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|-------|---------------------------------------|-------|---------------------------|
| 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/Stony Plain, Site NC036 – Highway 22:32 Lazy “S” Slide, Spring 2024 Instrumentation Monitoring Report

1.0 OBSERVATIONS

1.1 FIELD PROGRAM AND INSTRUMENTATION STATUS

The Spring 2024 reading cycle consisted of reading one standpipe (BH20-01a) and one slope inclinometer (BH20-01). The site plan is shown on Figure 1 attached. The instruments were read by Andres Padros, Technician and Olawale Odusi, Geotechnical Technologist on May 15, 2024.

The slope inclinometer (SI) was 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. Standpipe piezometer (SP) was read with a Heron Instruments water tape.

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

2.0 INSTRUMENTATION READINGS

2.1 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 NC036-1 and the attachments.

The groundwater levels from SP readings are plotted in the attachments, summarized in Table NC036-2 and in the following sections.

2.2 ZONES OF MOVEMENT

No new zones of movement were observed in the operational SI. Directions of movement are referenced to the azimuth of the A+ groove in the SI casing.

2.3 MONITORING RESULTS

SLOPE INCLINOMETER

BH20-01 showed about 5 mm of incremental movement at approximate 5.5 m depth since Spring 2023, corresponding to a rate of movement of 5 mm/yr.

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2.3.2 PIEZOMETERS

Piezometric levels in BH20-01a increased by less than 0.1 m since the Spring 2023 measurement which marked the first time the water level increased since initializing in 2020.

3.0 RECOMMENDATIONS

3.1 FUTURE WORK

The instruments at NC036 should be read again during the Spring 2025 reading cycle.

3.2 INSTRUMENTATION REPAIRS

No instruments require repair at this site.

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Table NC036-1: 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 | | | | | | | |
| SI1 | Sept. 1, 2006 | - | - | 122 mm over 2.2 m to 4.2 m depth in 353 ^o direction | 28 Sept. 2009 | Non-Operational | Sept 17, 2015 | Confirmed destroyed after 2016 culvert construction. SI casing cannot be found | | |
| SI2 | Sept. 1, 2006 | - | - | 160 over 3.2 m to 5.8 m depth in 348 ^o direction | 144 Sept. 2016 | Non-Operational | Sept. 8, 2017 | Confirmed blocked at 2.0 m below top of casing in 2019 | | |
| SI20-01 | June 19, 2020 | 5969774 | 622175 | 28 over 3.9 m to 5.9 m depth at 345 ^o | 21.2 Sept 2020 | Operational | May 15, 2023 | 5 | 5 | -4 |
| Note: (1) Updated May 15, 2024, with approximate accuracy of ± 3 m | | | | | | | | | | |

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Table NC036-2: Spring 2024 Standpipe Piezometer Reading Summary

| Instrument Name | Date Initialized | Coordinates ⁽¹⁾ (UTM 11U, NAD1983) (m) | | Bottom Depth (m) | Current Status | Maximum Water Level (mbgs) | Measured Water Level (Spring 2024) (mbgs) | Previous Water Level (Spring 2023) (mbgs) | Change in Water Level (m) |
|--|------------------|---|---------|------------------|-----------------|----------------------------|---|---|---------------------------|
| | | Northing | Easting | | | | | | |
| SP1 | Sept. 1, 2006 | - | - | 6.3 | Non-operational | 0.5 in Sept. 2018 | Could not be found in Spring 2019 | | |
| SP2 | Sept. 1, 2006 | - | - | 4.58 | Non-operational | 1.77 in May 2008 | Confirmed destroyed after 2016 slope remediation construction | | |
| SP3 | Sept. 1, 2006 | - | - | 9.59 | Non-operational | 3.21 in May 2008 | | | |
| BH20-01 | June 19, 2020 | 5969768 | 662176 | 6.1 | Operational | 0.7 in June 2020 | 2.3 | 2.3 | < 0.1 |
| Note: (1) Updated May 27, 2024, with approximate accuracy of ± 3 m. | | | | | | | | | |

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4.0 CLOSING

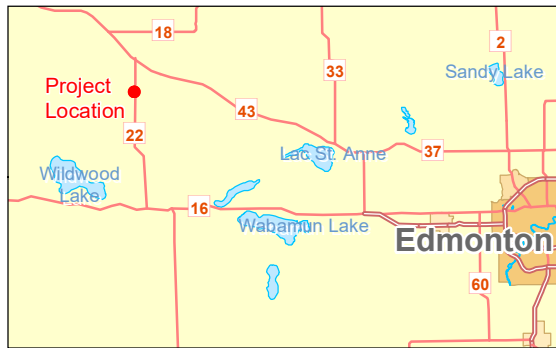
We trust this instrumentation report meets your requirements. If you have any questions, please do not hesitate to contact the undersigned.





