



TECHNICAL MEMORANDUM

DATE May 23, 2025

Reference No. CA0029692.2934-TM-03-Rev0

TO Vanessa Heilman, P.Eng.
City of Saskatoon

CC

FROM Blaise Wilson, Hung Vu

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hung.vu@wsp.com

NUTANA SLOPE STABILITY UPDATE – MAY 2025

1 INTRODUCTION

WSP Canada Inc. (WSP) was retained by the City of Saskatoon (COS) to complete the monitoring of select geotechnical instrumentation and provide the monitoring data results for the slope failures (referred to as the west slide and east slide) at the Nutana Slope Instability site. Locations of the slope inclinometers and tilt plates are shown in Figure 1.

This memorandum must be read and used in conjunction with the Study Limitations provided in Section 5 that follows the main text and forms an integral part of this document. The reader is specifically directed to this information as it is essential for the proper use and interpretation of this document.

1.1 Background

The west slide occurred in June 2012 and impacted a slope area approximately 70 m (230 ft) long and 40 m (130 ft) wide. It is most pronounced in the back yards of 229, 231, 233/235, and 237/239 11th Street East, through the back alley, and into the back yard of 222 Saskatchewan Crescent East.

The east slide occurred in June 2013 and impacted a slope area of approximately 50 m (165 ft) long and 30 m (100 ft) wide. It is most pronounced in the back yards of 303, 305, 307, and 309 11th Street East, through the back alley, and into the back yard of 306, 310 and 316 Saskatchewan Crescent East.

2 FIELD MONITORING RESULTS

Instrumentation monitoring of the slope inclinometers and tilt plates were collected by WSP on May 9, 2025. The monitoring results for this period are summarised below. Photos of the site conditions are attached to this memorandum in Appendix A. The results of the instrumentation monitoring are presented in Appendix B.

2.1 Slope Inclinometer Data

The slope inclinometer plots are shown in Appendix B.

- Inclinometer COS-13-002 plots continue to show a slight drift, with insignificant cumulative movement, less than 2.5 mm (or 0.10 in between July 30, 2013 and May 9, 2025).

- Inclinometer COS-13-004 has in recent years indicated drift both in the direction parallel to and along the direction of the laneway (perpendicular to the downslope direction). The inclinometer plots indicate approximately 3.9 mm (or 0.15 in) of movement in the upslope direction between August 12, 2024 and May 9, 2025.
- Inclinometer COS-13-005 indicated insignificant movement (less than 2 mm or 0.08 in) between August 13, 2020 and May 9, 2025.
- Inclinometer 20-109 has indicated approximately 27 mm of cumulative downslope movement between October 28, 2020 and May 9, 2025, including 3.0 mm (0.12 in) of movement between August 12, 2024 and May 9, 2025. The zone of movement is approximately 2.5 m below the top of casing. The rate of slope movement has increased from approximately 1 mm/yr between October 28, 2020 and May 5, 2022, to approximately 5 mm/yr between May 5, 2022 and May 9, 2025.
- Inclinometer 20-111 plots continue to show drifts in upslope direction, with approximately 4.5 mm (0.18 in) of cumulative movement between October 28, 2020 and May 9, 2025.

2.2 Tilt Plate Data

The results of the tilt plate monitoring are shown on Figure B1 for the City of Saskatoon tilt plates, and in Figure B2 for the tilt plates installed on Saskatoon Light and Power power poles:

- Tilt plates TP4, TP5, and TP6 indicate insignificant changes in angle of tilt (less than 0.05 degrees) between August 23, 2013 and May 9, 2025.
- Tilt plate TP7 could not be accessed at the time of instrumentation monitoring and will be read during a future visit.
- Tilt Plate SLP3 indicated a change in angle of tilt of approximately 0.19 degrees, towards the north, between August 12, 2024 and May 9, 2025. However, past readings for SLP3 have been erratic and appear to be affected by seasonal changes.
- Tilt Plate SLP4 indicated an insignificant change in angle of tilt (less than 0.05 degrees) between August 12, 2024 and May 9, 2025. The cumulative change in angle of tilt from May 2019 to May 2025 is approximately 0.30 degrees towards the north.
- Tilt plate SLP5 indicated an insignificant change in angle of tilt (less than 0.05 degrees) between August 12, 2024 and May 9, 2025.
- Tilt plate SLP6 indicated a change in angle of tilt of approximately 0.07 degrees, towards the north, between August 12, 2024 and May 9, 2025.

3 RECOMMENDATIONS

Slope inclinometer 20-109 indicates a zone of movement a depth of approximately 2.5 m below the top of casing with a rate of movement approximately 5 mm/yr between May 5, 2022 and May 9, 2025, an increase from 1 mm/yr for the period between October 2020 and May 2022. Inclinator 20-111 plots continue to show drifts in upslope direction, with approximately 4.5 mm (0.18 in) of cumulative movement between October 28, 2020 and May 9, 2025.

WSP recommends that the intended additional monitoring trip be completed for the two inclinometers on the west slide (20-109 and 20-111) in the summer.

4 CLOSURE

This memorandum provides a factual summary of the instrumentation monitoring results from the May 2025 period. WSP is providing this information for the specific use of the City of Saskatoon. No other party may rely on the information provided herein, or any portion thereof. This memorandum is not intended to serve as a geotechnical assessment and therefore should not be used as the geotechnical basis for any future developments.

We trust that this memorandum provides you with the information you require at this time.

WSP Canada Inc.



Blaise Wilson, P.Eng.
Senior Geotechnical Engineer

Hung Vu, P.Eng., Ph.D.
Senior Principal Geotechnical Engineer

BW/HV/

Attachments: Figure 1: Instrumentation Plan
Appendix A: Site Photographs
Appendix B: Instrumentation Monitoring Results

[https://wsponlinecan.sharepoint.com/sites/ca-ca00296929234/shared documents/06. deliverables/03 may2025/ca0029692.9234-tm-03-rev1 - cos nutana monitoring update_may2025.docx](https://wsponlinecan.sharepoint.com/sites/ca-ca00296929234/shared%20documents/06.%20deliverables/03%20may2025/ca0029692.9234-tm-03-rev1-cos%20nutana%20monitoring%20update_may2025.docx)

5 STUDY LIMITATIONS

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Figures

Path: \\ccorp.plhwan.net\CA\CA\CA\K300\GIS\ Client\CityOfSaskatoon\Saskatoon\09_PROJECTS\CA0029692.9234-FIG001.dwg | File Name: CA0029692.9234-FIG001.dwg | Last Edited By: gdl_sabedoff Date: 2024-09-18 Time: 12:56:27 PM | Printed By: gdl_sabedoff Date: 2024-09-18 Time: 12:56:05 PM



South Saskatchewan River →

D1-008 ▲

CP-1 CP-4 CP-2 CP-3

Saskatchewan Crescent

200 Area of Interest 300

200 300

TP-7 TP-5 TP-4

Melrose Avenue Victoria Avenue

11th Street

10th Street

Eastlake Avenue

LEGEND

⊕ TILT PLATE LOCATION

▲ SLOPE INCLINOMETER

● POWER POLES

303 LOT NUMBER

REFERENCE(S)

LOT LOCATIONS PROVIDED BY CITY OF SASKATOON

CITY OF SASKATOON DATUM

IMAGE OBTAINED FROM GOOGLE EARTH © 2024 GOOGLE INC. USED WITH PERMISSION. GOOGLE AND GOOGLE LOGO ARE REGISTERED TRADEMARKS OF GOOGLE INC. IMAGERY DATE: OCTOBER 14, 2023. GOOGLE EARTH IMAGE IS NOT TO SCALE.

0 10 20

1:600 METRES

CLIENT



PROJECT

NUTANA SLOPE INSTABILITY

TITLE

INSTRUMENTATION LOCATION PLAN

CONSULTANT	YYYY-MM-DD	2024-09-18
	DESIGNED	BW
	PREPARED	SL
	REVIEWED	BW
	APPROVED	HV

PROJECT NO.	CONTROL	REV.	FIGURE
CA0029692.9234	1000	0	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

APPENDIX A

Site Photographs



Photograph 1: Looking west down the back alley at the East Failure (May 9, 2025)



Photograph 2: Looking east down the back alley at the West Failure (May 9, 2025)

