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

Reference: North Central Region, Edson, Site NC044 - Highway 633:02 Cattlepass East, Spring 2024 Instrumentation Monitoring Report

1.0 OBSERVATIONS

1.1 FIELD PROGRAM AND INSTRUMENTATION STATUS

The Spring 2024 reading cycle consisted of instrument readings of two slope inclinometers (SI17-01 and SI17-02), one pneumatic piezometer (PN05-8), and two vibrating wire piezometers (VW17-01 and VW17-02). Figure 1 attached provides a schematic of the site. The instruments were read by Andres Padros, Technician and Olawale Odusi, Geotechnical Technologist on May 16, 2024.

Slope inclinometers (SI) were measured using an RST MEMS digital inclinometer probe with 0.5 m increments and handheld PC. Readings were taken based on cable markings in relation to the top of SI casing. The pneumatic piezometer (PN) was read with an RST Instruments C-109 Pneumatic Readout. The vibrating wire piezometers (VW) were read with an RST VW2106 readout box.

GPS coordinates of all instruments were obtained using a Garmin eTrex 10x handheld GPS unit.

2.0 INTERPRETATION

2.1 GENERAL

The SI plots are provided in the attachments and summarized in the following sections. The movement rates, total cumulative movement, maximum movement rates, and incremental movements since initializing each SI are provided in Table NC044-1 and the attachments.

Plots for the piezometric levels are provided in the attachments with summaries provided in Table NC044-2 and Table NC044-3.

2.2 MONITORING RESULTS

2.2.1 Slope Inclinometer

SI17-01 has a movement zone at approximately 6.7 m to 10.6 m below ground surface (bgs). During the Spring 2024 reading cycle, 2 mm of incremental movement was recorded corresponding to a current movement rate of 2 mm/yr. The overall movement rate is about 2 mm/yr since Spring 2018.

SI17-02 has a zone of movement at approximately 10.4 m to 12.9 m below ground surface (bgs). The current reading showed about 3 mm incremental movement since the last reading in Spring 2023.

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2.2.2 Piezometers

Pneumatic piezometer PN05-8 showed an increase of approximately 0.4 m in the piezometric level since the Spring 2023 reading cycle.

The piezometric level in VW17-01 showed an increase of approximately 0.1 m while VW17-02 showed an increase of less than 0.1 m, compared to the Spring 2023 reading cycle.

3.0 FUTURE WORK

It is recommended that all instruments be monitored again during the Spring 2025 reading cycle.

3.1 INSTRUMENTATION REPAIRS

PN05-4, PN05-5, and PN05-9 are damaged and are considered unrepairable.

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Table NC044-1: Spring 2024 Slope Inclinometer Reading Summary

Instrument Name	Date Initialized	Coordinates ⁽¹⁾ (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	November 24, 2017	5942550	642823	18 over 6.7m to 10.6m depth in 352° direction	10 in May 2018	Operational	May 19, 2023	2	2	< 1
SI17-02	November 24, 2017	5942513	642807	6 over 10.4 m to 12.9 m depth in 0° direction	5 in May 2018	Operational	May 19, 2023	3	3	1

Note:
(1) Updated May 16, 2024, with approximate accuracy of ± 3 m.

Table NC044-2: Spring 2024 Pneumatic Piezometer Reading Summary

Instrument Name	Date Initialized	Coordinates ⁽¹⁾ (UTM 11U, NAD1983) (m)		Tip Elevation (m aMSL) ⁽²⁾	Ground Elevation (m aMSL)	Current Status	Maximum Piezometric Elevation (m aMSL)	Measured Piezometric Elevation (m aMSL) (Groundwater Level)	Previous Piezometric Elevation (Spring 2023) (m aMSL) (Groundwater Level)	Change in Water Level Since Previous Reading (m bgs)
		Northing	Easting							
PN05-4	May 3, 2005	-	-	733.7	744.6	Non-Operational	741.8 Oct. 2011	Damaged	Damaged	Damaged
PN05-5	May 3, 2005	-	-	729.4	739.2	Non-Operational	738.7 June 2017	Damaged	Damaged	Damaged
PN05-8	May 3, 2005	5942531	642813	729.4	739.4	Operational	739.5 Sept. 2019	739.1 (0.3 m bgs)	738.8 (0.7 m bgs)	0.4
PN05-9	May 3, 2005	-	-	984.9	737.0	Non-Operational	737.9 May 2015	Damaged	Damaged	Damaged

Note:
(1) Updated May 16, 2024, with approximate accuracy of ± 3 m.
(2) aMSL = Above Mean Sea Level

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Table NC044-3: Spring 2024 Vibrating Wire Piezometer Reading Summary

Instrument Number	Date Initialized	Coordinates ⁽¹⁾ (UTM 11U, NAD1983) (m)		Tip Elevation (m aMSL) ⁽²⁾	Ground Elevation (m aMSL)	Current Status	Maximum Piezometric Elevation (m aMSL)	Measured Piezometric Elevation (m aMSL) (Groundwater Level)	Previous Piezometric Elevation (Spring 2023) (m aMSL) (Groundwater Level)	Change in Water Level Since Previous Reading (m bgs)
		Northing	Easting							
VW17-01 (100D1700257)	Nov. 24, 2017	5942550	642823	729.0	741	Operational	738.9 May 8, 2018	737.7 (3.3 m bgs)	737.6 (3.4 m bgs)	0.1
VW17-02 (100D1701604)	Nov. 24, 2017	5942513	642807	727.7	737	Operational	736.6 Sept. 24, 2019	735.9 (1.1 m bgs)	735.9 (1.1 m bgs)	< 0.1

Note:
(1) Updated May 16, 2024, with approximate accuracy of ± 3 m.
(2) aMSL = Above Mean Sea Level