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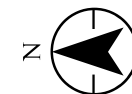
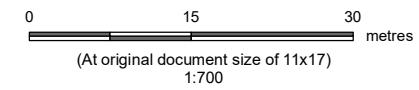
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Attachment: Figure 1 – Borehole Location Plan
BH20-01 Slope Inclinator Plots
Standpipe Piezometer Level Depth vs Time Plot



-  Borehole Location
-  Non-operational Instrument
-  Approximate Culvert Alignment
-  Ground Elevation Contours (m AMSL, LiDAR Nov. 3, 2014)



Project Location: Hwy 22, Lac Ste. Anne County, Alberta
 Prepared by MK on 2020-07-03
 Quality Review by LC on 2020-07-06
 Independent Review by CM on 2020-07-08

Client/Project: Alberta Transportation, NC036 Lazy "S" Slide
 123315222

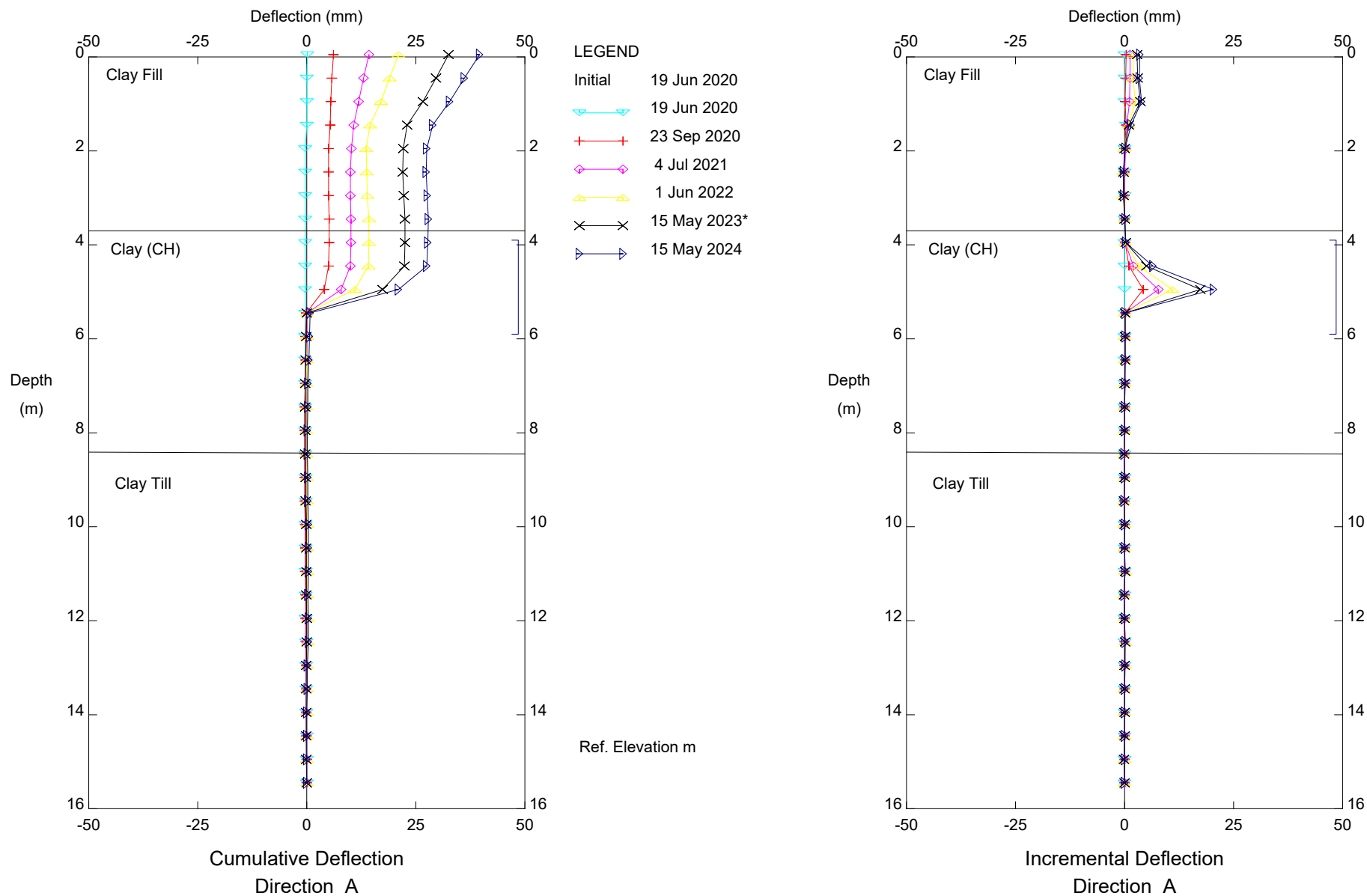
Figure No.: 1

Title: Borehole Location Plan

Notes
 1. Coordinate System: NAD 1983 UTM Zone 11N
 2. Data Sources: Geogratis, ©Department of Natural Resources Canada, All rights reserved.
 3. Background: © 2020 Microsoft Corporation © 2020 Maxar ©CNES (2020) Distribution Airbus DS

\\Cd1001-c200\WORKGROUP\123315222\active\123312435\INC_Sites\Eaton_NC36\Task 6 Annual Inspection\CAD_GIS\sh_loc_plan\fig_1_bh_loc_plan_nc36.mxd Revised: 2020-07-08 By: MKUHL

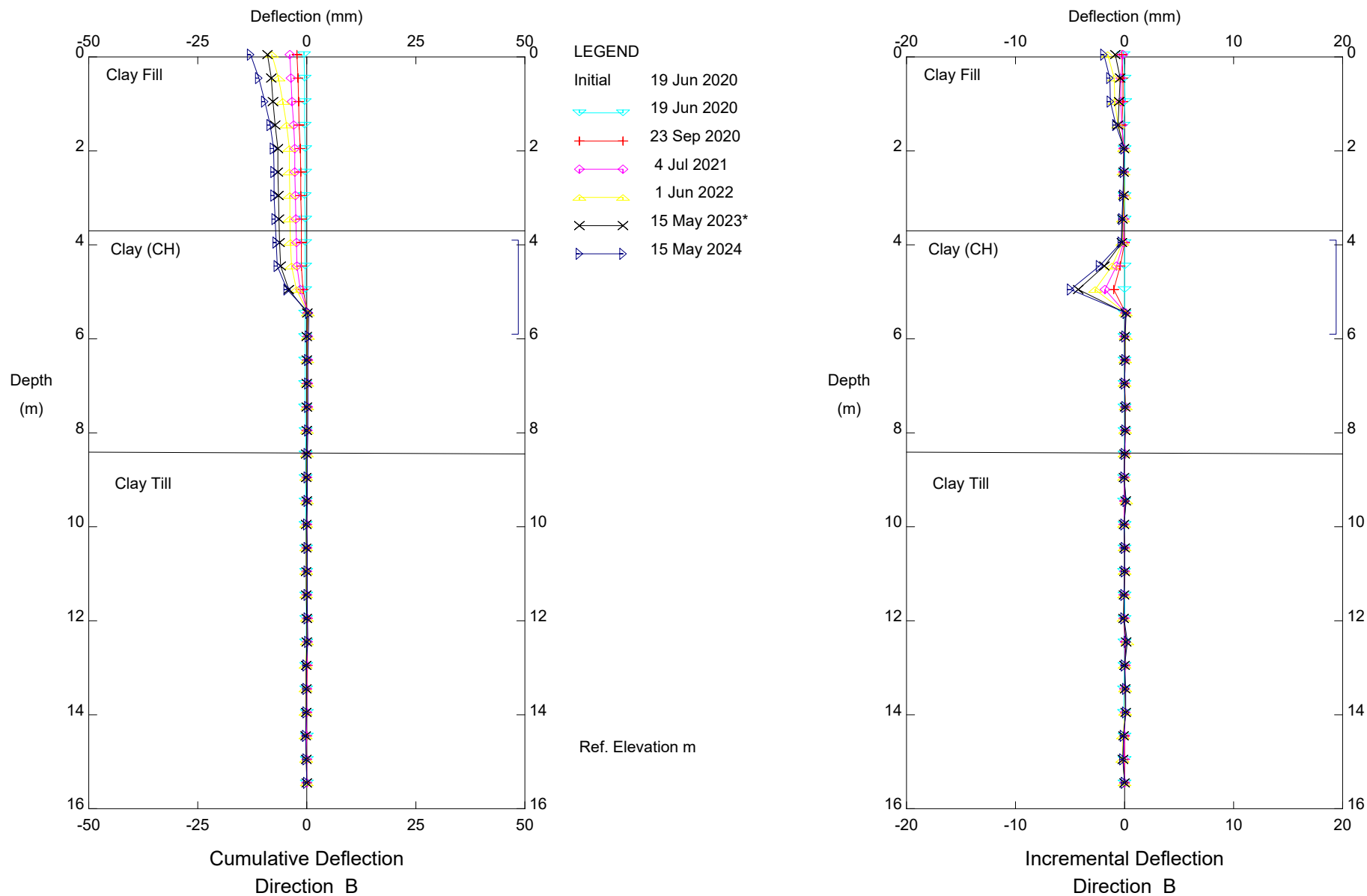
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NC36, Inclinator SI20-01