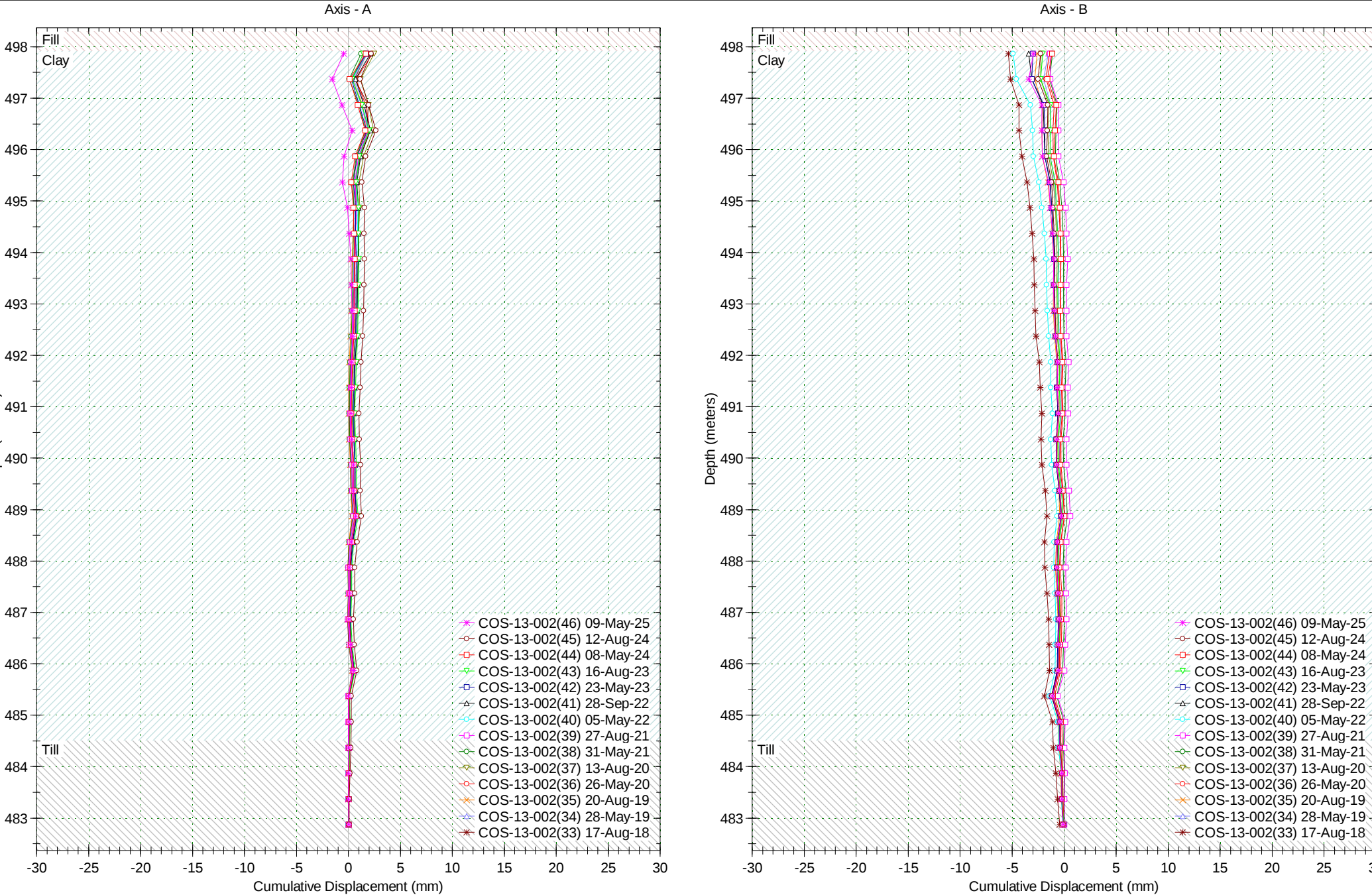
APPENDIX B

Instrumentation Monitoring Results

SLOPE INCLINOMETERS

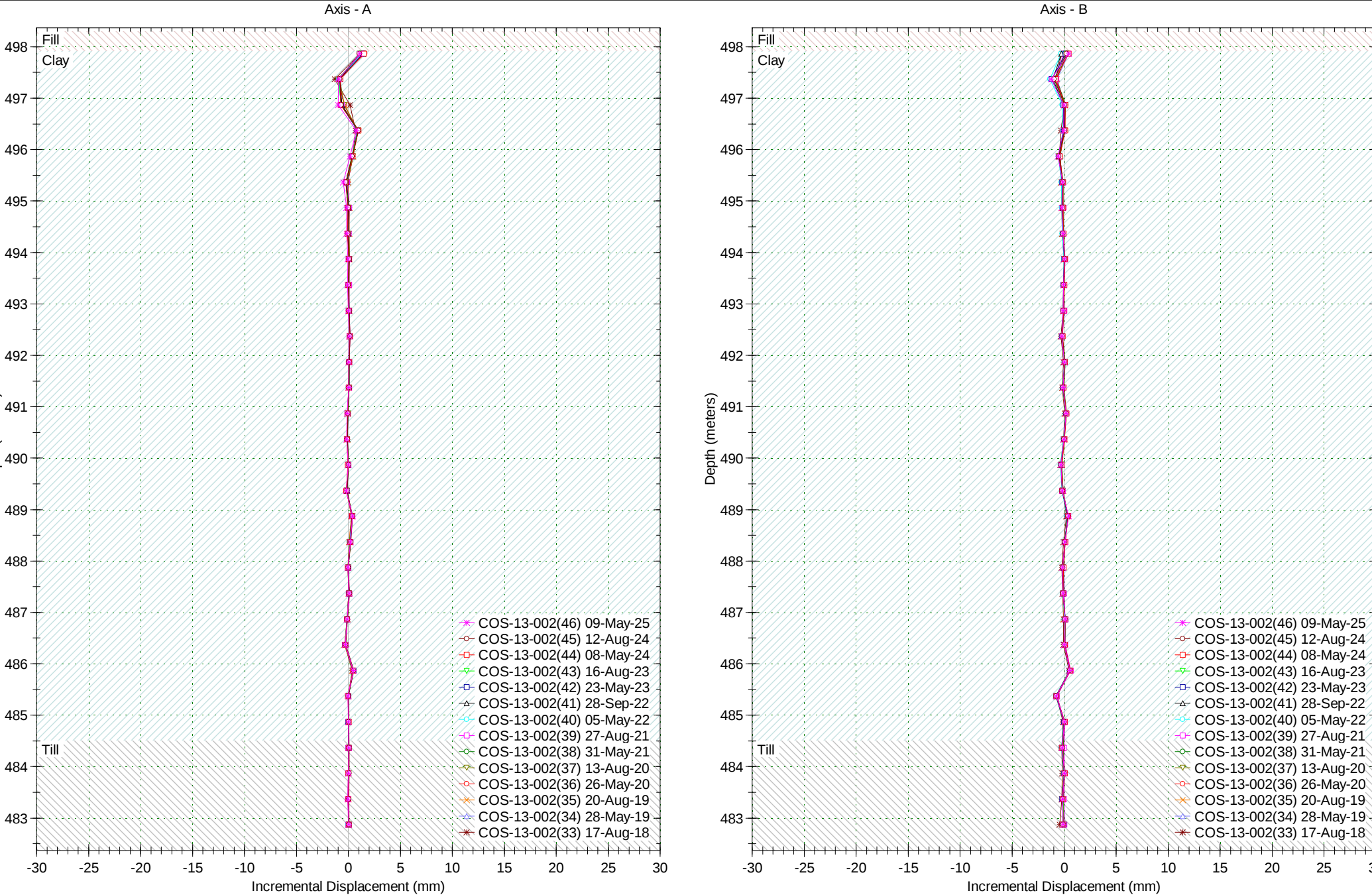
Borehole : COS-13-002
Project : Nutana Slope
Location : 307 11th St. E. (Front)
Northing : 5775567.41
Easting : 386043.54
Collar : -0.113

Spiral Correction : N/A
Collar Elevation : :498.37 meters
Reading Depth : 15.5 meters
A+ Groove Azimuth :
Base Reading : 2013 Jul 30 16:18
Applied Azimuth : 0.0 degrees



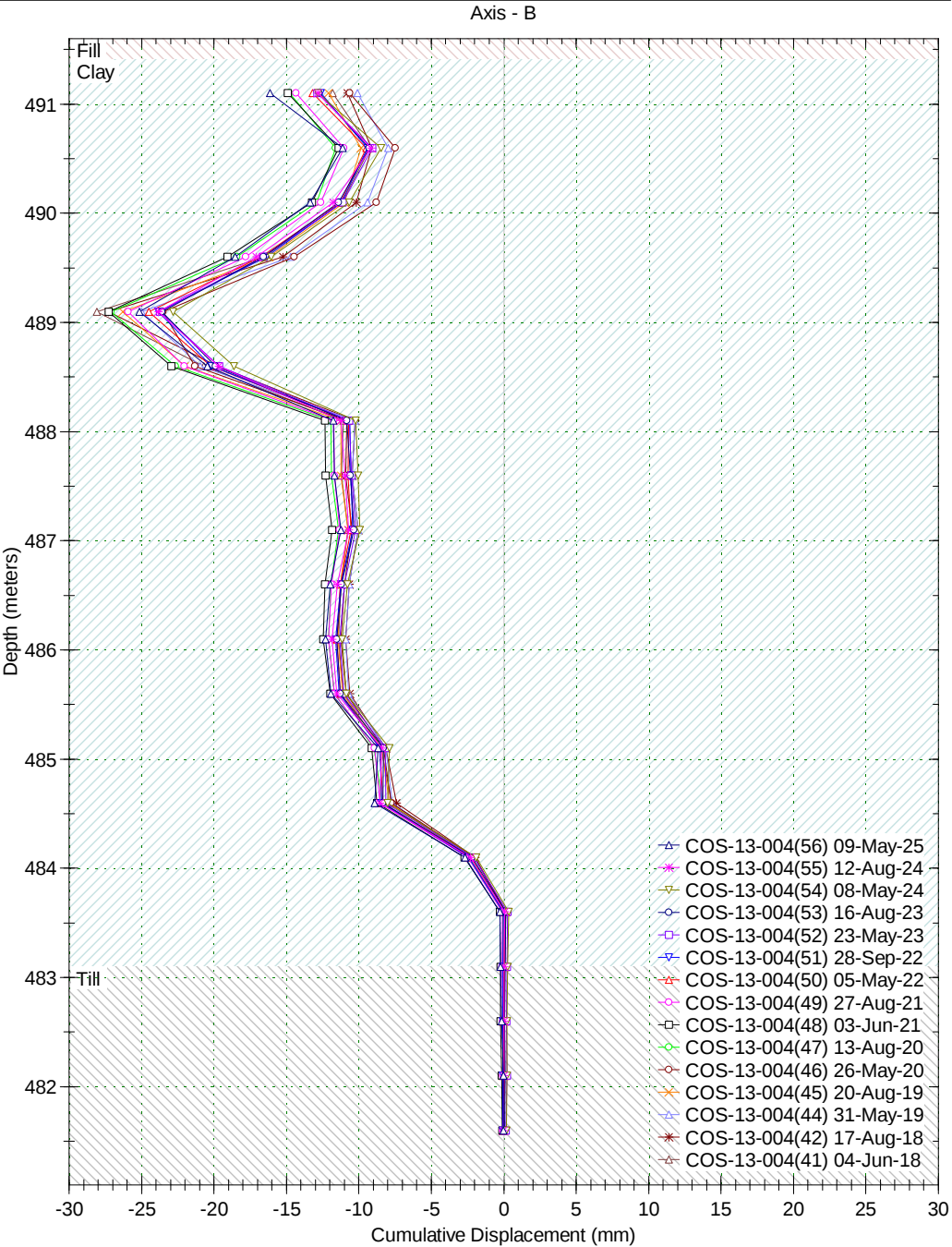
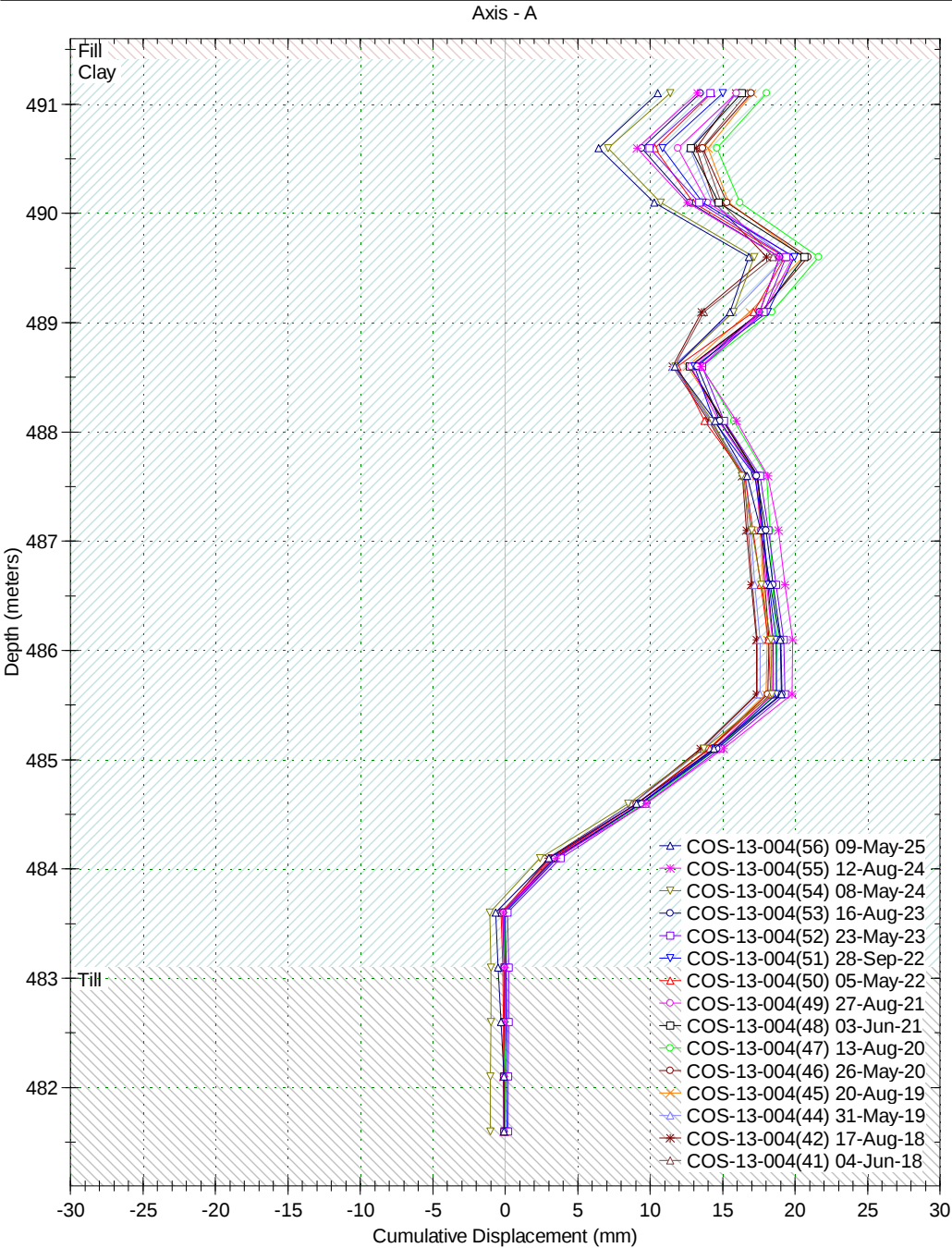
Borehole : COS-13-002
Project : Nutana Slope
Location : 307 11th St. E. (Front)
Northing : 5775567.41
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Collar Elevation : :498.37 meters
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Base Reading : 2013 Jul 30 16:18
Applied Azimuth : 0.0 degrees



