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To:	Amy Driessen	From:	Leslie Cho and Xiteng Liu
	Transportation and Economic Corridors		Stantec Consulting Ltd.
File:	123315222	Date:	October 18, 2024

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**Reference: North Central Region, Edson, Site NC083 - Highway 40:30 West of Wildhay River, Fall 2024 Instrumentation Monitoring Report**

## OBSERVATIONS

### FIELD PROGRAM AND INSTRUMENTATION STATUS

The Fall 2024 reading cycle consisted of instrument readings of three slope inclinometers (SI17-01, SI17-02, and SI17-03) and three vibrating wire piezometers (VW17-01, VW17-02, and VW17-03). Figure 1 attached provides a schematic of the site. The instruments were read by Benjamin Lou, EIT and Olawale Odusi, Geotechnical Technician on September 23, 2024.

The slope inclinometers (SI) were measured using an RST MEMS digital inclinometer probe with 0.5 m increments and RST handheld PC. The vibrating wire piezometers (VW) were read with a Slope Indicator VW Data Recorder PN 52613500 readout box.

GPS coordinates of all instruments were obtained using a Garmin eTrex 22x handheld unit.

## INTERPRETATION

### GENERAL

The SI plots are provided in the attachments and summarized in the following sections. Plots in both directions along with movement rates, total cumulative movement, maximum movement rates, and incremental movements are provided in Table NC083-1 and the attachments.

The vibrating wire piezometer results are summarized in Table NC083-2 and in the following sections with resulting plots attached.

### ZONES OF MOVEMENT

No new zones of movement were observed in any of the operational slope inclinometers. Directions of movement are referenced to the azimuth of the A+ groove in each SI casing in Table NC083-1.

## INSTRUMENTATION READINGS

### Slope Inclinometers

SI17-01 shows three zones of movement at depths of 1.5 m to 3 m, 4.4 m to 6.4 m and 7.9 m to 9.9 m below ground surface (bgs). Since initialization in December 2017, SI17-01 has accumulated 33 mm, 68 mm and 42 mm of movement in the upper, middle and lower shear zones, respectively. Their current respective rates of

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movement for the three zones are 5 mm/yr, 8 mm/yr and 4 mm/yr. All three shear zones showed similar rates of movement compared to the last reading cycle in Spring 2024.

**SI17-02** shows approximately 9 mm/yr in the rate of movement during this reading cycle with 39 mm of cumulative movement.

**SI17-03** has three zones of movement at depths of 2.2 m to 3.8 m, 5.2 m to 7.2 m and 9.8 m to 11.2 m bgs. The upper movement zone is located within the fill and shows a rate of movement of about 3 mm/yr. The middle movement zone at 6 m bgs shows current movement rate of 9 mm/yr corresponding to a decrease of 3 mm/yr. The lower movement zone shows a current rate of movement of 5 mm/yr.

### **Piezometers**

The piezometers showed a change in water level ranging from decrease of less than 0.1 m to an increase of about 0.1 m for the current reading cycle. The piezometric levels measured were between 0.4 m and 0.7 m below ground surface (bgs). In general, the piezometric levels have been in the same range since Spring 2018. Seasonal fluctuations of higher groundwater table in the fall are observed in the piezometers.

## **RECOMMENDATIONS**

### **FUTURE WORK**

It is recommended that the next reading cycle take place in Spring 2025.

### **INSTRUMENTATION REPAIRS**

No instruments require repair currently.

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**Table NC083-1: Fall 2024 Slope Inclinometer Reading Summary**

Instrument Name	Date Initialized	Coordinates <sup>(1)</sup> (UTM 11U, NAD1983) (m)		Total Cumulative Resultant Movement and Depth of Movement to Date (mm)	Maximum Rate of Movement (mm/yr)	Current Status	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)
		Northing	Easting							
SI17-01	Dec 05, 2017	5935075	437716	33 over 1.5 m to 3.0 m depth in 339° direction	33 mm/yr; Sept. 2019	Operational	May 13, 2024	2	5	3
				68 over 4.4 m to 6.4 m depth in 339° direction	33 mm/yr; Sept. 2019			3	8	0
				42 over 7.9 m to 9.9 m depth in 339° direction	25 mm/yr; Sept. 2019			1	4	0
SI17-02	Dec 05, 2017	5935096	437706	39 over 12.8 m to 14.2 m depth in 346° direction	23 mm/yr; Sept. 2019	Operational	May 13, 2024	3	9	0
SI17-03	Dec 05, 2017	5935077	437737	23 over 2.2 m to 3.8 m depth in 353° direction	16 mm/yr; Sept. 2019	Operational	May 13, 2024	1	3	1
				101 over 5.2 m to 7.2 m depth in 353° direction	44 mm/yr; Sept. 2019			3	9	-3
				42 over 9.8 m to 11.2 m depth in 353° direction	27 mm/yr; Sept. 2019			2	5	1
Updated September 23, 2024 with approximate accuracy of ± 3 m										

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**Table NC083-2: Fall 2024 Piezometer Reading Summary**

Instrument Name	Date Initialized	Coordinates <sup>(1)</sup> (UTM 11U, NAD1983) (m)		Bottom/Tip Elevation (m aMSL) <sup>(2)</sup>	Current Status	Maximum Piezometric Level (m aMSL)	Measured Water Level (m aMSL) (m bgs)	Previous Water Level Spring 2024 (m aMSL) (m bgs)	Change in Water Level (m)
		Northing	Easting						
VW17-01 (100D1700261)	Dec. 5, 2017	5935075	437716	1258	Operational	1267.5 Dec. 5, 2017	1267.3 (0.4)	1267.3 (0.4)	<-0.1
VW17-02 (100D1701260)	Dec. 5, 2017	5935099	437706	1265	Operational	1265.2 Sep. 26, 2019	1264.9 (0.7)	1264.8 (0.8)	0.1
VW17-03 (100D1700262)	Dec. 5, 2017	5935077	437737	1261	Operational	1263.9 Dec. 5, 2017	1263.7 (0.6)	1263.7 (0.6)	<-0.1
Notes: (1) Updated September 23, 2024 with approximate accuracy of ± 3 m. (2) aMSL = Above Mean Sea Level									

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## 4.0 CLOSING

We trust this instrumentation report meets your requirements. If you have any questions, please do not hesitate to contact the undersigned.

**Stantec Consulting Ltd.**

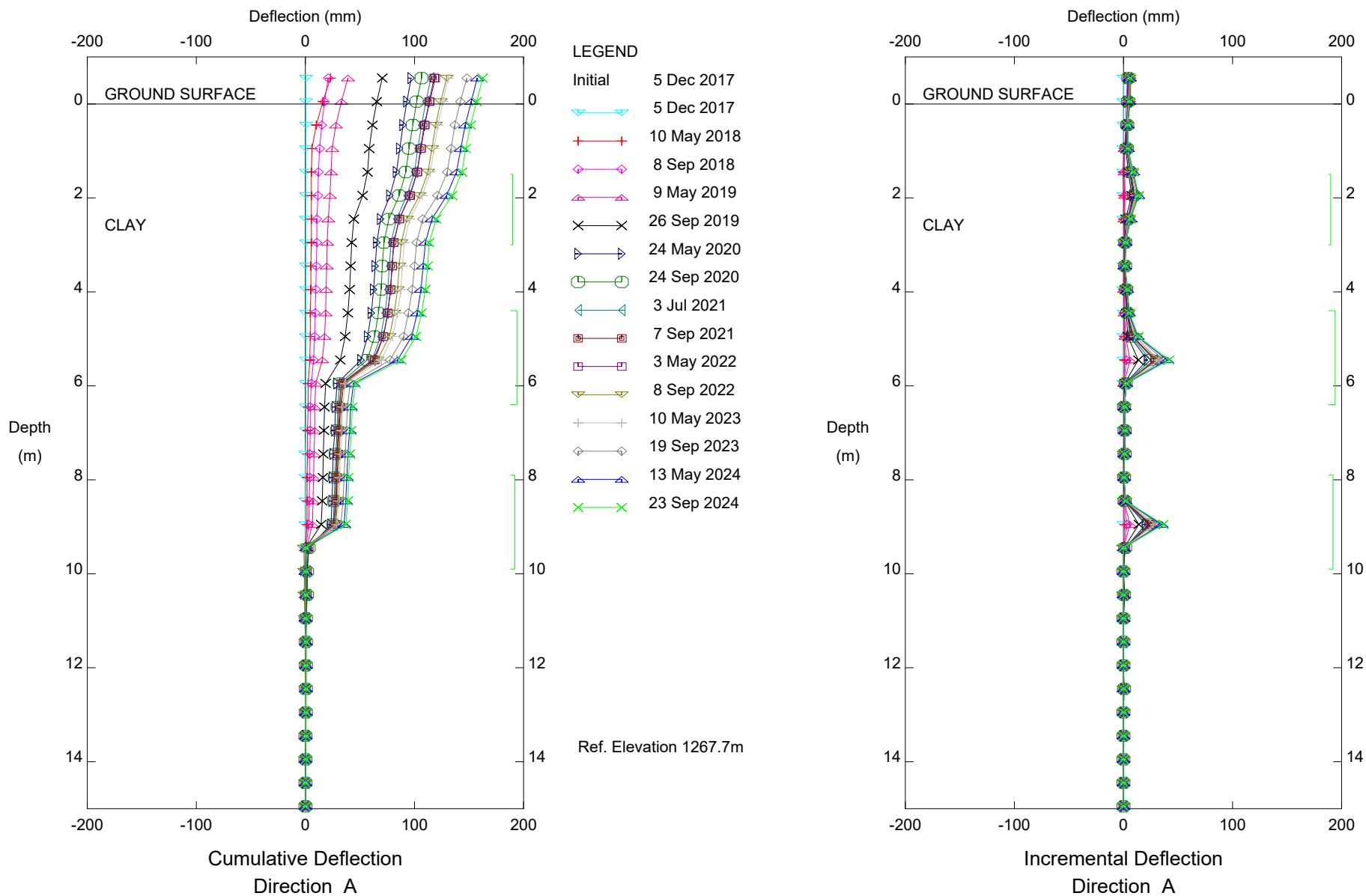
**Leslie Cho** M.Eng., P.Eng.  
Senior Associate, Geotechnical Engineer  
Phone: 780-917-7403  
[leslie.cho@stantec.com](mailto:leslie.cho@stantec.com)

**Xiteng Liu** M.Sc., P.Eng., PMP  
Senior Principal, Geotechnical Engineer  
Phone: 780-917-7247  
[xiteng.liu@stantec.com](mailto:xiteng.liu@stantec.com)

Attachment: Figure 1 – Site Plan  
S117-01 Slope Inclinator Plots  
S117-02 Slope Inclinator Plots  
S117-03 Slope Inclinator Plots  
Vibrating Wire Piezometer Elevation vs Time Plot  
Vibrating Wire Piezometer Depth vs Time Plot

