ALBERTA TRANSPORTATION AND ECONOMIC CORRIDORS GRMP
PEACE REGION – (PEACE RIVER DISTRICT)
INSTRUMENTATION MONITORING - SPRING 2024

THURBER ENGINEERING LTD.

Site Number	Location	Name	Hwy	km
PH031	HWY 744:04 C1 57.7	Michelin Slide- Judah Hill	744:04	Km 57.7
Legal Description:		**UTM Co-ordinates**		
9-20-83-21 W5		11U E 483125.92	N 6229725.01	

Current Monitoring:	22-May-2024	**Previous Monitoring**	9-Oct-2023
Instruments Read By:	Mr. Niraj Regmi, G.I.T and Mr. Nixson Mationg, of Thurber		

Instruments Read During This Site Visit			
Slope Inclinometers (SIs): SI98-10i, SI10-4, SI10-7, and SI10-9	**Pneumatic Piezometers (PN):** PN10-4, PN10-6 to PN10-9	**Vibration Wire Piezometers (VW):** VW17-1 and VW17-2	**Standpipe Piezometers (SP):**
Load Cell (LC): N/A	**Strain Gauges: N/A**	**SAAs:** SAA10-8	**Others:**

Readout Equipment Used			
Slope Inclinometers: Two RST Digital Inclinometer probes with 2 ft wheelbases and RST Pocket PC readouts	**Pneumatic Piezometers:** RST C108 pneumatic piezometer readout	**Vibrating Wire Piezometers:** Campbell Scientific CR1000 datalogger	**Standpipe Piezometers:**
Load Cell:	**Strain Gauges:**	**SAAs:** Campbell Scientific CR1000 datalogger	**Others:**
Note:			

Zones of New Movement:	None
Interpretation of Monitoring Results:	Slope inclinometer SI98-10i, located beyond the toe of Michelin slide showed small incremental movements along six distinct shear planes, since the fall of 2023 readings. The multitude of distinct movement zones speaks to the complexity of ongoing valley wall deformations along Judah Hill. Since the slope indicator was installed in October 2000 the sum of the movements over all these zones is 372.0 mm. The movement rates in these zones ranged from no discernible movement to 2.0 mm/yr. The movement rates showed small changes since the previous readings in the spring of 2023, except for an increase in movement of 10.3 mm/yr over 18.9 m to 20.2 m depth, and a decrease in the rate of movement of 5.8 mm/yr over 14.1 to 17.7 m depth. and Slope inclinometer SI10-4 is located close to the highway and has one well defined movement zone at 6 m depth in a clay strata, and several subtle movement zones lower down in clay and clay till layers. A rate of movement of 1.7 mm/yr was measured over 5.7 m to 6.9 m depth and no discernible movement over 11.8 m to 17.9 m depth since the fall of 2023 readings. The movement is in the direction of the active

	landslide in the Heart River valley slope, directly opposite from the Michelin Slide direction. SI10-7 showed three zones of movement. In the upper clay fill a movement rate of 1.0 mm/yr was measured over 1.9 m to 6.8 m depth; near a sand/clay transition a movement rate of 0.8 mm/yr was measured over 8.6 m to 9.8 m depth, and; in a lower clay layer 0.5 mm/yr was measured, over 14.1 m to 15.9 m depth, all since the fall of 2023 readings. SI10-9 showed one distinct zone of movement and several more subtle movement zones. In the upper clay a movement rate of less than 0.1 mm/yr was measured one over 6.5 m to 7.7 m. The more distinct movement zone was between 11.9 and 14.4 m in a sand layer, where a movement rate of 1.0 mm/yr was measured since the fall of 2023 readings. SAA10-8 has one distinct movement zone which showed an incremental movement of 1.1 mm over 15.0 m to 16.5 m since the fall of 2023 readings. This rate is slow and consistent with the average rate of movement of 1.8 mm/yr over this zone since 2015. Pneumatic piezometers PN10-4, PN10-8, and PN10-9 showed decreases in groundwater levels of 0.01 m, 0.88 m, and 0.37 m, respectively, since the fall of 2023 readings. Pneumatic piezometers PN10-6 and PN10-7 showed increases in groundwater level of 0.52 m and 0.78 m, respectively, since the fall of 2023 readings. The battery was found to have died since the spring of 2023 readings, and only the current reading was able to be downloaded. Vibrating wire piezometer VW17-1 showed a decrease in groundwater level of 0.20 m since the fall of 2023 readings, while VW17-2 continued to be dry.
Future Work:	The instruments should be read again in the fall of 2024.
Instrumentation Repairs:	The battery for the CR1000 datalogger station was replaced during the fall 2023 readings cycle, however, after subsequent battery power loss the datalogger data could not be retrieved. The power level for this battery will be assessed during the next two reading cycles to determine its power usage and if the battery can adequately power the datalogger through the winter months. Due to past theft and vandalism at the site, it is tentatively planned that the datalogger station will be setup with the 12-volt battery inside of the enclosure going forward. This setup is expected to require annual battery replacements. A new battery should be installed and an attempt to retrieve the saved data should be made during the fall of 2024 reading program.
Additional Comments:	