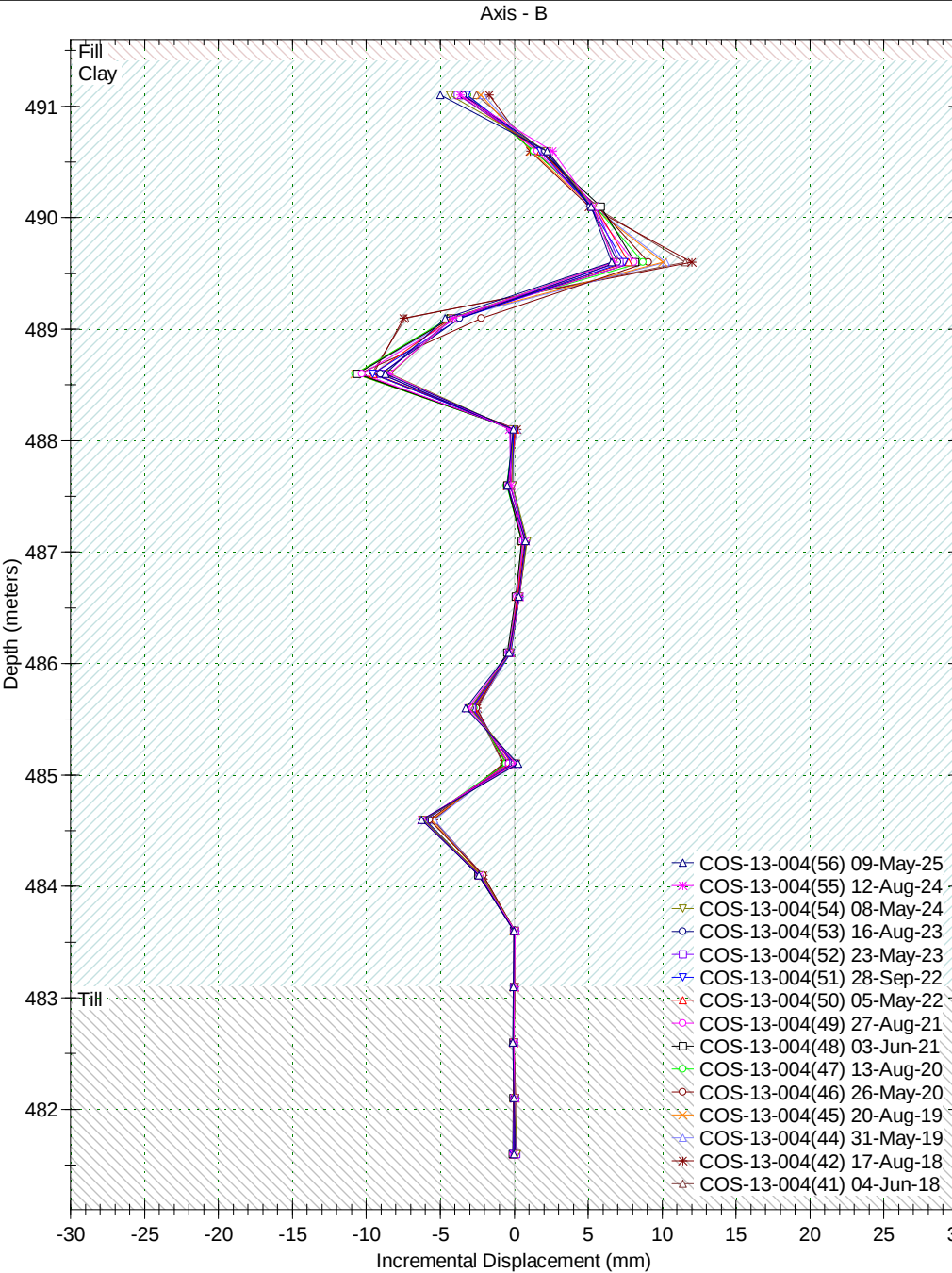
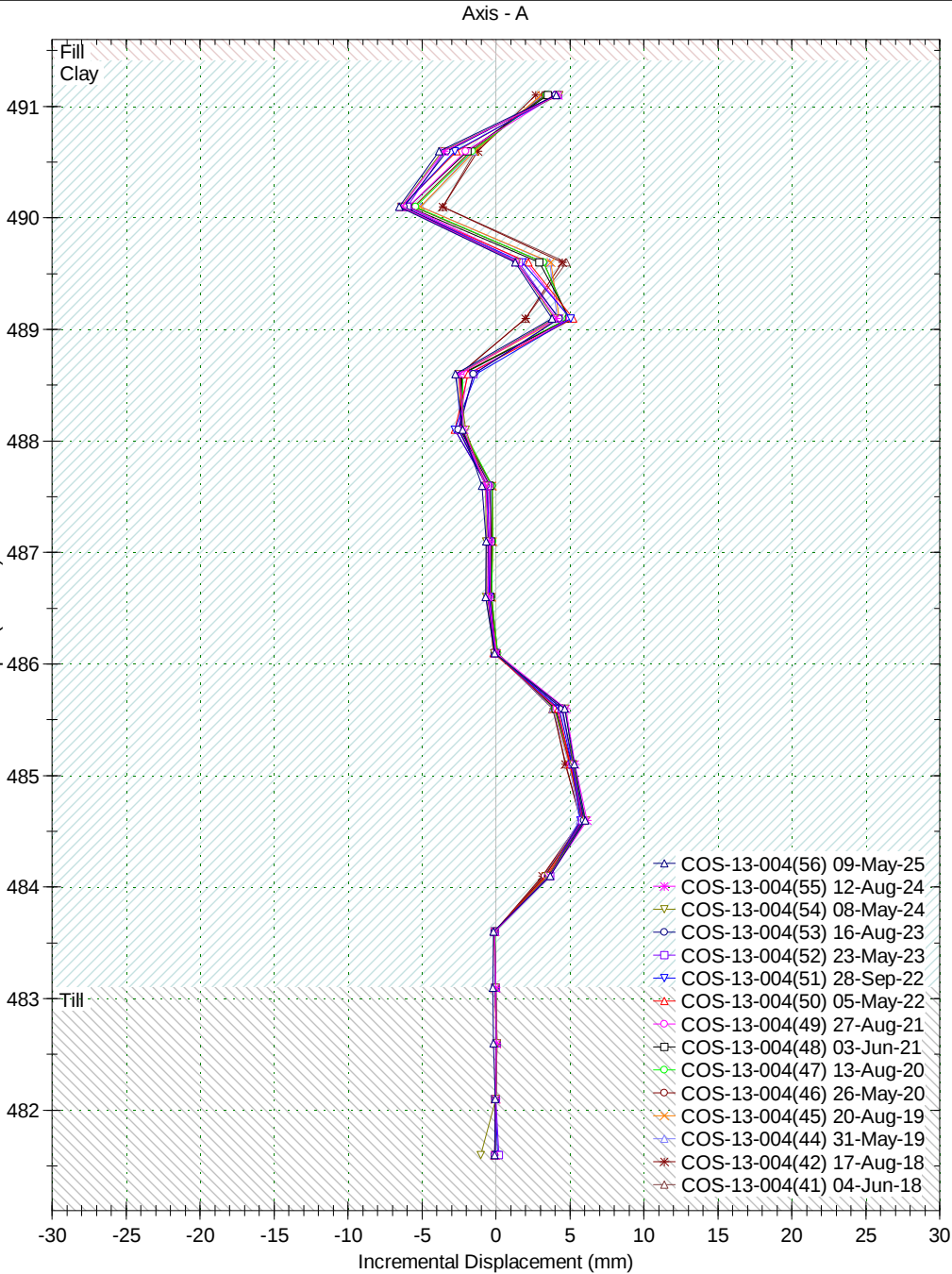
Borehole : COS-13-004
Project : Nutana Slope
Location : 307 11th. St. E. (back)
Northing : 5775604.97
Easting : 386050.63
Collar : -0.677

Spiral Correction : N/A
Collar Elevation : :491.60 meters
Reading Depth : 10.0 meters
A+ Groove Azimuth :
Base Reading : 2013 Aug 28 08:30
Applied Azimuth : 0.0 degrees