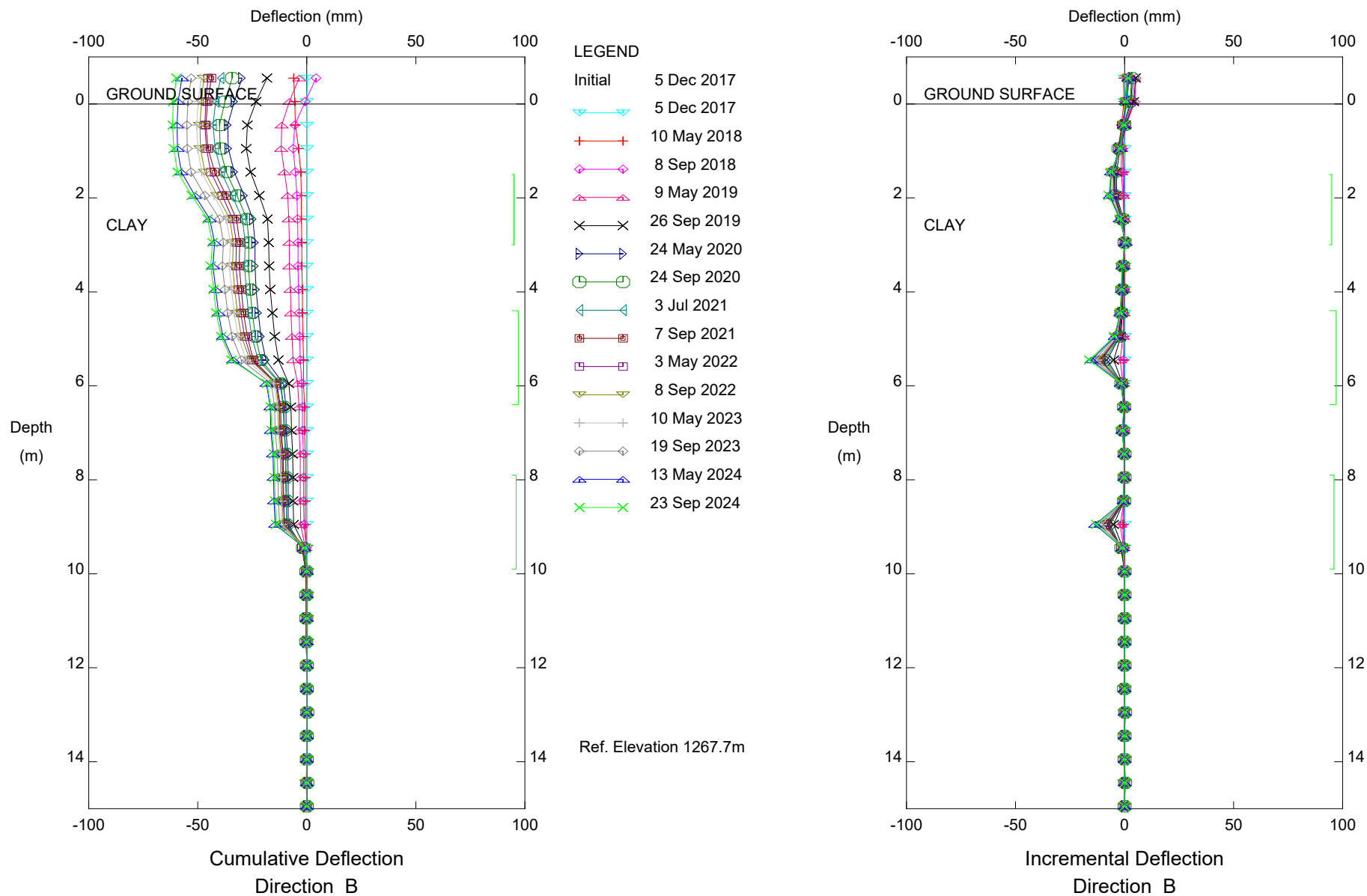






HWY 40:30 West of Wildhay River (NC83), Inclinometer SI17-01  
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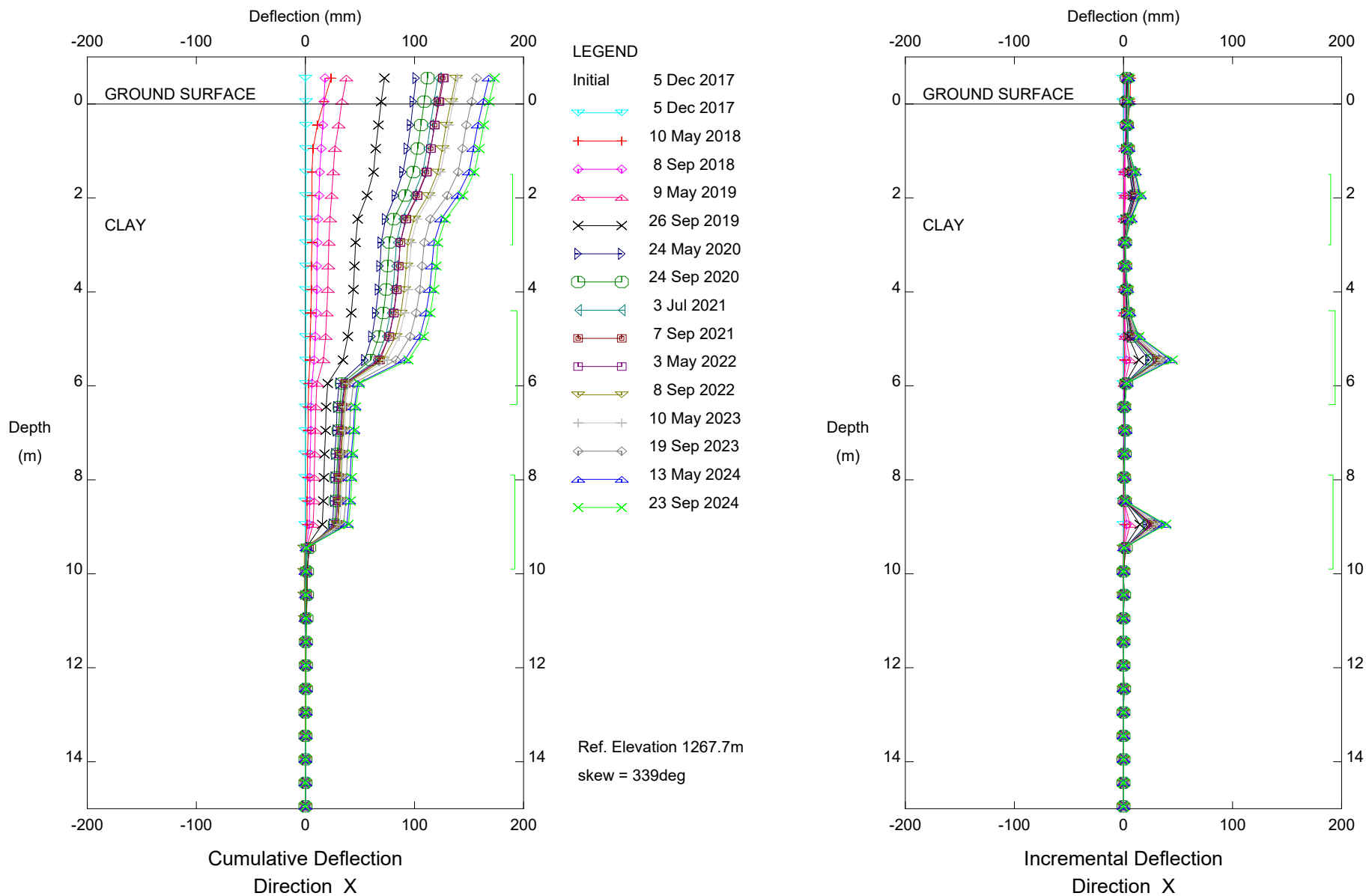
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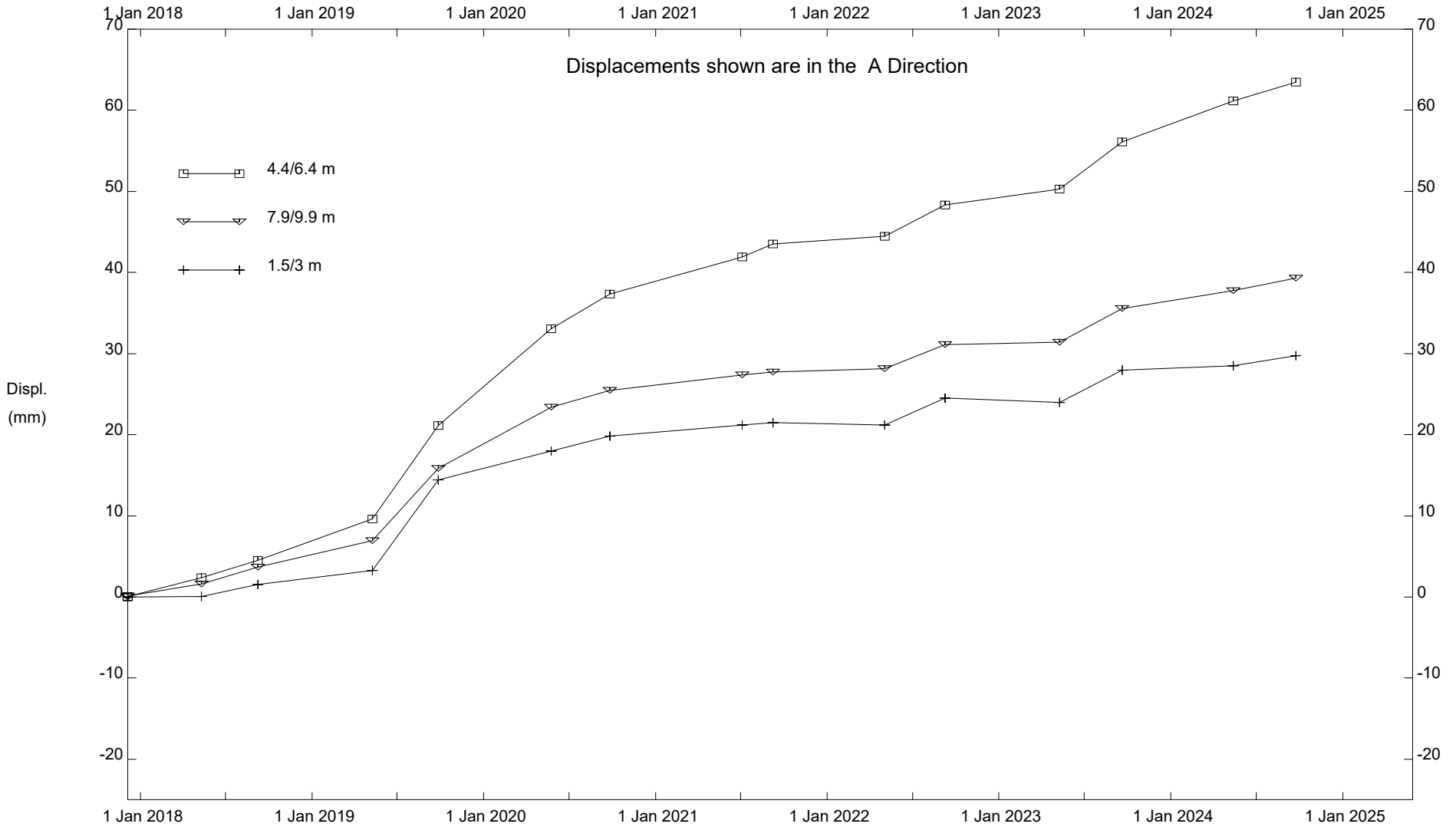
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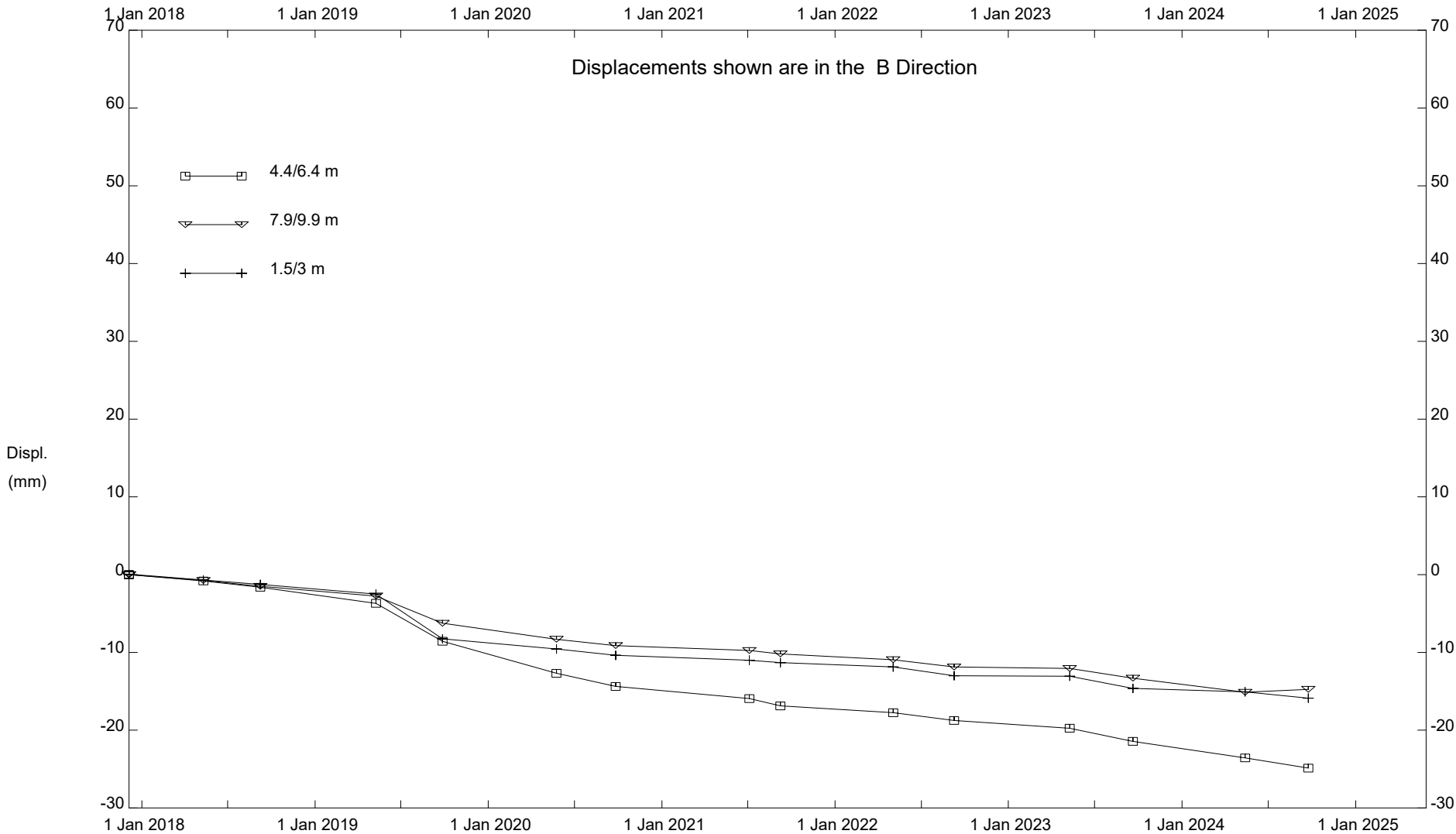
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HWY 40:30 West of Wildhay River (NC83), Inclinator SI17-01

