
To:	Amy Driessen Alberta Transportation	From:	Leslie Cho and Xiteng Liu Stantec Consulting Ltd.
File:	123315222	Date:	October 7, 2022

Reference: North Central Region, Edson/Stony Plain, Site NC081 – Highway 16A:08 Evansburg Slide, Fall 2022 Instrumentation Monitoring Report

1.0 OBSERVATIONS

1.1 FIELD PROGRAM AND INSTRUMENTATION STATUS

The Fall 2022 reading cycle consisted of instrument readings of three slope inclinometers (BH20-02, BH21-01 and BH21-02) and four standpipe piezometers (BH20-01A, BH20-01B, BH20-02A, and BH20-02B). **Figure 1** attached provides a schematic of the site. The instruments were read by Sonja Pharand, EIT, and Brian Qin, EIT on September 9, 2022.

The slope inclinometers (SI) were measured using a RST MEMS digital inclinometer probe with 0.5 m increments and RST handheld PC. The standpipe piezometers (SP) were measured using a Heron Instruments water tape.

GPS coordinates of all instruments were obtained using a Garmin GPSmap 60Cx handheld unit.

2.0 INSTRUMENTATION READINGS

2.1 GENERAL

The SI plots are provided in the attachments and summarized in the following sections. Displacement-time plots in the resultant x-direction (i.e. slope movement direction) along with movement rates, total cumulative movement, maximum movement rates, and incremental movements are provided in **Table NC081-1** and the attachments.

Standpipe piezometer results are summarized in **Table NC081-2** and in the following sections with resulting plots attached.

2.2 ZONES OF MOVEMENT

No discernable zone of movement was observed in the newly installed SIs BH21-01 and BH21-02, installed in piles P27 and P47, respectively. However, small movements were observed at the pile tops. These movements may reflect deflection and loading of the pile wall.

2.3 MONITORING RESULTS

2.3.1 Slope Inclinometers

BH20-02 has a discrete movement zone from 2.2 m to 4.2 m. The rate of movement has increased since the Spring 2022 readings by approximately 27 mm/yr. The current cumulative movement is 53 mm.

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BH21-01 and **BH21-02** have no discernable movement zones.

2.3.2 Piezometers

The standpipe piezometers (SP) installed in BH20-02A and BH20-02B both show a decrease in water level up to 0.3 m. SPs BH20-01A and BH20-01B show the opposite, with an increase in water level of up to 0.3 m. The water levels at the site range from 1.9 m to 4.1 m below ground surface (bgs), with elevations ranging from 749.6 m to 752.2 m. For reference, the creek elevation is at approximately 750 m.

3.0 RECOMMENDATIONS

It is recommended that the next reading cycle take place in Spring 2023.

3.1 INSTRUMENTATION REPAIRS

No instruments require repair at this time.

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Table NC81-1: Fall 2022 Slope Inclinometer 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							
BH20-01	Sept. 23, 2020	5941007	630594	19 mm over 1.2 m to 3.8 m depth in 15° direction	39 mm/yr; September 2021	Non-Operational	Sept. 7, 2021	Found blocked at 3.0 m in October 2021		
BH20-02	Sept. 23, 2020	5940980	630613	53 mm over 2.2 m to 4.2 m depth in 346° direction	68 mm/yr; September 2022	Operational	May 4, 2022	24	68	27
BH21-01 (P27)	Oct. 21, 2021	5941010	630595	No discernable movement zone.		Operational	May 4, 2022	No discernable movement zone.		
BH21-02 (P57)	Oct. 21, 2021	5941013	630618	No discernable movement zone.		Operational	May 4, 2022	No discernable movement zone.		

(1) Operational instruments updated on September 9, 2022, with approximate accuracy of ± 3 m

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Table NC81-2: Fall 2022 Standpipe Piezometer Readings Summary

Instrument Name	Date Initialized	Coordinates ⁽¹⁾ (UTM 11U, NAD1983) (m)		Bottom Depth (mbgs), (Elevation)	Current Status	Maximum Water Level (m bgs)	Measured Water Level (Fall 2022 (m bgs), (Elevation)	Previous Water Level (Spring 2022) (Elevation), (m bgs)	Change in Water Level (m)
		Northing	Easting						
BH20-01A	Sept. 23, 2020	5941004	630594	5.0 (750.7 m)	Operational	2.8 (October 2021)	3.5 (752.2 m)	3.8 (751.9 m)	0.3
BH20-01B	Sept. 23, 2020	5941004	630594	10.0 (745.7 m)	Operational	3.9 (October 2020)	4.1 (751.6 m)	4.3 (751.4 m)	0.2
BH20-02A	Sept. 23, 2020	5940983	630616	6.9 (745.7 m)	Operational	2.7 (May 2022)	3.0 (749.6 m)	2.7 (749.9 m)	-0.3
BH20-02B	Sept. 23, 2020	5940983	630616	4.9 (747.7 m)	Operational	1.7 (May 2022)	1.9 (750.6 m)	1.7 (750.8 m)	-0.2

(1) Updated on September 9, 2022, with approximate accuracy of ± 3 m

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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.

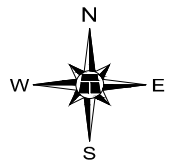
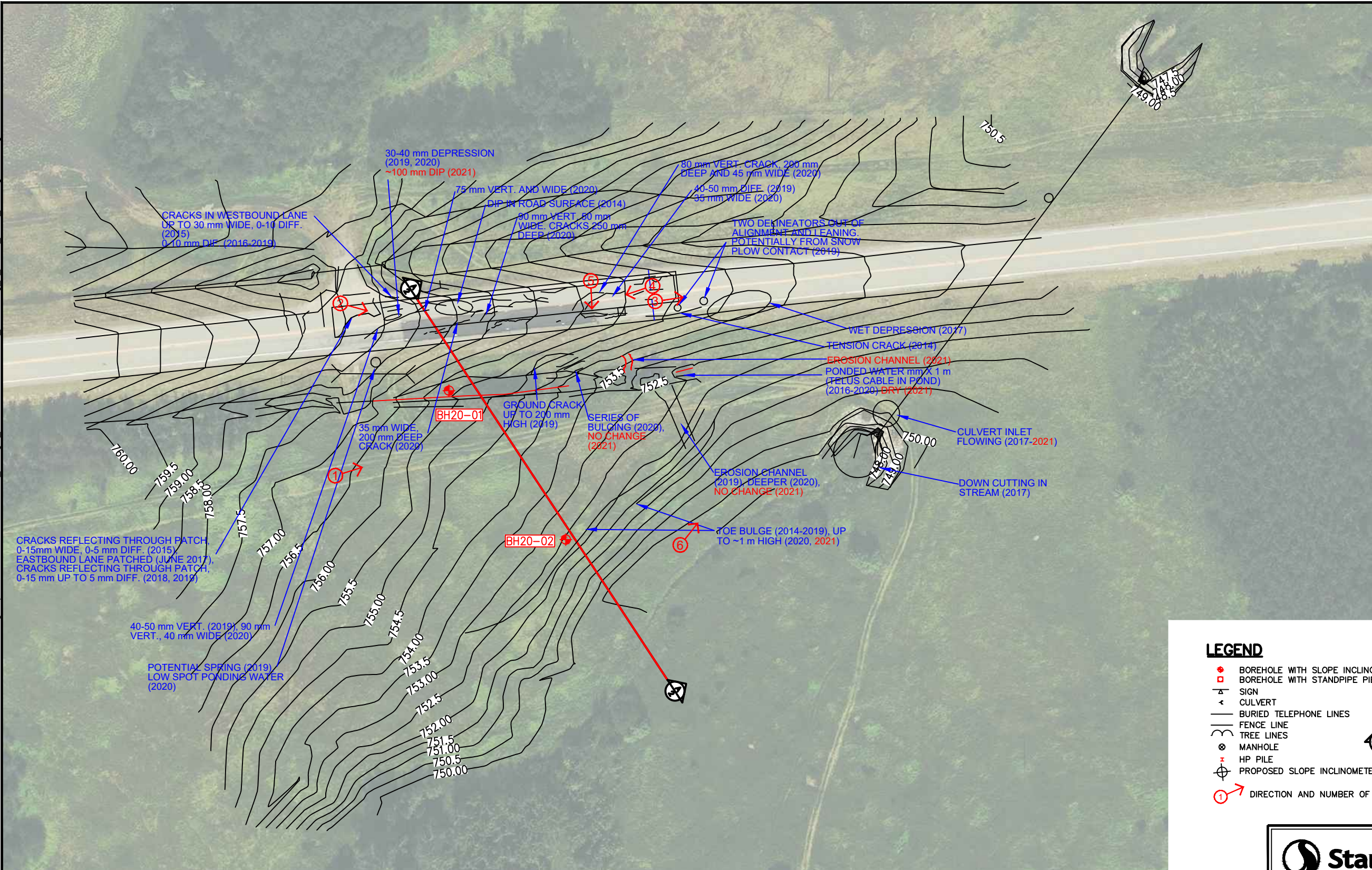
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Attachment: Figure 1 – Site Plan
BH20-02 Slope Inclinator Plots
BH21-01 Slope Inclinator Plots
BH21-02 Slope Inclinator Plots
Standpipe Piezometer Level Depth vs Time Plot
Standpipe Piezometer Level Elevation vs Time Plot