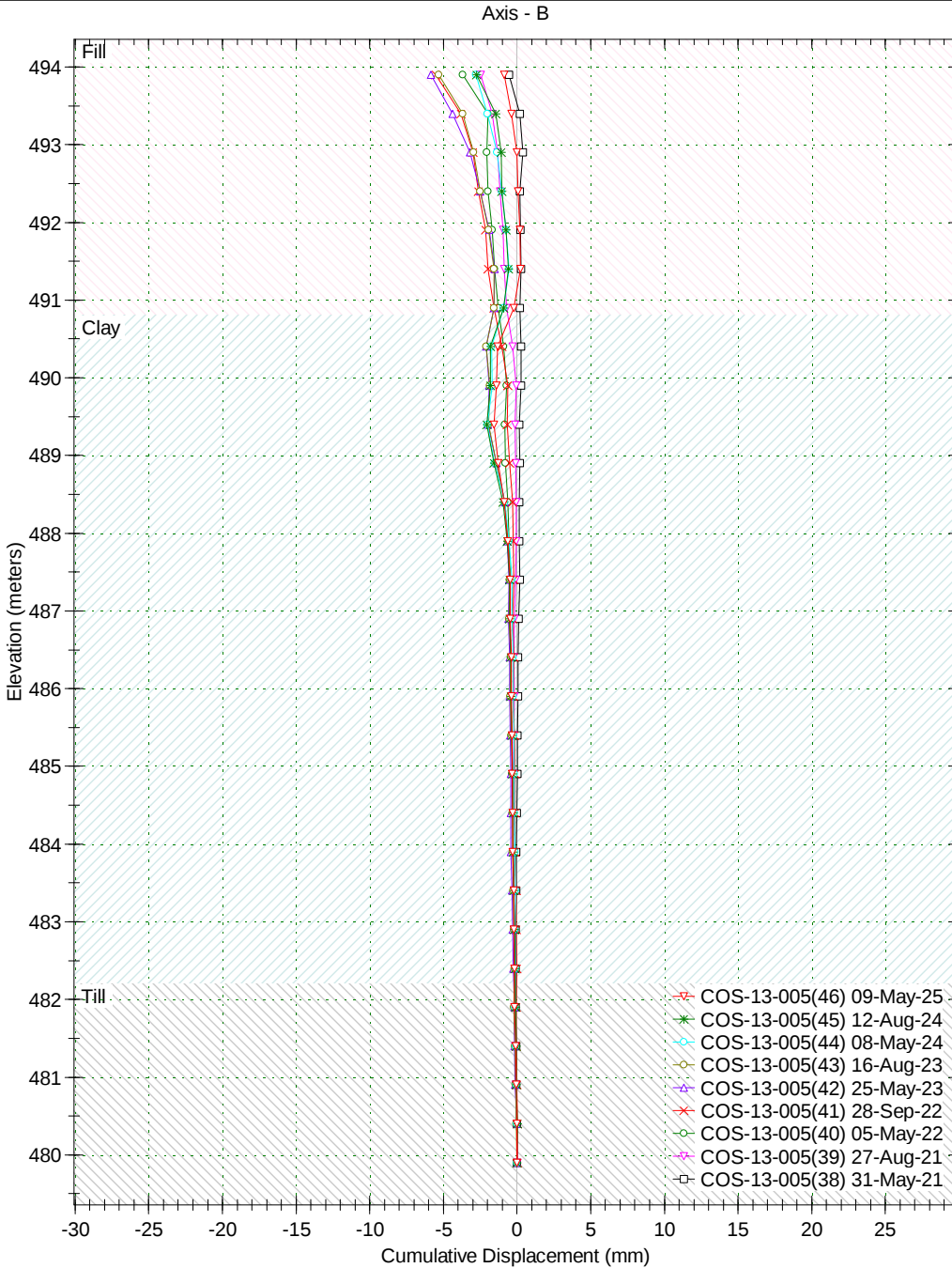
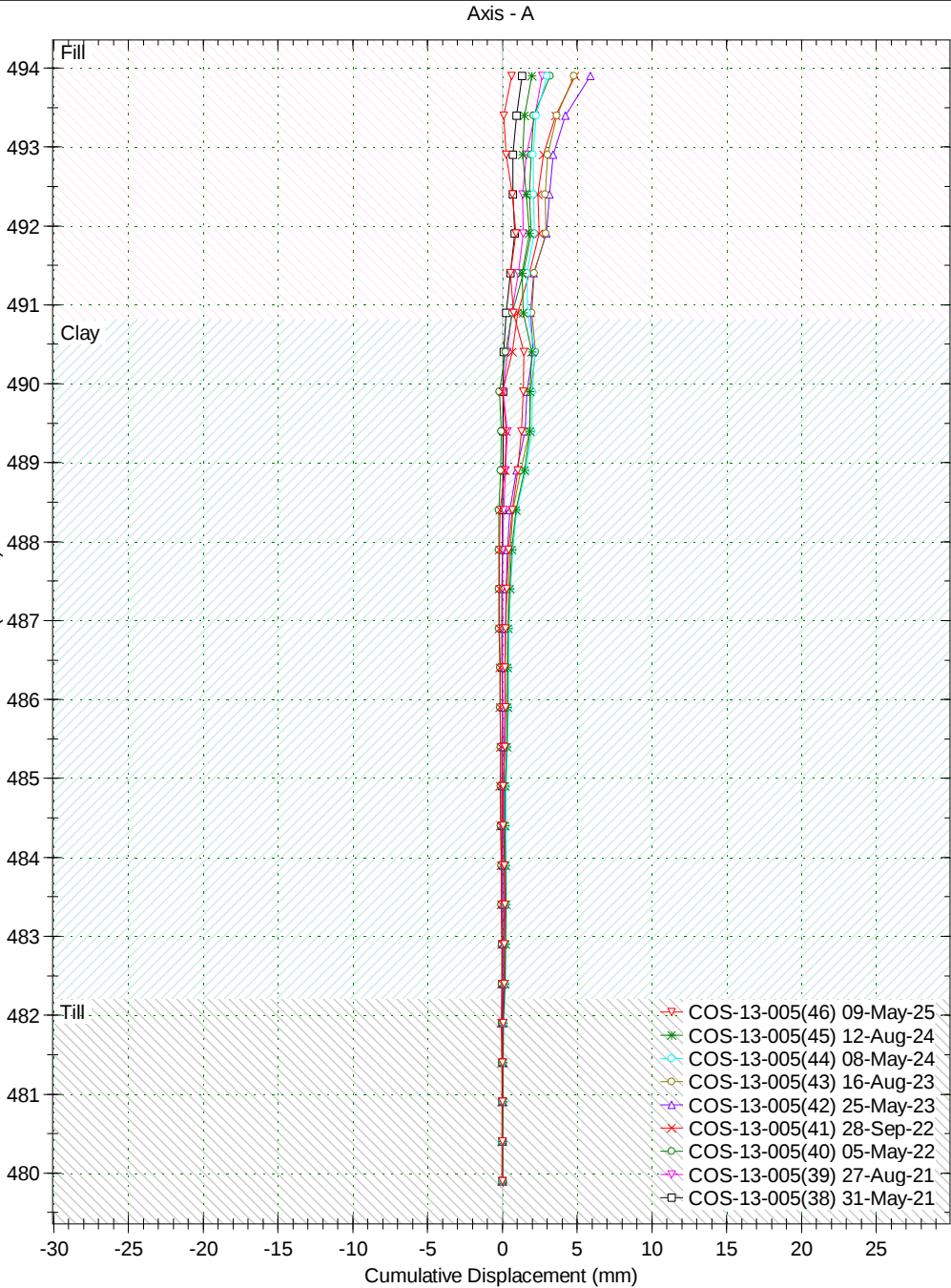
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Collar : -0.677

Spiral Correction : N/A
Collar Elevation : :491.60 meters
Reading Depth : 10.0 meters
A+ Groove Azimuth :
Base Reading : 2013 Aug 28 08:30
Applied Azimuth : 0.0 degrees



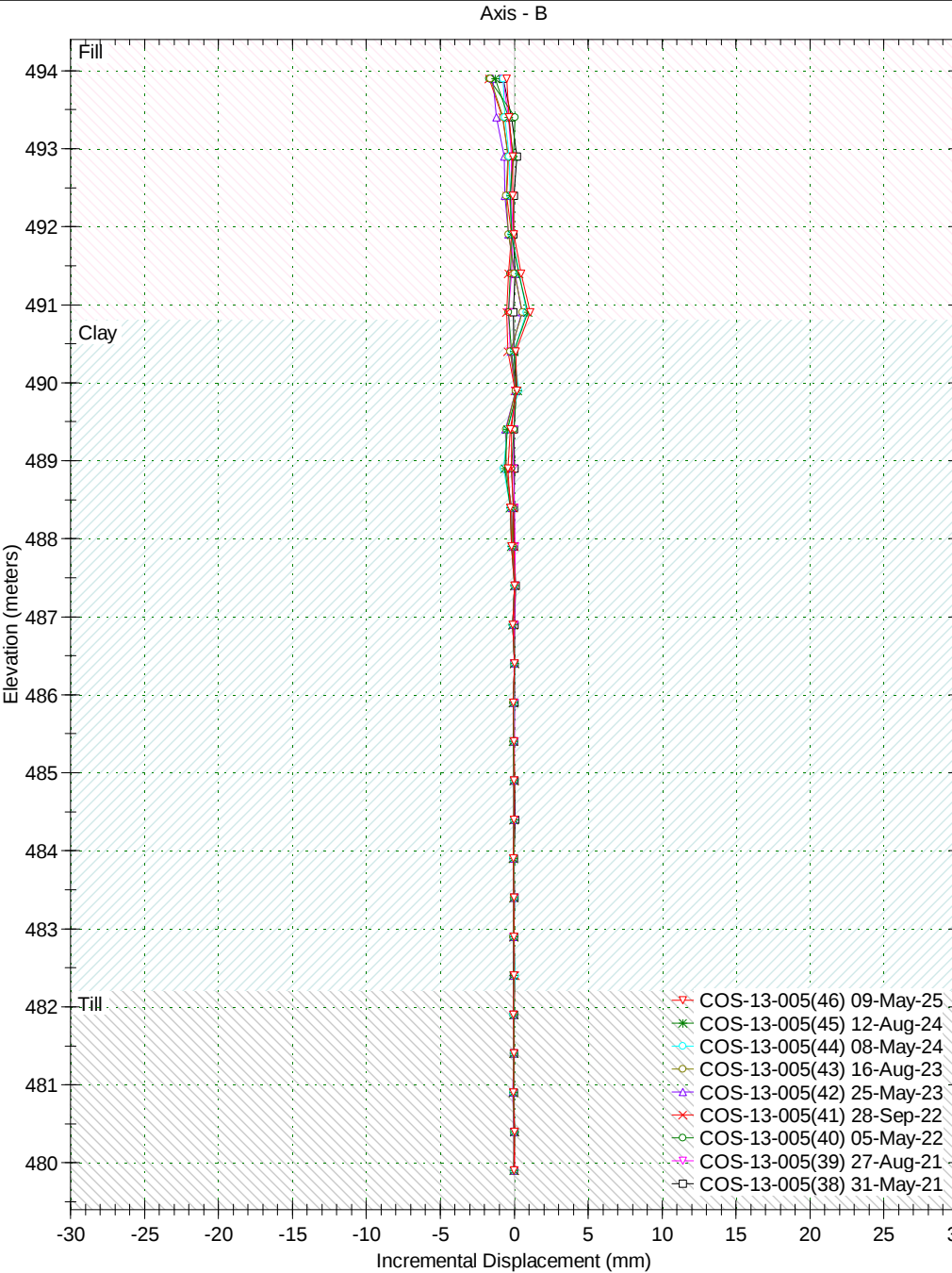
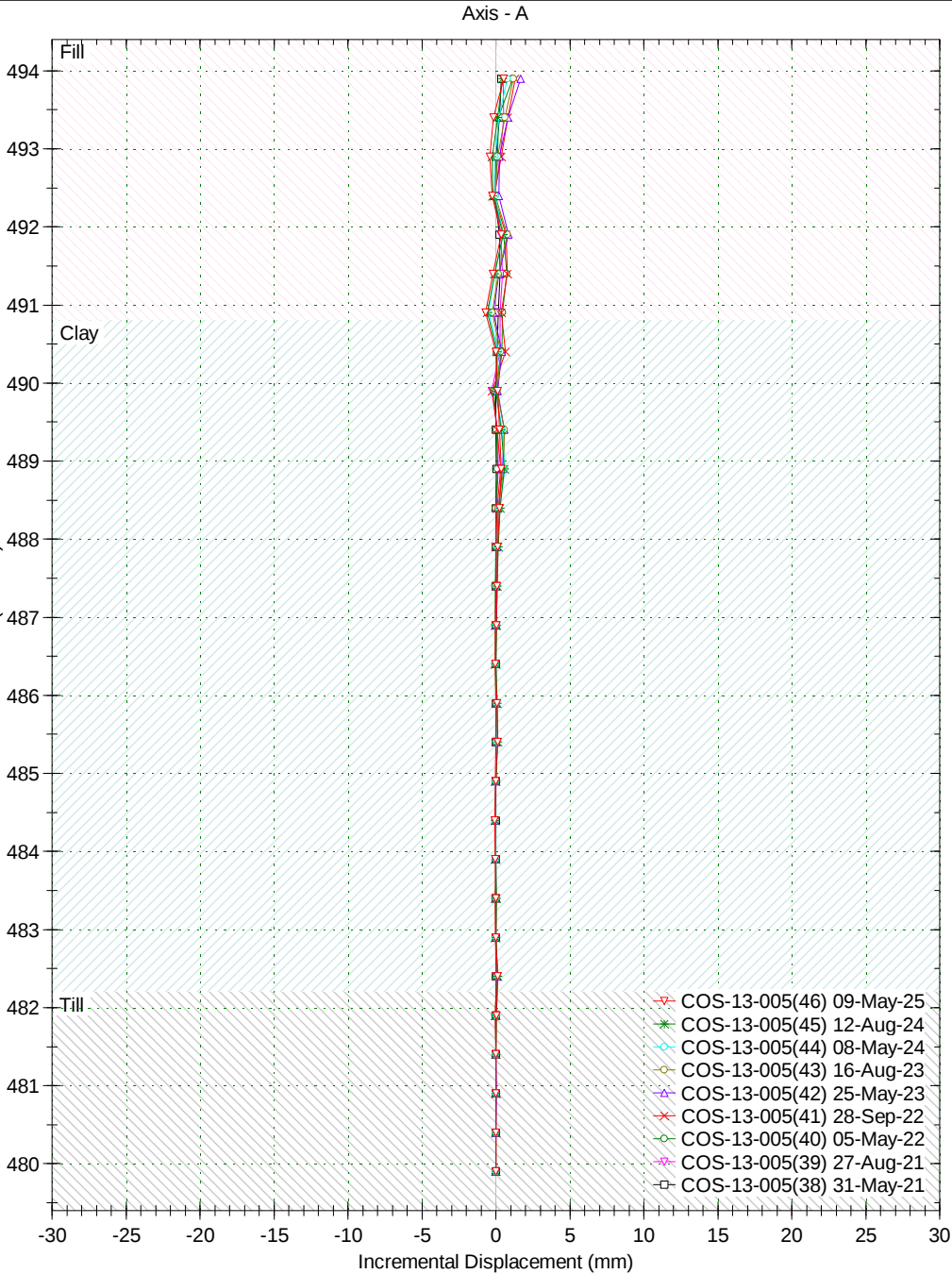
Borehole : COS-13-005 (Aug 13 2020 Baseline)
Project : Nutana Slope
Location : 316 Sask. Cres. E.
Northing : 5775631.299
Easting : 386078.8467
Collar : -0.1