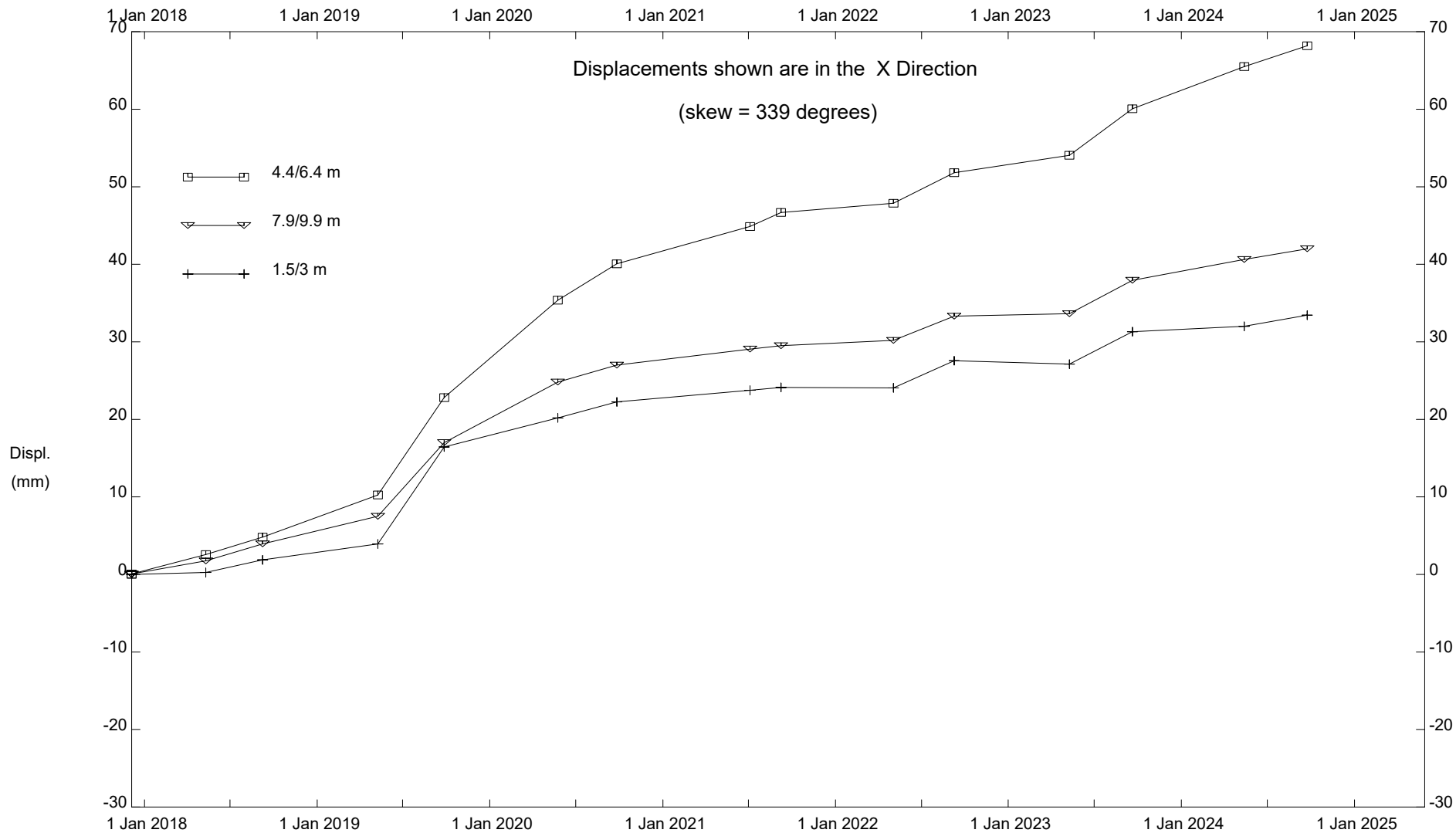
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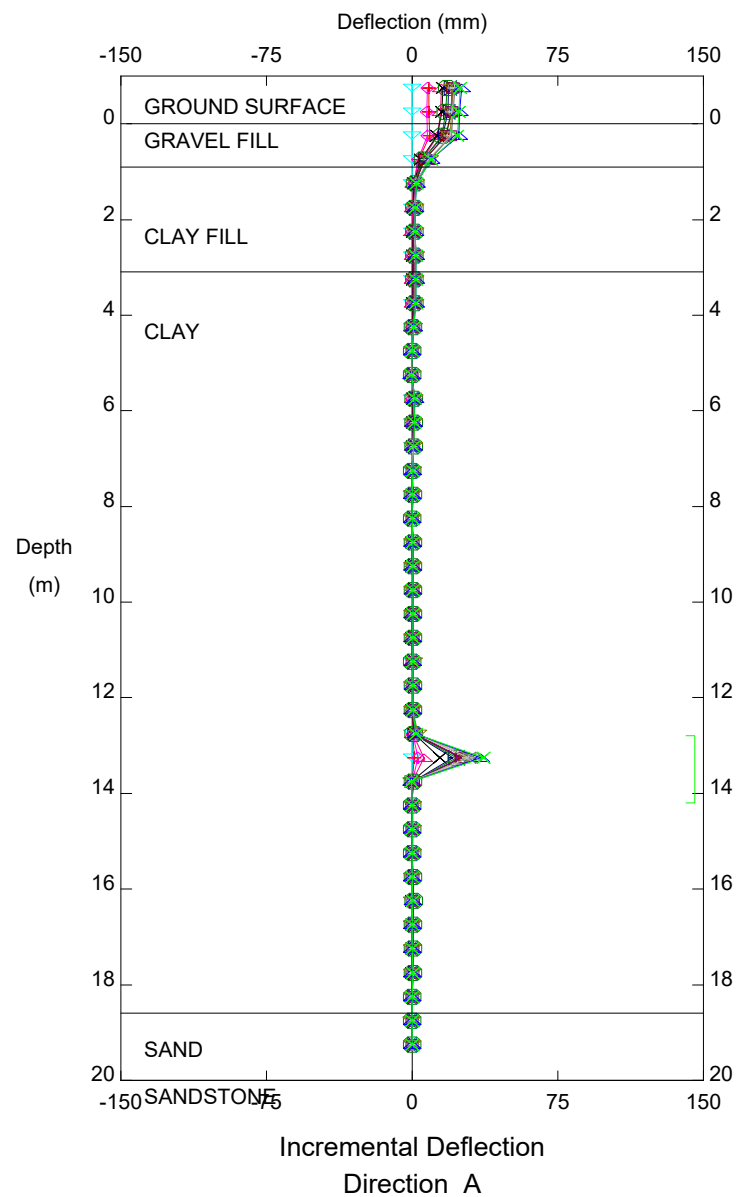
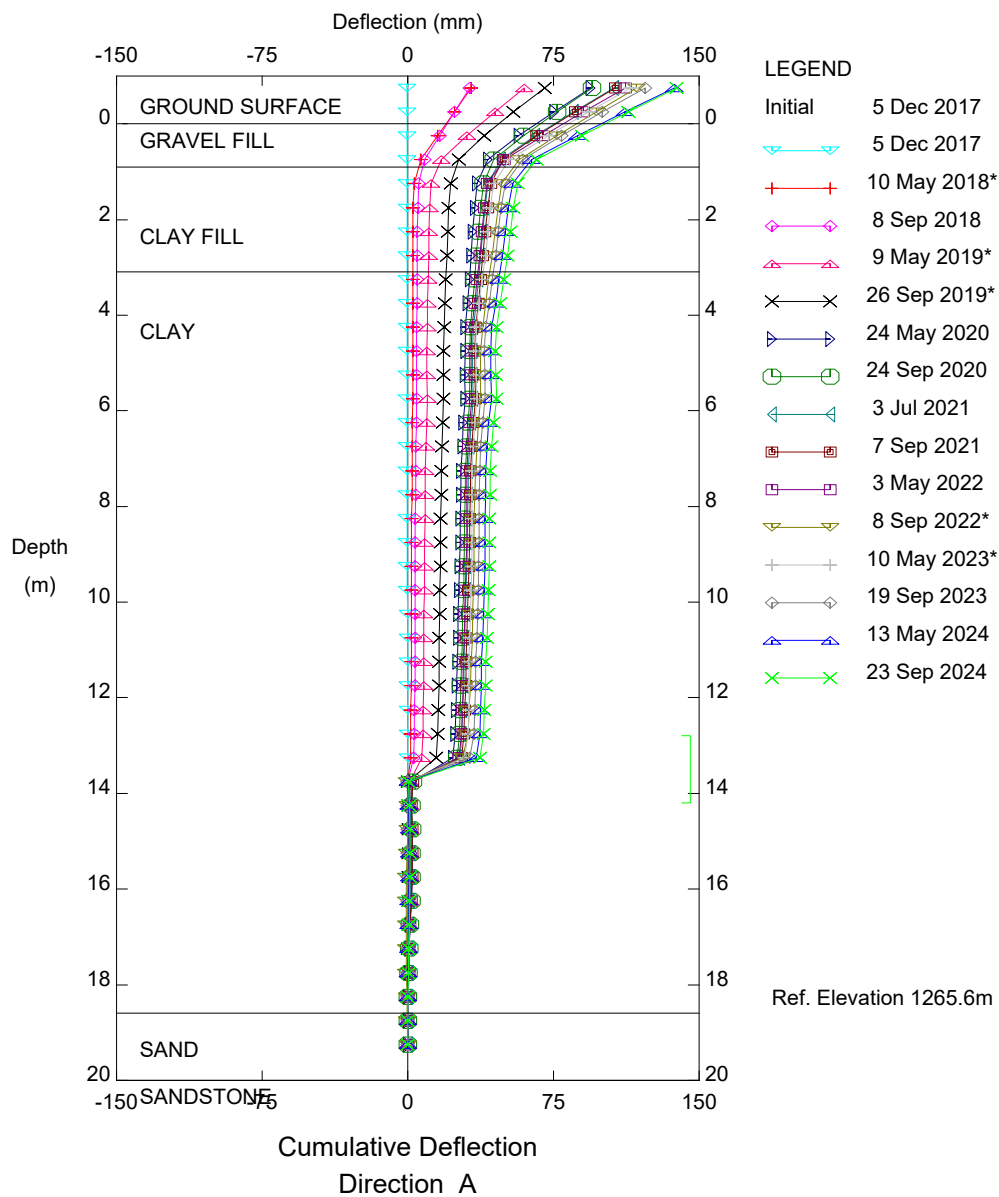
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HWY 40:30 West of Wildhay River (NC83), Inclinometer SI17-01

