THURBER ENGINEERING LTD.

July 12, 2023 File No.: 32122

Alberta Transportation and Economic Corridors
Construction and Maintenance Division
North Central Region
Box 4596, 4513 – 62 Avenue
Barrhead, Alberta
T7N 1A5

Attention: Ms. Amy Driessen, P.Eng.

ALBERTA TRANSPORTATION AND ECONOMIC CORRIDORS GRMP (CON0022163)
NORTH CENTRAL (ATHABASCA AND FORT McMURRAY DISTRICTS)
INSTRUMENTATION MONITORING RESULTS – SPRING 2023

SECTION C

SITE NC025: HWY 646:04 LINDBERGH HILL

Dear Ms. Driessen:

This report provides the results of the annual geotechnical instrumentation monitoring for the above-mentioned site as part of Alberta Transportation and Economic Corridors' Geohazard Risk Management Program for North Central – Athabasca and Fort McMurray Districts (CON0022163).

It is a condition of this letter report that Thurber's performance of its professional services will be subject to the attached Statement of Limitations and Conditions.

1. FIELD PROGRAM AND INSTRUMENTATION STATUS

Four slope inclinometers (SI02-1 and SI07-1 to 07-3), two standpipe piezometers (SP02-1 and SP02-4) and six vibrating wire load cells (VC1463 through 1468) were read at the Hwy 646:04 Lindbergh Hill site on May 24, 2023, by Mr. Niraj Regmi, G.I.T. and Mr. Omar Elshimi, both of Thurber Engineering Ltd.

A site plan showing the approximate instrument locations is also included in Appendix A.

The SIs were read using a RST Digital Inclinometer probe with a 2 ft wheelbase and a RST Pocket PC readout. Inclinometer reading depths were defined as per cable markings with respect to the top of the inclinometer casing. The standpipe piezometers were read using a Heron dipmeter. The load cells were read using a RST Digital readout unit.

2. DATA PRESENTATION

2.1 General

SI plots for A and B directions are presented in Appendix A. Where movement has been recorded the resultant plot (X direction, if applicable) and rate of movement have also been provided. The piezometer and load cell reading plots are also provided in Appendix A. Slope inclinometer, piezometer and load cell reading summary tables are provided below. These tables also include instruments deleted from the GRMP or not read during this monitoring event for future reference.

2.2 Zones of Movement

Zones of new movement were not observed in the SIs since the last set of readings in the spring of 2022.

Zones of movement are summarized in Table NC025-1 at the end of this report. Table NC025-1 also provides the total movement, the depth of movement and the maximum rate of movement that has occurred at this site.

Table NC025-1: Spring 2023– Hwy 646:02 Lindbergh Hill Slope Inclinometer Instrumentation Reading Summary

Date Monitored: May 24, 2023

INSTRUMENT #	DATE INITIALIZED	TOTAL CUMULATIVE RESULTANT MOVEMENT AND DEPTH OF MOVEMENT TO DATE (mm)	MAXIMUM RATE OF MOVEMENT (mm/yr)	CURRENT STATUS OF SI	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)
SI02-1	Sept. 9, 2002	No discernible movement	N/A	Operational	May 25, 2022	N/A	N/A	N/A
SI02-2	*Sept. 9, 2002*	*N/A*	*47.6 mm/yr between Sept. 2002 and Oct. 2002*	*Sheared off*	*Oct. 12, 2006*	*N/A*	*N/A*	*N/A*
SI02-3	*Sept. 9, 2002*	*N/A*	*52.8 mm/yr between Sept. 2002 and Oct. 2002*	*Sheared off*	*Oct. 2006*	*N/A*	*N/A*	*N/A*
SI02-4	*Sept. 9, 2002*	*N/A*	*65.1 mm/yr between Sept. 2002 and Oct. 2002*	*Sheared off*	*Oct. 12, 2006*	*N/A*	*N/A*	*N/A*
SI06-1	*Apr. 4, 2006*	*N/A*	*207.9 mm/yr between Apr. 2006 and May 2006*	*Sheared off*	*Oct. 12, 2006*	*N/A*	*N/A*	*N/A*
SI06-2	*Apr. 6, 2006*	*N/A*	*430.4 mm/yr between Apr. 2006 and May 2006*	*Sheared off*	*Oct. 12, 2006*	*N/A*	*N/A*	*N/A*

Drawing 32122-NC025 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.

Table NC025-1 – Continued: Spring 2023 – Hwy 646:02 Lindbergh Hill Slope Inclinometer Instrumentation Reading Summary

Date Monitored: May 24, 2023

INSTRUMENT #	DATE INITIALIZED	TOTAL CUMULATIVE RESULTANT MOVEMENT AND DEPTH OF MOVEMENT TO DATE (mm)	MAXIMUM RATE OF MOVEMENT (mm/yr)	CURRENT STATUS OF SI	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)
SI06-3	*Aug. 22, 2006*	*N/A*	*445.6 mm/yr between Aug. 22 and 30, 2006*	*Sheared Off*	*Oct. 12, 2006*	*N/A*	*N/A*	*N/A*
SI06-4	*Aug. 22, 2006*	*N/A*	*194.4 mm/yr between Aug. 22 and Aug. 30, 2006*	*Sheared Off*	*Oct. 12, 2006*	*N/A*	*N/A*	*N/A*
SI07-1 (Pile #14)	May 22, 2007	-3.5 over 0.4 m to 12.0 m depth in 20° direction	84.8 mm/yr between May 2007 and June 2007	Operational	May 25, 2022	<0.1	<0.1	-1.9
		-1.5 over 0.4 m to 20.0 m depth in 20° direction	92.2 mm/yr between May 2007 and June 2007			No discernible movement	N/A	-2.2
SI07-2 (Pile #28)	May 22, 2007	20.8 over 0.3 m to 11.2 m depth in 20° direction	262.7 mm/yr between May 2007 and June 2007	Operational	May 25, 2022	0.5	0.6	-4.5
		21.7 over 0.3 m to 16.7 m depth in 20° direction	258.0 mm/yr between May 2007 and June 2007			0.1	0.1	-6.0

Drawing 32122-NC025 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.

Table NC025-1 – Continued: Spring 2023 – Hwy 646:02 Lindbergh Hillslope Inclinometer Instrumentation Reading Summary

Date Monitored: May 24, 2023

INSTRUMENT #	DATE INITIALIZED	TOTAL CUMULATIVE RESULTANT MOVEMENT AND DEPTH OF MOVEMENT TO DATE (mm)	MAXIMUM RATE OF MOVEMENT (mm/yr)	CURRENT STATUS OF SI	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)
SI07-3 (Pile #38)	May 22, 2007	40.7 over 0.2 m to 5.6 m depth in 10° direction	158.5 mm/yr between Jun. 2007 and July 2007	Operational	May 25, 2022	No discernible movement	N/A	-11.0
		43.4 over 0.2 m to 13.6 m depth in 10° direction	149.8 mm/yr between June 2007 and July 2007			No discernible movement	N/A	-10.0

Drawing 32122-NC025 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.

Table NC025-2: Spring 2023 – Hwy 646:02 Lindbergh Hill Standpipe Piezometer Instrumentation Reading Summary

Date Monitored: May 24, 2023

INSTRUMENT #	DATE INITIALIZED	TIP ELEV. (m)	GROUND ELEV. (m)	CURRENT STATUS	HIGHEST MEASURED GROUNDWATER LEVEL BGS (m)	CURRENT GROUNDWATER DEPTH BGS (m)	PREVIOUS GROUNDWATER DEPTH BGS (m)	CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)
SP02-1	N/A	998.320	1004.50	Operational	999.2 on May 7, 2007 (5.32 mBGS)	998.33 (6.17 mBGS)	998.34 (6.16 mBGS)	-0.01
SP02-3A	*N/A*	*993.99*	*1002.71*	*Destroyed*	*998.11 on Oct. 29, 2003 (4.6 mBGS)*	*N/A*	*N/A*	*N/A*
SP02-3	N/A	*990.44*	*1002.71*	*Destroyed*	*991.41 on Oct. 3, 2002 (11.3 mBGS)*	*N/A*	*N/A*	*N/A*
SP02-4	N/A	989.01	997.45	Operational	996.44 on May 24, 2017 (1.01 mBGS)	995.19 (2.26 mBGS)	995.30 (2.15 mBGS)	-0.11
SP06-1	N/A	*986.09*	*1002.20*	*Destroyed*	*989.89 on May 30, 2006 (12.3 mBGS)*	*N/A*	*N/A*	*N/A*

Drawing 32122-NC025 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site

Table NC025-3: Spring 2023 – Hwy 646:04 Lindbergh Hill Load Cell Instrumentation Reading Summary

Date Monitored: May 24, 2023

SERIAL #	ANCHOR NUMBER	DESIGN LOAD (kN)	DATE INSTALLED	MEASURED FORCE (kN)	PREVIOUS READING (kN)	CHANGE IN FORCE SINCE PREVIOUS READING (kN)
VC 1463	G37	240	Jul. 6, 2007	164.74*	209.74*	-45.00
VC 1464	G28U	240	Jul. 6, 2007	219.30*	217.62*	1.68
VC 1465	G28L	240	Jul. 6, 2007	160.63	159.15	1.48
VC 1466	G19L	330	Jul. 17, 2007	315.20	312.90	2.30
VC 1467	G9U	330	Jul. 6, 2007	275.98*	275.19*	0.79
VC 1468	G19U	330	Jul. 6, 2007	233.92	231.82	2.10

Figure 32122-NC025 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.

* The estimated loads for VC1463, VC1464, and VC1467 are based on the average readings from 3 wires instead of 4.

3. INTERPRETATION OF MONITORING RESULTS

SI02-1, installed in the south ditch of the highway, continued to show no discernible movement.

The movements in the SIs installed in the piles were as follows:

- SI07-1 = -3.5 mm pile head movement over 0.4 m to 12.0 m depth
- SI07-2 = 21.7 mm pile head movement over 0.3 m to 16.7 m depth
- SI07-3 = 43.4 mm pile head movement over 0.2 m to 13.6 m depth.

SI07-1, located in the western segment of the wall, showed a rate of movement less than 0.1 mm/yr over 0.4 m to 12.0 m depth, and no discernible movement over 0.4 m to 20.0 m depth, since the spring 2022 readings. SI07-2, located in the middle segment of the pile wall, showed a rate of movement of 0.6 mm/yr over 0.3 m to 11.2 m depth, and a rate of movement of 0.1 mm/yr over 0.3 m to 16.7 m depth, since the spring 2022 readings. SI07-3, located in the eastern segment of the wall, showed no discernible movement over 0.2 m to 5.6 m depth and over 0.2 m to 13.6 m depth, since the spring 2022 readings.

Standpipe piezometers SP02-1 and SP02-4 showed decreases in groundwater level of 0.01 m and 0.11 m, respectively, since the spring of 2022 readings. The standpipe piezometer readings are summarized in Table NC025-2 are plotted on Figure NC025-1 in Appendix A.