Spiral Correction : N/A
Collar Elevation : 494.40 meters
Reading Depth : 14.5 meters
A+ Groove Azimuth :
Base Reading : 2020 Aug 13 12:59
Applied Azimuth : 0.0 degrees



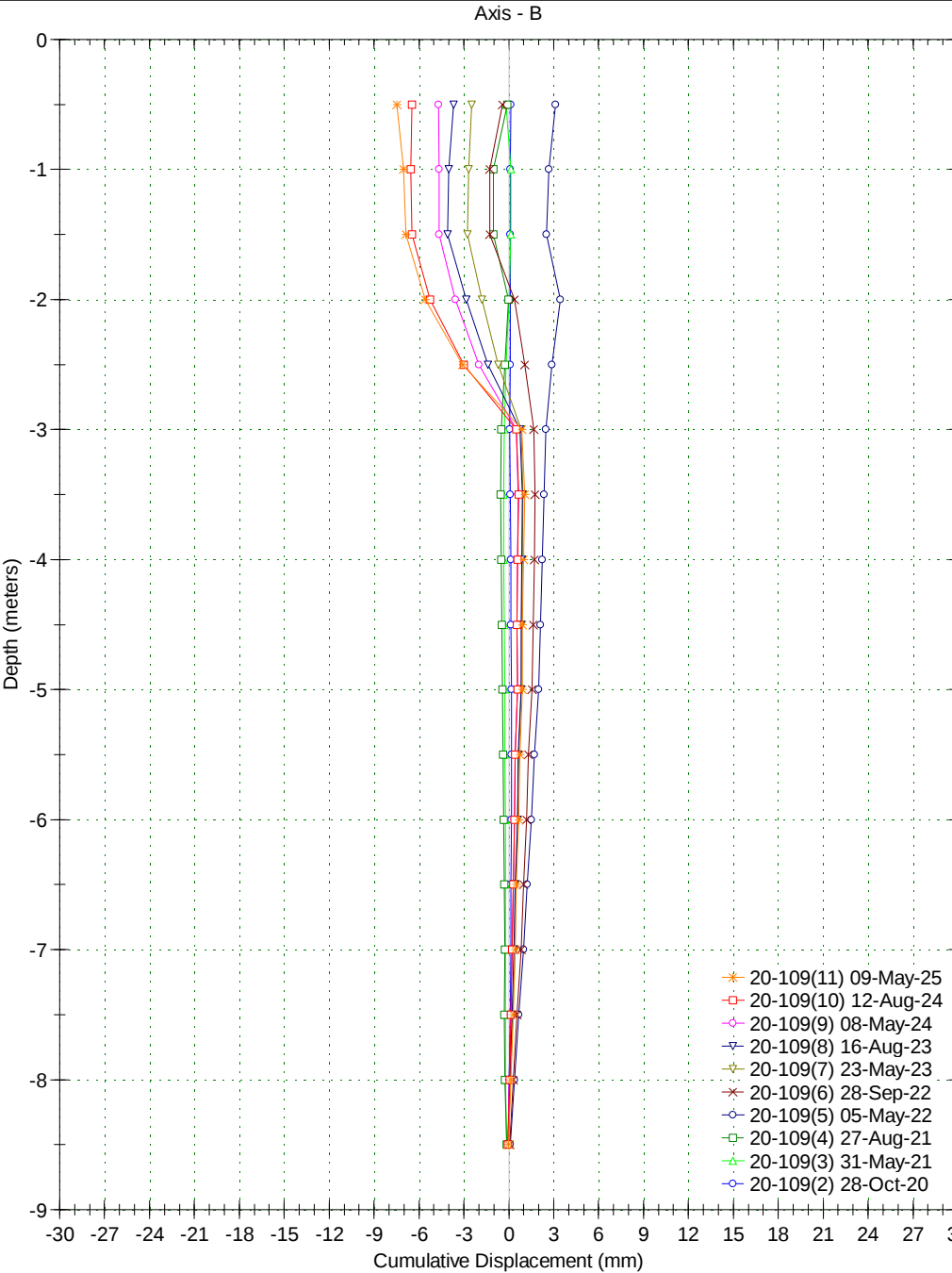
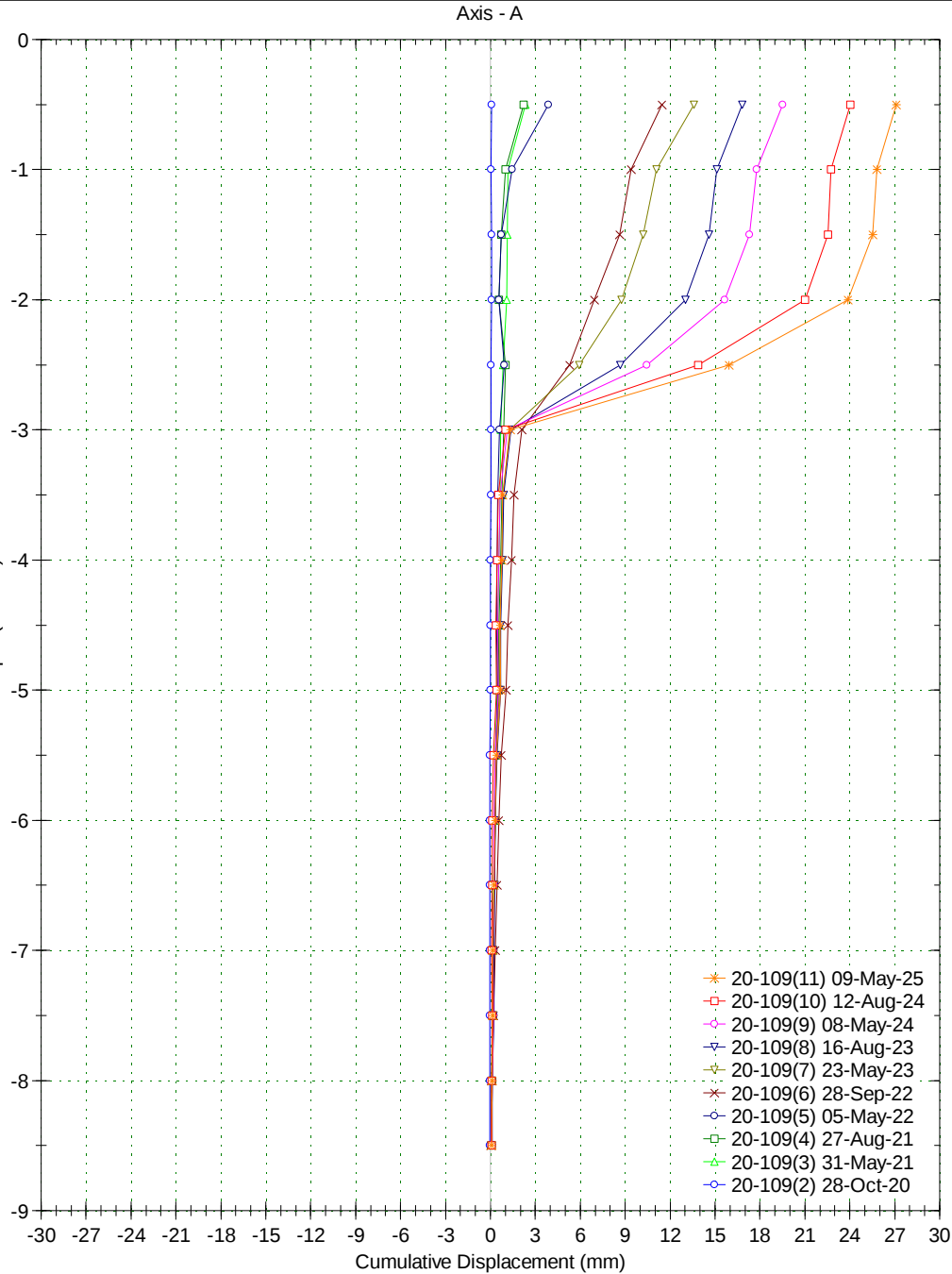
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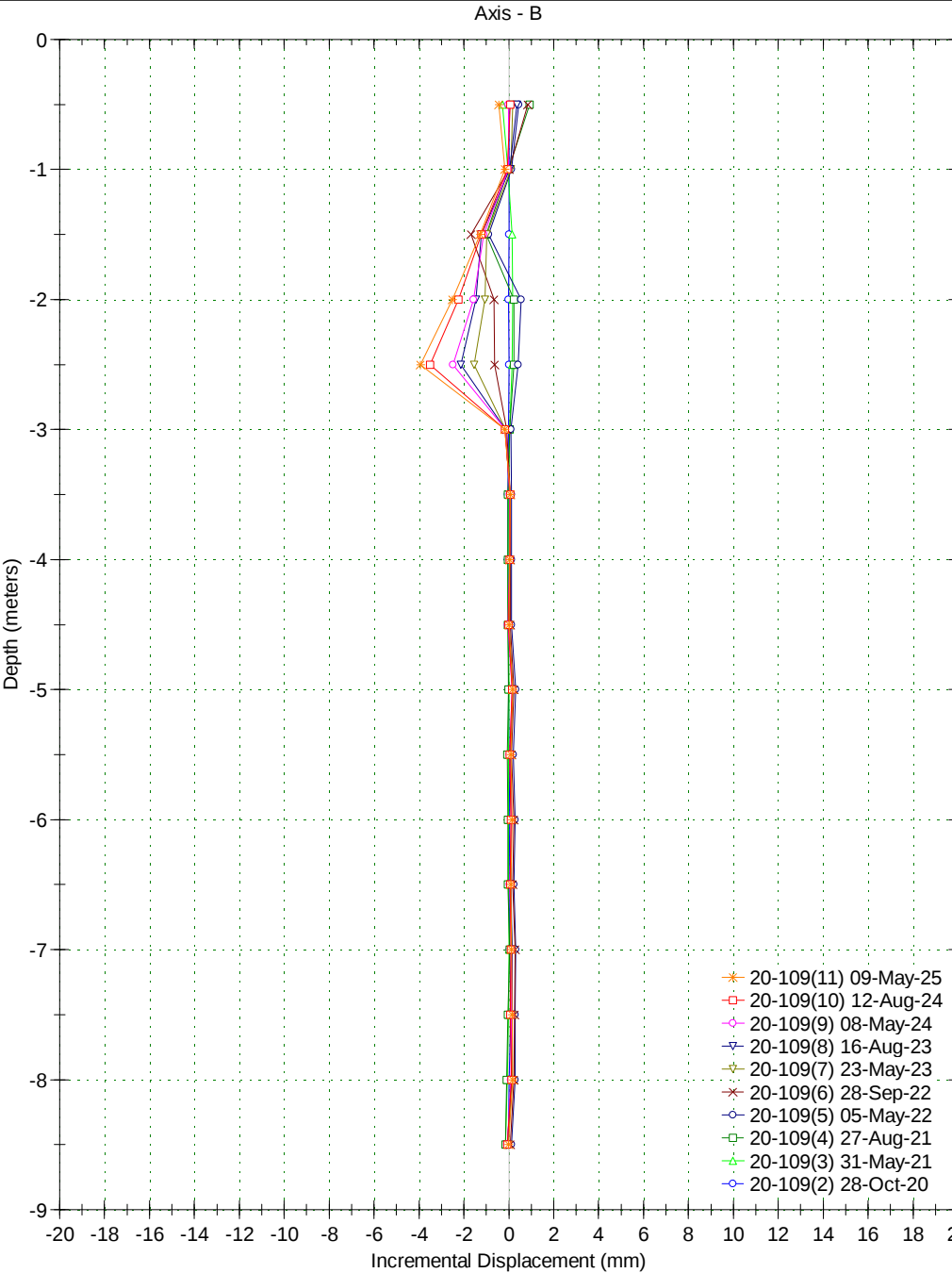
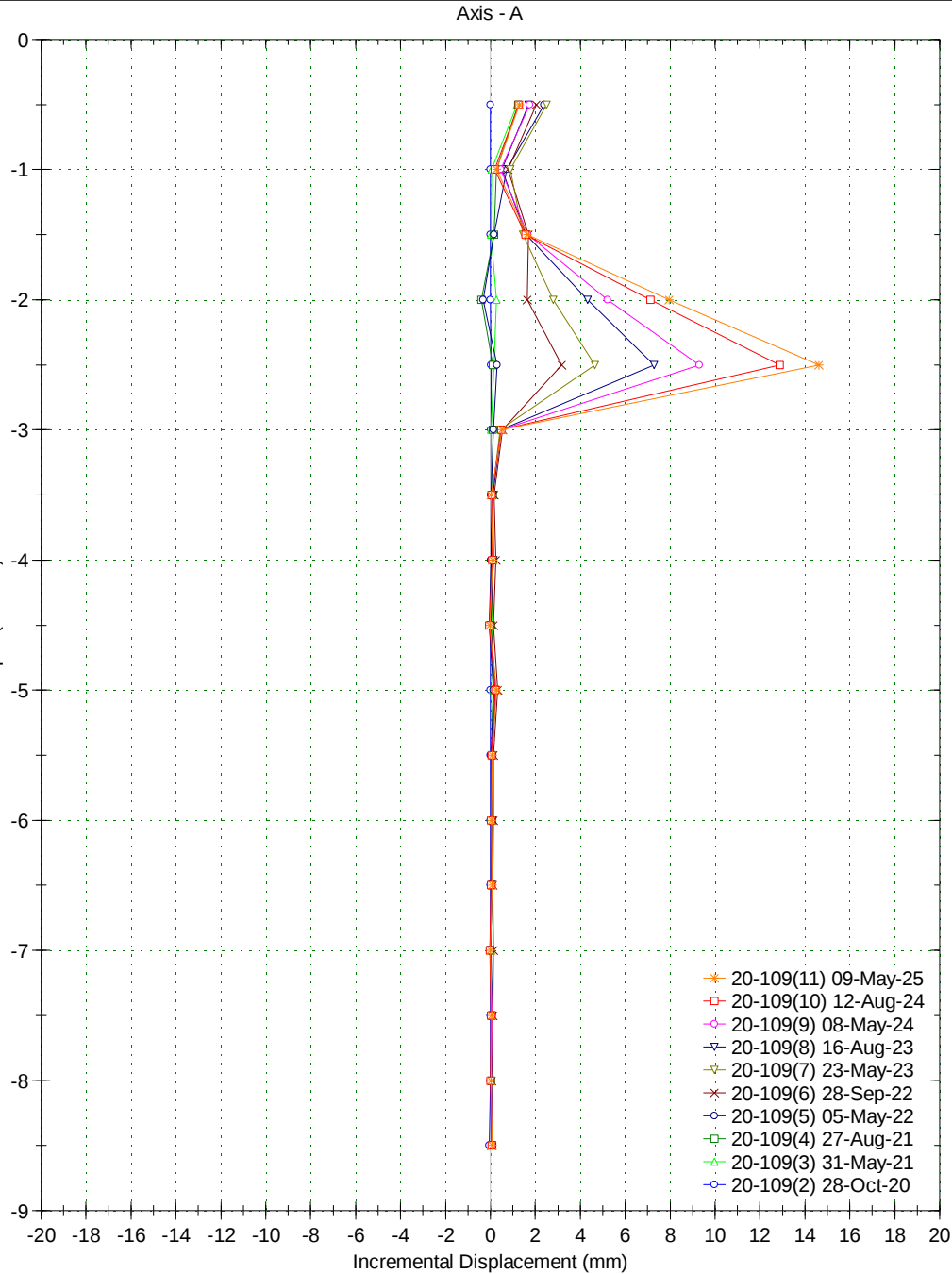
Borehole : 20-109
Project : Nutana Slope
Location :
Northing : 5775622
Easting : 385977
Collar :