\\Cd1001-c200\workgroup\1233\active\1233\15222\03_data\gis_cad\cad\NC81\Section_B\2021\fig_1_nc081_2021_investigation.dwg - 2-SITE PLAN - Oct. 08, 2021



LEGEND

- BOREHOLE WITH SLOPE INCLINOMETER
- BOREHOLE WITH STANDPIPE PIEZOMETER
- SIGN
- CULVERT
- BURIED TELEPHONE LINES
- FENCE LINE
- TREE LINES
- MANHOLE
- HP PILE
- PROPOSED SLOPE INCLINOMETER (SI) IN PILE
- DIRECTION AND NUMBER OF PHOTO
- CROSS SECTION LOCATION

NOTES:

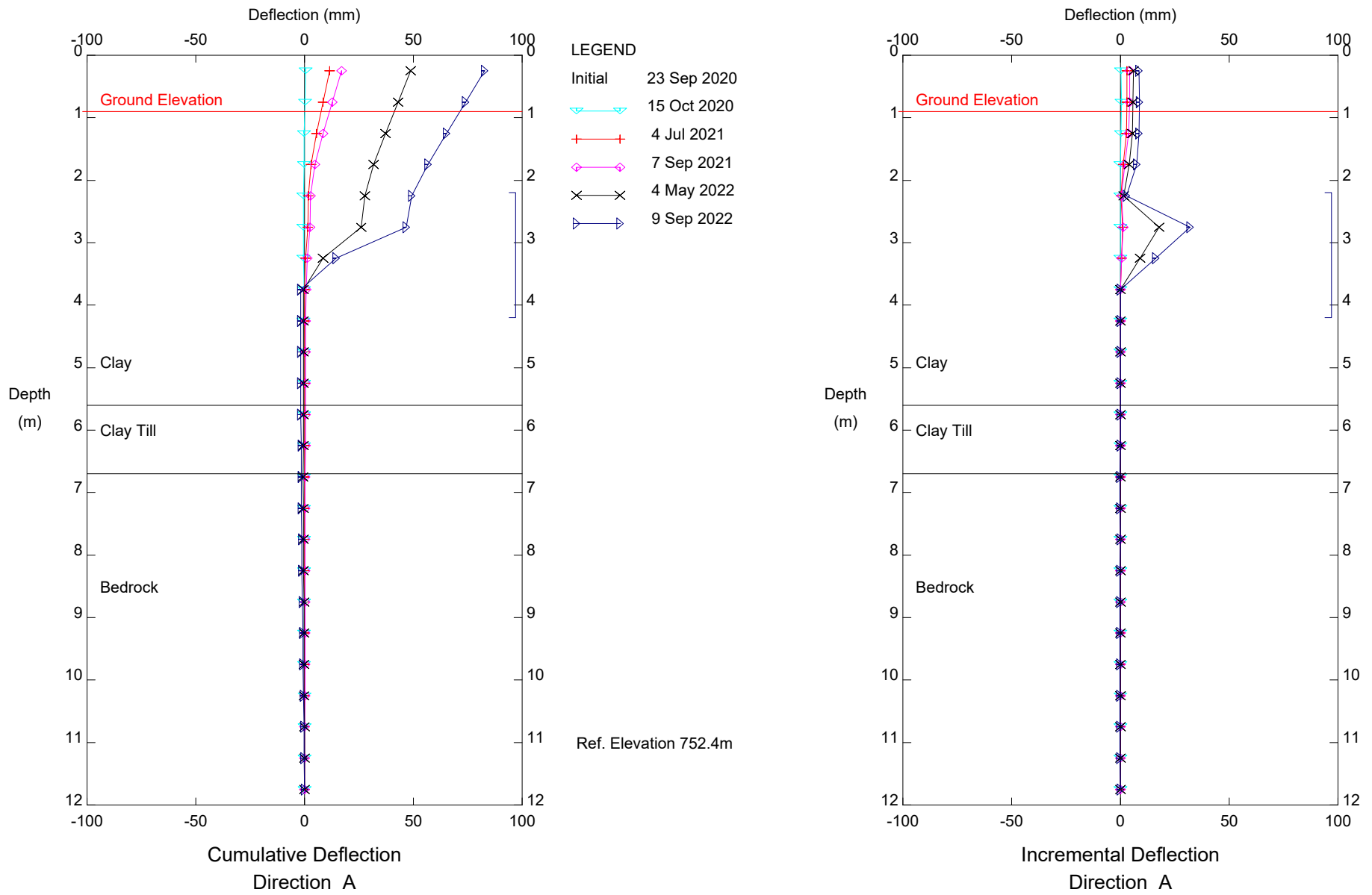
1. FEATURE LOCATIONS ARE APPROXIMATE.
2. PREVIOUS OBSERVATIONS SHOWN IN BLUE
3. 2021 OBSERVATIONS SHOWN IN RED