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4.0 CLOSING

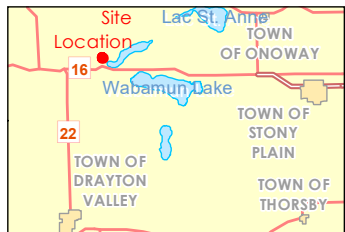
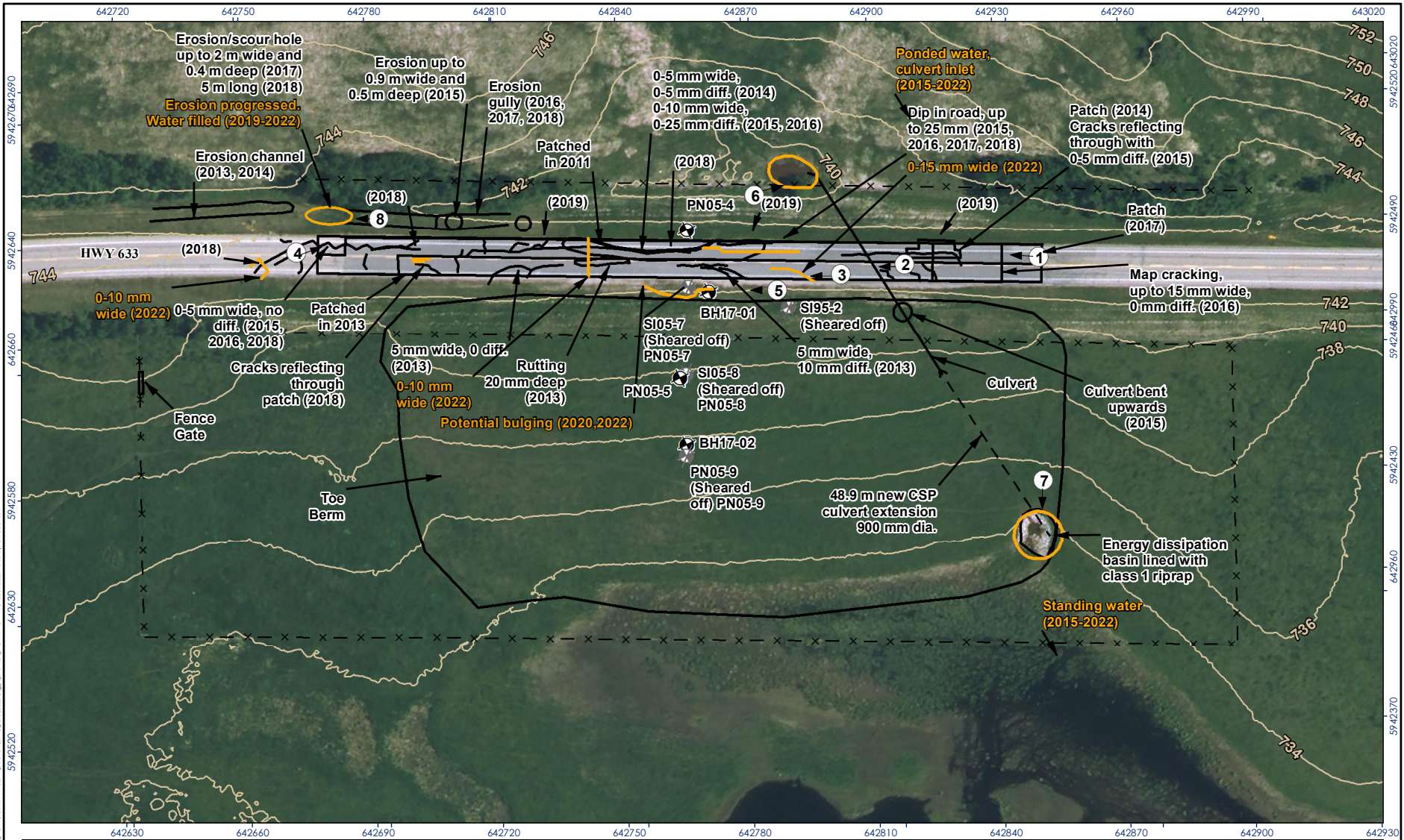
We trust this instrumentation report meets your requirements. If you have any questions, please do not hesitate to contact the undersigned.

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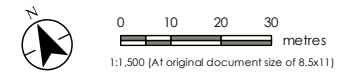
Leslie Cho M.Eng., P.Eng.
Senior Associate, Geotechnical Engineer
Phone: 780-917-7403
leslie.cho@stantec.com

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

Attachment: Figure 1 – Site Plan
S117-01 Slope Inclinometer Plots
S117-02 Slope Inclinometer Plots
Piezometer Depth vs Time Plot
Piezometer Elevation vs. Time Plot



- Borehole Location
- Non-Operational Instrument
- Previous Observation
- 2020 Observation
- Fence
- Ground Elevation Contours (m AMSL, LiDAR May 2015)
- Approximate Photo Location and Direction