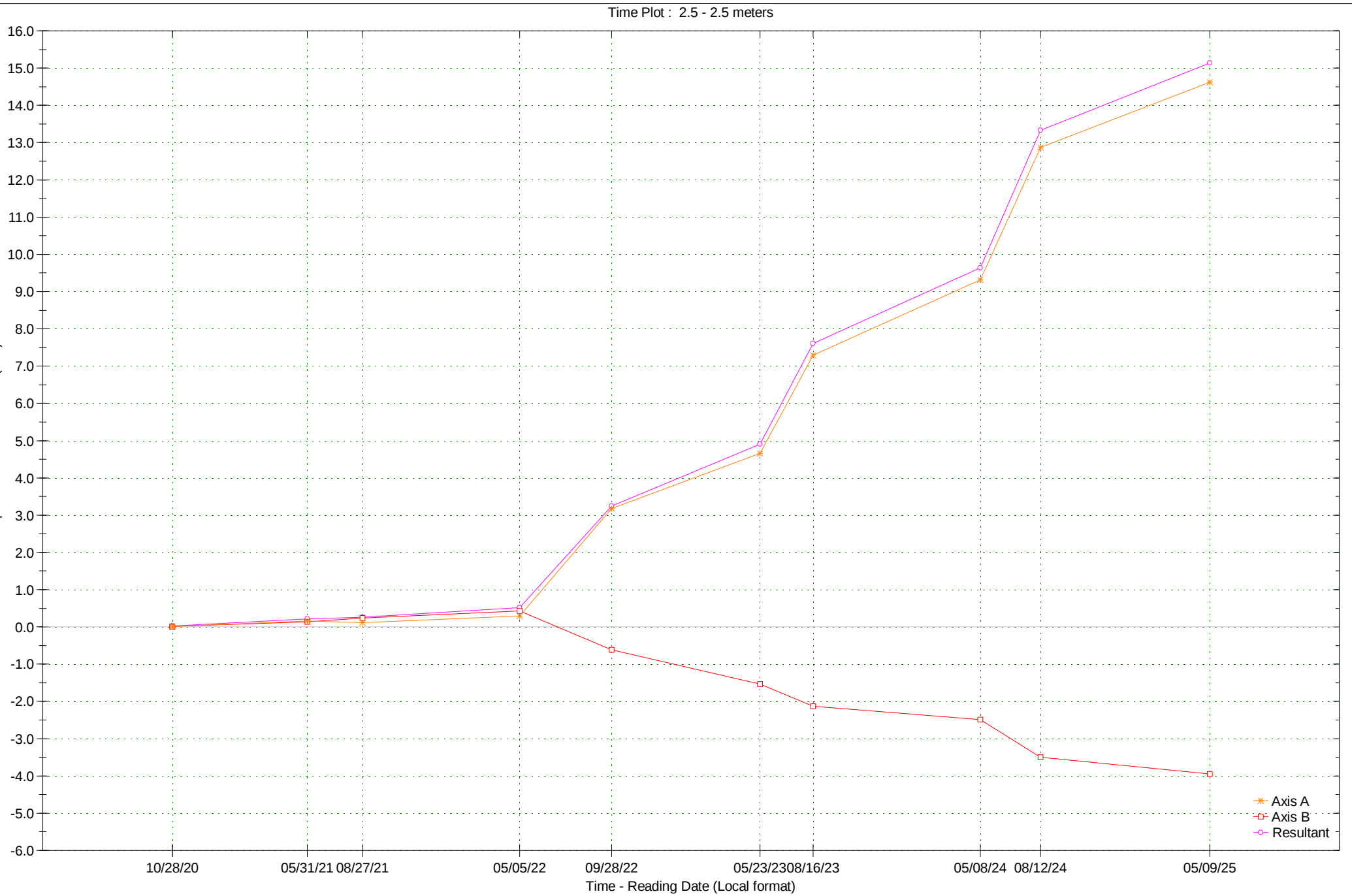
Spiral Correction : N/A
Collar Elevation : 0.00 meters
Reading Depth : 8.5 meters
A+ Groove Azimuth :
Base Reading : 2020 Oct 28 16:29
Applied Azimuth : 0.0 degrees



Borehole : 20-109
Project : Nutana Slope
Location :
Northing : 5775622
Easting : 385977
Collar :