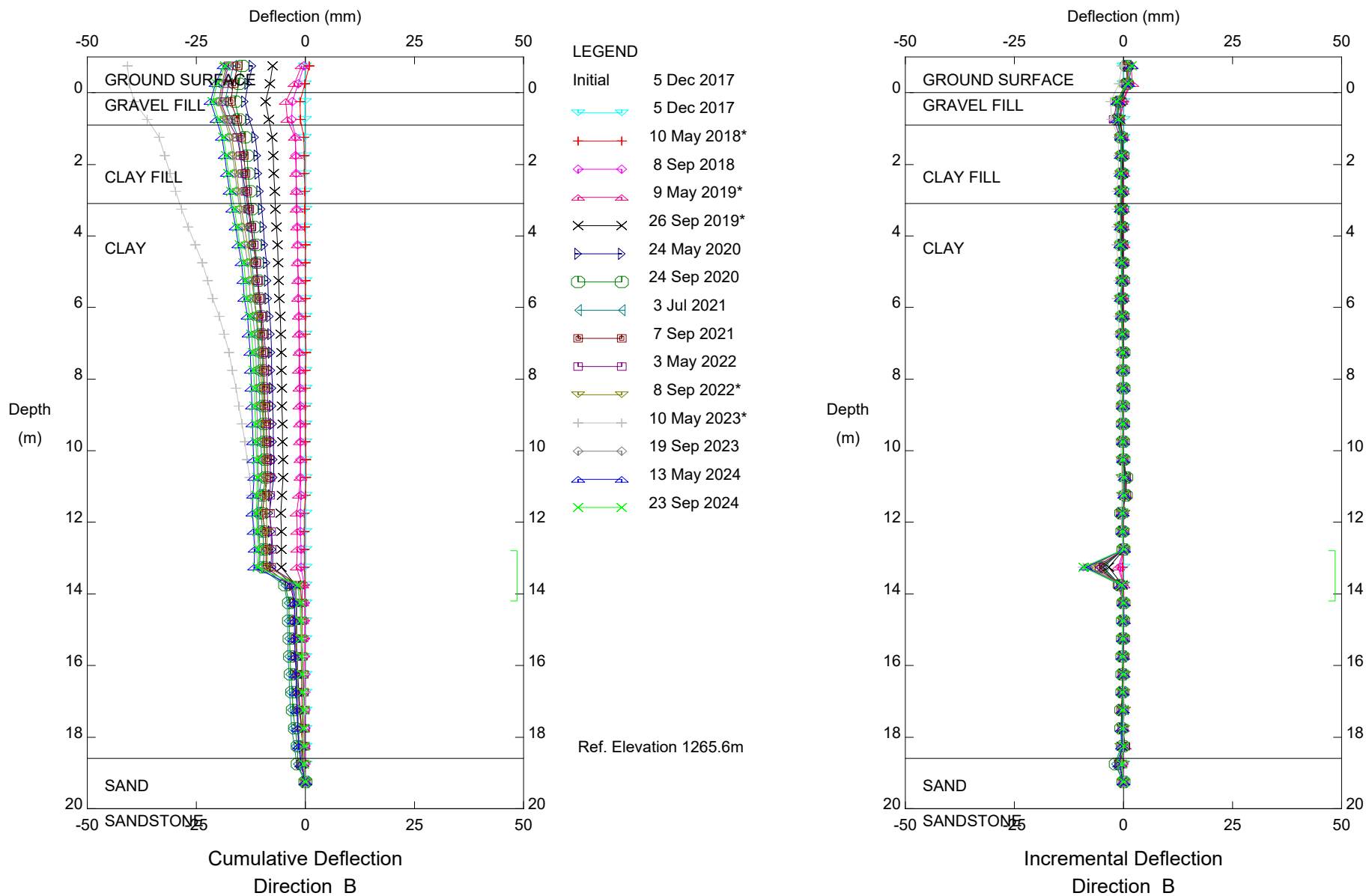
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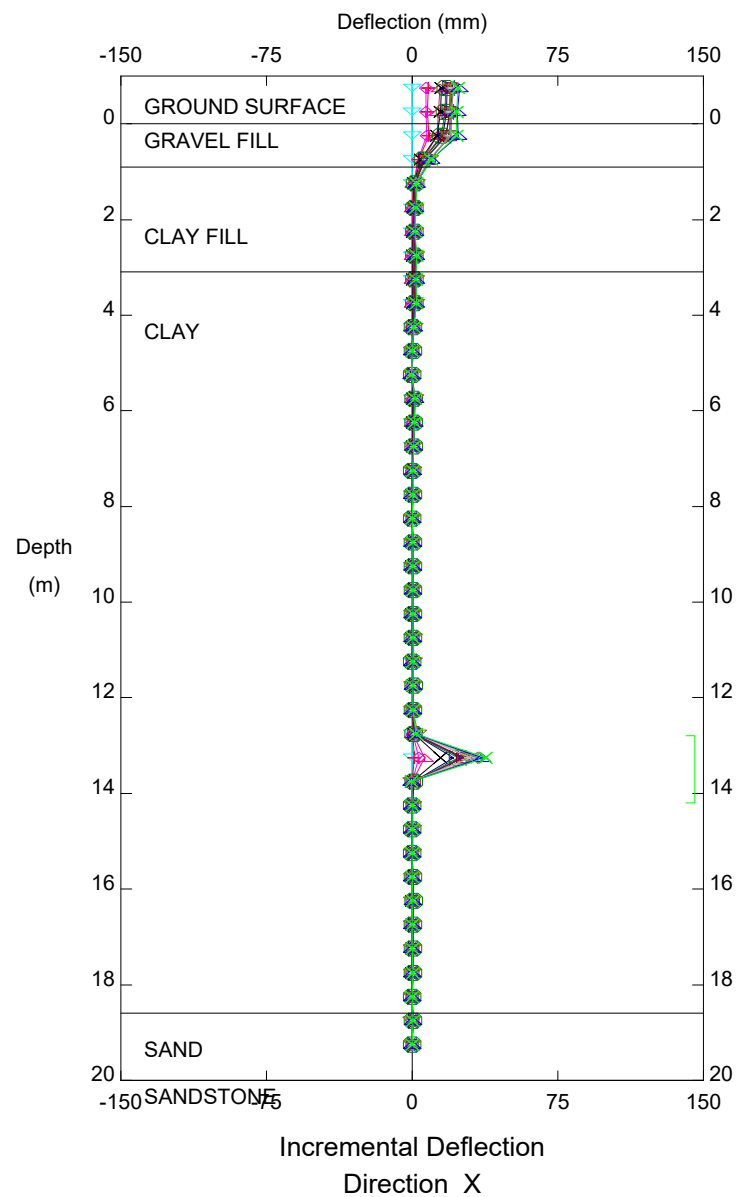
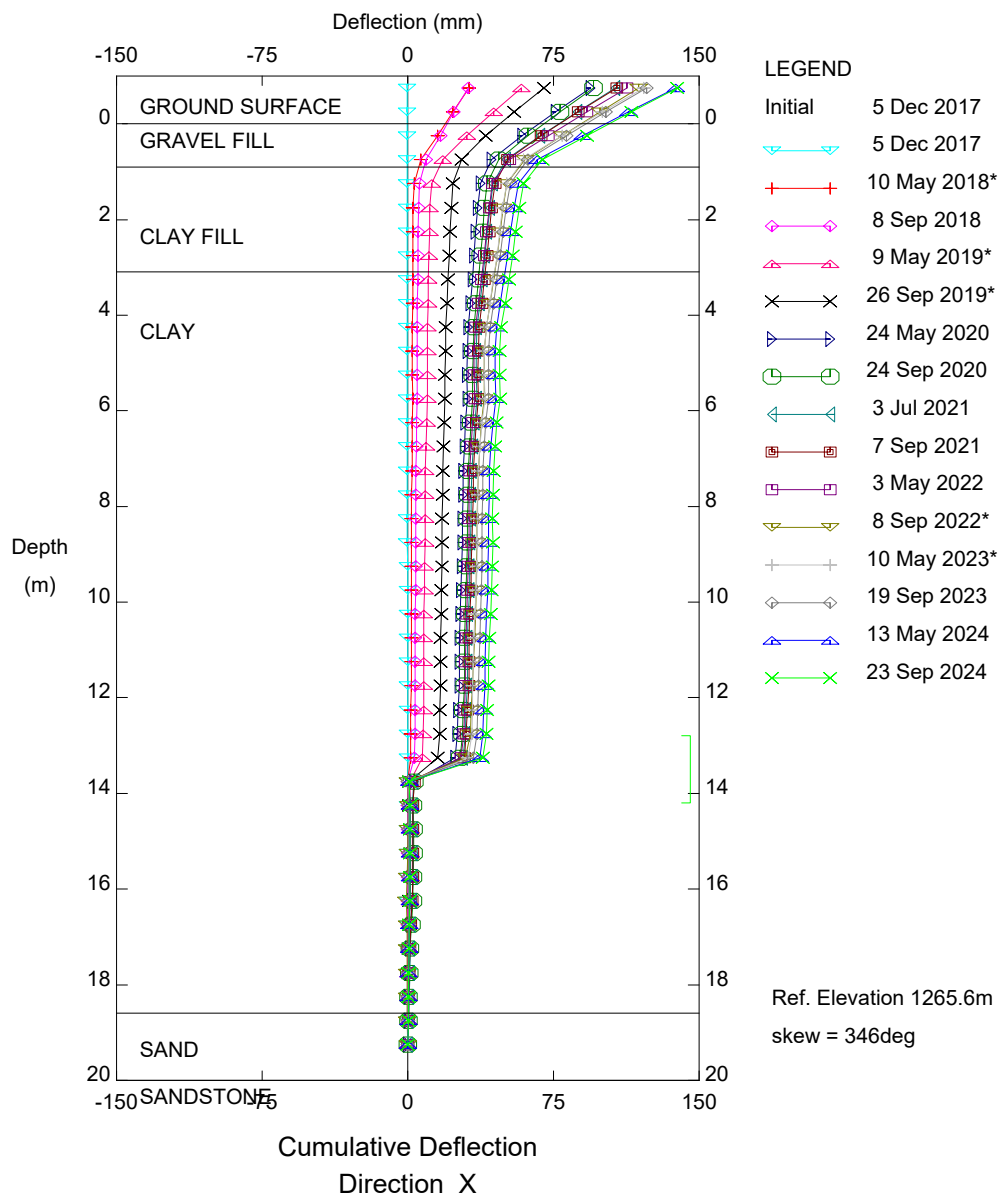