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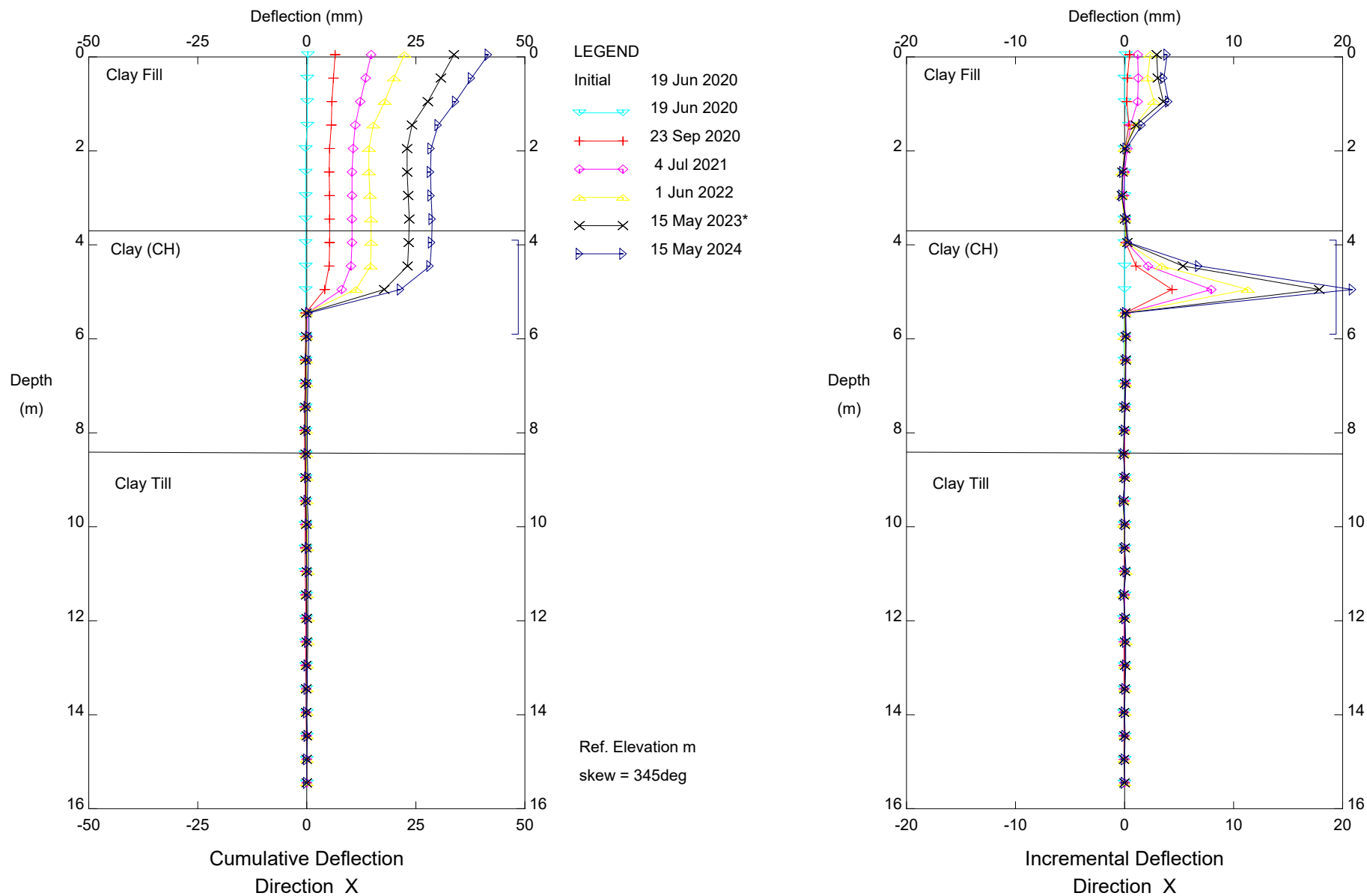
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NC36, Inclinator SI20-01