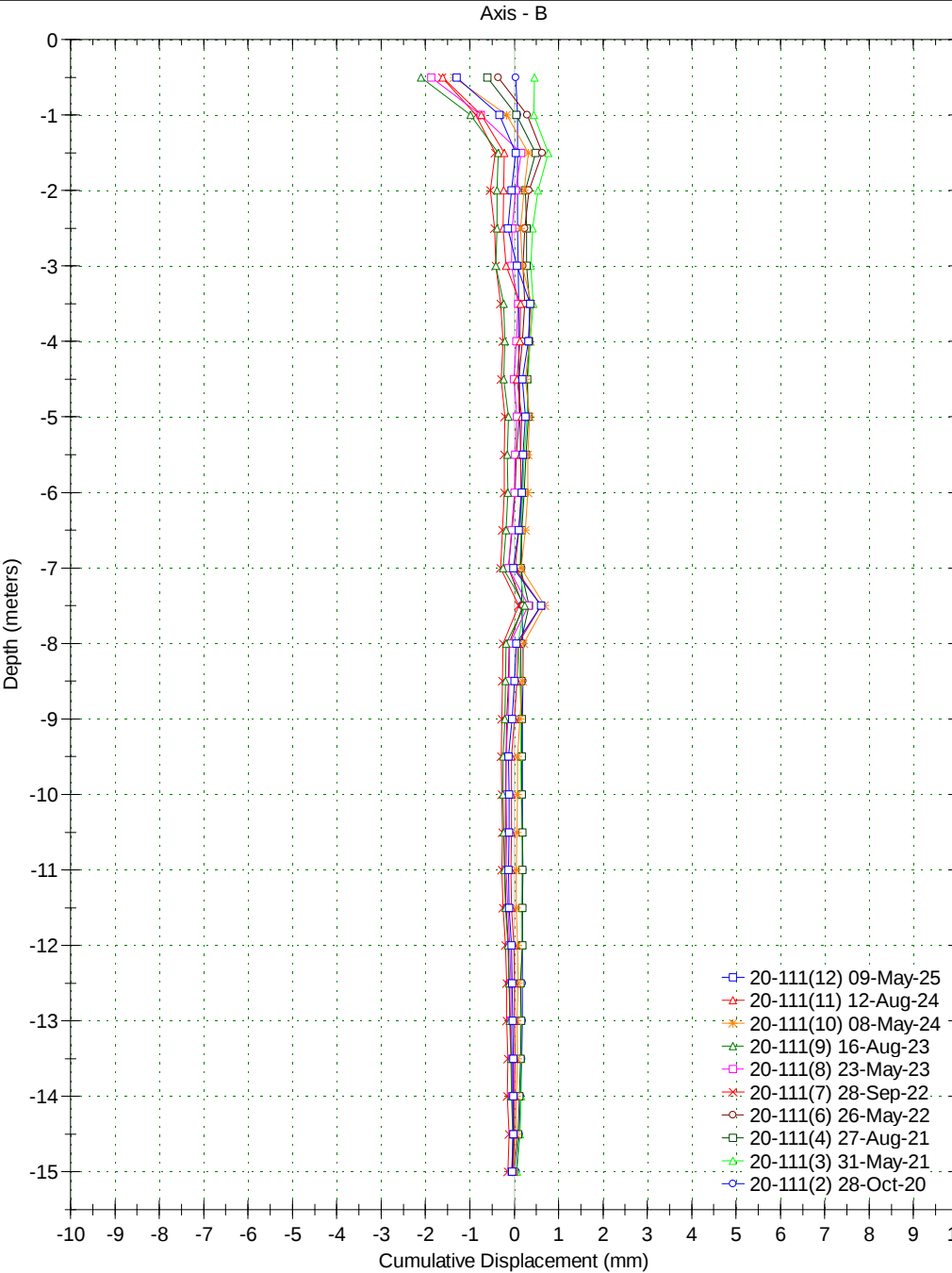
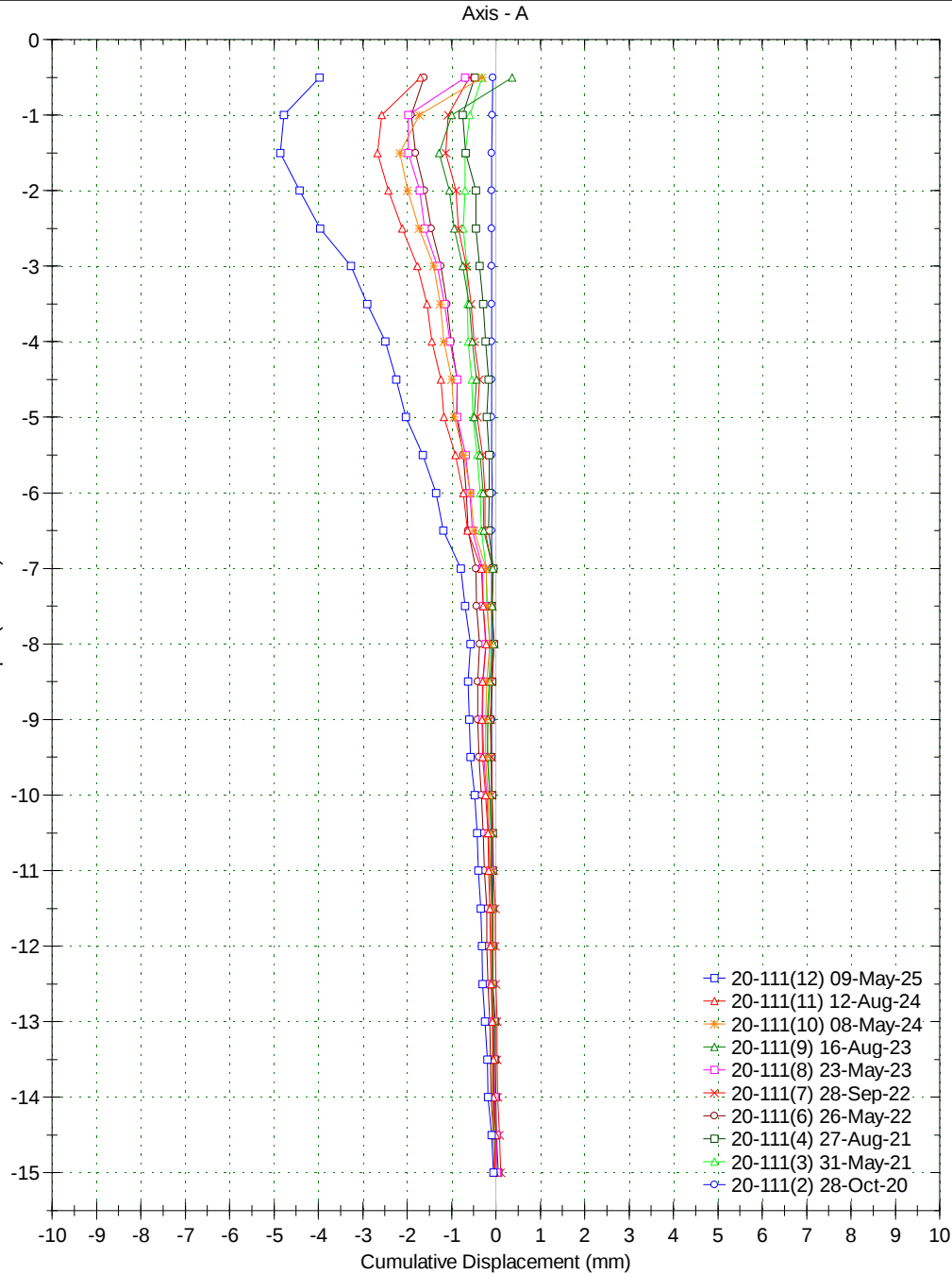
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Collar Elevation : 0.00 meters
Reading Depth : 8.5 meters
A+ Groove Azimuth :
Base Reading : 2020 Oct 28 16:29
Applied Azimuth : 0.0 degrees





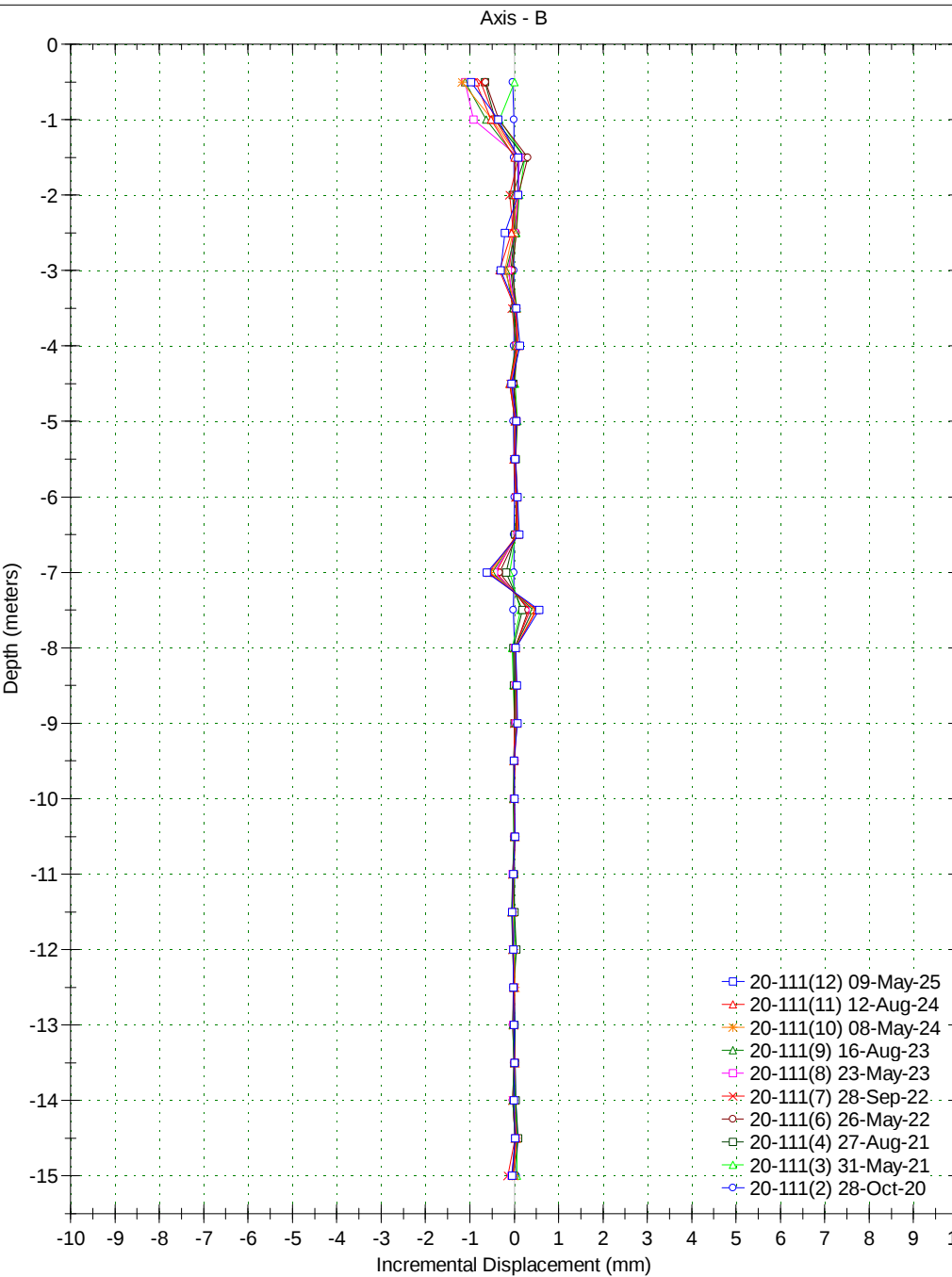
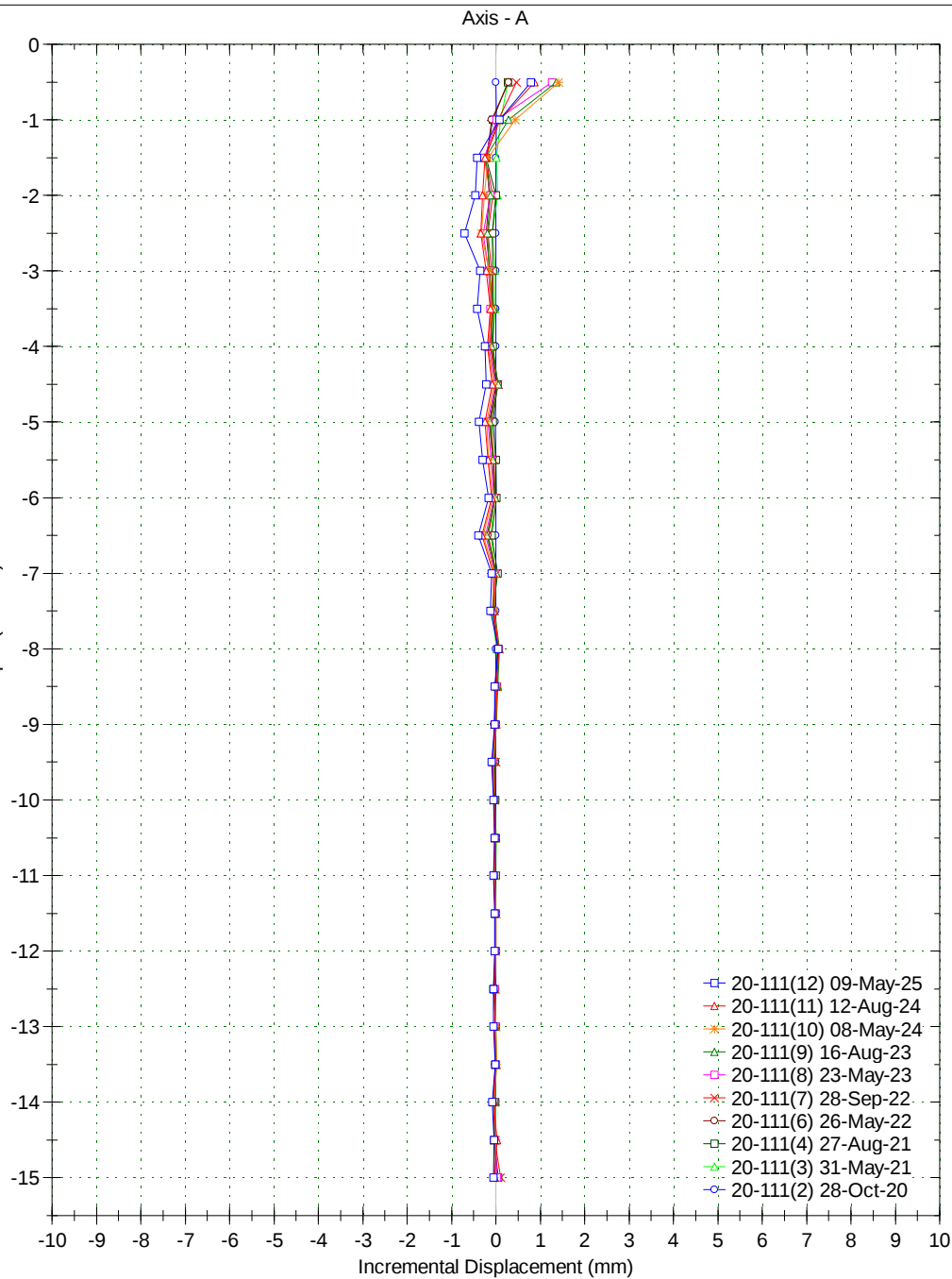
Borehole : 20-111
Project : Nutana Slope
Location :
Northing : 5775568
Easting : 385953
Collar :