Load cell VC1463 showed a decrease in measured load of 45.00 kN since the spring of 2022 readings. The large decrease in VC1463 is likely from one of the vibrating wires functioning incorrectly.

VC1464, VC1465, VC1466, VC1467 and VC1468 showed increases in measured load of 1.68 kN, 1.48 kN, 2.30 kN, 0.80 kN and 2.10 kN, respectively, since the spring of 2022 readings. VC1463, VC1464 and VC1467 currently have three of the four vibrating wire channels functioning so the measured load is the average of the functioning channels. The load cell readings are summarized in Table NC025-3, and are plotted on Figure NC025-2 in Appendix A.

In general, the instrumentation monitoring results indicate that the pile wall has performed well since construction completion.

4. RECOMMENDATIONS

4.1 Future Work

The instruments should be read again in the spring of 2024.

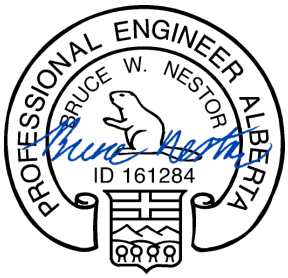
4.2 Instrumentation Repairs

No instrument repairs are required at this time.

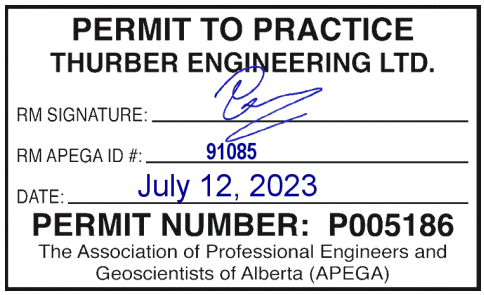
5. CLOSURE

We trust this report meets your requirements at present. If you have any questions, please contact the undersigned at your convenience.

Yours very truly,
Thurber Engineering Ltd.
Tarek Abdelaziz, Ph.D., P.Eng.
Principal | Senior Geotechnical Engineer



July 12, 2023



Bruce Nestor, P.Eng.
Geotechnical Engineer
/ak

Attachments

- Statement of Limitations and Conditions
- Appendix A
  - Field Inspector's report
  - Site Plan Showing Approximate Instrument Locations (Drawing No. 32122-NC025)
  - SI Reading Plots
  - Figure NC025-1 (Piezometric Depths)
  - Figure NC025-2 (Load Cell Readings)

THURBER

STATEMENT OF LIMITATIONS AND CONDITIONS

1. STANDARD OF CARE

This Report has been prepared in accordance with generally accepted engineering or environmental consulting practices in the applicable jurisdiction. No other warranty, expressed or implied, is intended or made.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report, which is of a summary nature and is not intended to stand alone without reference to the instructions given to Thurber by the Client, communications between Thurber and the Client, and any other reports, proposals or documents prepared by Thurber for the Client relative to the specific site described herein, all of which together constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. THURBER IS NOT RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF REPORT

The Report has been prepared for the specific site, development, design objectives and purposes that were described to Thurber by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the Report, subject to the limitations provided herein, are only valid to the extent that the Report expressly addresses proposed development, design objectives and purposes, and then only to the extent that there has been no material alteration to or variation from any of the said descriptions provided to Thurber, unless Thurber is specifically requested by the Client to review and revise the Report in light of such alteration or variation.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT THURBER'S WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS THURBER MAY EXPRESSLY APPROVE. Ownership in and copyright for the contents of the Report belong to Thurber. Any use which a third party makes of the Report, is the sole responsibility of such third party. Thurber accepts no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without Thurber's express written permission.

5. INTERPRETATION OF THE REPORT

a) Nature and Exactness of Soil and Contaminant Description: Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature. Comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel may fail to locate some conditions. All investigations utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and the Client and all other persons making use of such documents or records with our express written consent should be aware of this risk and the Report is delivered subject to the express condition that such risk is accepted by the Client and such other persons. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. If special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.

b) Reliance on Provided Information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to Thurber. Thurber has relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, Thurber does not accept responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other persons providing information relied on by Thurber. Thurber is entitled to rely on such representations, information and instructions and is not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.

c) Design Services: The Report may form part of design and construction documents for information purposes even though it may have been issued prior to final design being completed. Thurber should be retained to review final design, project plans and related documents prior to construction to confirm that they are consistent with the intent of the Report. Any differences that may exist between the Report's recommendations and the final design detailed in the contract documents should be reported to Thurber immediately so that Thurber can address potential conflicts.

d) Construction Services: During construction Thurber should be retained to provide field reviews. Field reviews consist of performing sufficient and timely observations of encountered conditions in order to confirm and document that the site conditions do not materially differ from those interpreted conditions considered in the preparation of the report. Adequate field reviews are necessary for Thurber to provide letters of assurance, in accordance with the requirements of many regulatory authorities.

6. RELEASE OF POLLUTANTS OR HAZARDOUS SUBSTANCES

Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause the escape, release or dispersal of those substances. Thurber shall have no liability to the Client under any circumstances, for the escape, release or dispersal of pollutants or hazardous substances, unless such pollutants or hazardous substances have been specifically and accurately identified to Thurber by the Client prior to the commencement of Thurber's professional services.

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The information, interpretations and conclusions in the Report are based on Thurber's interpretation of conditions revealed through limited investigation conducted within a defined scope of services. Thurber does not accept responsibility for independent conclusions, interpretations, interpolations and/or decisions of the Client, or others who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes but is not limited to decisions made to develop, purchase or sell land.

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ALBERTA TRANSPORTATION AND ECONOMIC CORRIDORS GRMP (CON0022163)
NORTH CENTRAL (ATHABASCA AND FORT McMURRAY DISTRICTS)
INSTRUMENTATION MONITORING RESULTS

SPRING 2023

APPENDIX A
DATA PRESENTATION AND SITE PLANS

SITE NC025: HWY 646:04 LINDBERGH HILL

ALBERTA TRANSPORTATION AND ECONOMIC CORRIDORS
NORTH CENTRAL REGION - ATHABASCA AND FORT McMURRAY DISTRICTS
INSTRUMENTATION MONITORING FIELD SUMMARY (NC025)
SPRING 2023

Location:	Lindberg Hill (HWY 646:04 C1 16.082)	**Readout:**	DGSI Dipmeter/RST VW 2106 Unit 3
File Number:	32122	**Casing Diameter:**	2.75"
Probe:	RST SI SET 8R	**Temp:**	15°C
Cable:	RST SI SET 8R	**Read by:**	OTE/NKR

SLOPE INCLINOMETER (SI) READINGS

SI#	GPS Location (UTM 12)		Date	Stickup m	Depth from top of casing (ft)	Azimuth of A+ Groove	Current Bottom Depth Readings				Probe/ Reel #	Remarks
	Easting (m)	Northing (m)					A+	A-	B+	B-		
SI02-1	522385.00	5969334.00	24-May-23	0.82	49 to 3	16	-619	584	733	-716	8R	
SI07-1*	522428.20	5969328.17	24-May-23	0.47	67 to 5	5	191	-173	-291	306	8R	***
SI07-2*	522428.20	5969328.17	24-May-23	0.66	61 to 5	5	-43	63	342	-336	8R	
SI07-3*	522428.20	5969328.17	24-May-23	0.76	49 to 3	355	493	120	-483	-113	8R	

STANDPIPE PIEZOMETER (SP) READINGS

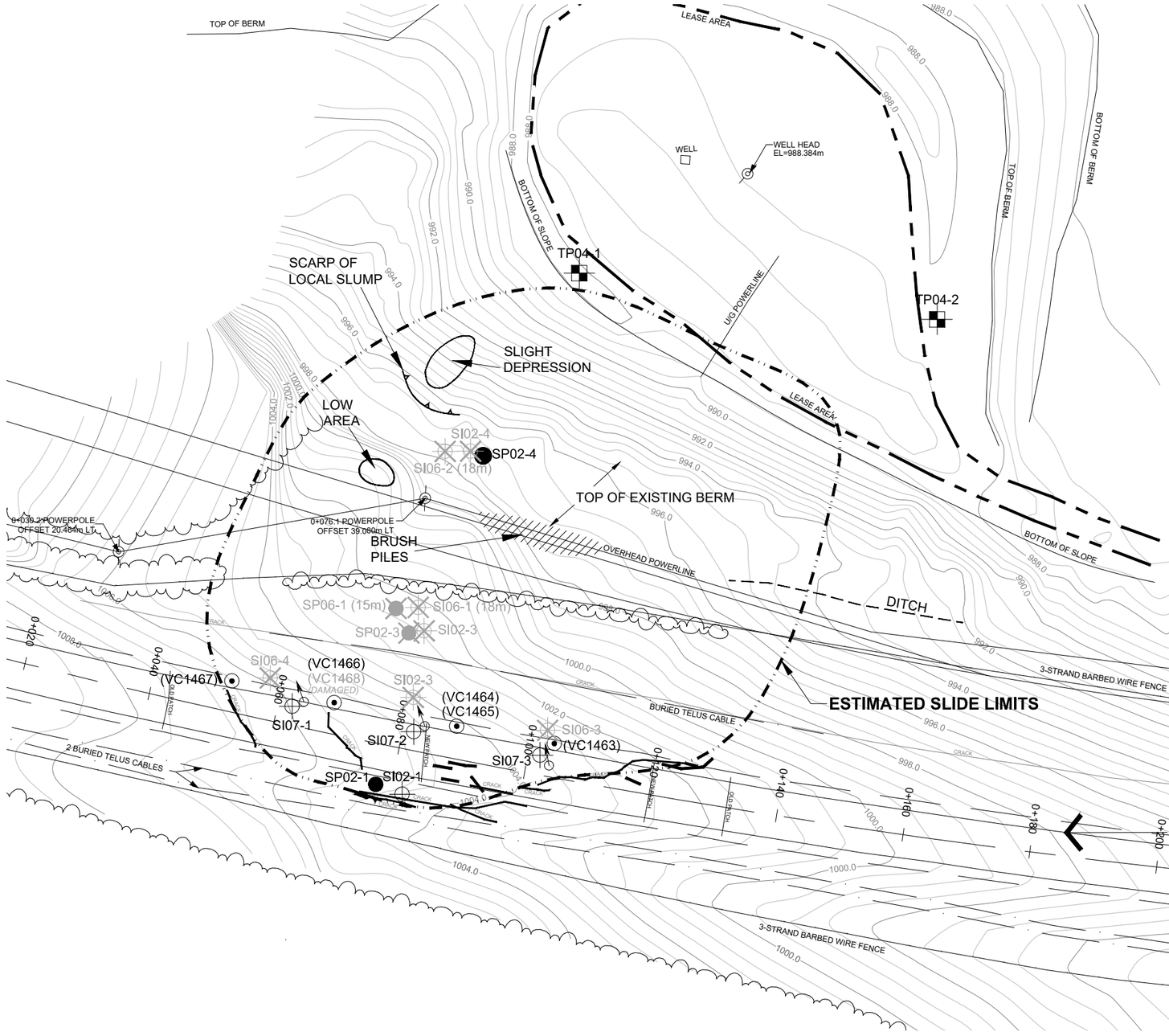
SP#	GPS Location (UTM 12)		Date	Stick-up (m)	Reading below top of casing (m)	Bottom Pipe Depth (below top of casing (m)
	Easting (m)	Northing (m)				
SP02-1	522398.88	5969352.84	24-May-23	0.86	7.03	7.06
SP02-4	522393.12	5969402.21	24-May-23	0.77	3.03	9.14