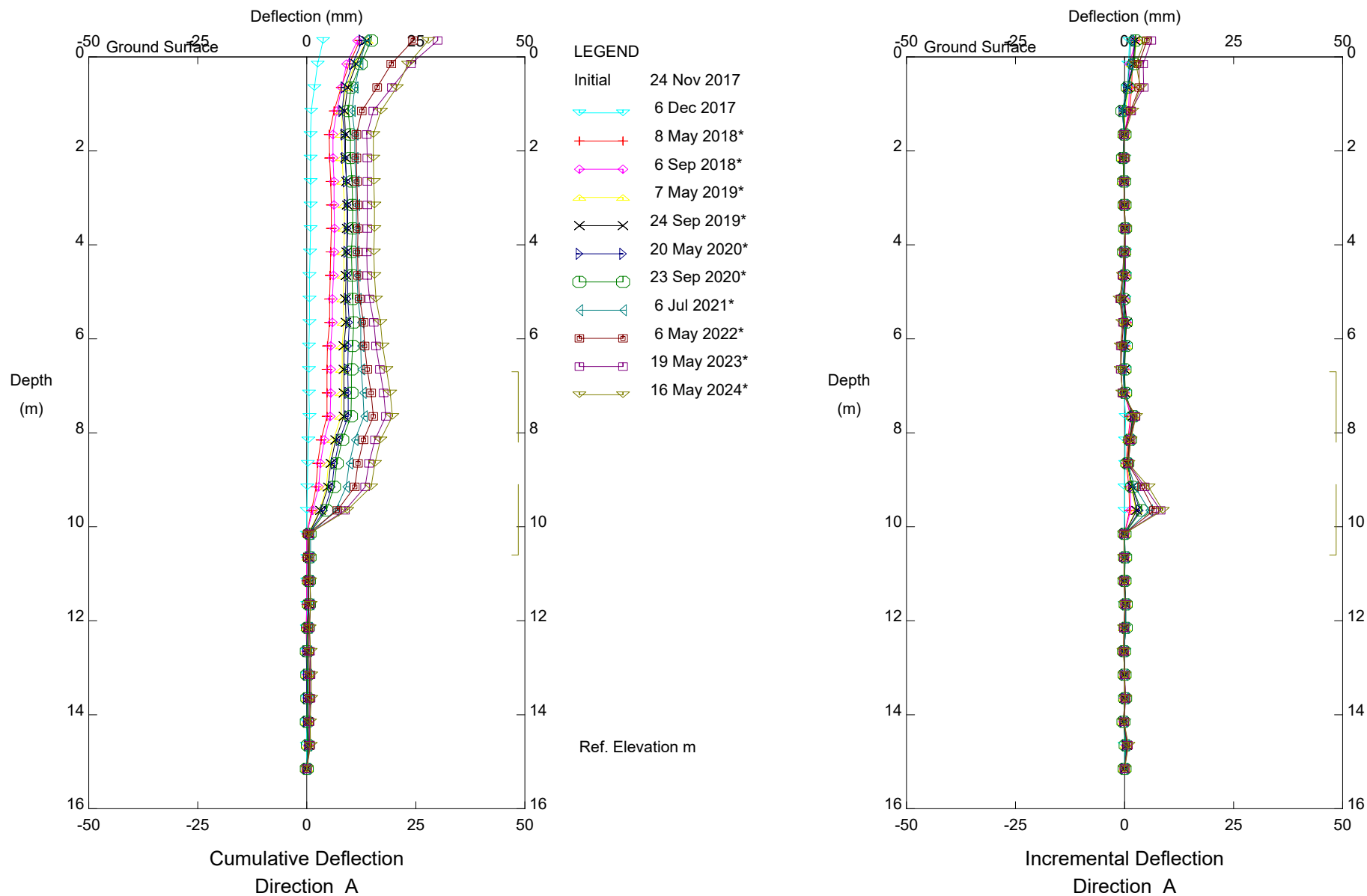


- Notes**
1. Coordinate System: NAD 1983 UTM Zone 11N
 2. Base features: Geogratis, ©Department of Natural Resources Canada. All rights reserved.
 3. Imagery: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.

Project Location: 123512435
 Hwy 633
 Parkland County, Alberta
 Prepared by SJ on 2022-09-23
 Quality Review by LC on 2022-09-27
 Independent Review by XL on 2022-09-28

Client/Project:
 Alberta Transportation
 Geohazard Monitoring Program
 NC44 Cattle Pass East