Stantec
 STANTEC CONSULTING
 400-10220 103 AVENUE NW
 EDMONTON, ALBERTA, CANADA
 T5J 0K4

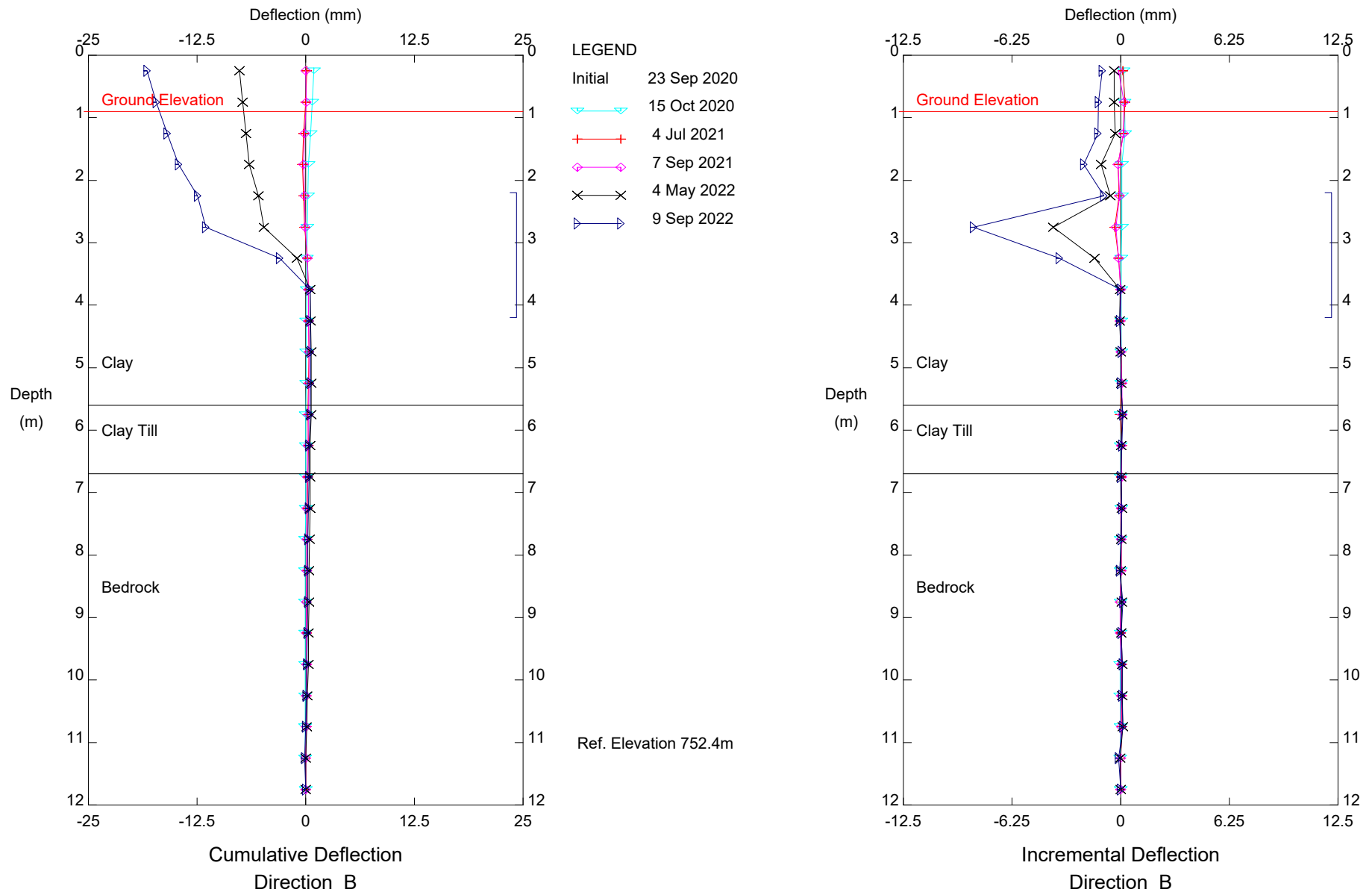
ALBERTA TRANSPORTATION
 GEOHAZARD MONITORING PROGRAM
 NC81 EVANSBURG SLIDE
 SITE PLAN