LOAD CELL (VC) READINGS

Anchor#	VC#	GPS Location		Date	Reading B(units)	Temp degree C
		Latitude	Longitude			
G9U	VC1467	-	-	24-May-23	6333.2/6741.7/6854.0	11.8
G19U	VC1468	-	-	24-May-23	6509.9	10.3
G19L	VC1466	-	-	24-May-23	6385.7	8.5
G28U	VC1464	-	-	24-May-23	6417.8/6735.2/6479.6	12.2
G28L	VC1465	-	-	24-May-23	6779.9	Not working**
G37	VC1463	-	-	24-May-23	6713.6/6715.0/6691.3	11.3

INSPECTOR REPORT

*SI07-1,2,3 were installed in the wall.
Use RST with 1 ft extension.
For VC1463, VC1464, and VC1467, taken reading and recorded the three individual numbers and average taken of the three readings.
***SI07-1 hard to pull at 6 ft
Note: 4 SENSOR ON VW MONITOR SETTING
** Tempeture sensor not working



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LEGEND

- TEST PIT
- SLOPE INCLINOMETER (OPERATIONAL)
- STANDPIPE PIEZOMETER
- DAMAGED
- SLOPE INCLINOMETER (SHEARED OFF)
- LOAD CELL
- DIRECTION OF MOVEMENT IN SLOPE INCLINOMETER

0 10 20 30 40 50m
SCALE 1:750

BASE PLAN SURVEYED BY EXH ENGINEERING SCIENCES LTD.

Alberta

NORTH CENTRAL
(ATHABASCA AND FORT MCMURRAY DISTRICTS)
NC025: HWY 646:04 (km 16)
WEST LINDBERGH HILL SLIDE
SITE PLAN SHOWING APPROXIMATE INSTRUMENT LOCATIONS
DWG No. 32122-NC025

DRAWN BY	ML
DESIGNED BY	BWN
APPROVED BY	TSA
SCALE	1:750
DATE	JULY 2021
FILE No.	32122

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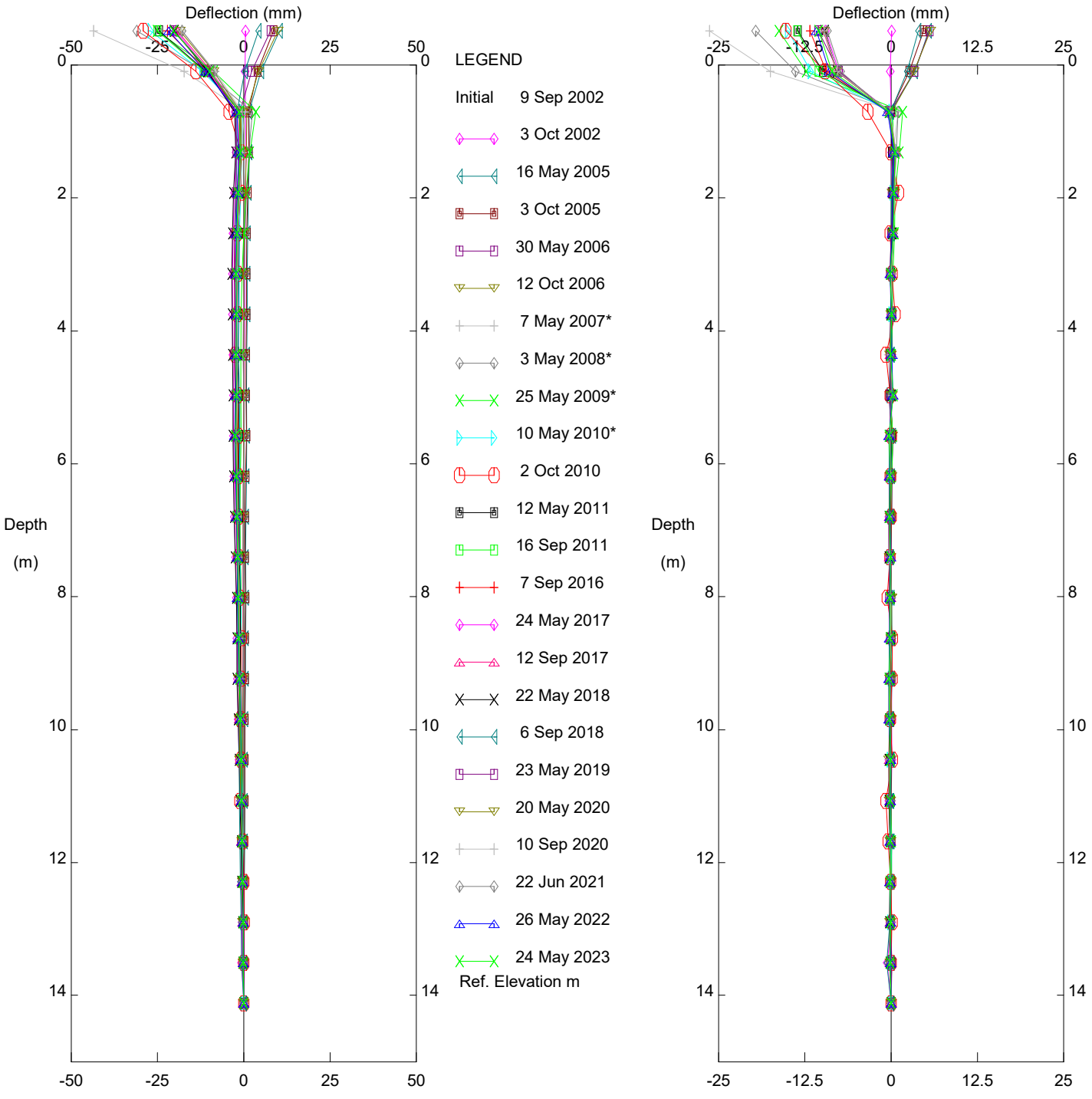

Cumulative Deflection

Direction A

Incremental Deflection

Direction A

HWY 646:04 Lindbergh Hill, Inclinometer SI02-1

Alberta Transportation

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

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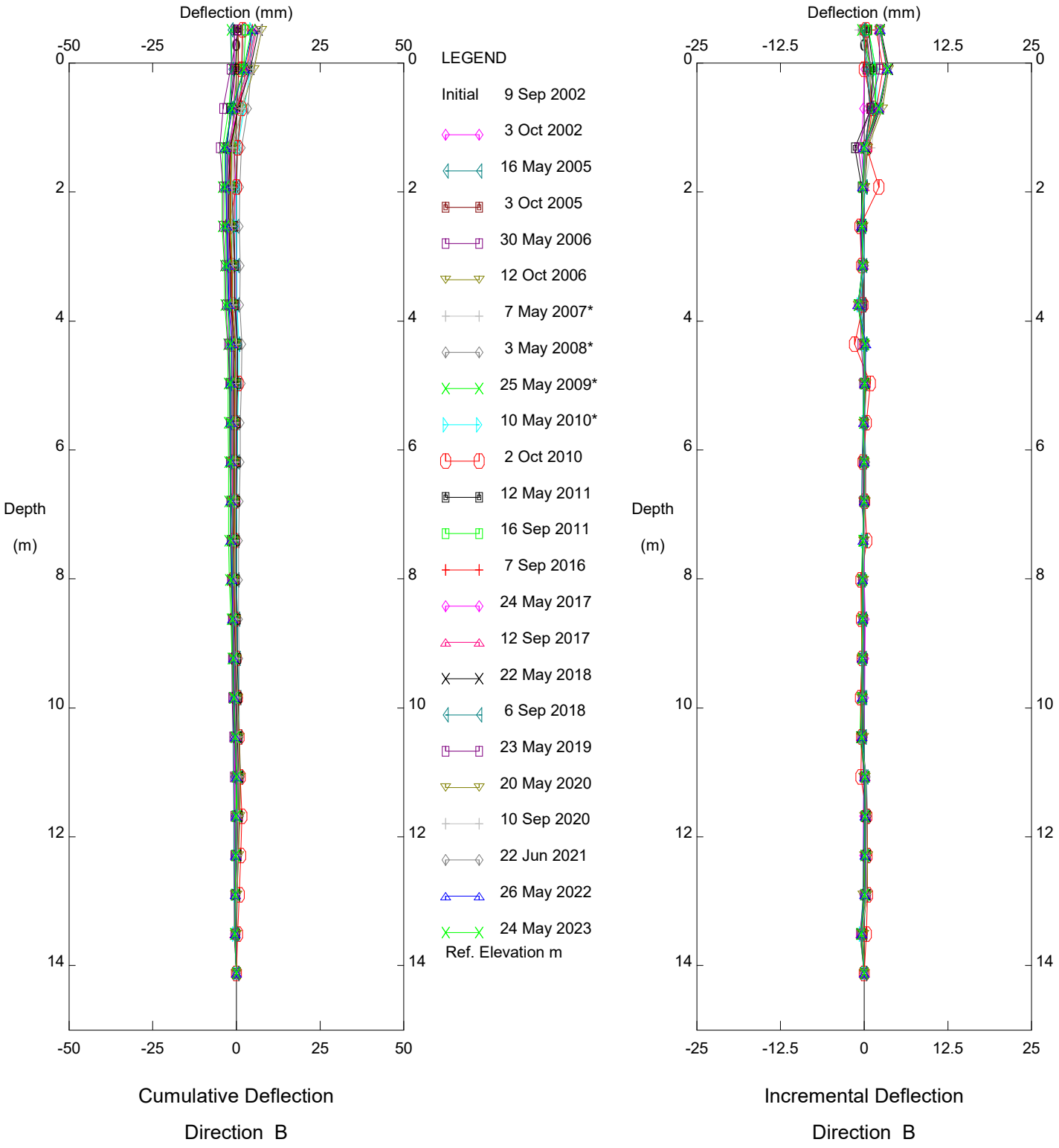