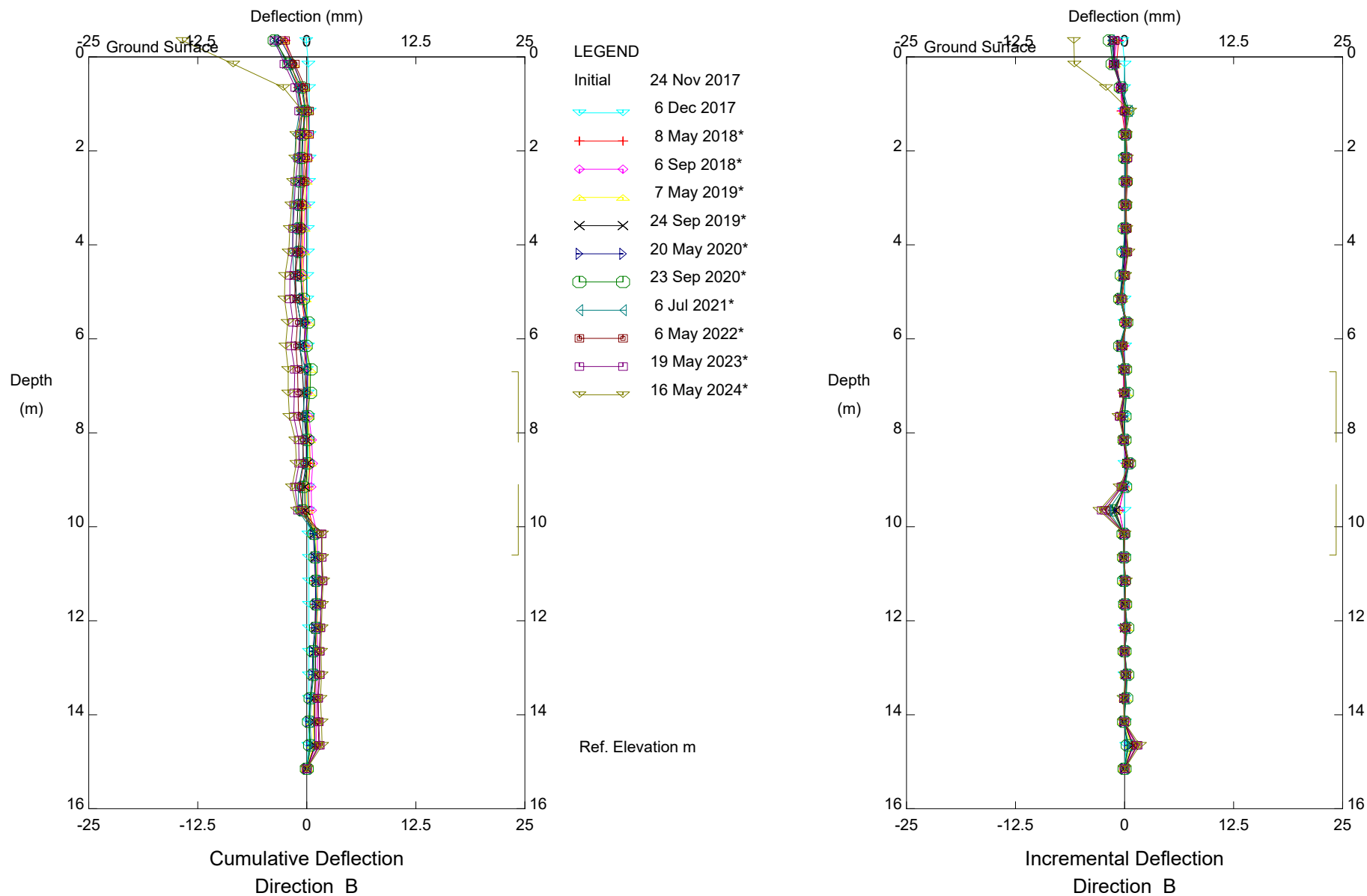
Figure No.: 1
 Title: **Site Plan**



HWY 633:02 Cattlepass East (NC44), Inclinator SI17-01

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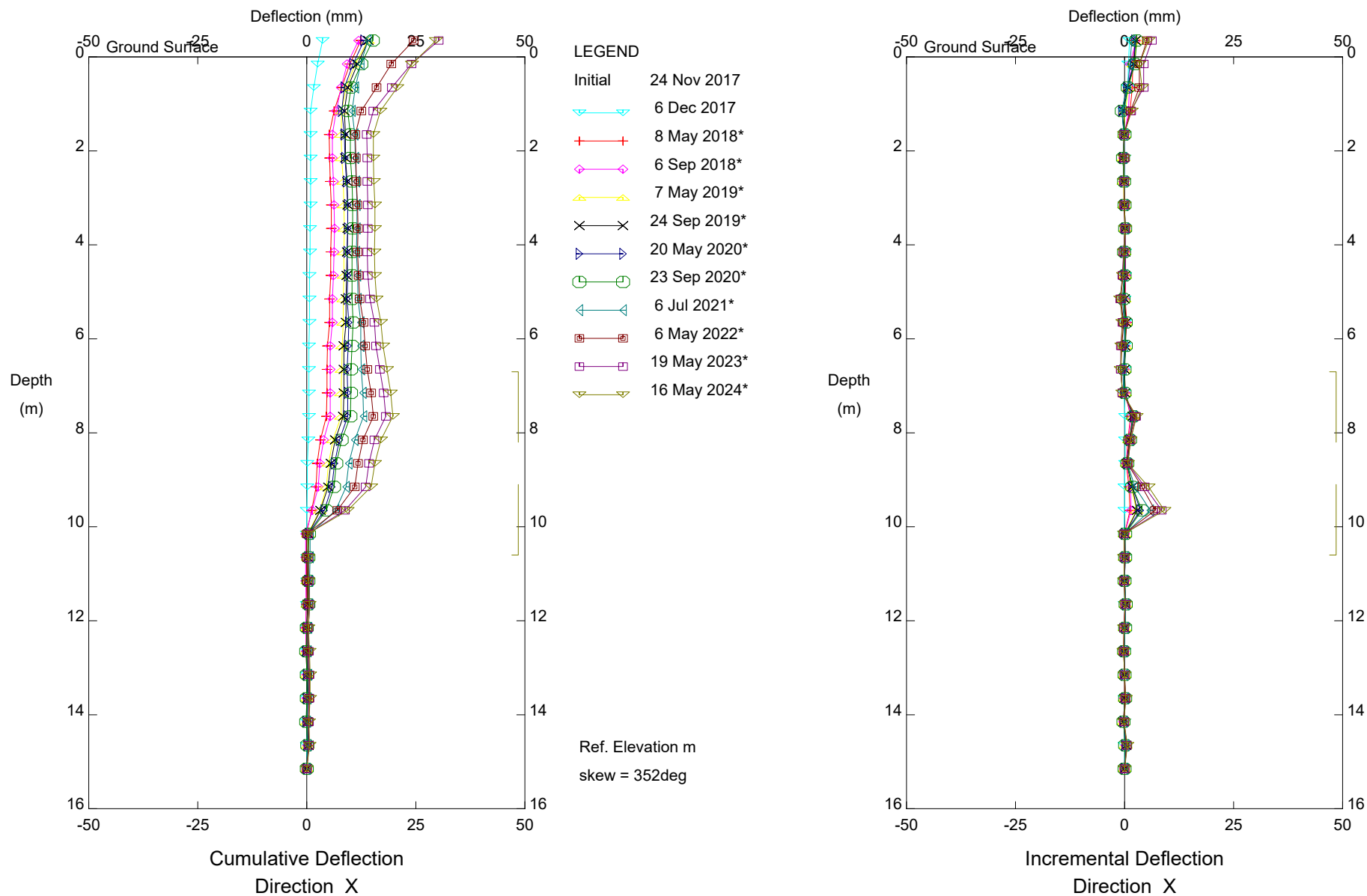
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HWY 633:02 Cattlepass East (NC44), Inclinometer SI17-01

