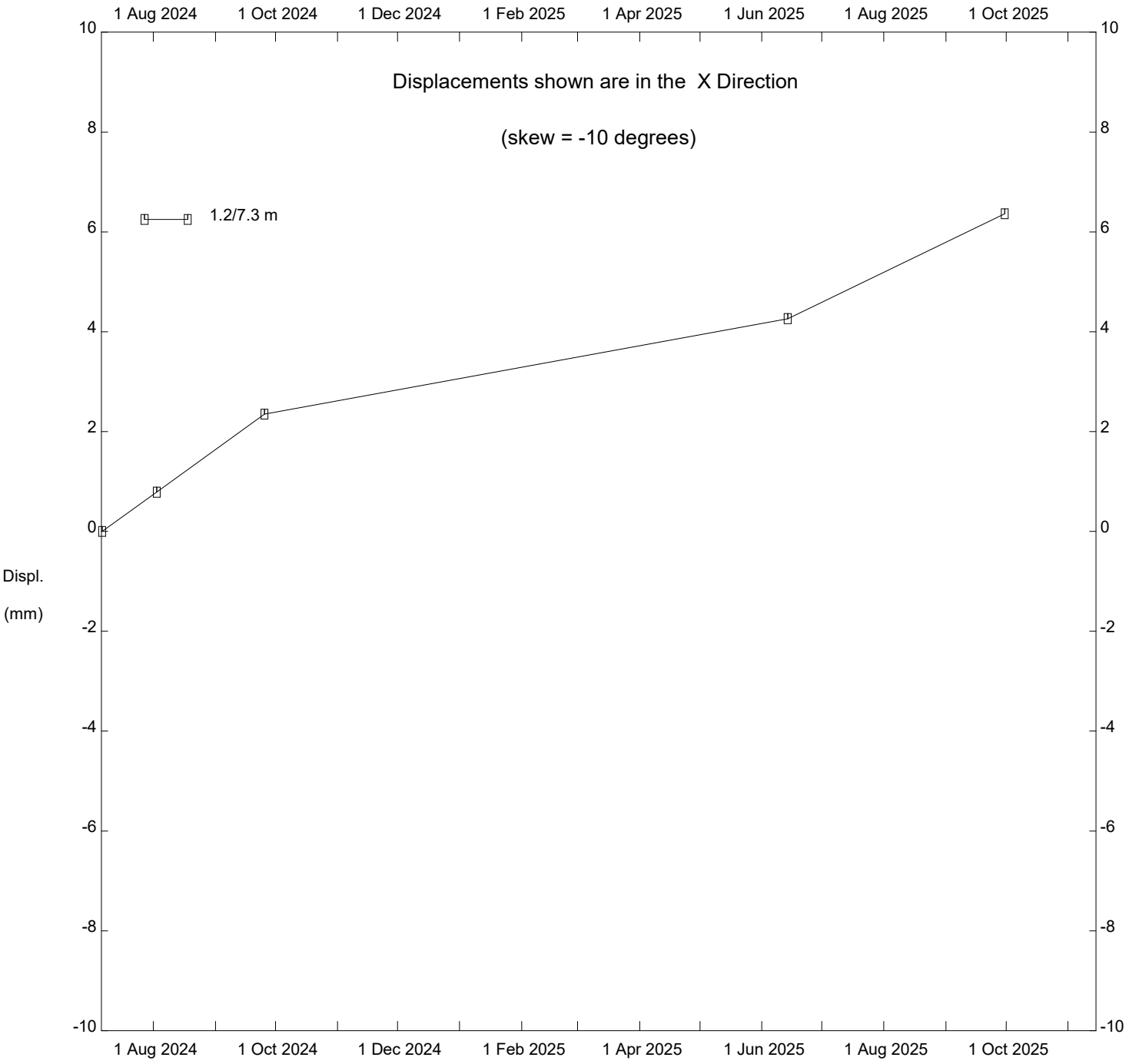
Thurber Engineering - Edmonton



51763, Inclinometer TH24-11

FIGURE PH077-1
HWY 682:02 EAST SIDE OF