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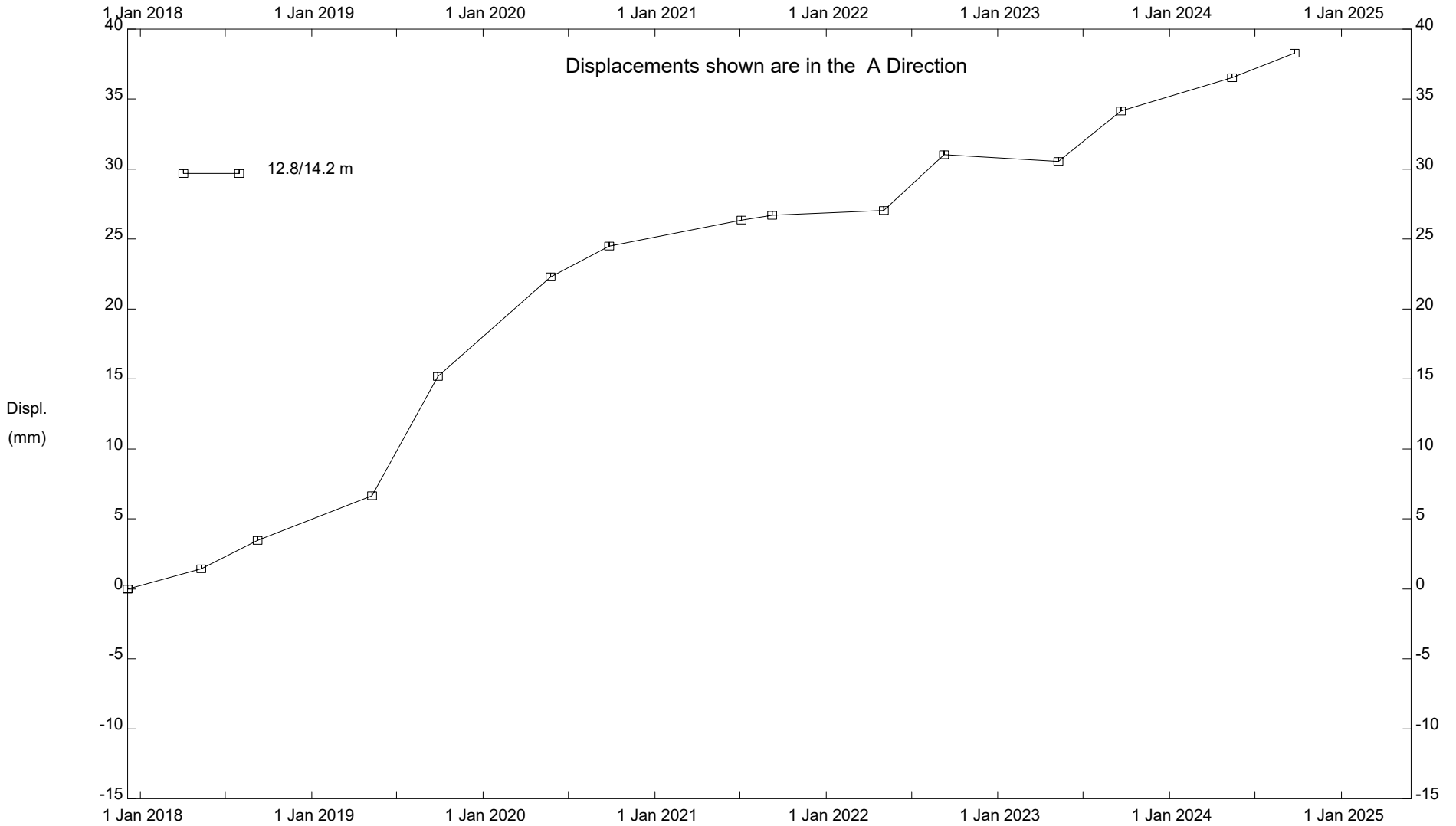