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

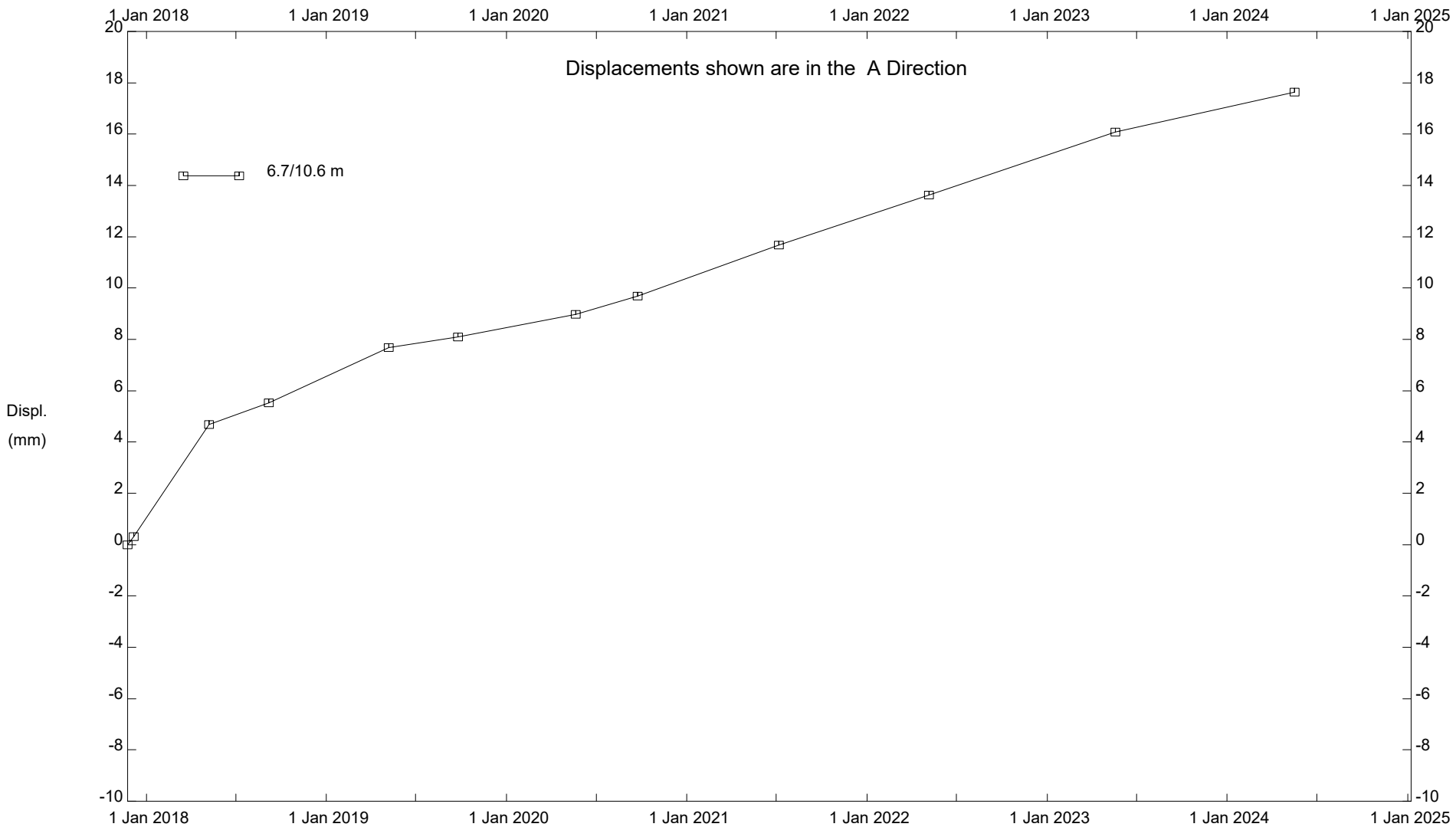


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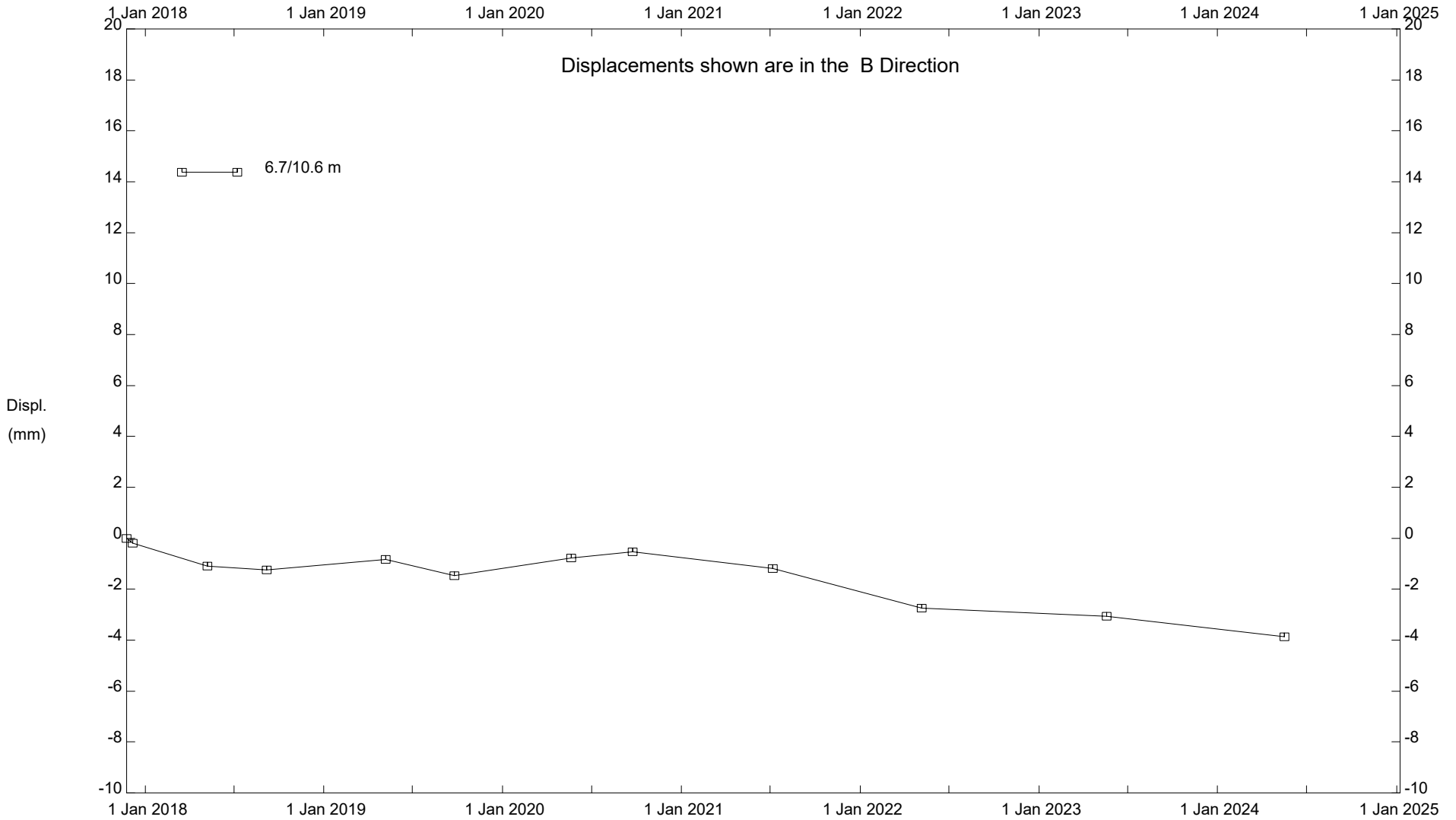
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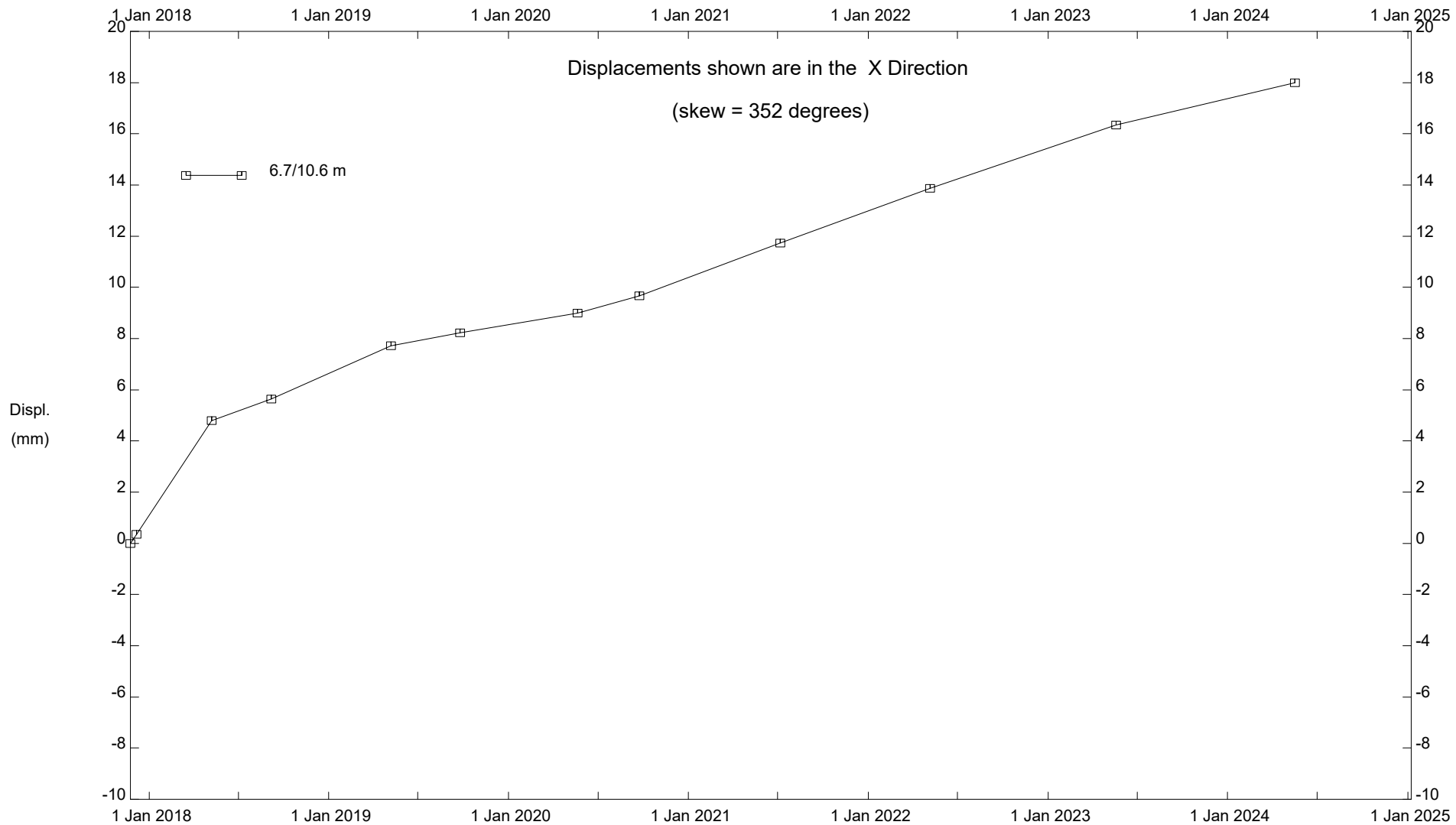