Attachments:	▪ Table PH031-1: Spring 2024 – HWY 744:04 Judah Hill (Michelin Slide) Slope Inclinometer Instrumentation Reading Summary ▪ Table PH031-2: Spring 2024 – HWY 744:04 Judah Hill (Michelin Slide) Pneumatic Piezometer Instrumentation Reading Summary ▪ Table PH031-3: Spring 2024 – HWY 744:04 Judah Hill (Michelin Slide) Vibrating Wire Piezometer Instrumentation Reading Summary ▪ Statement of Limitations and Conditions ▪ Appendix A □ Field Inspector's Report □ Site Plan Showing Approximate Instrument Locations (Drawing No. 32121 PH031) □ SI and SAA Reading Plots □ Figure PH031-1 (Piezometric Depths) □ Figure PH031-2 (Piezometric Elevations)

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.
Roger Skirrow, M.Sc., P. Eng.
Senior Geotechnical Engineer

PROFESSIONAL ENGINEER ALBERTA
LUCAS R.M. GREEN
ID 206714

2024-07-15

PERMIT TO PRACTICE
THURBER ENGINEERING LTD.
RM SIGNATURE: Don Proudfoot
RM APEGA ID #: 51674
DATE: July 15, 2024
PERMIT NUMBER: P005186
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

Lucas Green, P.Eng.
Geotechnical Engineer

THURBER ENGINEERING LTD.

Table PH031-1: Spring 2024 – HWY 744:04 Judah Hill (Michelin Slide) Slope Inclinometer Instrumentation Reading Summary

Date Monitored: May 22, 2024

INSTRUMENT #	DATE INITIALIZED	TOTAL CUMULATIVE RESULTANT MOVEMENT AT NOTED DEPTH SINCE INITIAL READING (mm)	MAXIMUM RATE OF MOVEMENT (mm/yr)	CURRENT STATUS	DATE OF PREVIOUS READING	INCREMENTAL MOVEMENT SINCE PREVIOUS READING (mm)	RATE OF MOVEMENT (mm/yr)	CHANGE IN RATE OF MOVEMENT SINCE PREVIOUS READING (mm/yr)
SI98-10i	Oct. 27, 2000	95.2 mm over 6.1 m to 7.4 m depth in 314° direction	14.0 mm/yr in September 2017	Operational	October 9, 2023	0.2	0.4	-3.1
		13.0 mm over 11.0 m to 12.2 m depth in 324° direction	2.9 mm/yr in October 2020			No discernible movement	N/A	-1.4
		89.8 mm over 14.1 m to 17.7 m depth in 314° direction	15.3 mm/yr in September 2017			0.4	0.6	-5.8
		28.5 mm over 18.9 m to 20.2 m depth in 324° direction	5.0 mm/yr in September 2017			<0.1	0.1	10.3
		35.0 mm over 21.4 m to 22.6 m depth in 341° direction	9.2 mm/yr in October 14, 2021			0.4	0.6	-0.2
		110.5 mm over 23.2 m to 26.9 m depth in 324° direction	13.5 mm/yr in October 2021			1.3	2.0	0.7

Drawing 32121-PH031 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.

Table PH031-1 – Continued… Spring 2024 – HWY 744:04 Judah Hill (Michelin Slide) Slope Inclinometer Instrumentation Reading Summary