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

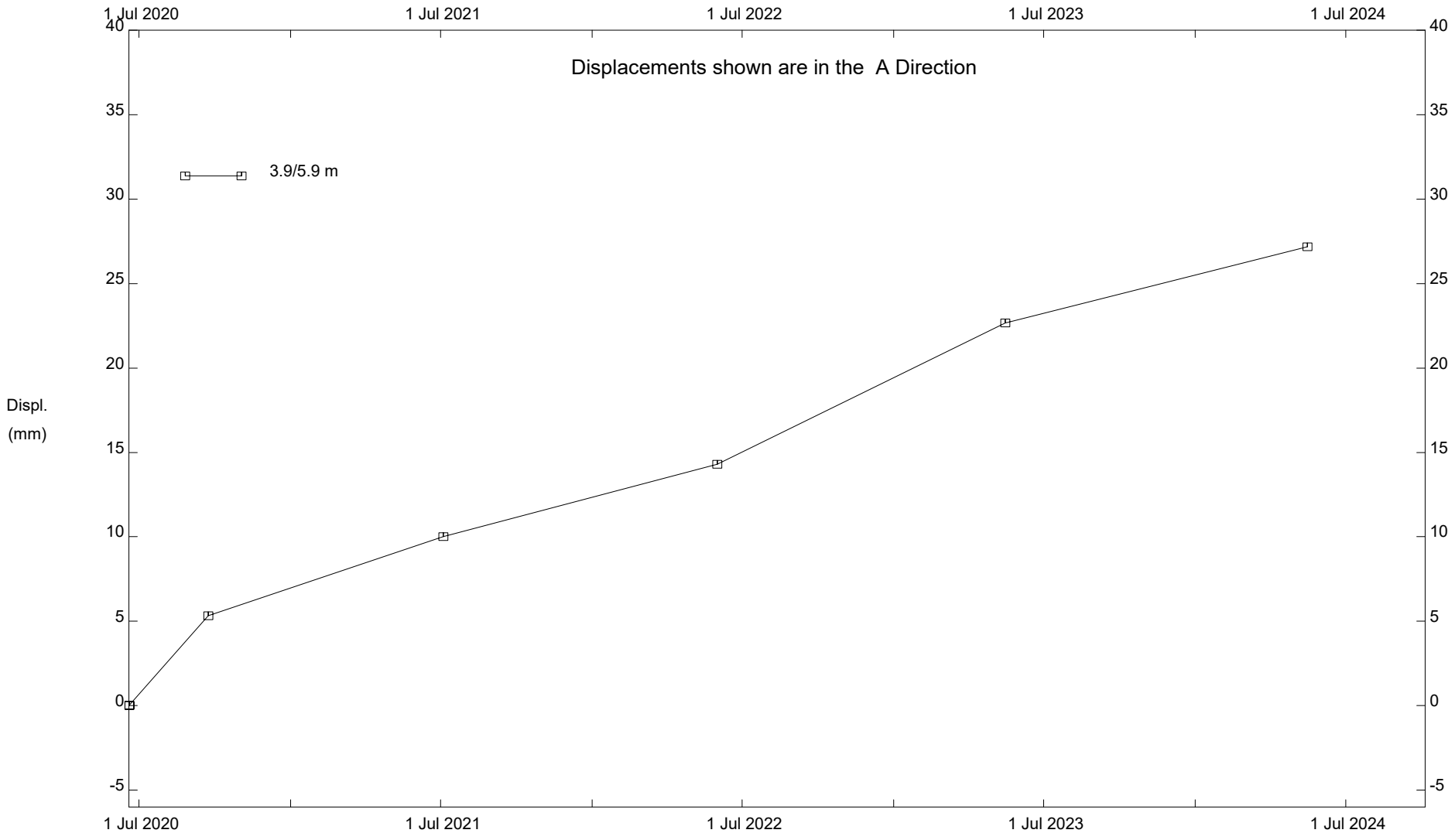


NC36, Inclinometer SI20-01