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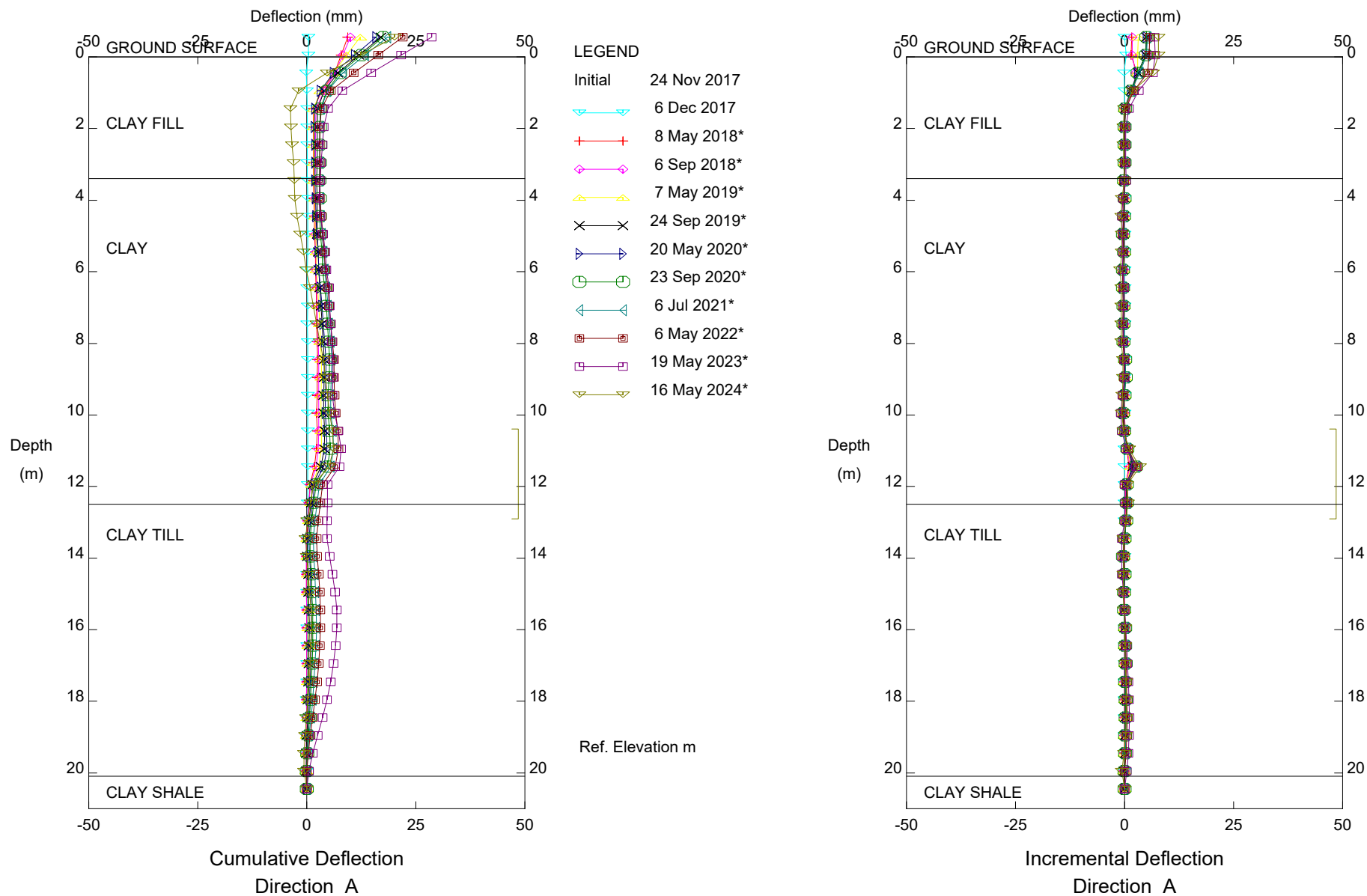
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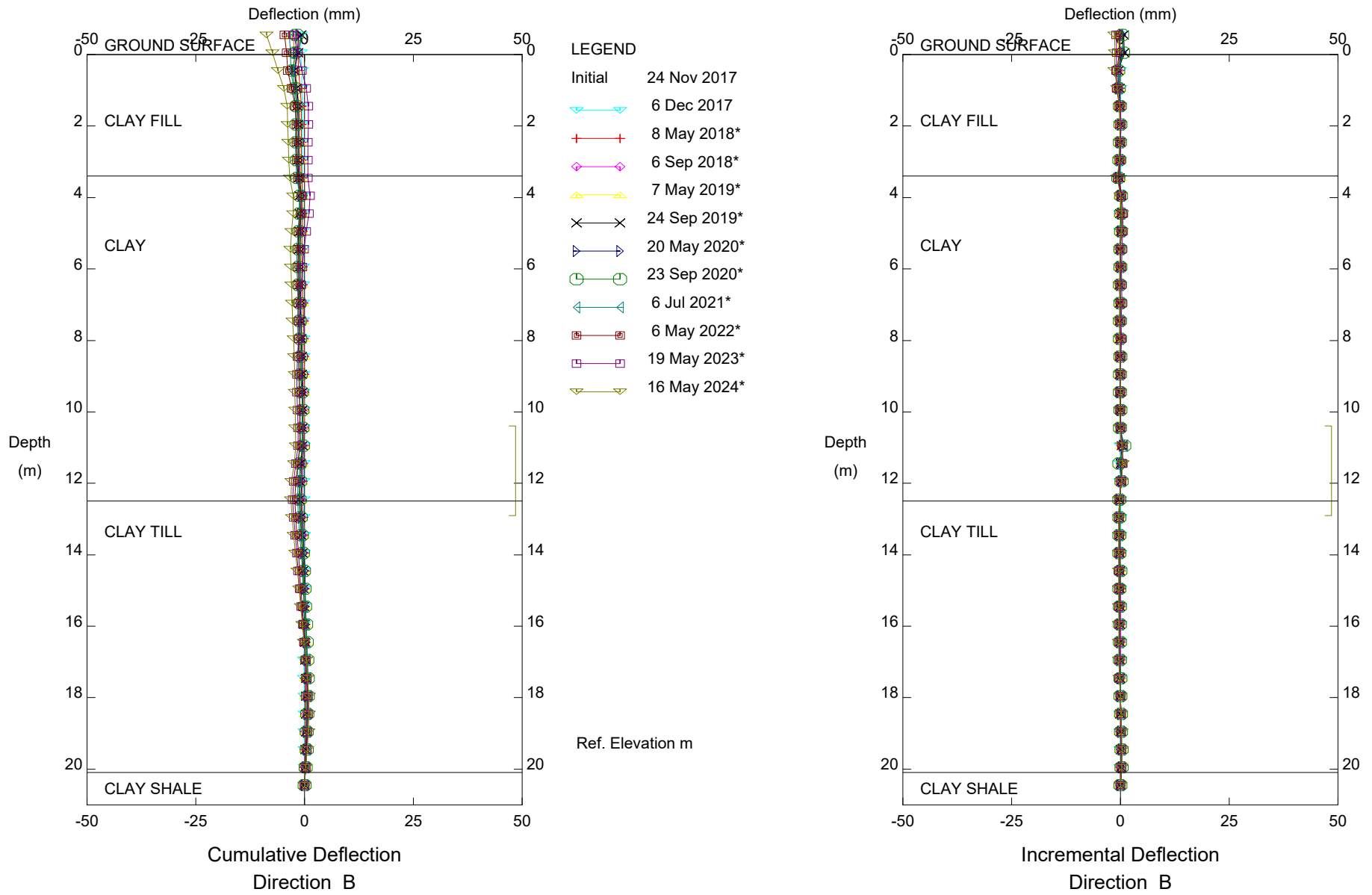
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HWY 633:02 Cattlepass East (NC44), Inclinometer SI17-02