Cumulative Deflection

Direction B

Incremental Deflection

Direction B

HWY 646:04 Lindbergh Hill, Inclinometer SI02-1

Alberta Transportation

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

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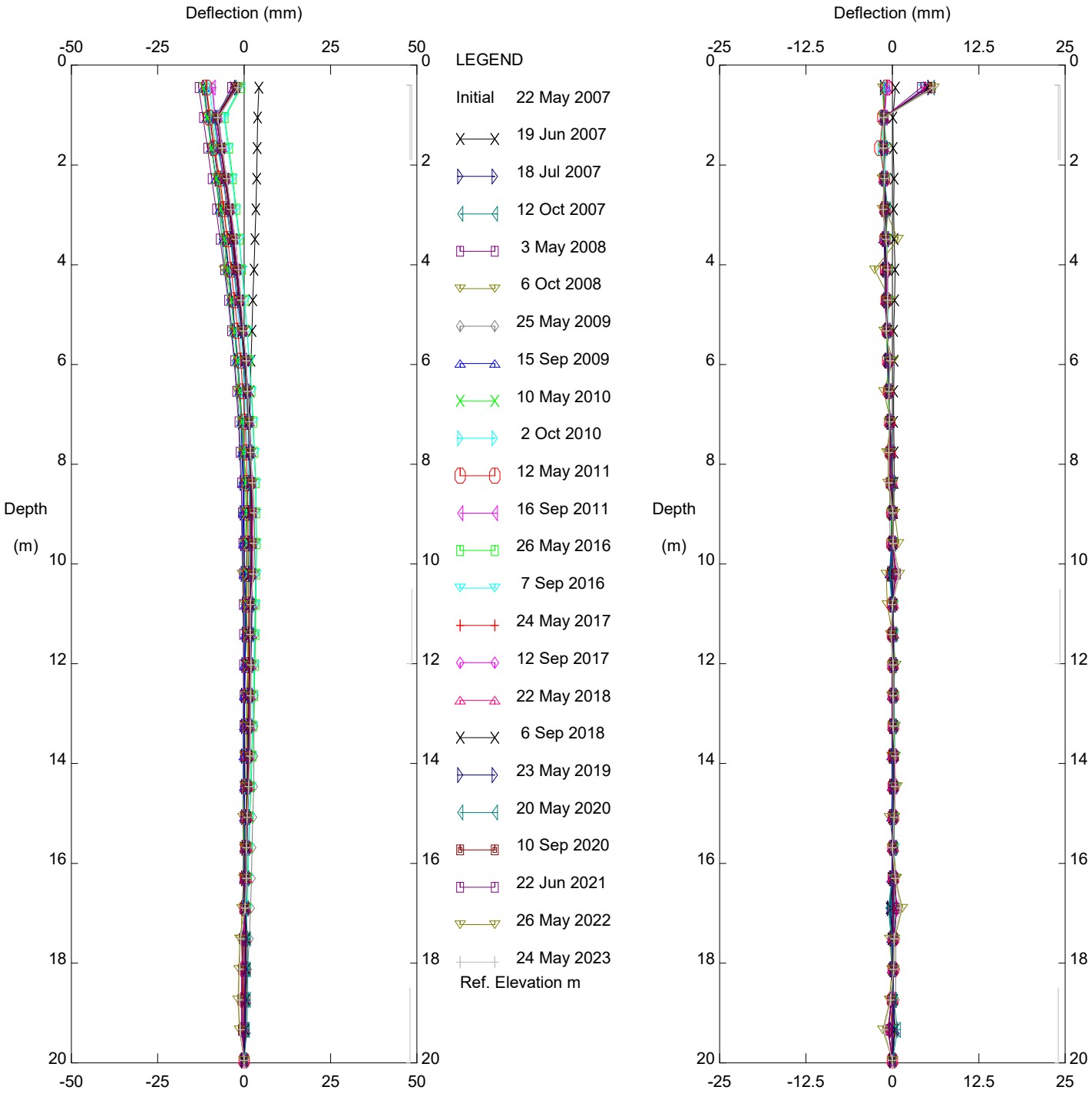

Cumulative Deflection

Direction A

Incremental Deflection

Direction A

HWY646:04 Lindbergh Hill, Inclinometer SI07-1

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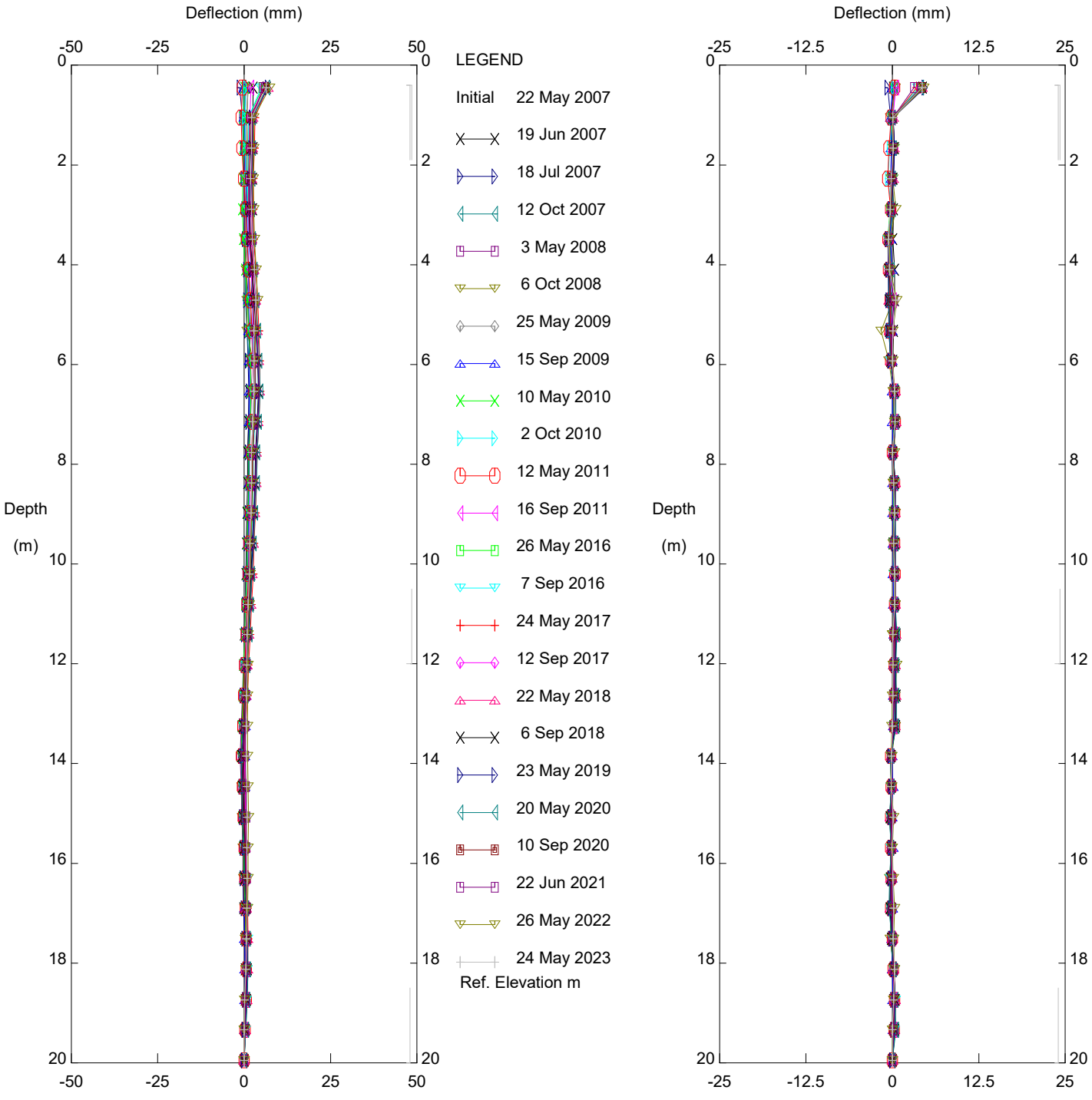

Cumulative Deflection

Direction B

Incremental Deflection

Direction B

HWY646:04 Lindbergh Hill, Inclinometer SI07-1

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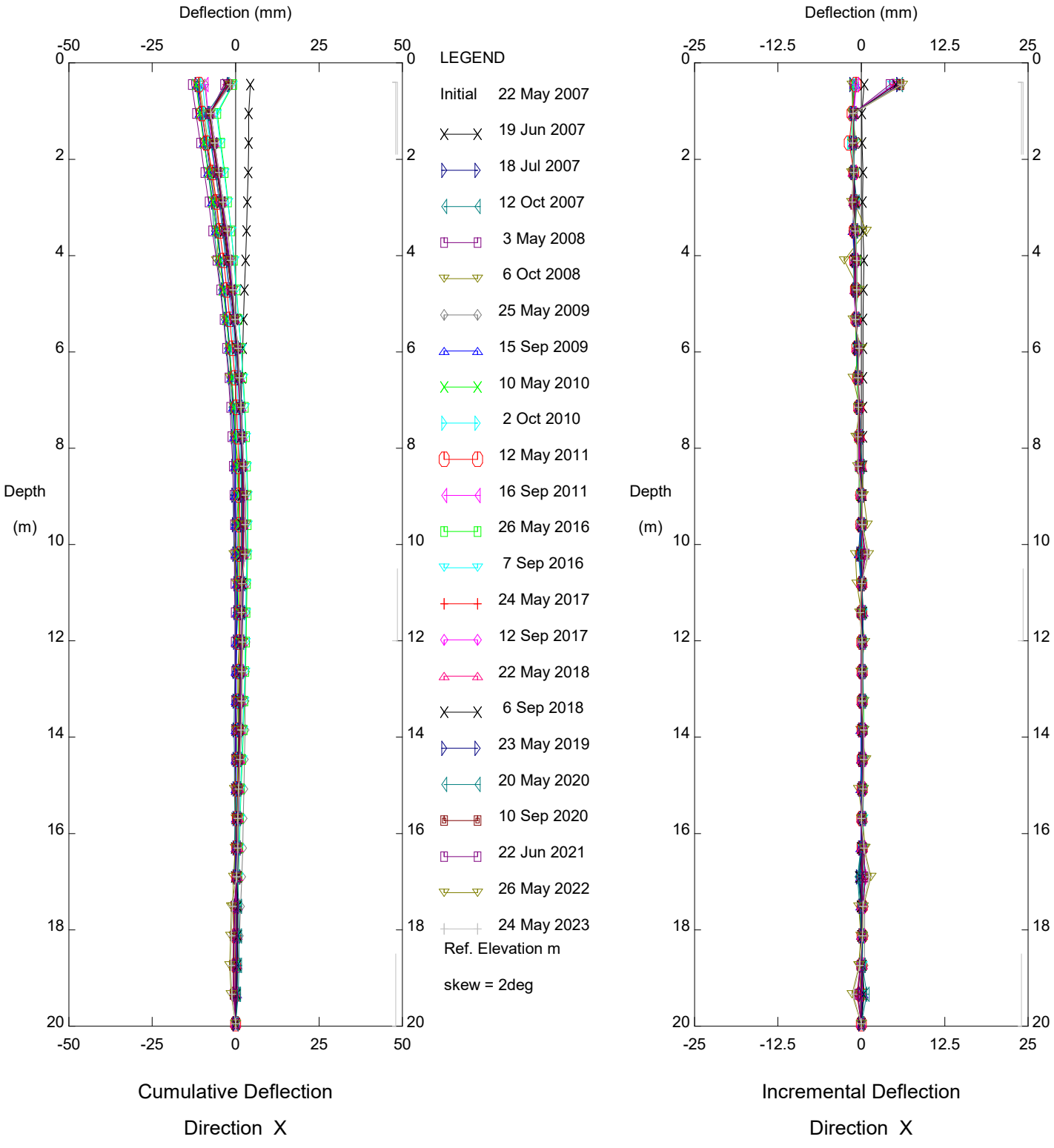