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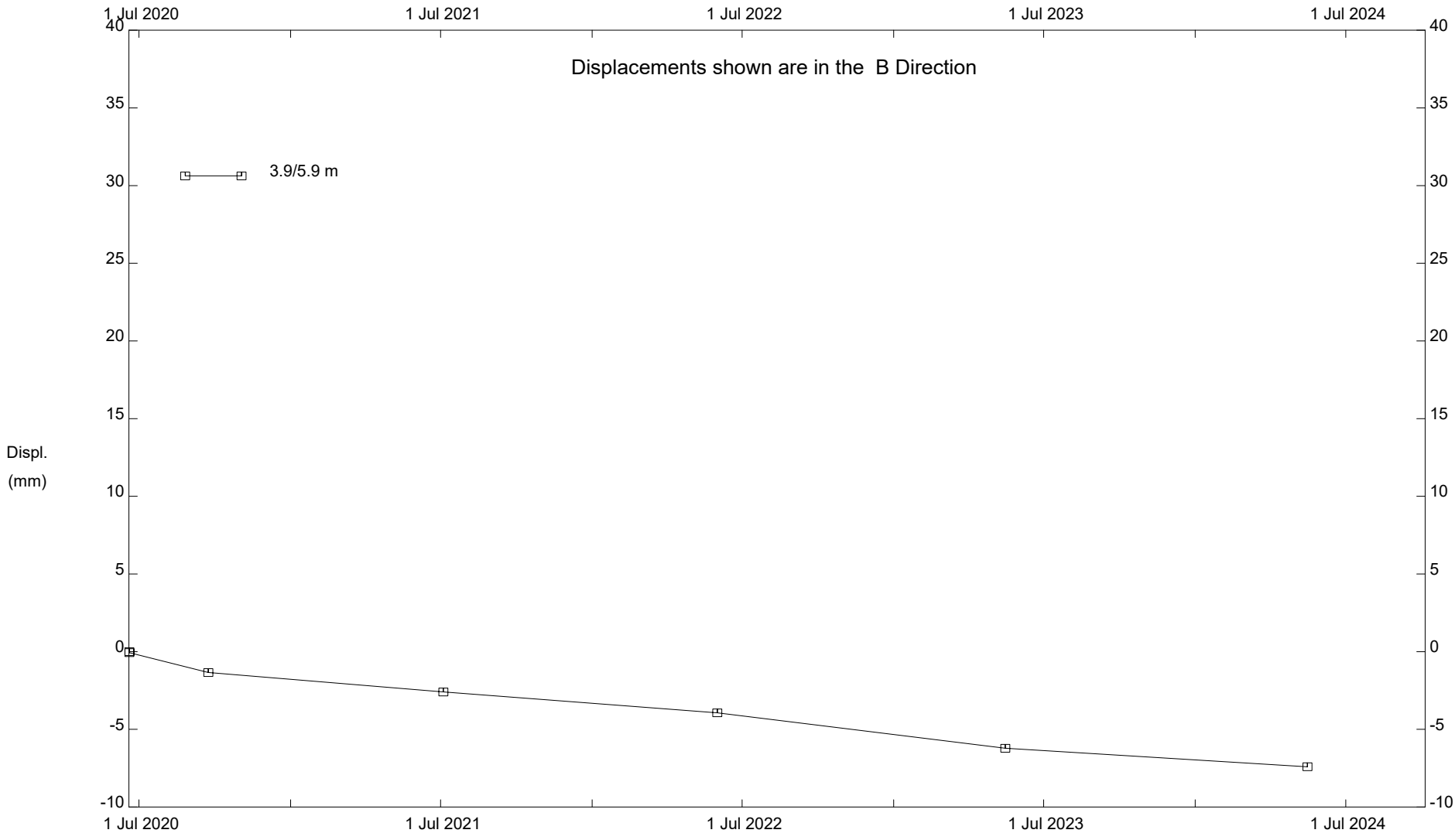