DRAWN	ML	CHECK	CM	APPROVE	LC
DATE	02 SEPT 2021	SCALE	AS SHOWN	PROJECT #	123315222

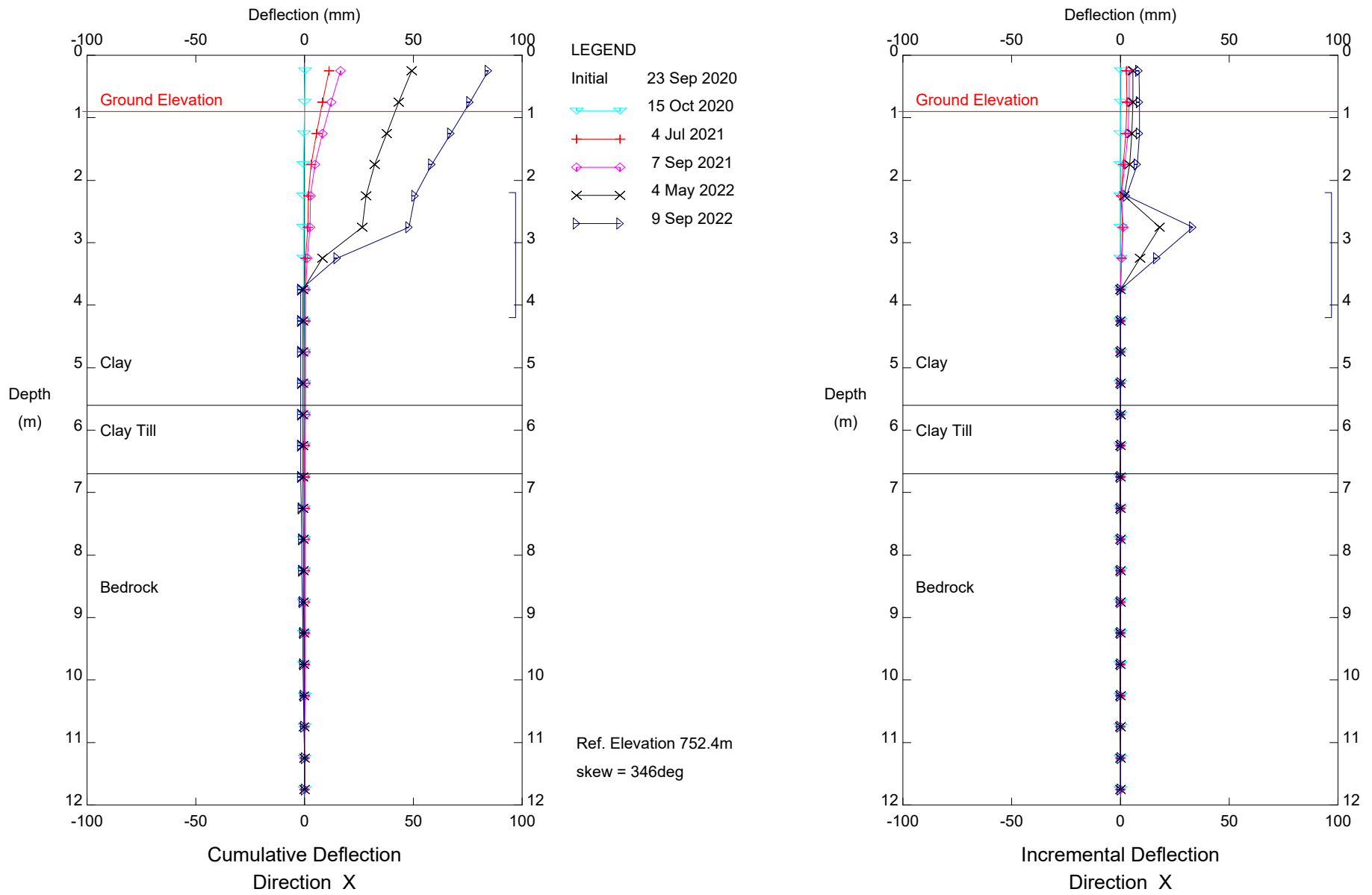
FIGURE - 1



NC81 - 16A Evansburg, Inclinometer BH20-02
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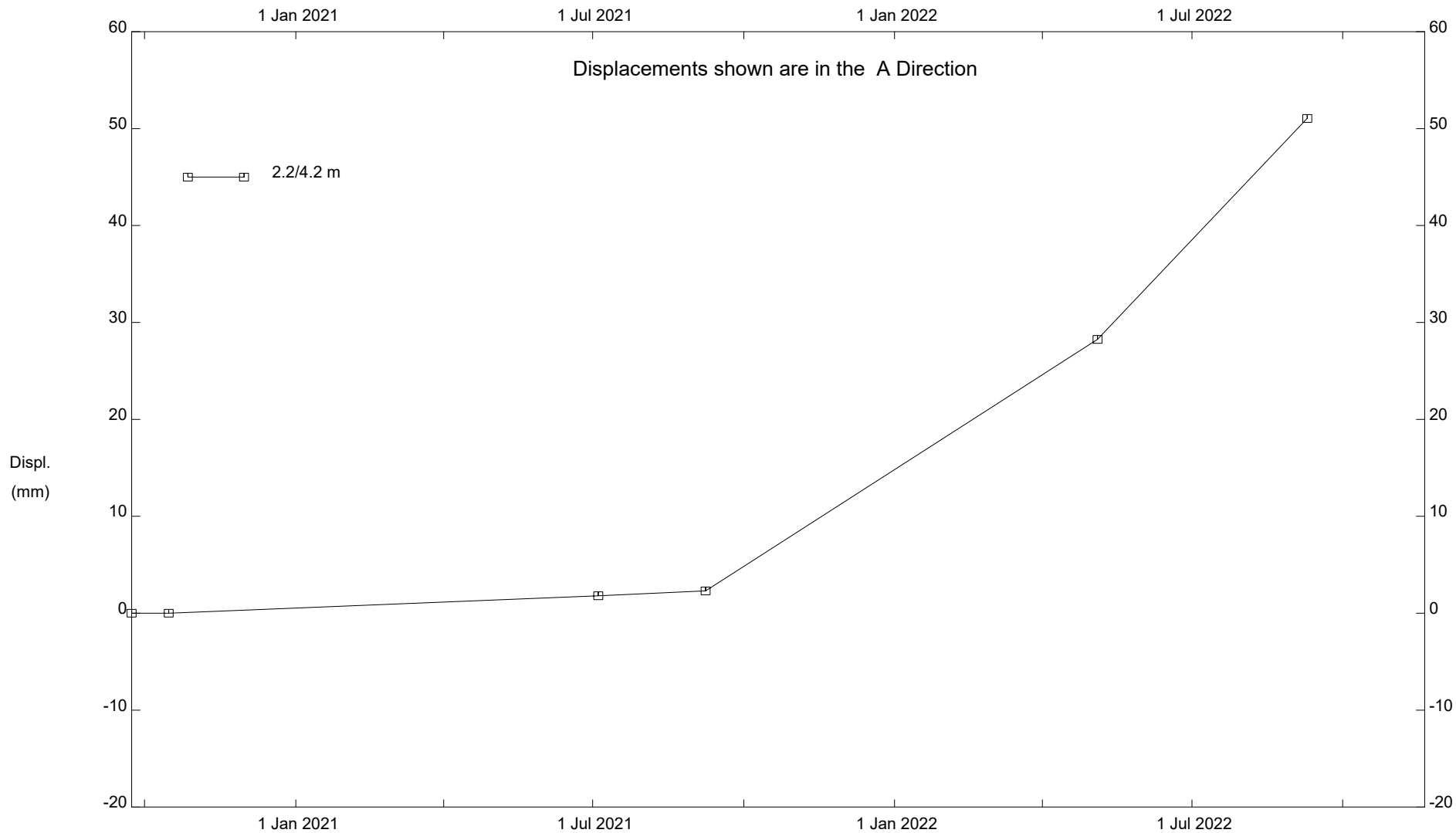