Cumulative Deflection

Direction X

Incremental Deflection

Direction X

HWY646:04 Lindbergh Hill, Inclinometer SI07-1

Alberta Transportation

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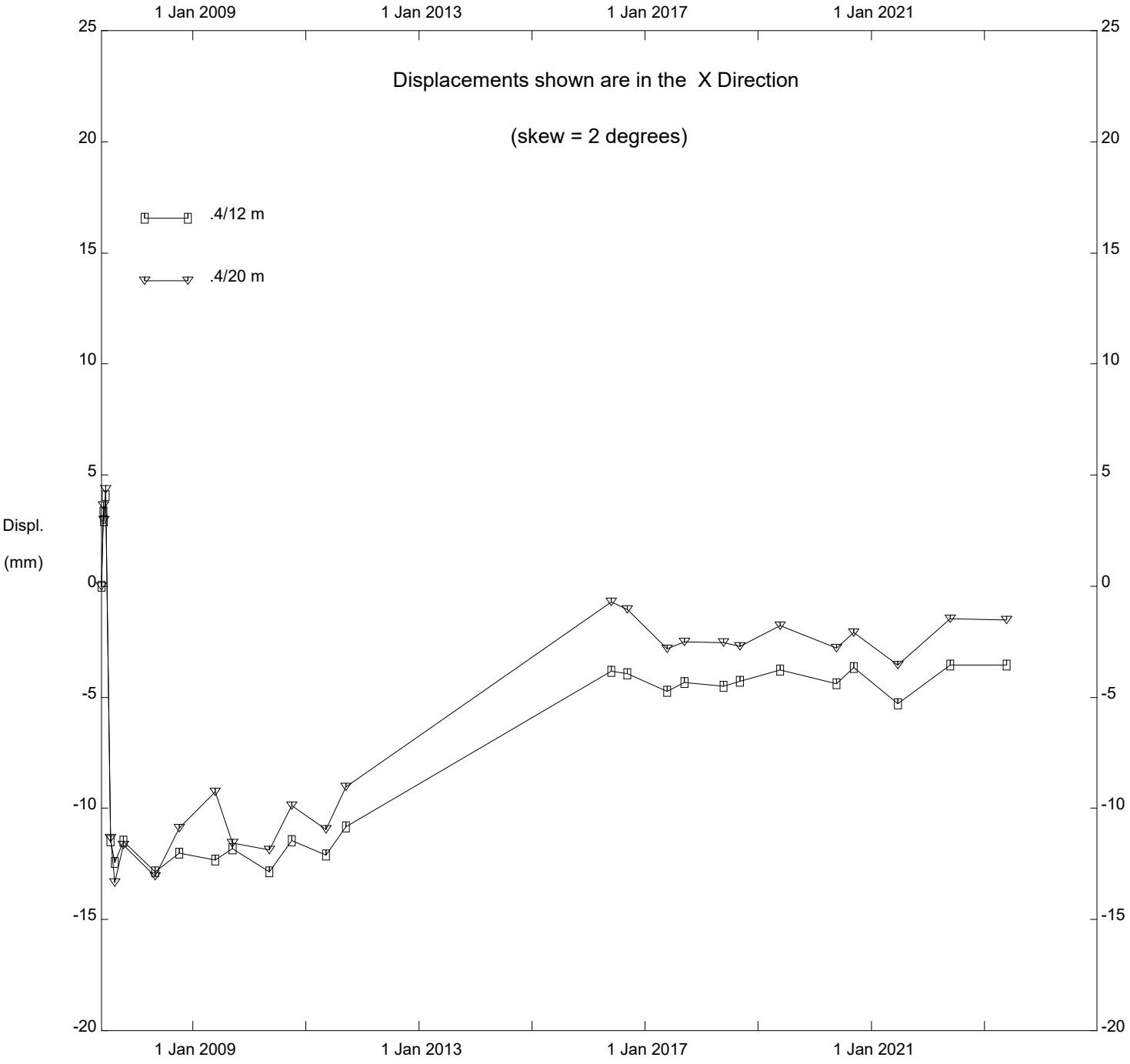
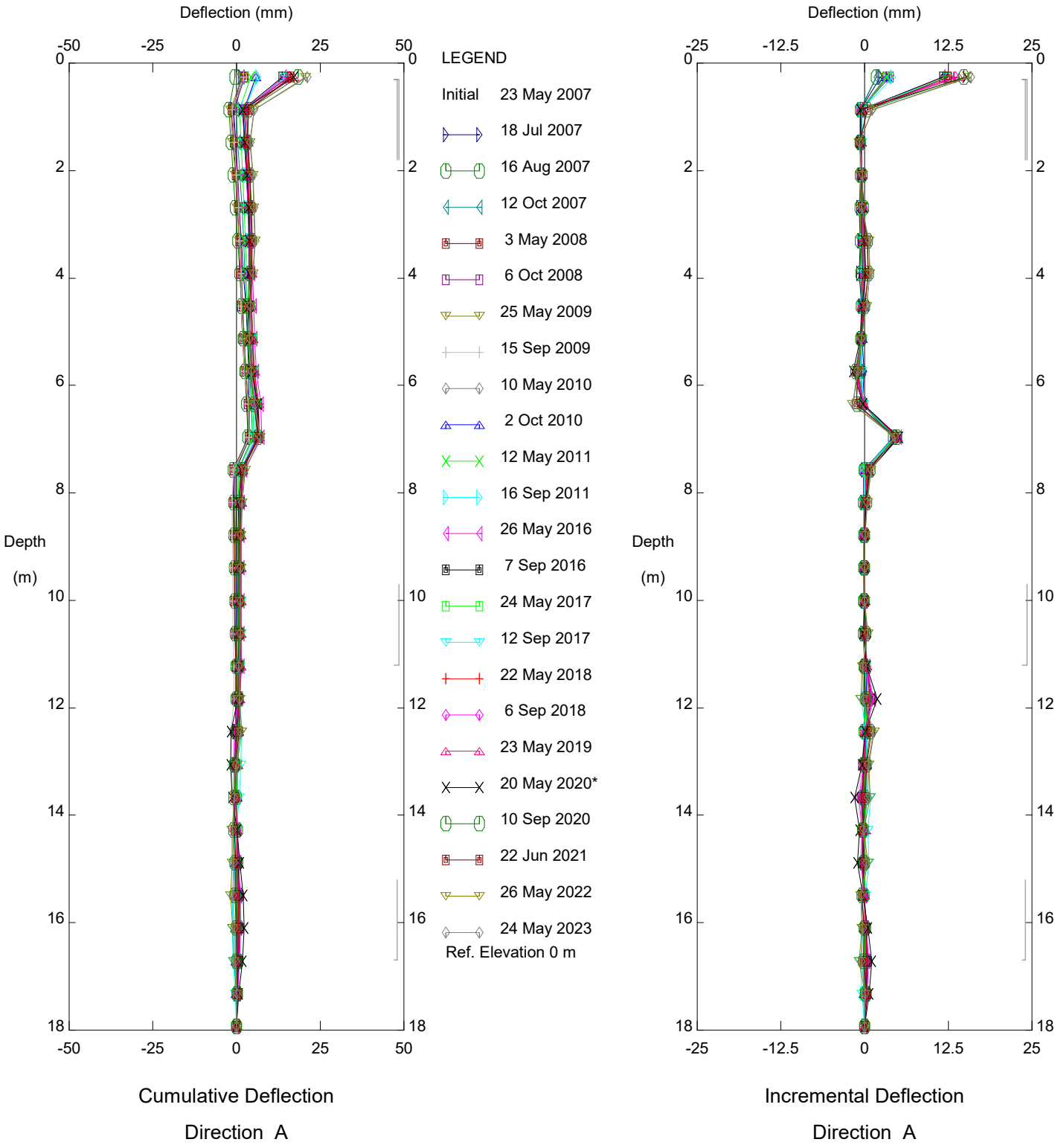


HWY646:04 Lindbergh Hill, Inclinometer SI07-1

Alberta Transportation

Thurber Engineering Ltd.



Cumulative Deflection

Direction A

Incremental Deflection

Direction A

HWY646:04 Lindbergh Hill, Inclinometer SI07-2

Alberta Transportation

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

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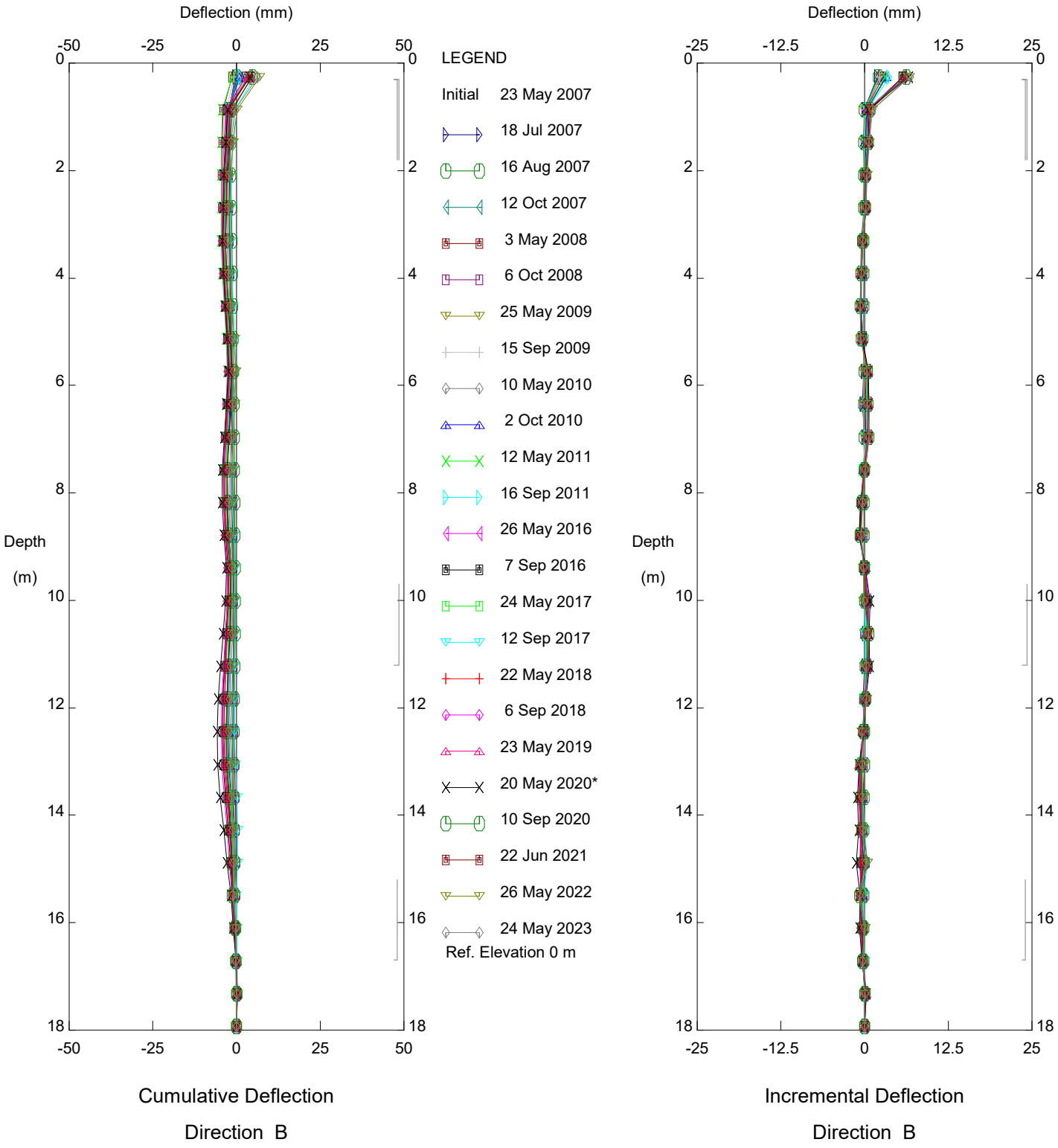