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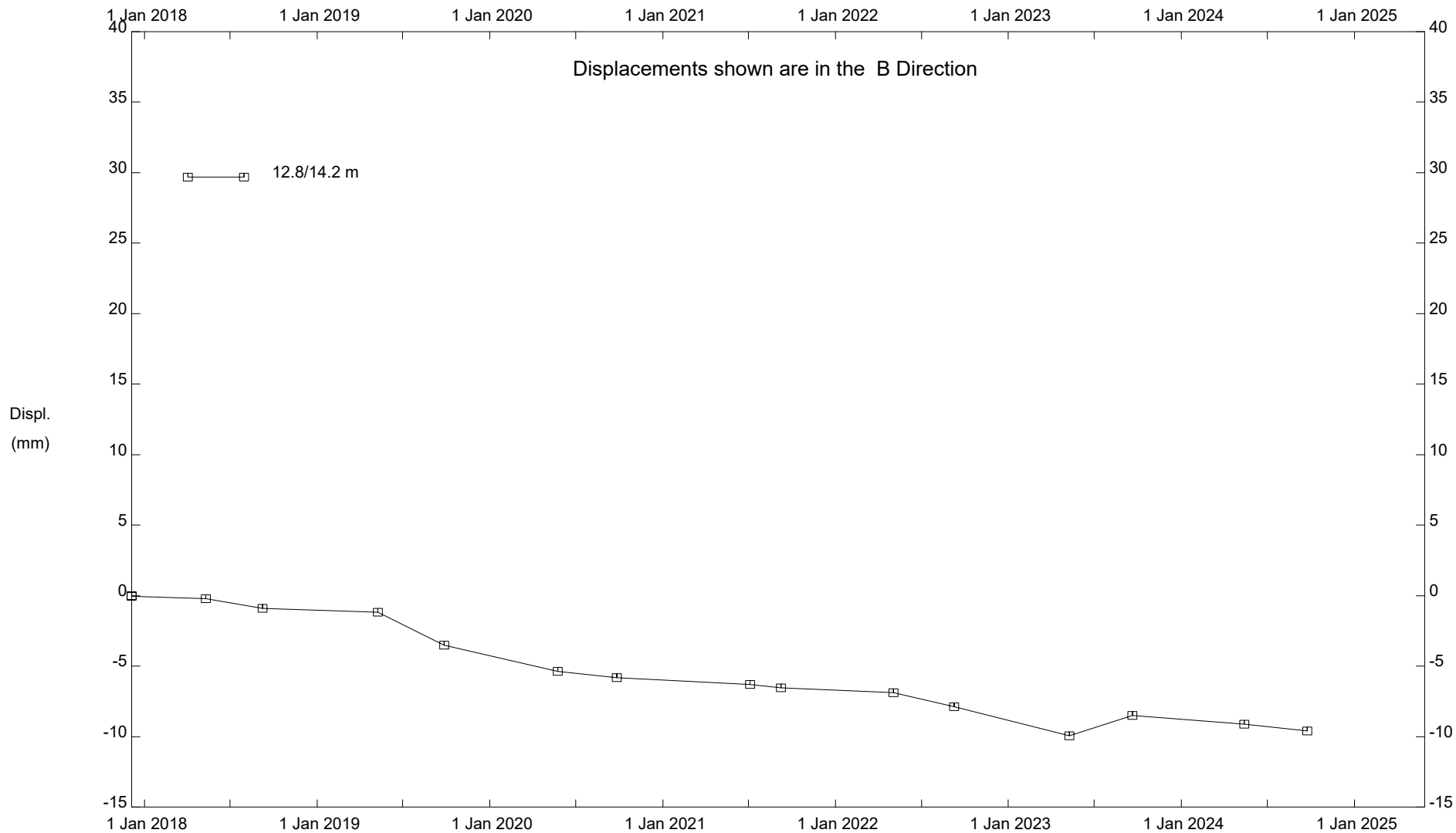
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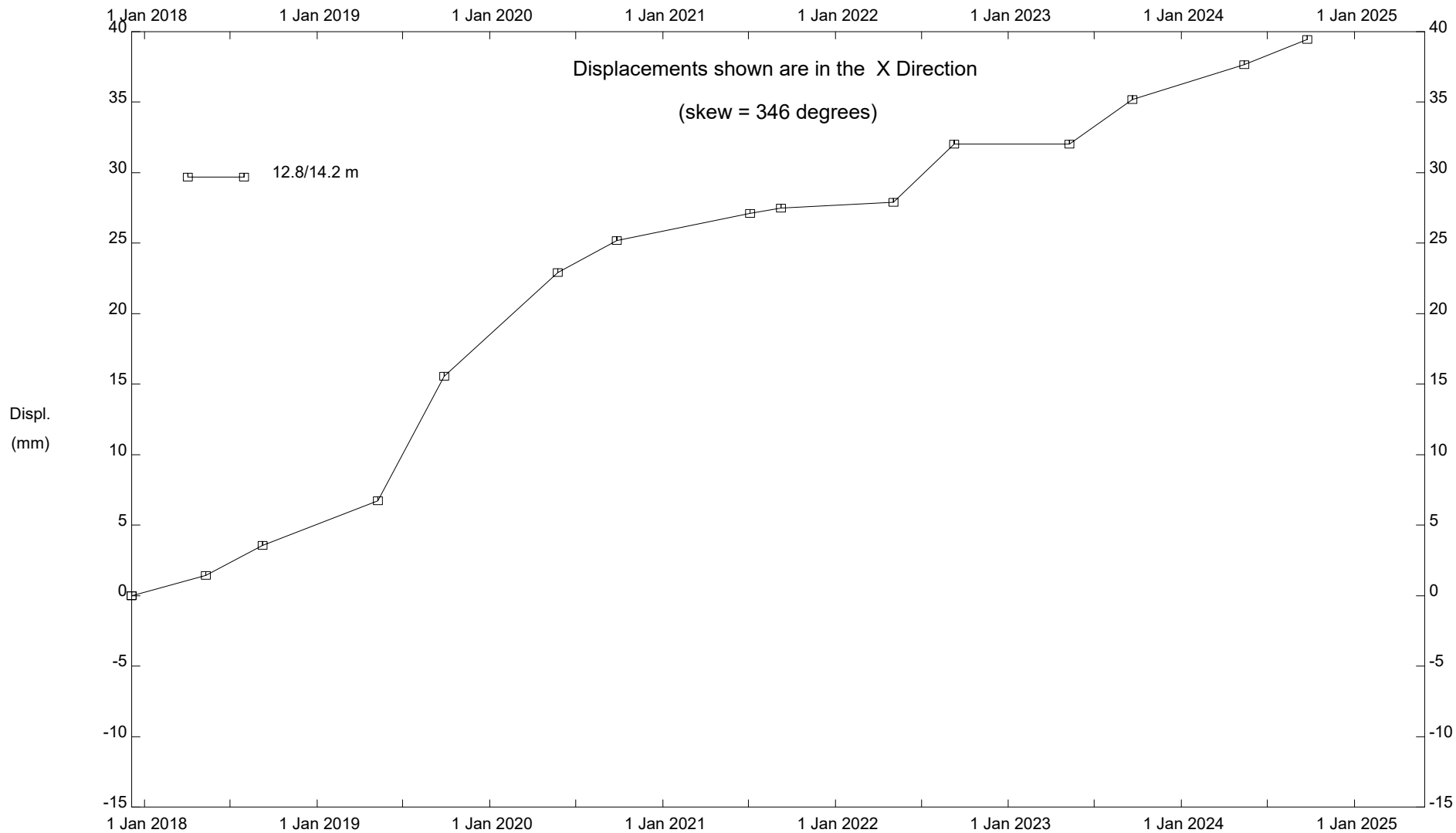
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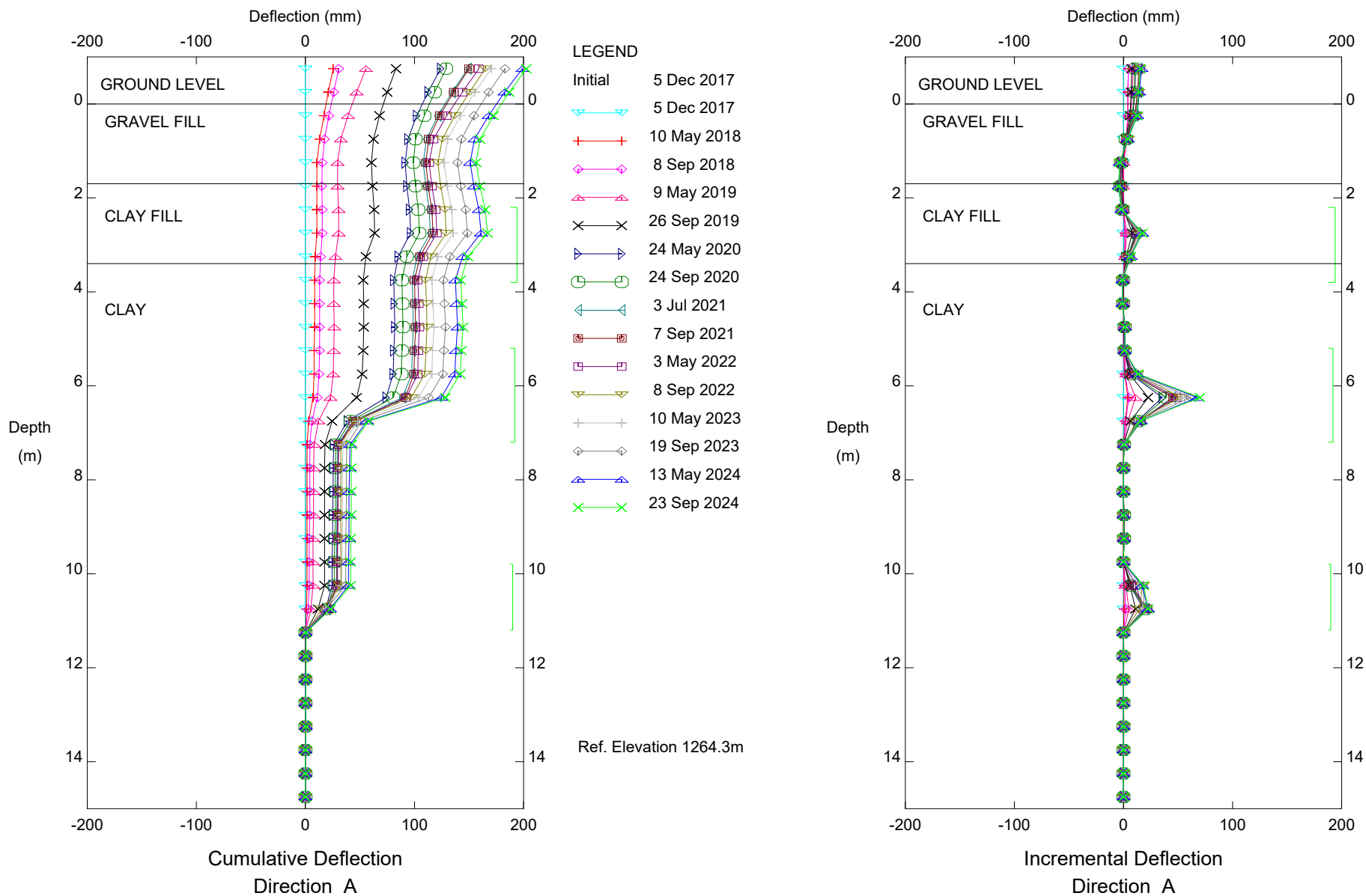
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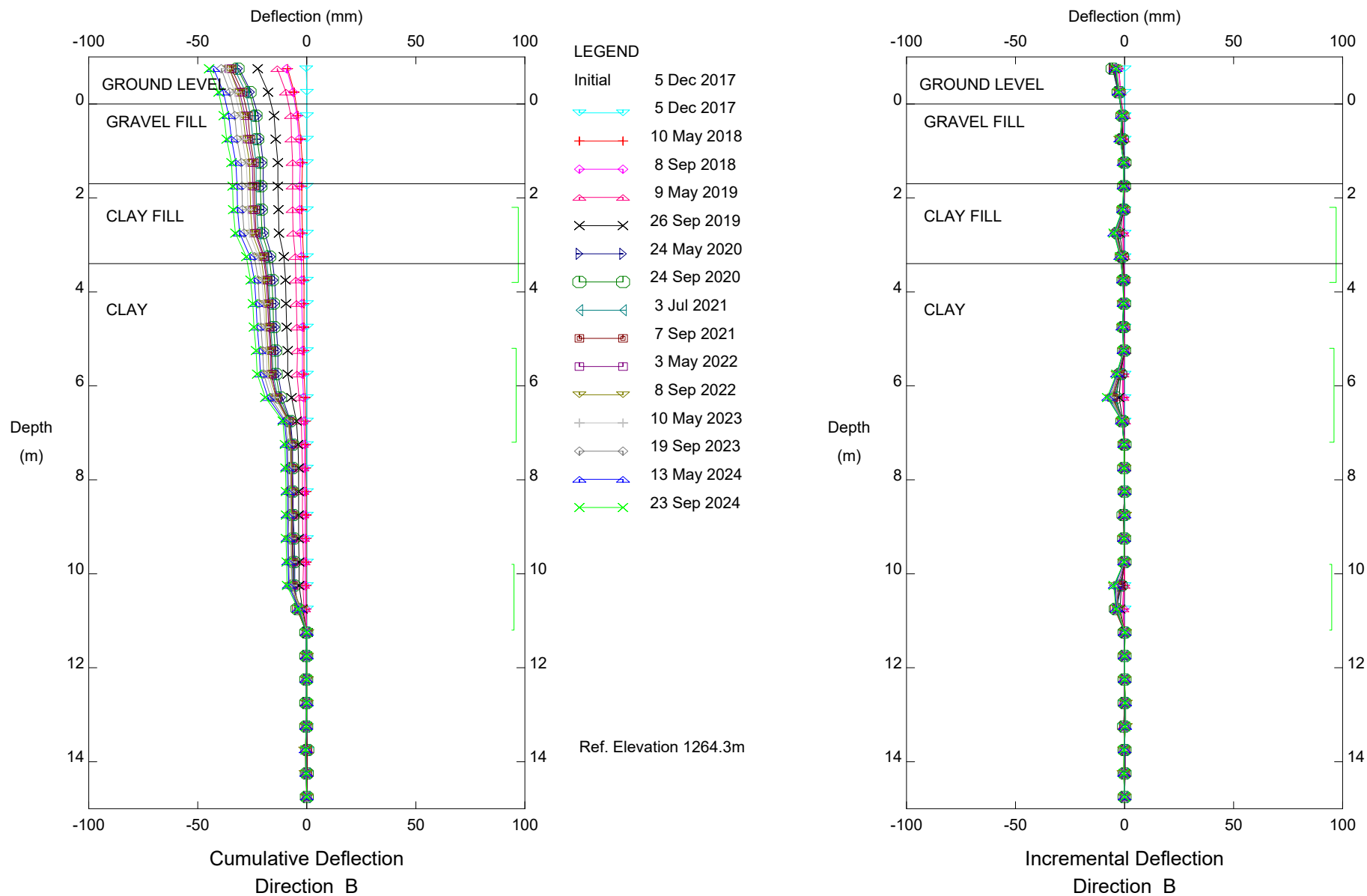