NC81 - 16A Evansburg, Inclinometer BH20-02
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NC81 - 16A Evansburg, Inclinometer BH20-02
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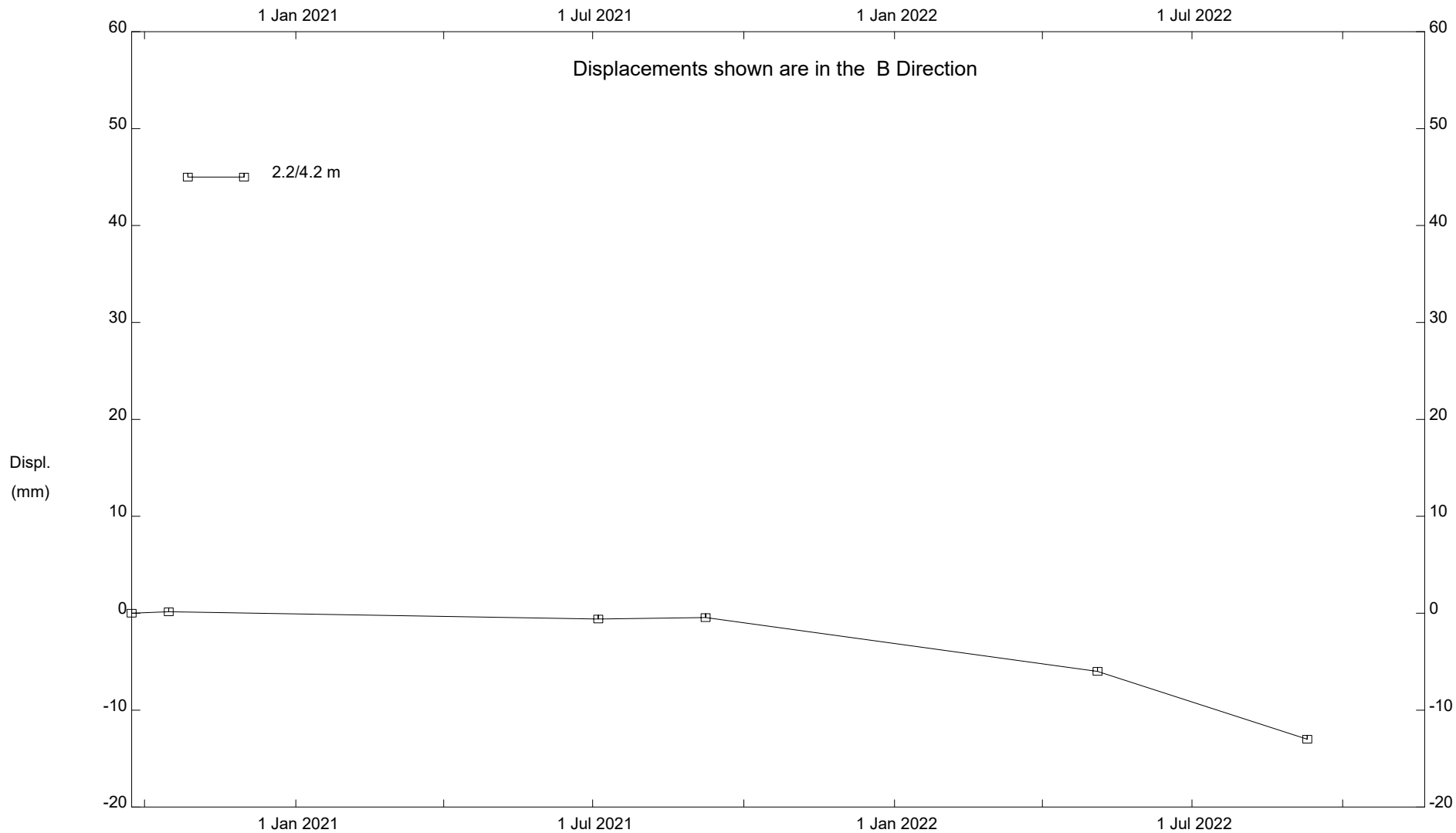