Cumulative Deflection

Direction B

Incremental Deflection

Direction B

HWY646:04 Lindbergh Hill, Inclinometer SI07-2

Alberta Transportation

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

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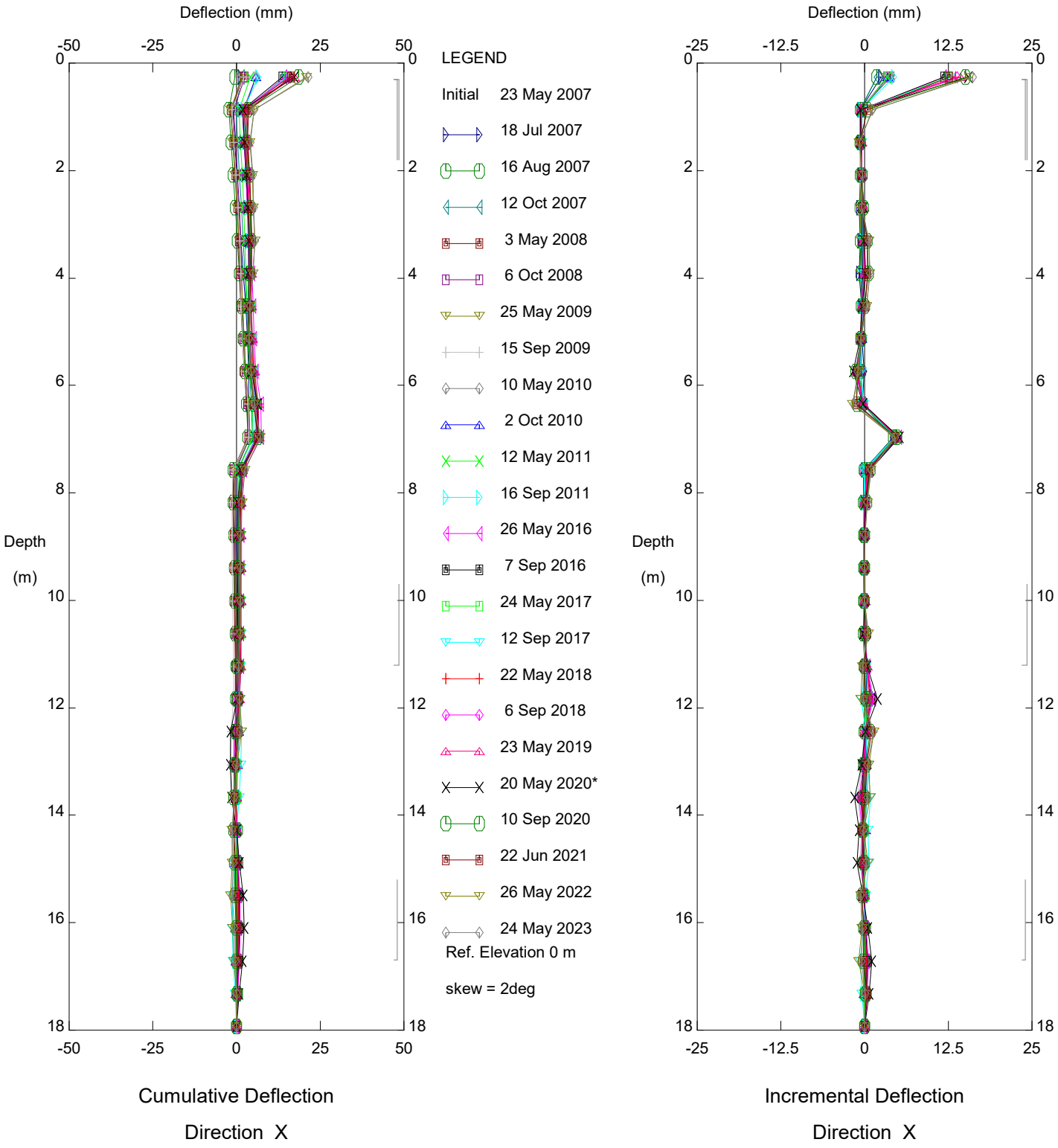

Cumulative Deflection

Direction X

Incremental Deflection

Direction X

HWY646:04 Lindbergh Hill, Inclinometer SI07-2

Alberta Transportation

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

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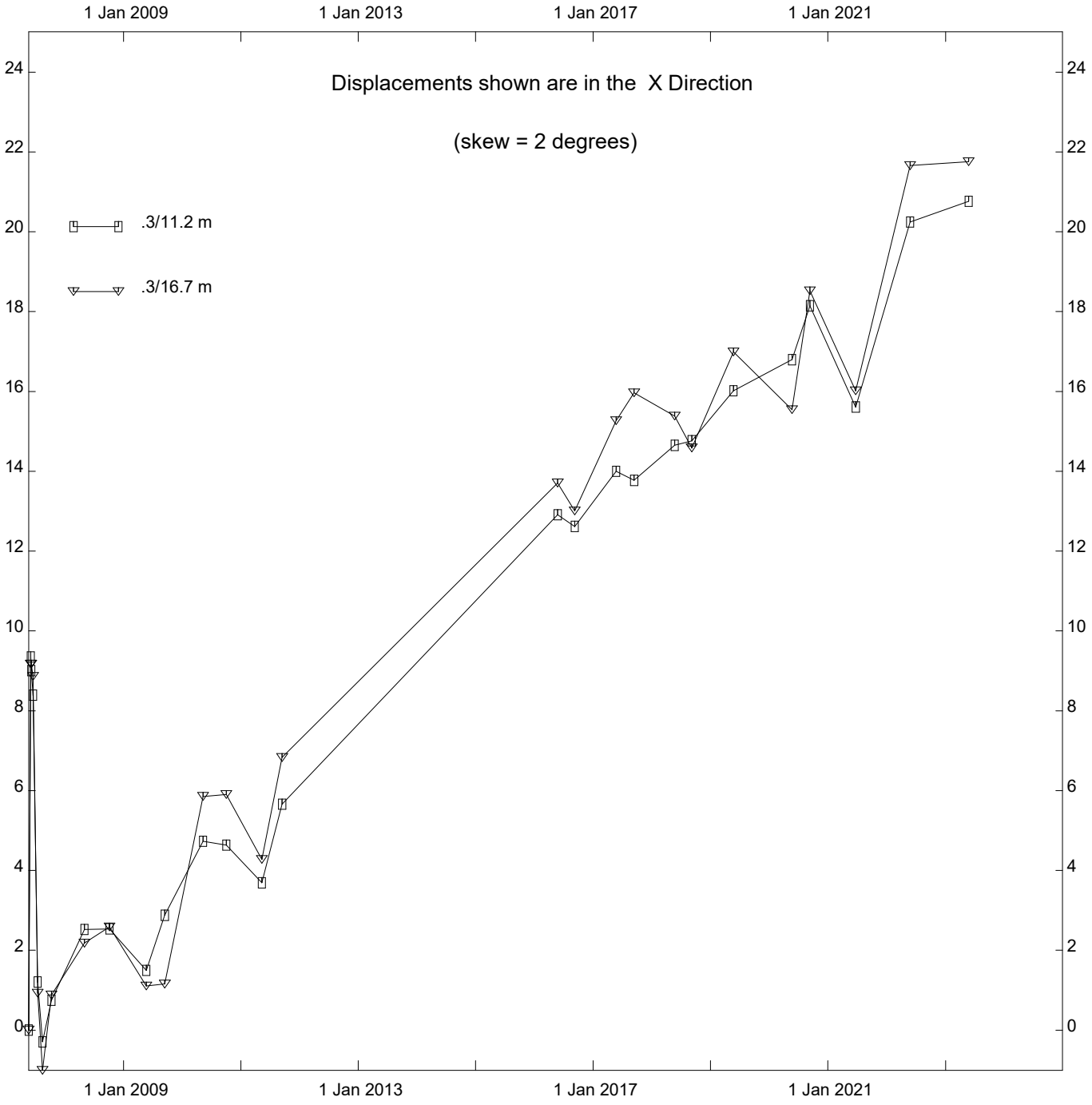
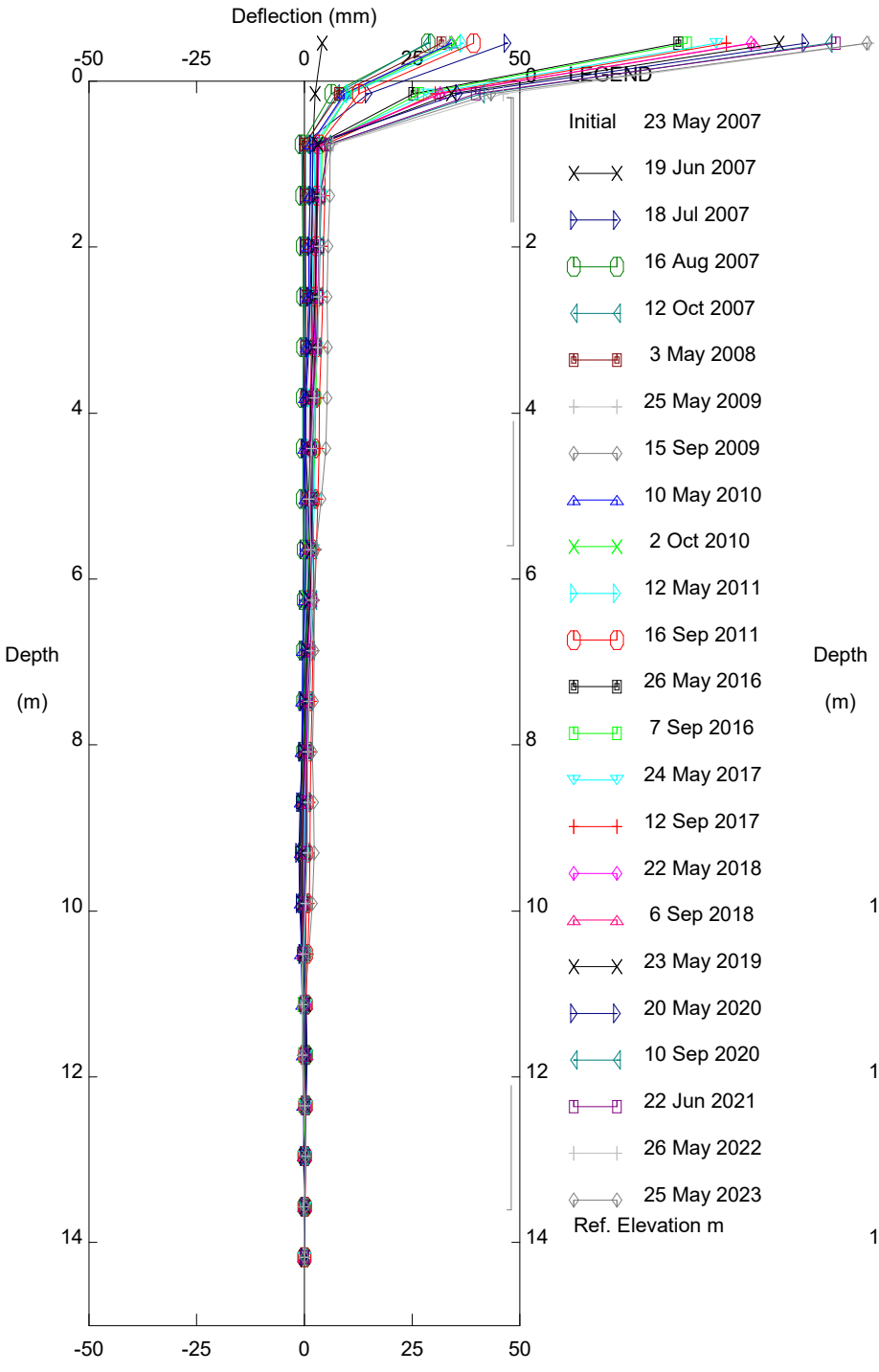