Spiral Correction : N/A
Collar Elevation : 0.00 meters
Reading Depth : 15.0 meters
A+ Groove Azimuth :
Base Reading : 2020 Oct 28 15:01
Applied Azimuth : 0.0 degrees

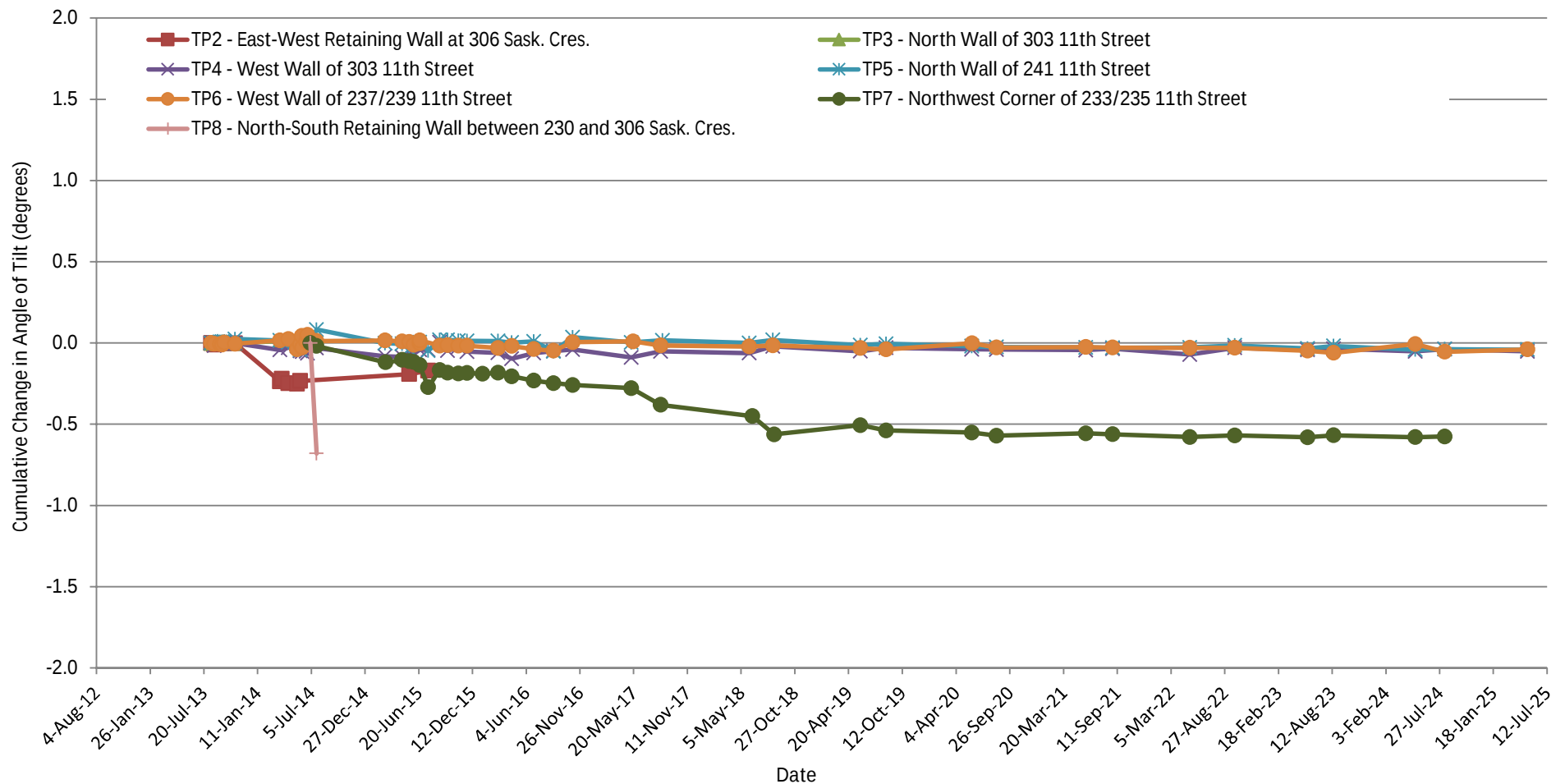


Borehole : 20-111
Project : Nutana Slope
Location :
Northing : 5775568
Easting : 385953
Collar :

Spiral Correction : N/A
Collar Elevation : 0.00 meters
Reading Depth : 15.0 meters
A+ Groove Azimuth :
Base Reading : 2020 Oct 28 15:01
Applied Azimuth : 0.0 degrees



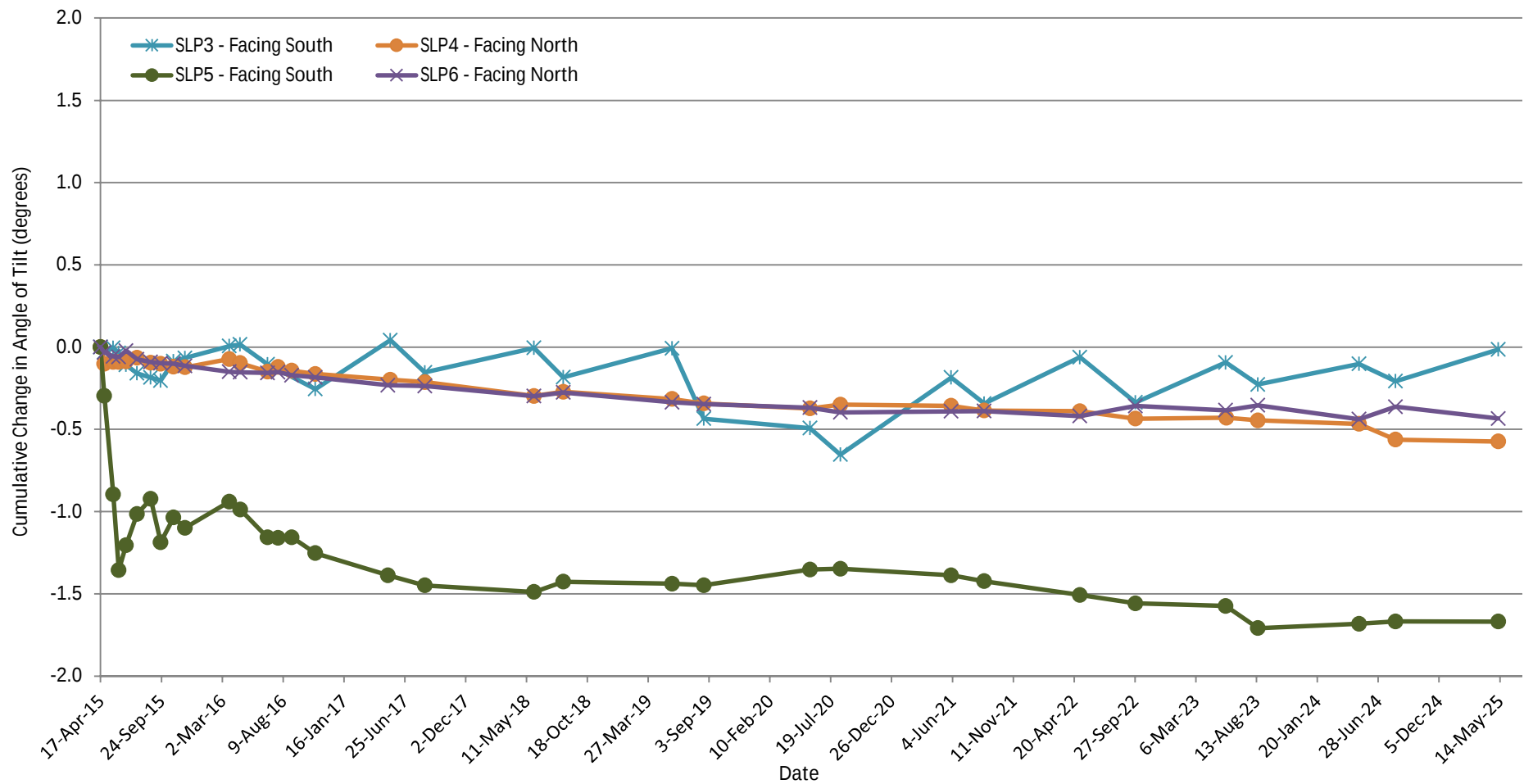
TILT PLATES



Notes:

- 1) Positive changes in tilt indicate tilting toward the monitoring structure.
- 2) TP1, located on the retaining wall between 230 and 306 Sask. Cres., is not monitored for health and safety reasons; monitoring results for this tilt plate show a change in angle of tilt of approximately 9 degrees between August 2013 and June 2014.
- 3) TP3 and TP8 are destroyed, and TP2 is buried.

PROJECT		 City of Saskatoon		NUTANA SLOPE INSTABILITY	
TITLE RESULTS OF TILT MONITORING May 2025 Monitoring					
	PROJECT	CA0029692.9234		FILE No.	
	DESIGN			SCALE	N/A
	CADD			REV.	
	CHECK			FIGURE: B1	
	REVIEW				



Notes:
1) Positive changes in tilt indicate tilting toward the monitoring structure.

PROJECT		 City of Saskatoon		NUTANA SLOPE INSTABILITY	
TITLE					
RESULTS OF TILT MONITORING May 2025 Monitoring					
	PROJECT	CA0029692.9234		FILE No.	
	DESIGN			SCALE	N/A
	CADD			REV.	
	CHECK			FIGURE: B2	
	REVIEW				