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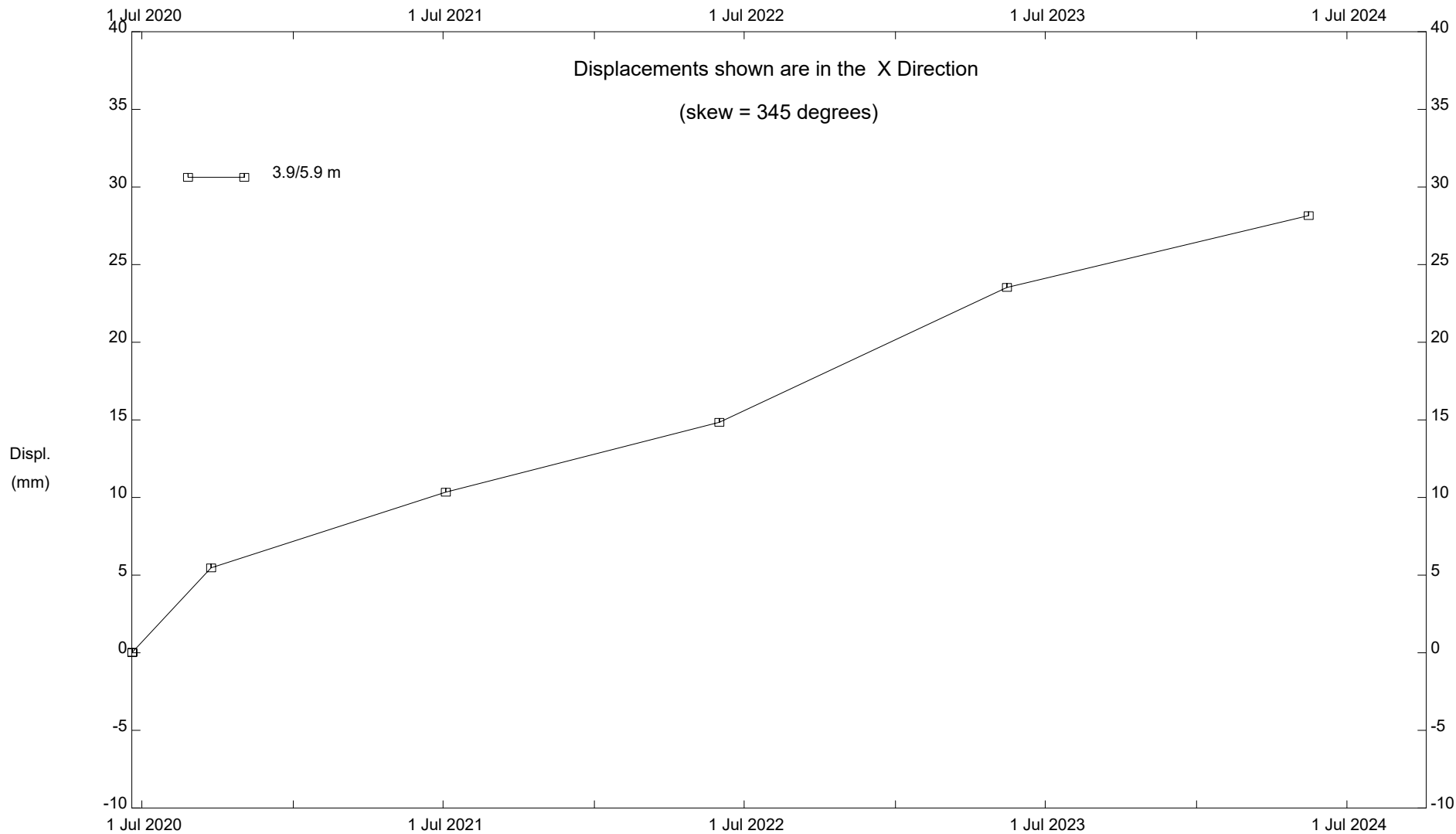
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