HWY646:04 Lindbergh Hill, Inclinometer SI07-2

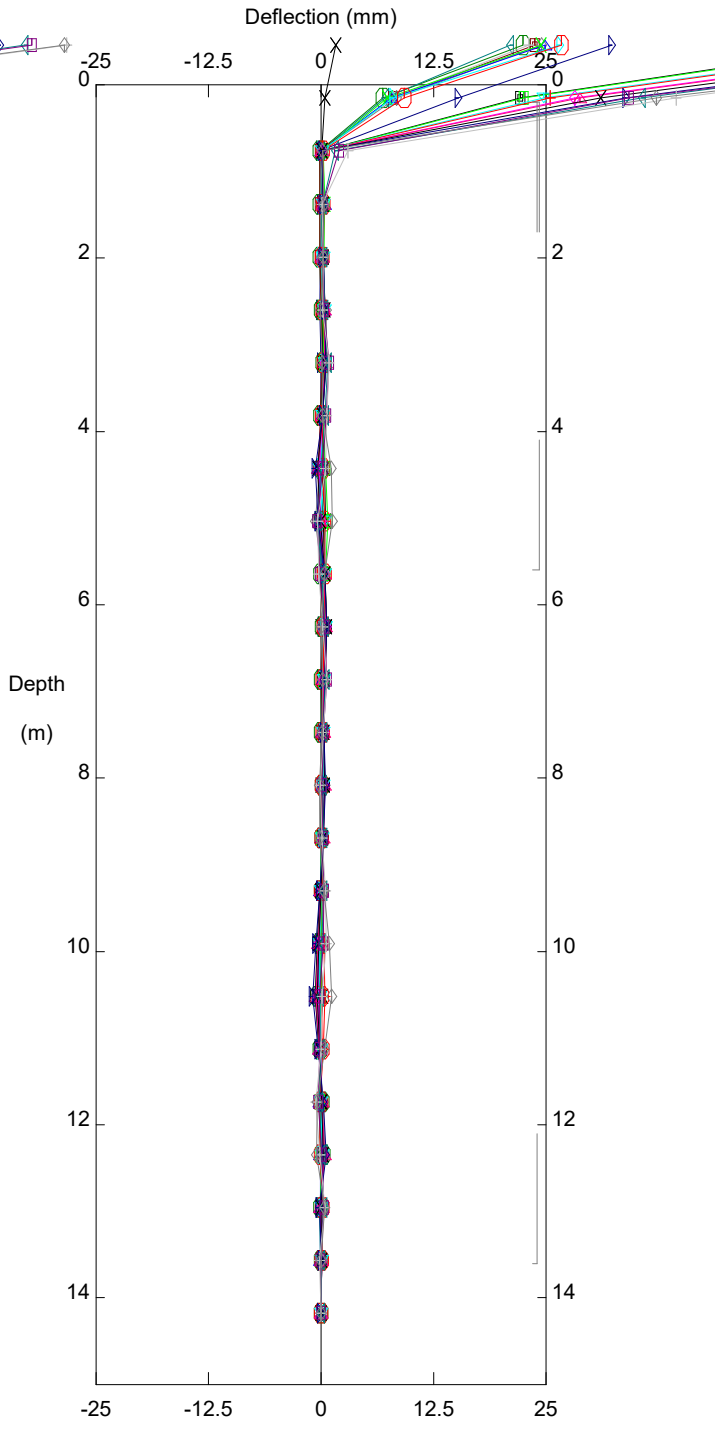
Alberta Transportation

Thurber Engineering Ltd.



Cumulative Deflection

Direction A



Incremental Deflection

Direction A

HWY646:04 Lindbergh Hill, Inclinometer SI07-3

Alberta Transportation

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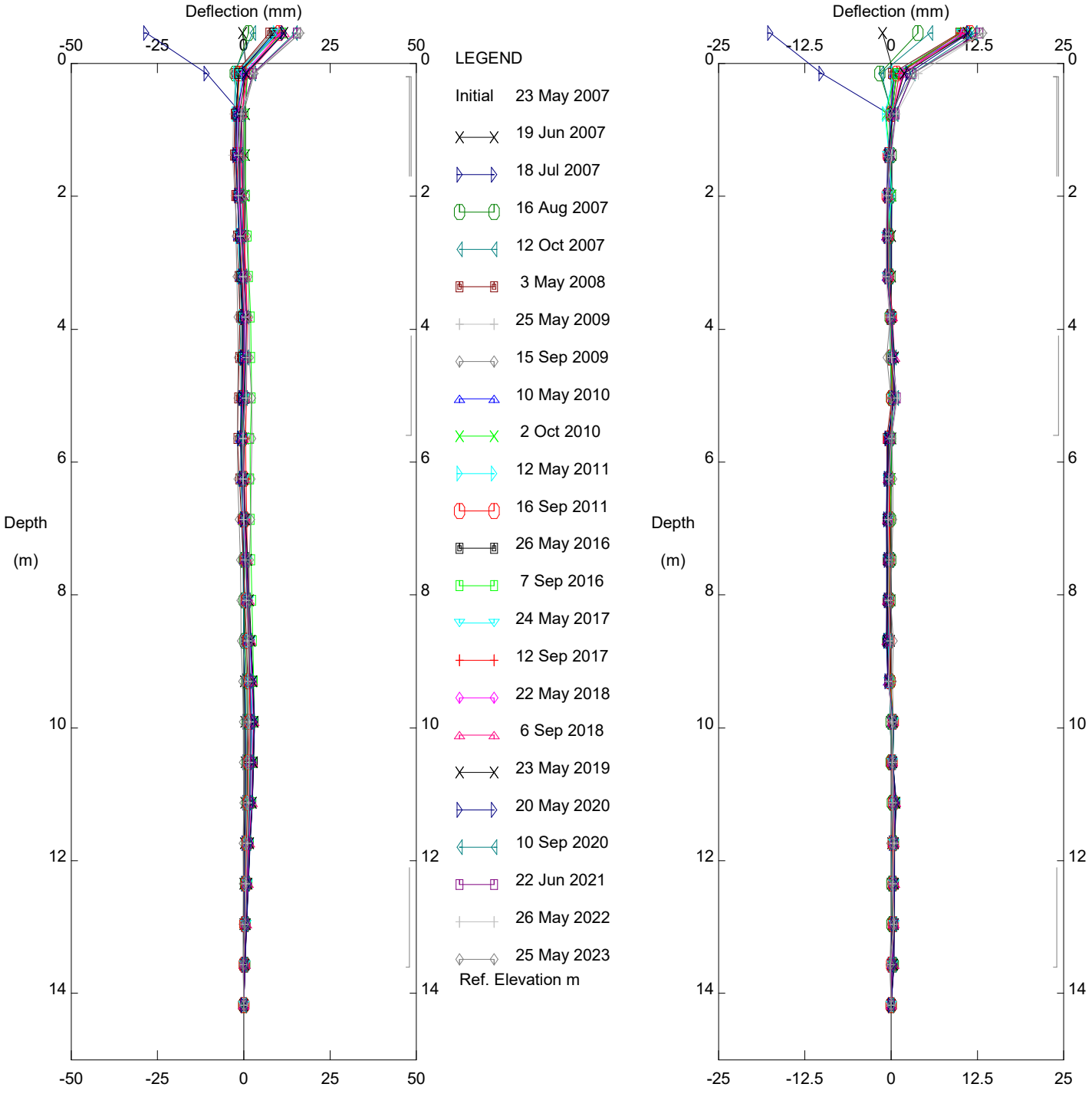