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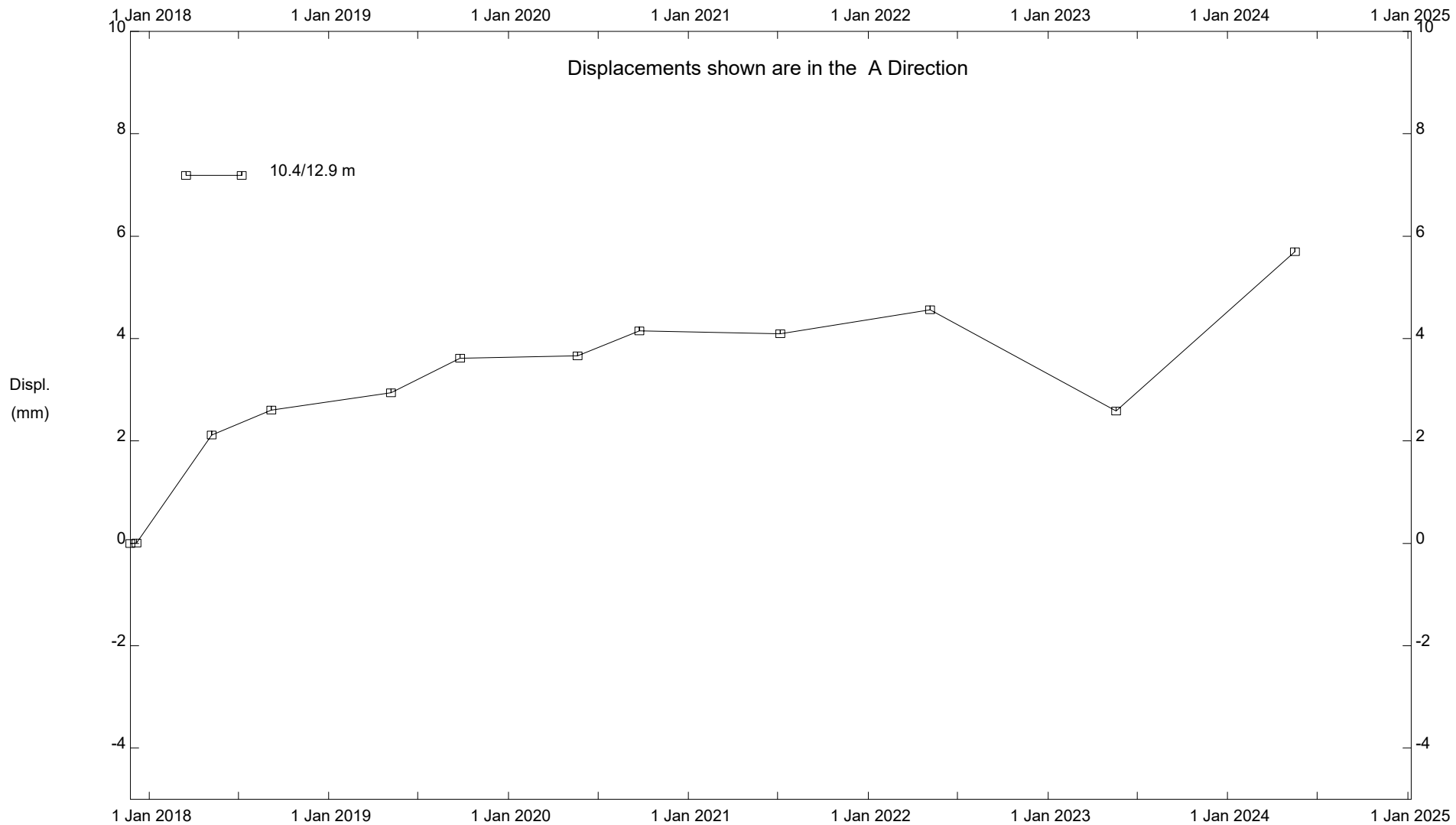