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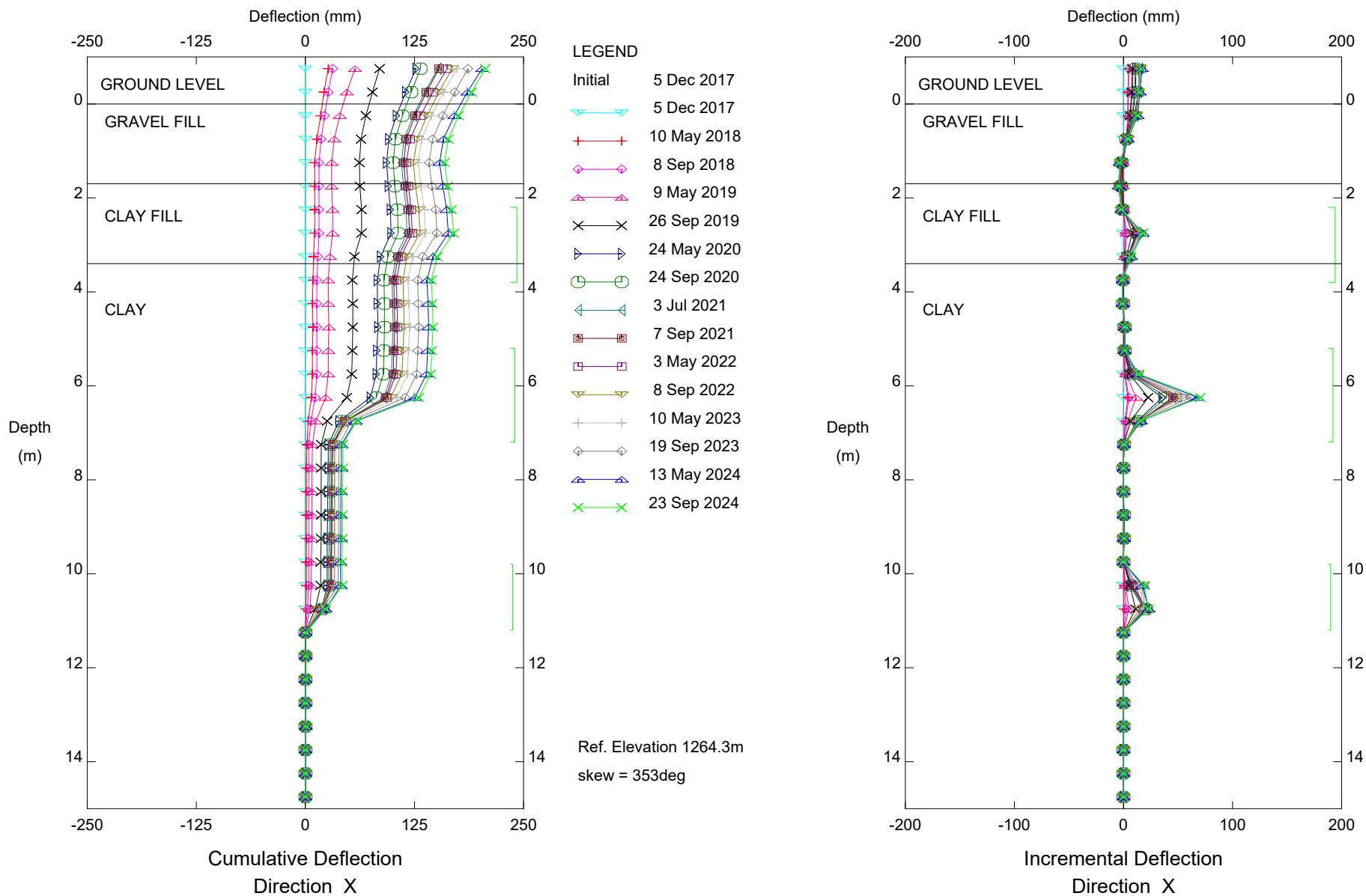