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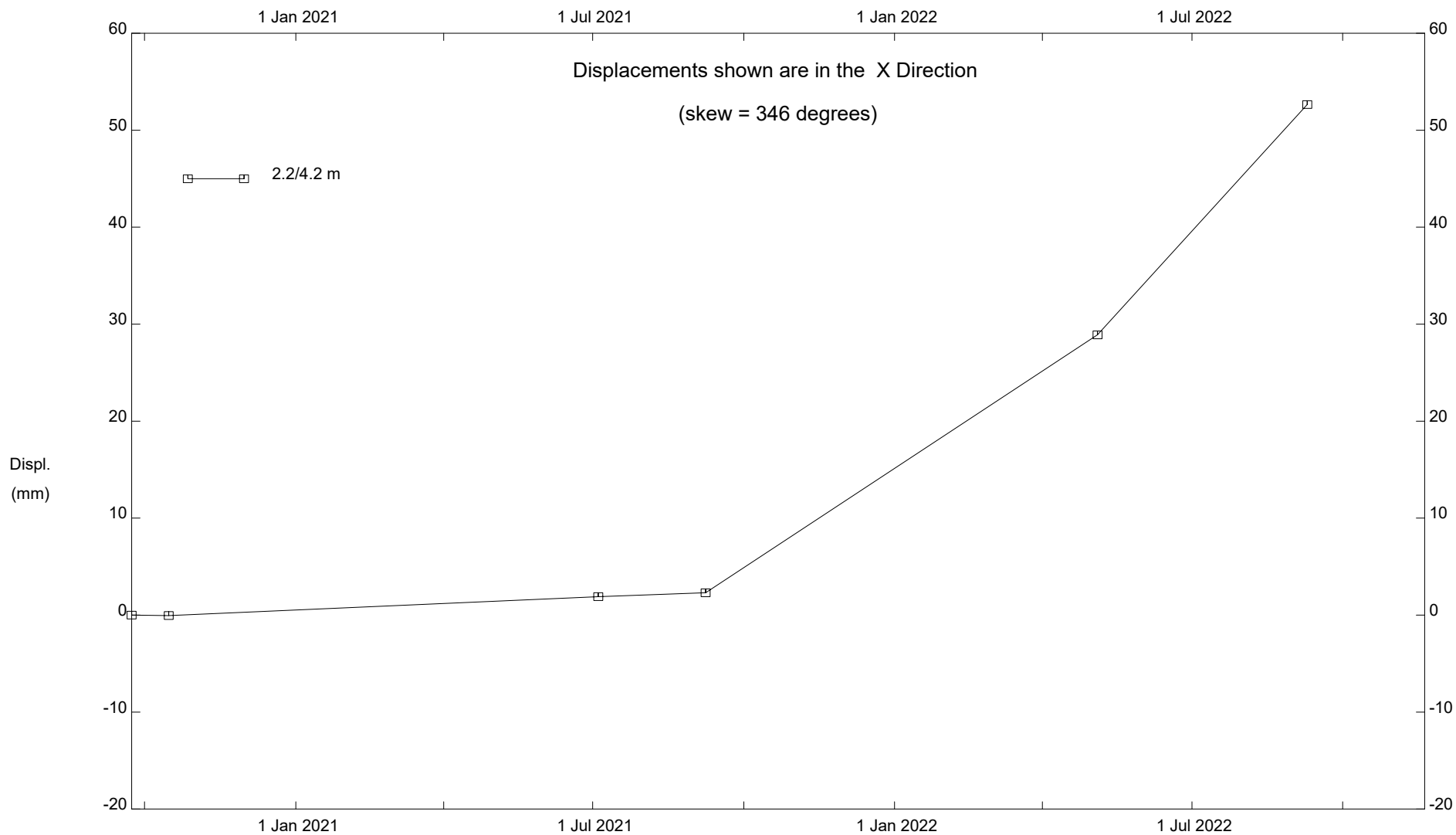
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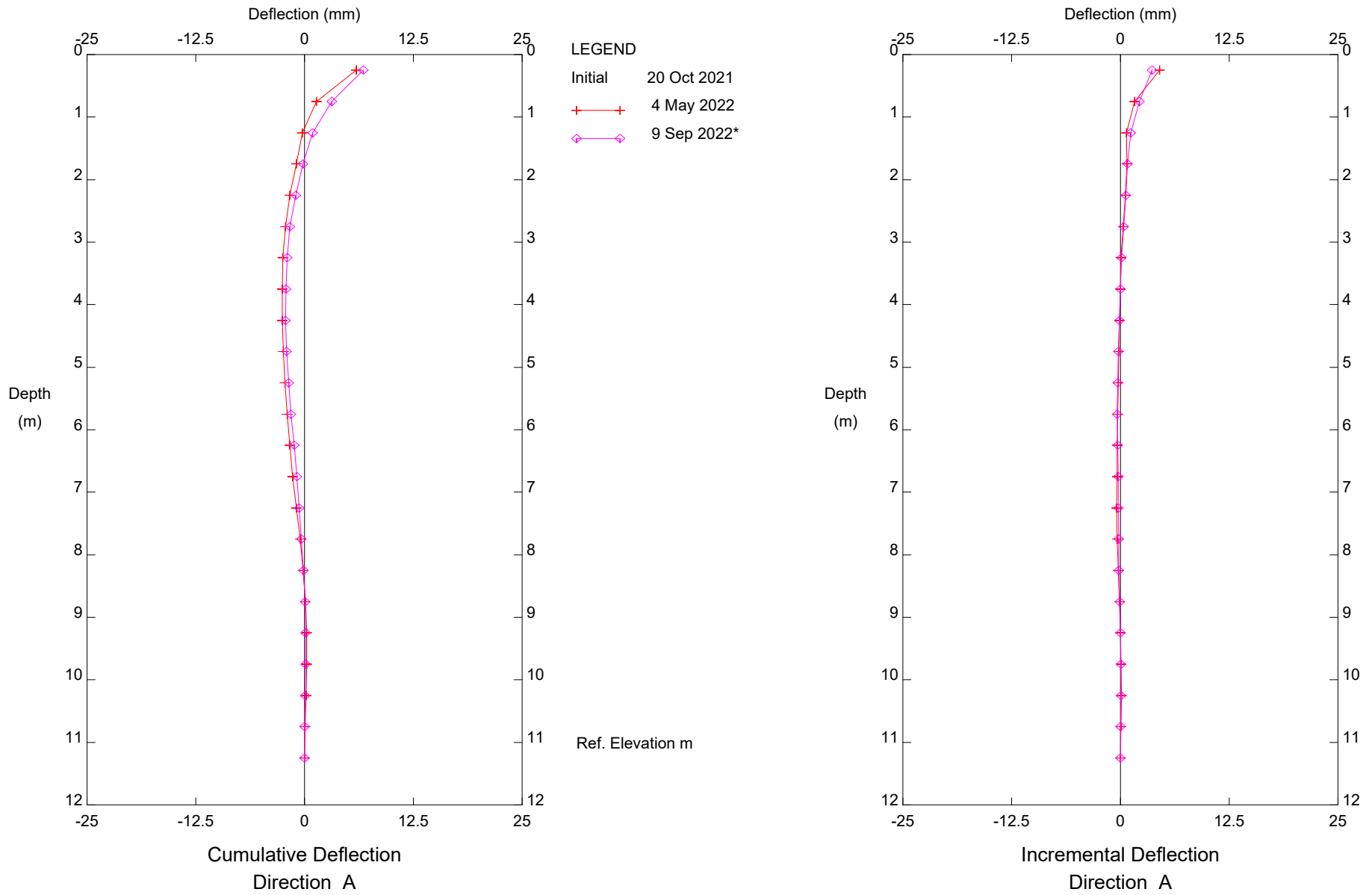