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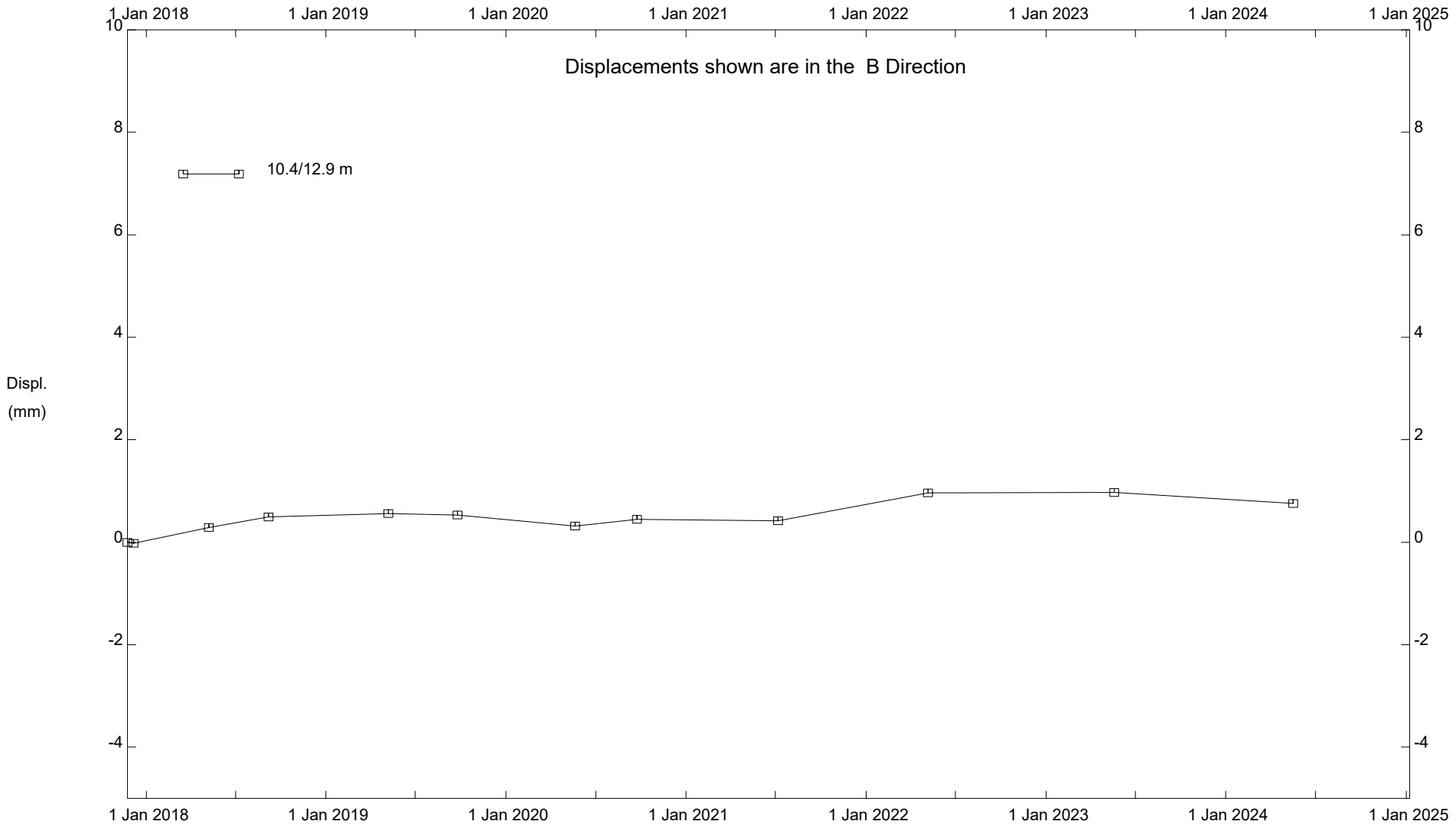
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