Cumulative Deflection

Direction B

Incremental Deflection

Direction B

HWY646:04 Lindbergh Hill, Inclinometer SI07-3

Alberta Transportation

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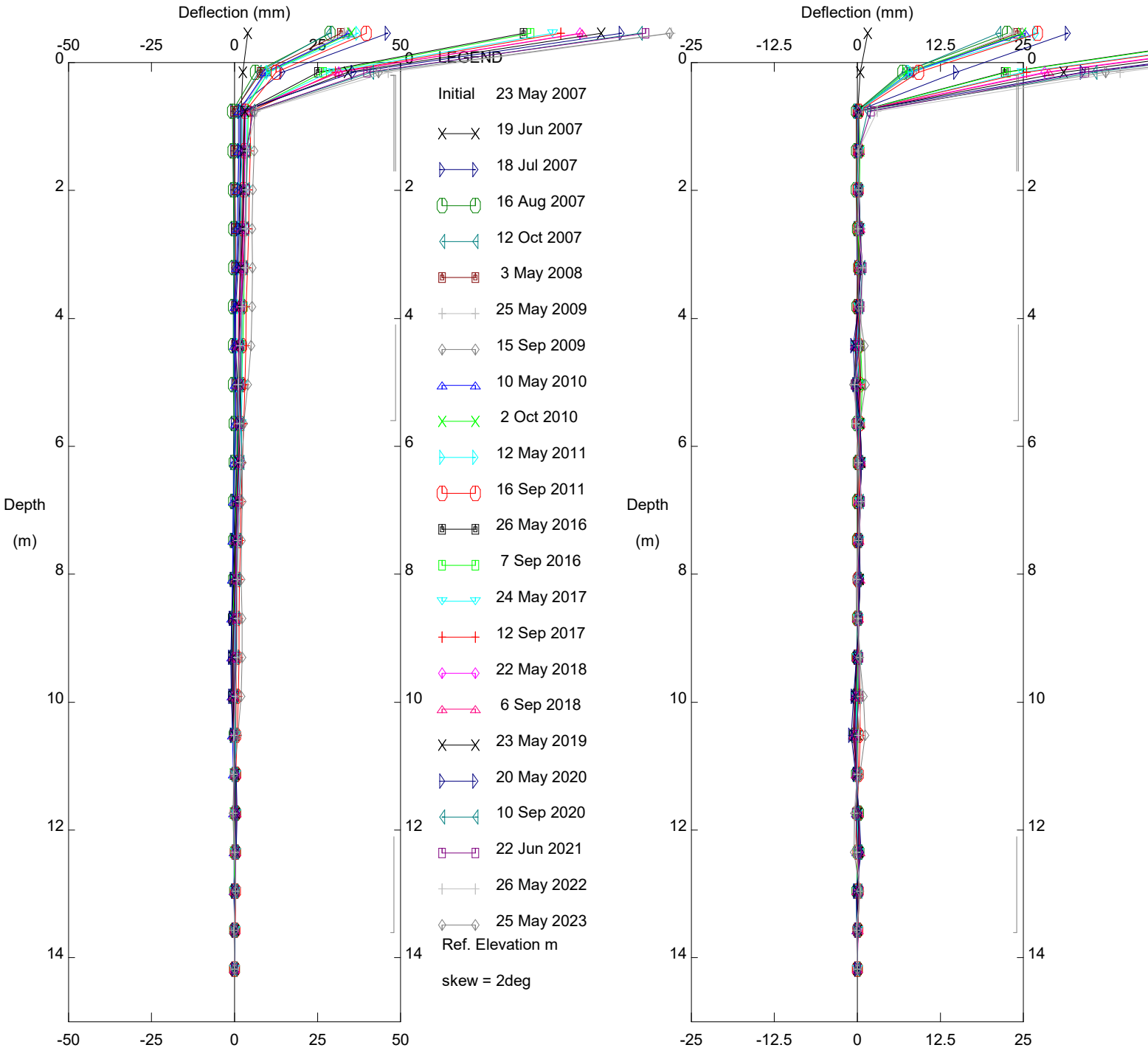

Cumulative Deflection

Direction X

Incremental Deflection

Direction X

HWY646:04 Lindbergh Hill, Inclinometer SI07-3

Alberta Transportation

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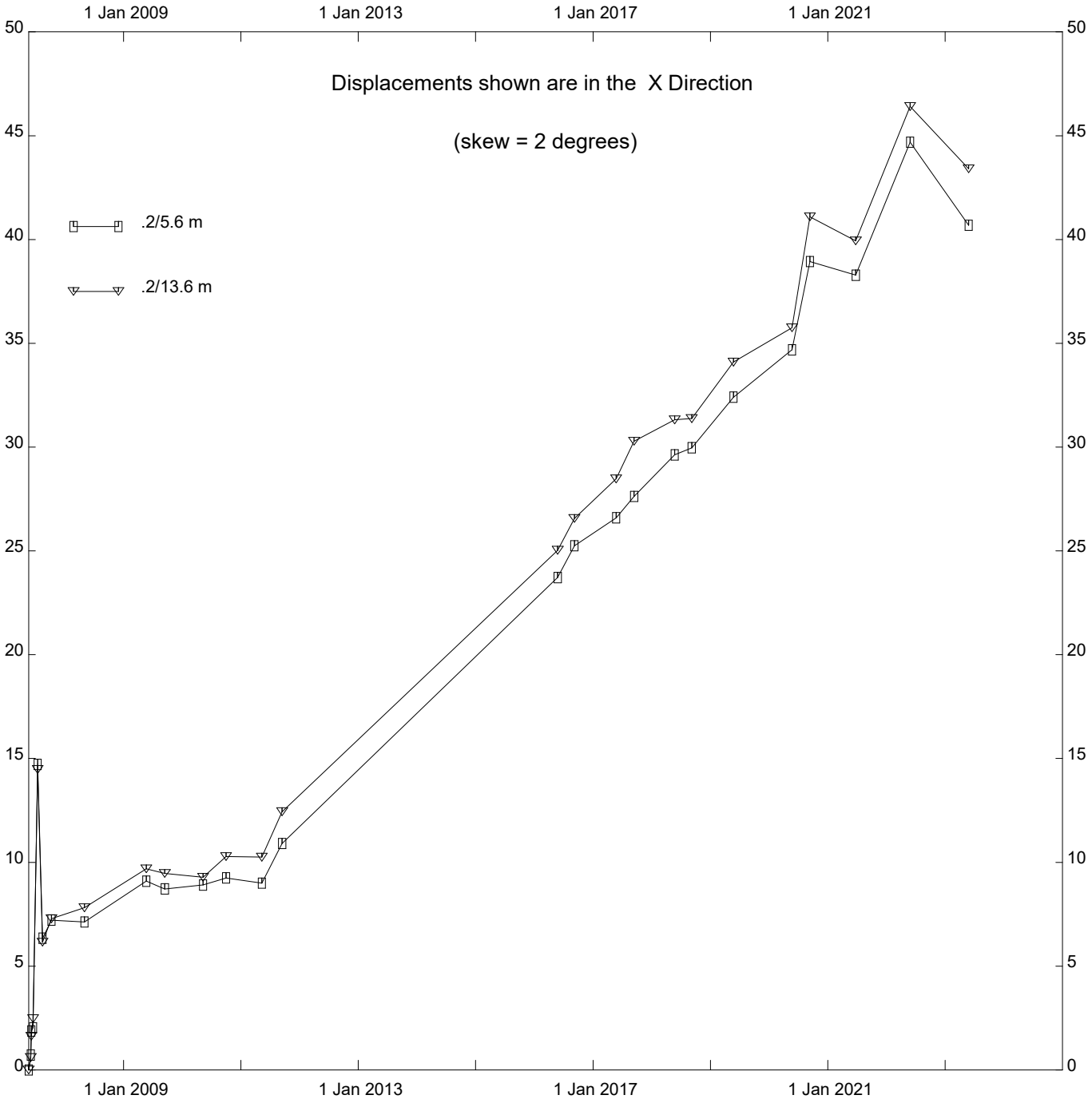

HWY646:04 Lindbergh Hill, Inclinometer SI07-3

Alberta Transportation

FIGURE NC025-1
STANDPIPE PIEZOMETER DATA FOR HWY 646:04, LINDBERG HILL

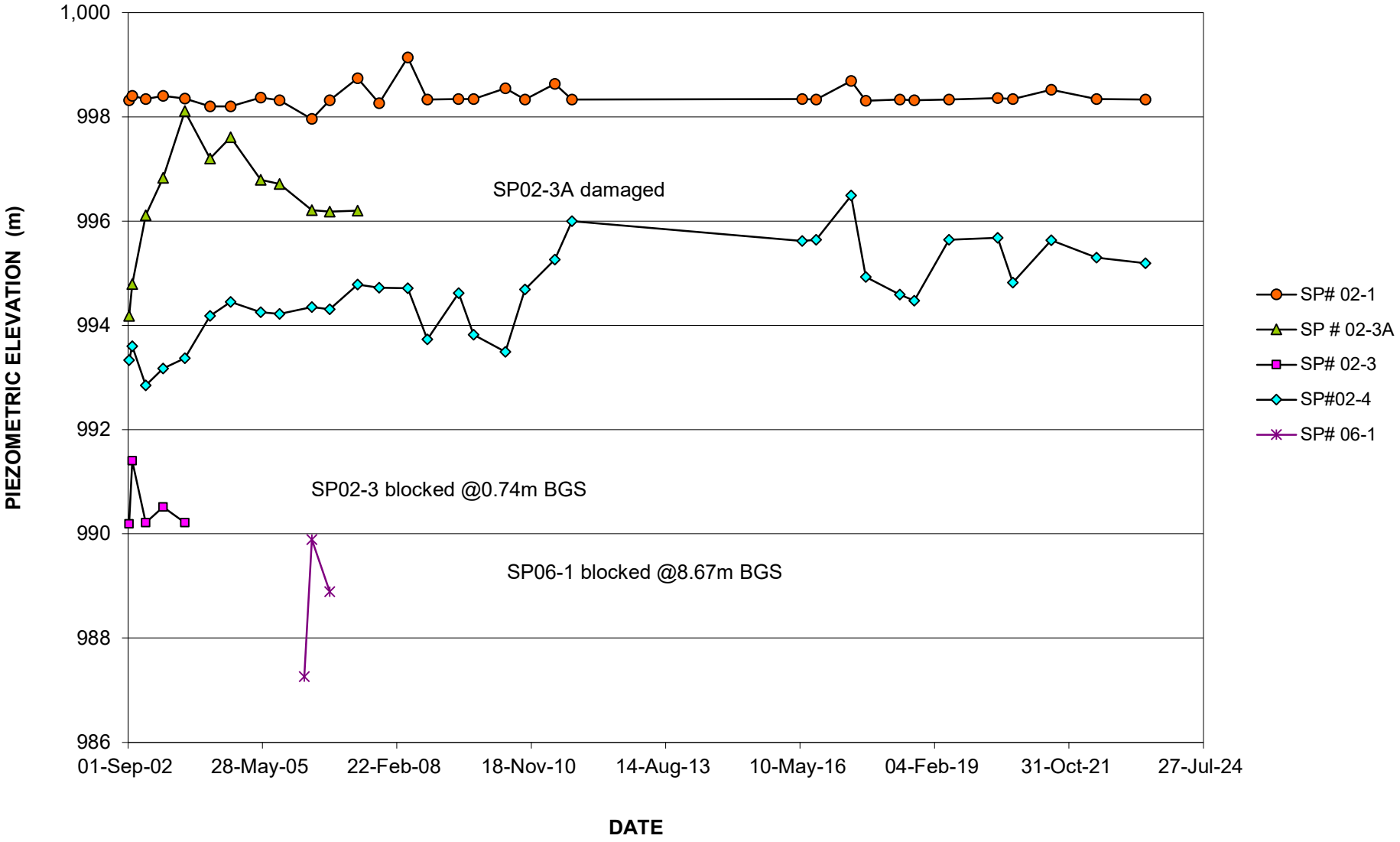

FIGURE NC025-2
LOAD CELL DATA FOR HWY 646:04, LINDBERG HILL