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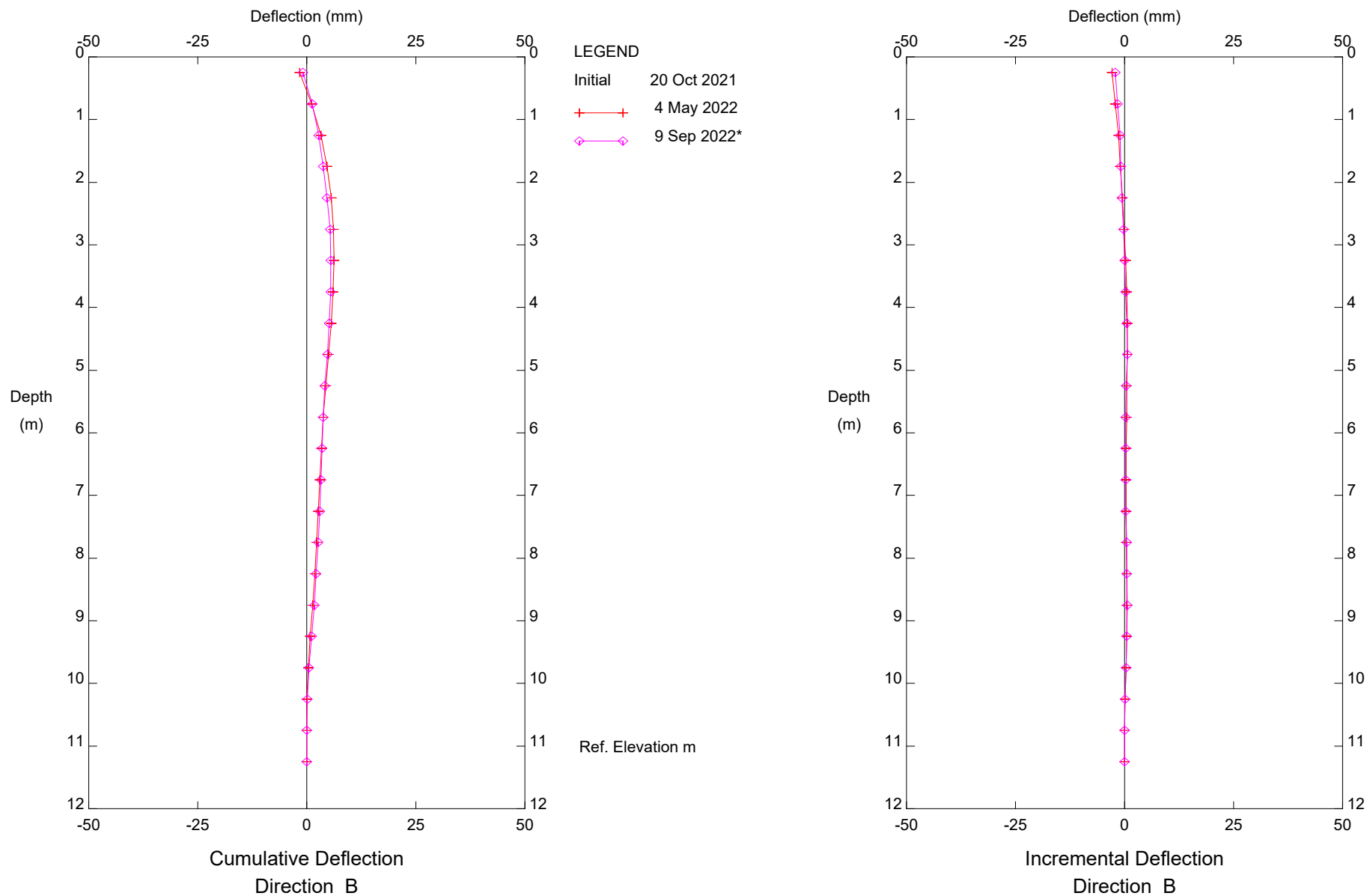
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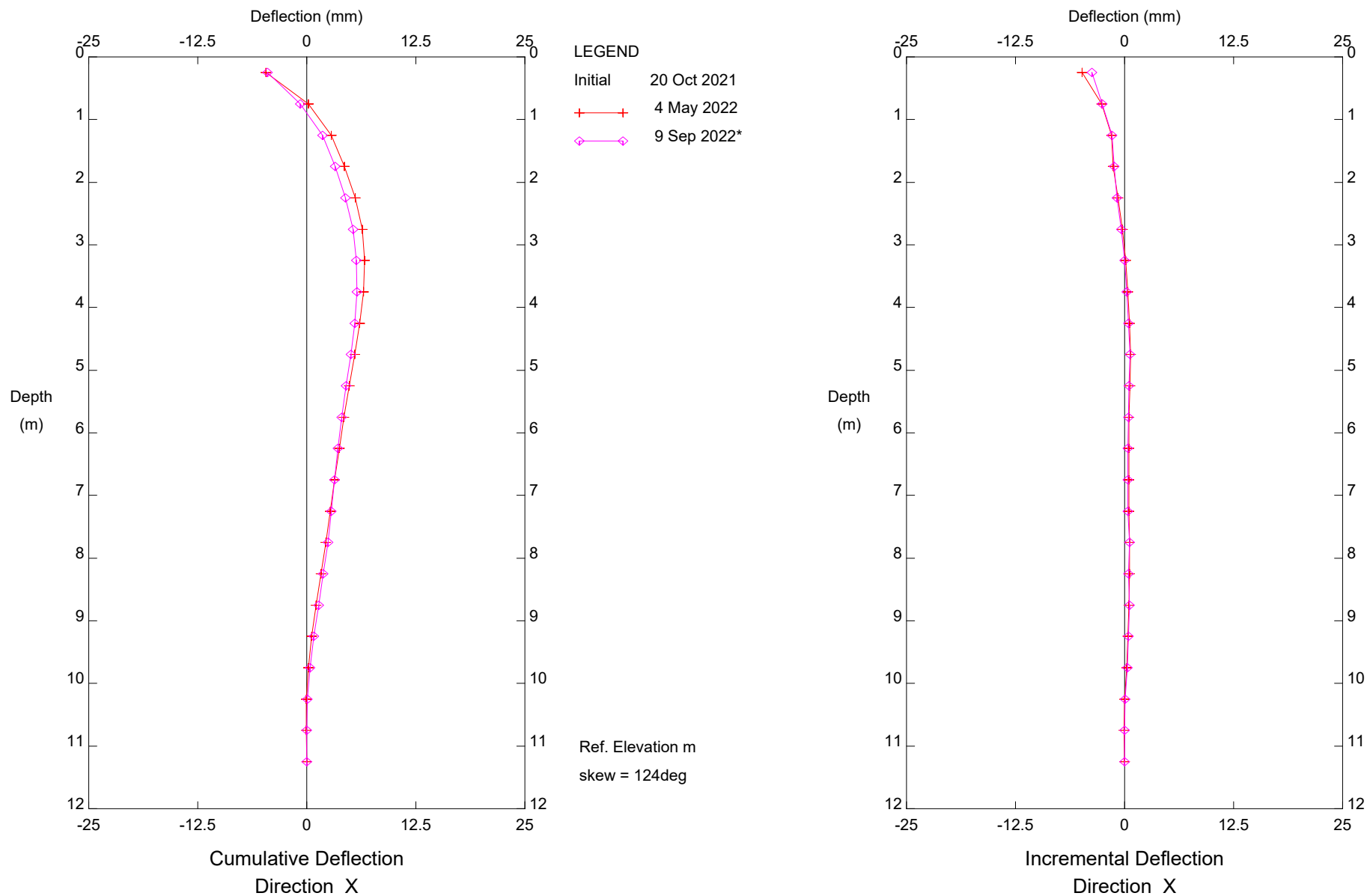
NC81 - 16A Evansburg, Inclinator BH 21-01
 Alberta Transportation