Date Monitored: May 22, 2024

INSTRUMENT #	DATE INITIALIZED	TOTAL CUMULATIVE RESULTANT MOVEMENT AT NOTED DEPTH SINCE INITIAL READING (mm)	MAXIMUM RATE OF MOVEMENT (mm/yr)	CURRENT STATUS	DATE OF PREVIOUS READING	INCREMENTAL MOVEMENT SINCE PREVIOUS READING (mm)	RATE OF MOVEMENT (mm/yr)	CHANGE IN RATE OF MOVEMENT SINCE PREVIOUS READING (mm/yr)
SI94-43i	*Oct. 27, 2000*	*59.0 mm over 24.8 m to 27.2 m depth in 282° direction*	*10.2 mm/yr in October 2020*	*Operational, not read during current readings*	*July 10, 2021*	*N/A*	*N/A*	*N/A*
SI10-4	March 26, 2010	10.4 mm over 5.7 m to 6.9 m depth in 86° direction	2.9 mm/yr in October 2021	Operational	October 9, 2023	1.0	1.7	-0.4
		7.9 mm over 11.8 m to 17.9 m depth in 86° direction	3.4 mm/yr in September 2011			No discernible movement	N/A	-1.5
SI10-5	*March 26, 2010*	*225.9 mm over 0.9 m to 11.9 m depth in 120° direction*	*196.4 mm/yr in September 2011*	*Sheared at 2.1 m depth*	*September 21, 2011*	*N/A*	*N/A*	*N/A*
SI10-6	*March 26, 2010*	*237.5 mm over 0.9 m to 5.8 m depth in 120° direction*	*130.5 mm/yr in September 2013*	*Sheared at 3.0 m depth*	*June 1, 2014*	*N/A*	*N/A*	*N/A*
		7.2 mm over 11.9 m to 14.3 m depth in 110° direction	*6.8 mm/yr in September 2011*			*N/A*	*N/A*	*N/A*

Drawing 32121-PH031 in Appendix A D provides a sketch of the approximate location of the monitoring instrumentation for this site.

Table PH031-1 – Continued… Spring 2024 – HWY 744:04 Judah Hill (Michelin Slide) Slope Inclinometer Instrumentation Reading Summary

Date Monitored: May 22, 2024

INSTRUMENT #	DATE INITIALIZED	TOTAL CUMULATIVE RESULTANT MOVEMENT AT NOTED DEPTH SINCE INITIAL READING (mm)	MAXIMUM RATE OF MOVEMENT (mm/yr)	CURRENT STATUS	DATE OF PREVIOUS READING	INCREMENTAL MOVEMENT SINCE PREVIOUS READING (mm)	RATE OF MOVEMENT (mm/yr)	CHANGE IN RATE OF MOVEMENT SINCE PREVIOUS READING (mm/yr)
SI10-7	March 26, 2010	28.9 mm over 1.9 m to 6.8 m depth in 325° direction	5.6 mm/yr in May 2010	Operational	September 28, 2022	0.62	1.0	0.4
		17.5 mm over 8.6 m to 9.8 m depth in 336° direction	4.0 mm/yr in September 2013			0.5	0.8	0.8
		9.3 mm over 14.1 m to 15.9 m depth in 336° direction	5.0 mm/yr in September 2020			0.3	0.5	-0.3
SI10-8*	March 4, 2010	52.1* mm over 15.0 m to 16.5 m depth in 321° direction	16.1 mm/yr in September 2013	SAA Installed in SI10-8 Casing (Dec 2014)	September 28, 2022	1.1	1.8	1.4
SI10-9	March 4, 2010	4.5 mm over 6.5 m to 7.7 m depth in 3° direction	1.8 mm/yr in September 2013	Operational	September 28, 2022	<0.1	<0.1	-0.7
		24.7 mm over 11.9 m to 14.4 m depth in 3° direction	12.5 mm/yr in September 2013			0.6	1.0	1.3

Drawing 32121-PH031 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.

* Total cumulative movement is based on the movement of the SI prior to SAA installation plus the total movement recorded in the SAA to date.

Table PH031-2: Spring 2024 – HWY 744:04 Judah Hill (Michelin Slide) Pneumatic Piezometer Instrumentation Reading Summary

Date Monitored: May 22, 2024

INSTRUMENT #	DATE INITIALIZED	TIP DEPTH (m)	GROUND ELEV. (m)	CURRENT STATUS	HIGHEST MEASURED WATER LEVEL BGS (m)	MEASURED PORE PRESSURE (kPa)	CURRENT WATER LEVEL BGS (m)	PREVIOUS WATER LEVEL BGS Oct. 22/23 (m)	CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)
PN98-10 (22835)	*N/A*	*7.0*	*N/A*	*Damaged*	*6.59 in May 2004*	*N/A*	*N/A*	*N/A*	*N/A*
PN98-10a (22827)	*N/A*	*22.0*	*N/A*	*Damaged*	*8.64 in May 2009*	*N/A*	*N/A*	*N/A*	*N/A*
PN10-4	March 26, 2010	19.4	516.401	Operational	18.37 in June 2020	0.7	19.33	19.32	-0.01
PN10-5	*March 5, 2010*	*16.9*	*514.950*	*Blocked*	*11.12 in May 2013*	*N/A*	*N/A*	*N/A*	*N/A*
PN10-6	March 5, 2010	10.2	513.055	Operational	7.73 in October 2020	18.5	8.31	8.83	0.52
PN10-7	March 3, 2010	13.8	519.529	Operational	8.83 in September 2019	43.0	9.42	10.20	0.78
PN10-8	February 27, 2010	17.5	514.522	Operational	11.75 in September 2013	31.8	14.26	13.38	-0.88
PN10-9	February 27, 2010	13.0	510.640	Operational	6.31 in September 2016	54.0	7.49	7.12	-0.37

Drawing 32121-PH031 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.