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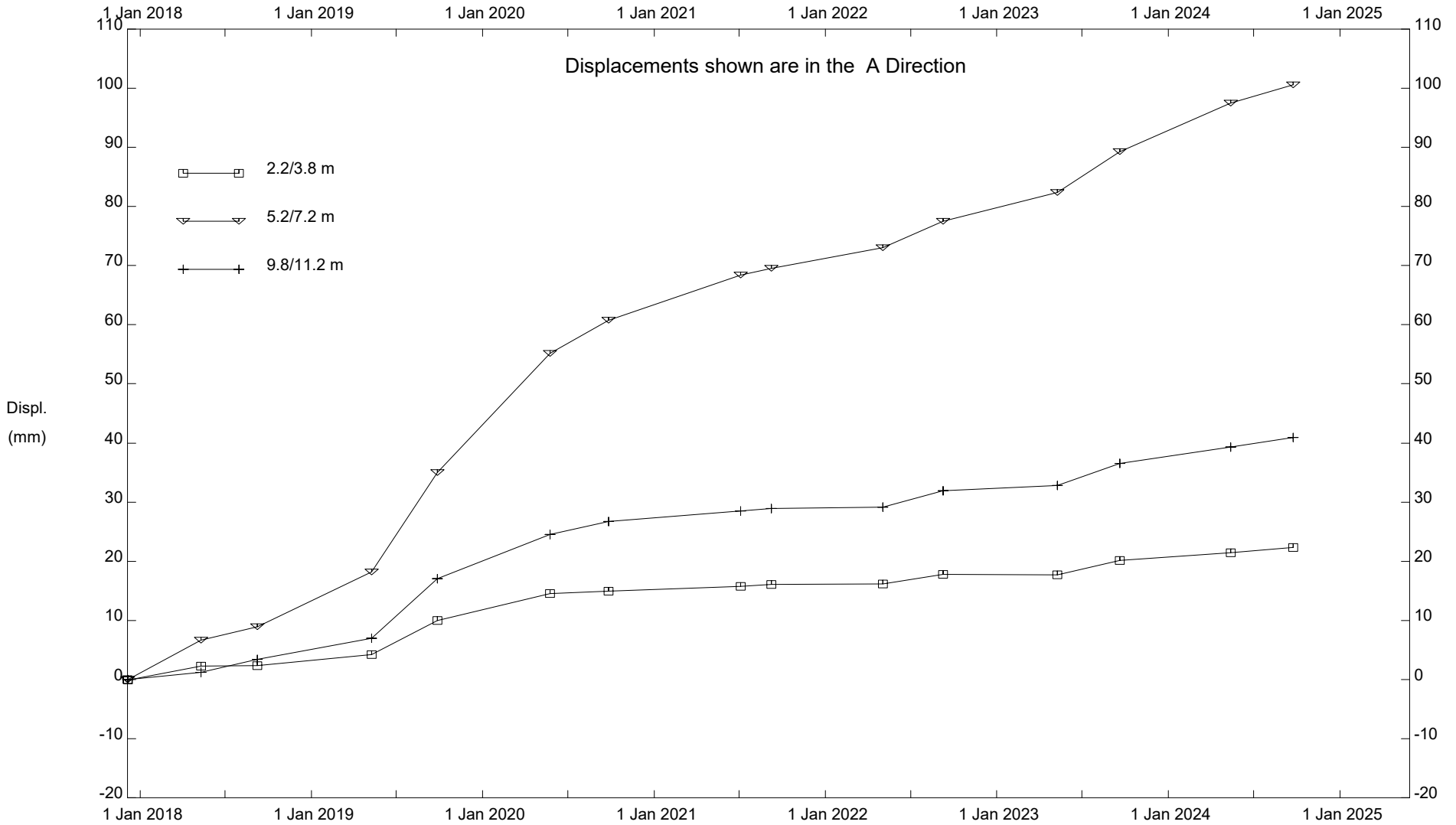
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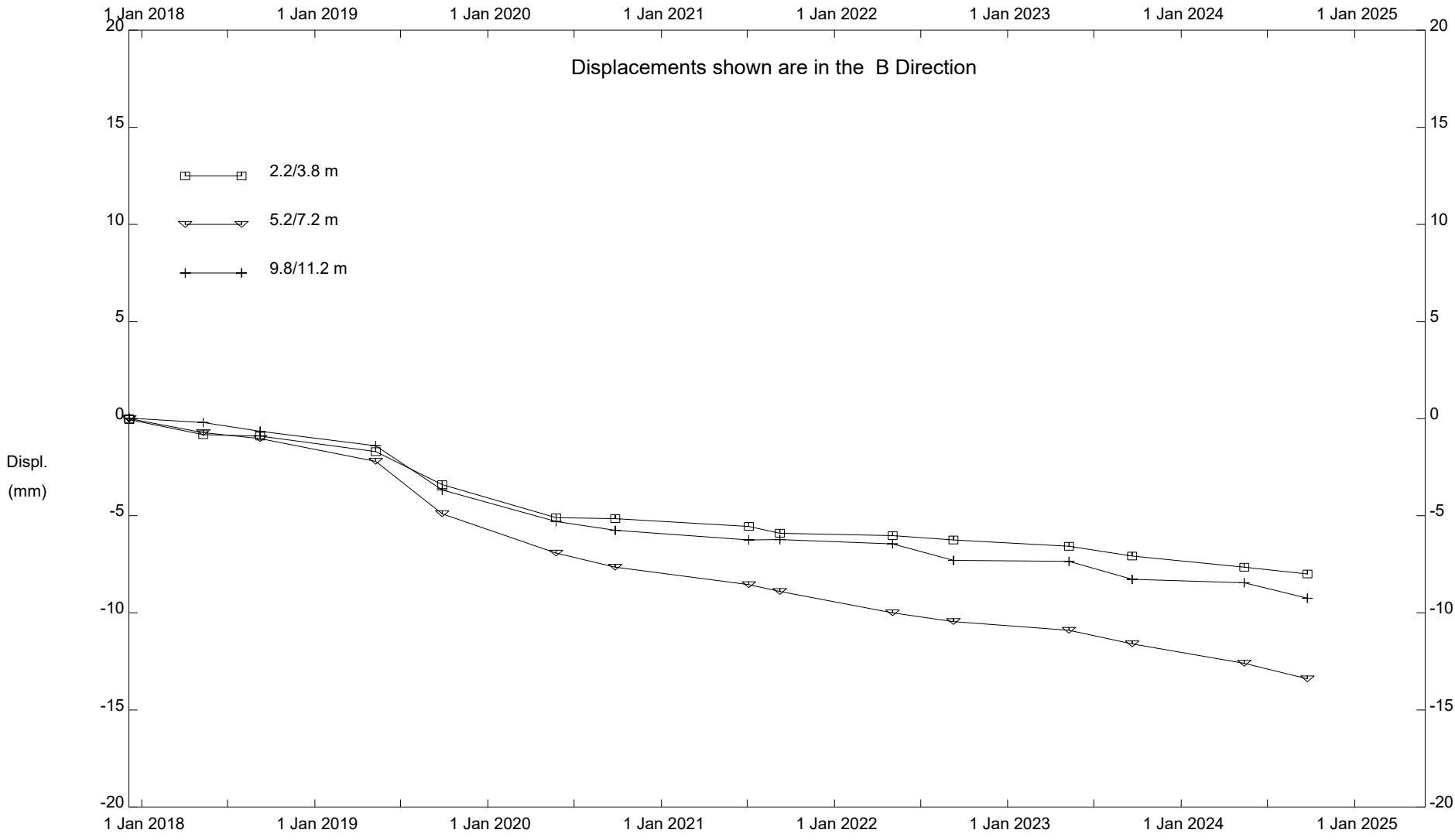
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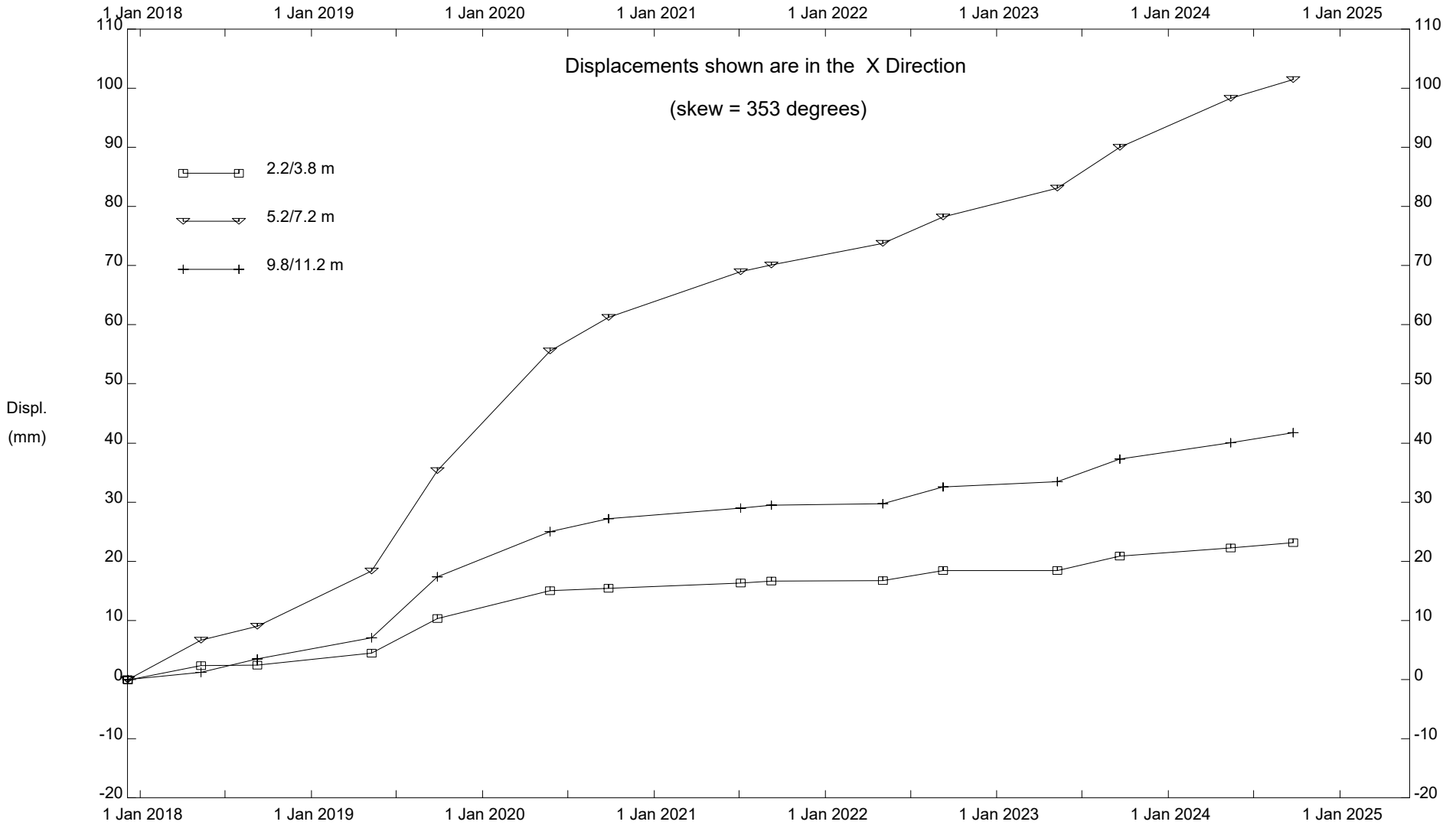
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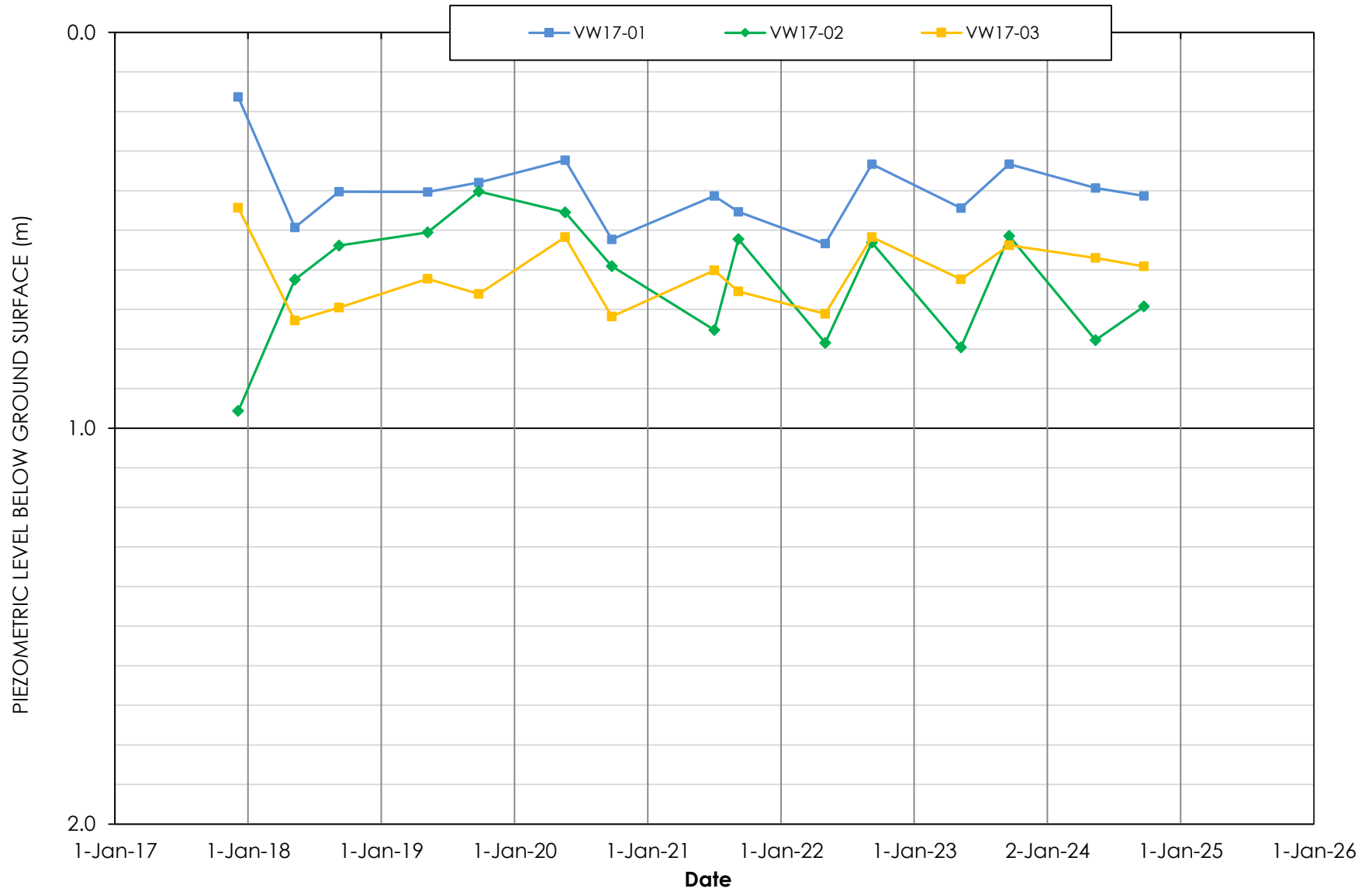
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HWY 40:30 West of Wildhay River (NC83), Inclinometer SI17-03

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### PIEZOMETER DATA



### PIEZOMETER DATA