HINES CREEK PIEZOMETER DEPTHS

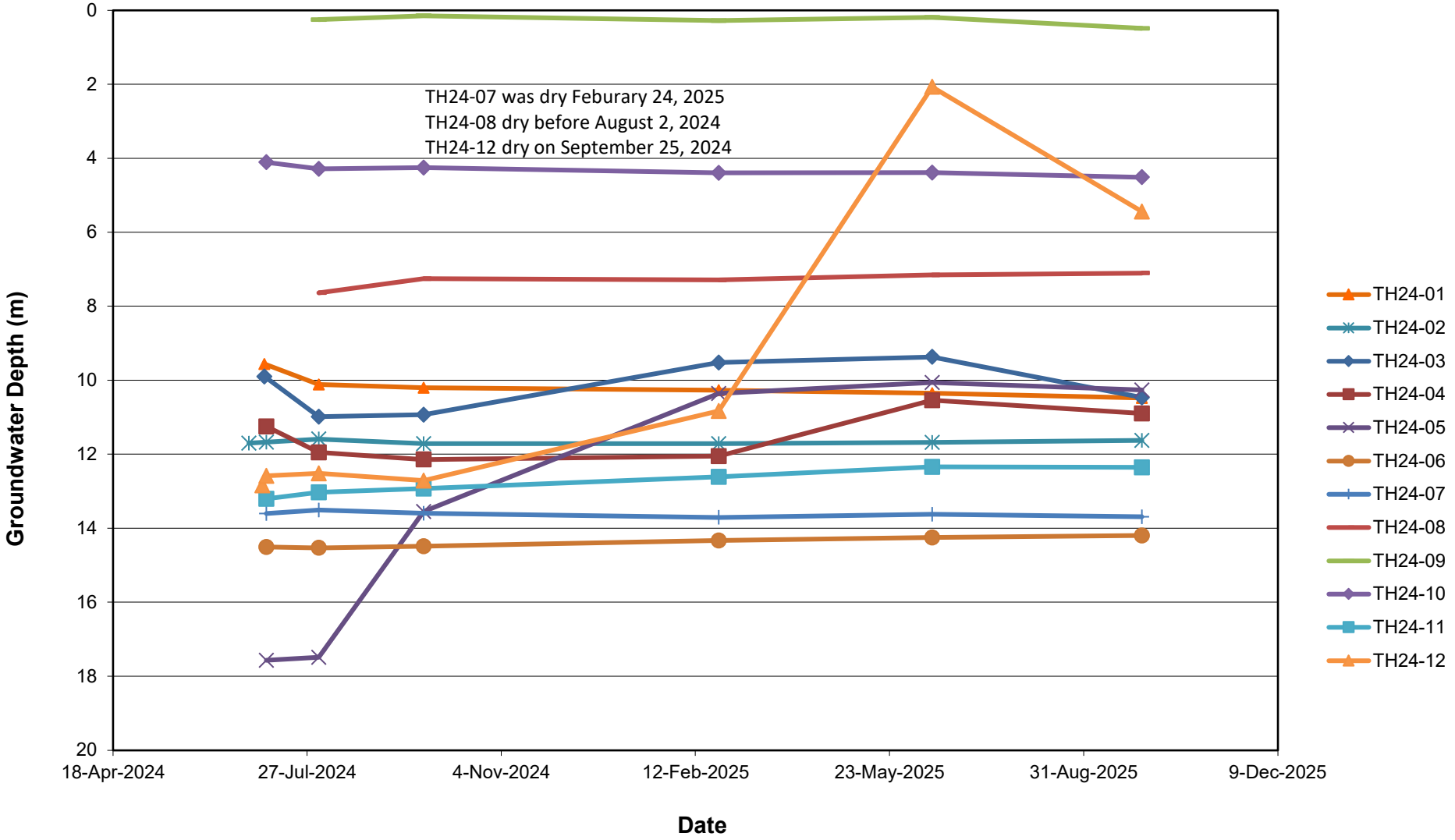


FIGURE PH077-2
HWY 682:02 EAST SIDE OF HINES CREEK PIEZOMETER ELEVATIONS