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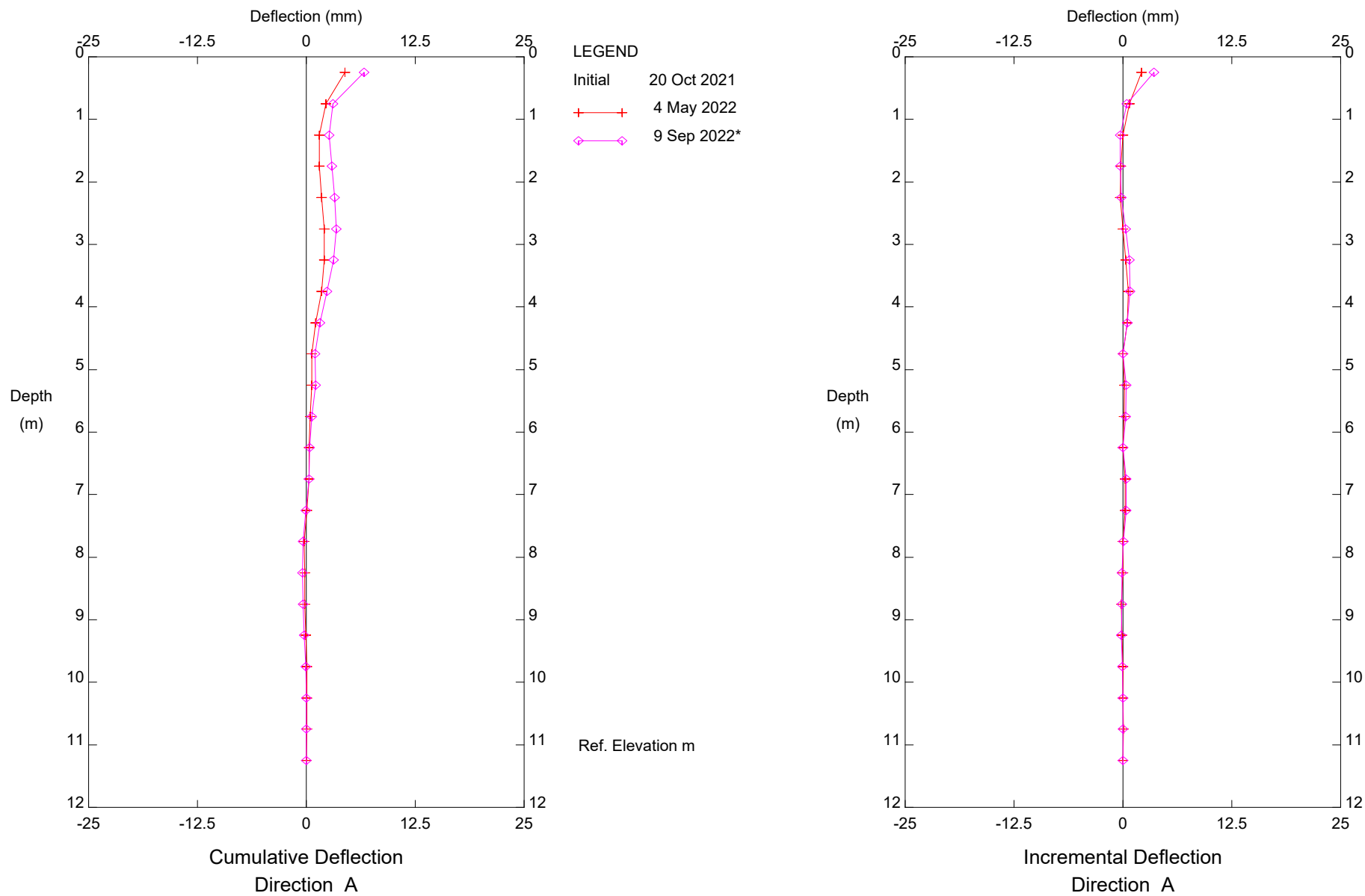
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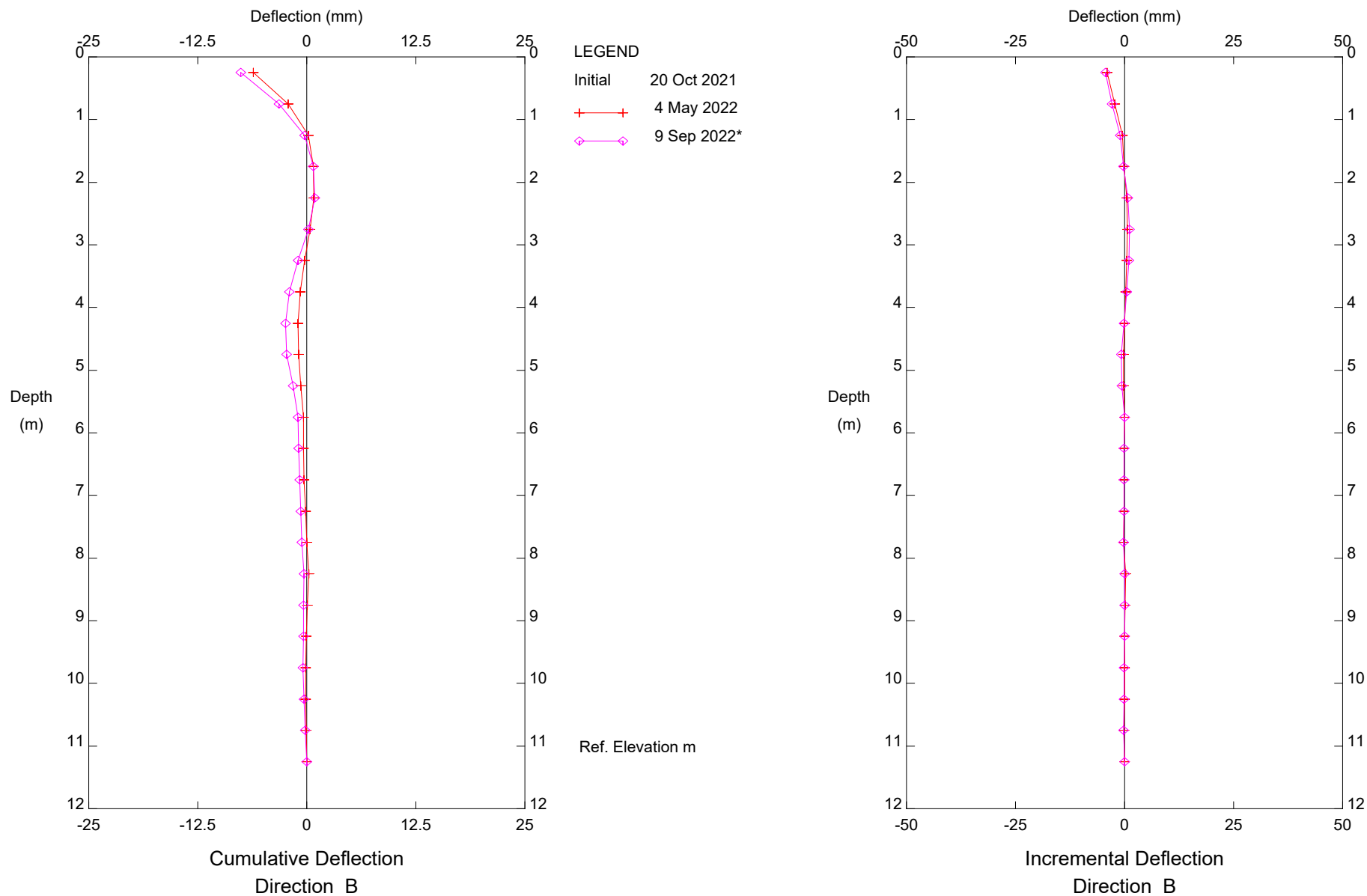
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NC81 - 16A Evansburg, Inclinator BH 21-02
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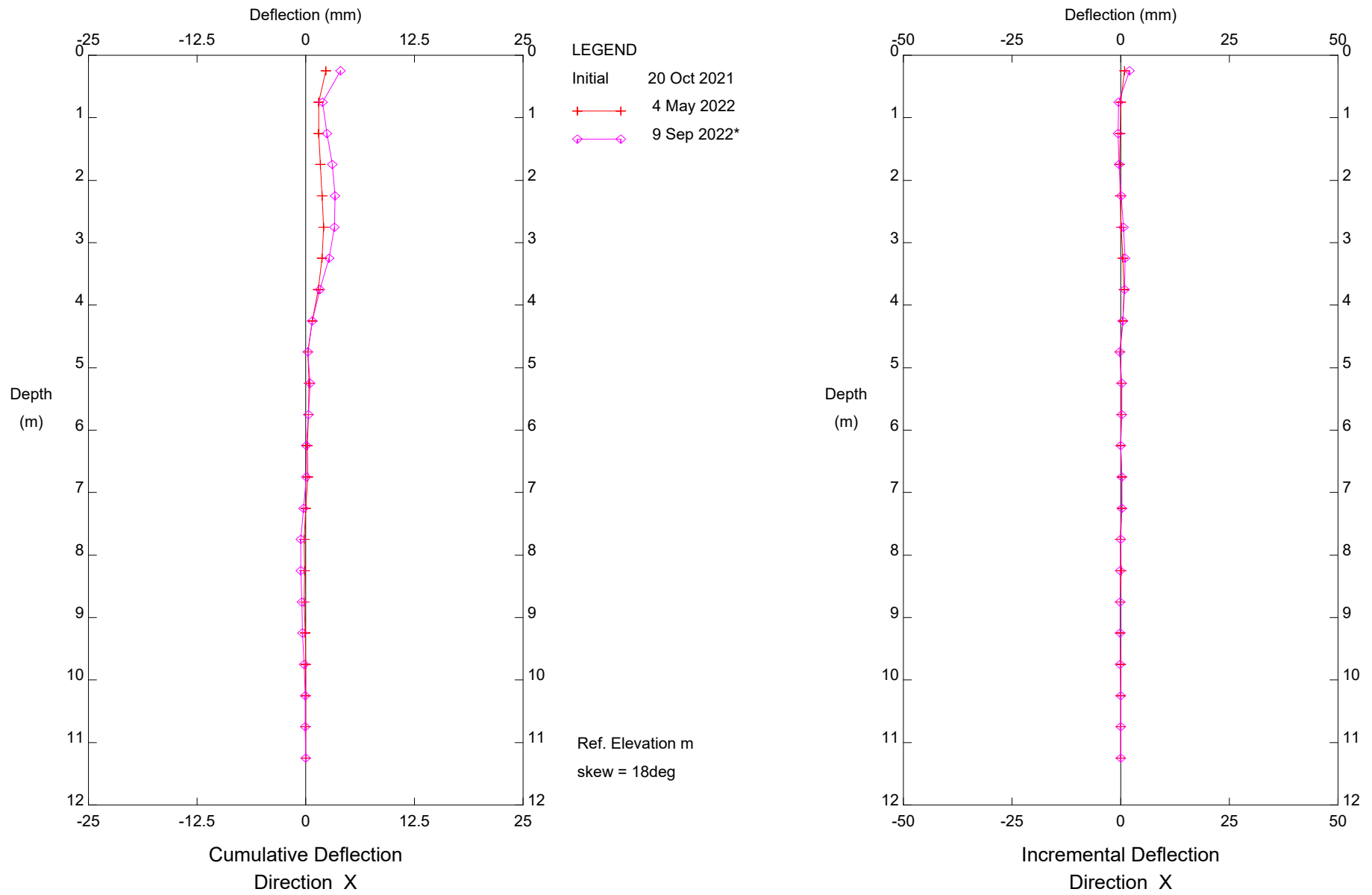
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