Notes:
PN - pneumatic piezometer.
BGS - below ground surface.

Table PH031-3: Spring 2024 – HWY 744:04 Judah Hill (Michelin Slide) Vibrating Wire Piezometer Instrumentation Reading Summary

Date Monitored: May 22, 2024

INSTRUMENT	DATE INITIALIZED	TIP ELEV. (m)	GROUND ELEV. (m)	CURRENT STATUS	HIGHEST RECORDED GROUNDWATER LEVEL (mBGS)	CURRENT GROUNDWATER DEPTH (mBGS)	PREVIOUS GROUNDWATER DEPTH Oct. 22/23 (mBGS)	CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)
VW17-1	June 6, 2017	502.52	514.52	Operational	10.40 on September 4, 2017	11.51	11.31	-0.20
VW17-2	June 6, 2017	496.38	514.52	Operational	DRY	DRY	DRY	N/A

Drawing 32121-PH031 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.

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.

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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.

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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.

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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.

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ALBERTA TRANSPORTATION AND ECONOMIC CORRIDORS GRMP (CON0022164)
PEACE REGION (PEACE RIVER DISTRICT)
INSTRUMENTATION MONITORING RESULTS

SPRING 2024

APPENDIX A
DATA PRESENTATION

SITE PH031: HWY 744:04, JUDAH HILL (MICHELIN SLIDE)

ALBERTA TRANSPORTATION AND ECONOMIC CORRIDORS
PEACE REGION (PEACE RIVER DISTRICT)
INSTRUMENTATION MONITORING FIELD SUMMARY (PH031)
SPRING 2024

Location:	Michelin Slide - Judah Hill (HWY 744:04 C1 57.664)	**Readout:**	RST PN C108 Unit 4
File Number:	32121	**Casing:**	2.75, SI 94-43i 3.34
Probe:	RST SI SET 5R and 8R	**Temp:**	17
Cable:	RST SI SET 5R and 8R	**Read by:**	NKR/NRM

SLOPE INCLINOMETER (SI) READINGS

SI#	GPS Location (UTM 11)		Date	Stickup (m)	Depth from top of Casing (ft)	Magn. North A+ Groove degree	Current Bottom Depth Readings				Probe/ Reel #	Size (")	Remarks
	Easting (m)	Northing (m)					A+	A-	B+	B-			
SI98-10i	483125.92	6229725.01	22-May-24	0.57	116 to 2	305	1481	-1476	-816	801	8R/8R	2.75	See notes
SI94-43i	482827.64	6229848.63	22-May-24	0.85	118 to 2	10	-8	22	3	7	8R/8R	3.34	Did not read due to bear den
SI10-4	483255.5	6229708.92	22-May-24	0.74	106 to 4	85	408	-398	11	-22	5R/5R	2.75	
SI10-7	483212.56	6229673.47	22-May-24	0.84	106 to 4	315	1225	-1210	-1564	1558	8R/8R	2.75	
SI10-9	483248.88	6229762.37	22-May-24	0.55	106 to 4	330	867	-853	-357	349	8R/8R	2.75	

PNEUMATIC PIEZOMETER READINGS

PN#	GPS Location (UTM 11)		Date	Reading (kPa)	Identification Number
	Easting (m)	Northing (m)			
10-4	483255.50	6229708.92	22-May-24	0.7	33094
10-6	483273.71	6229767.84	22-May-24	18.5	33084
10-7	483212.56	6229673.47	22-May-24	43	33085
10-8	483245.04	6229732.33	22-May-24	31.8	33082
10-9	483248.88	6229762.37	22-May-24	54	33087

INSPECTOR REPORT

For SI98-10i multiply readings by 2 to get the plot in Gtilt.
* Slowly increased
Download the CR1000 logger on site, no modem for remote download

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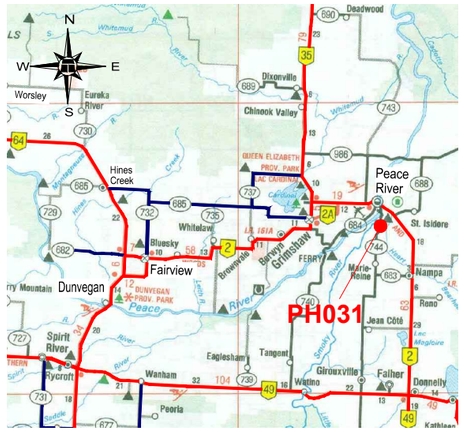
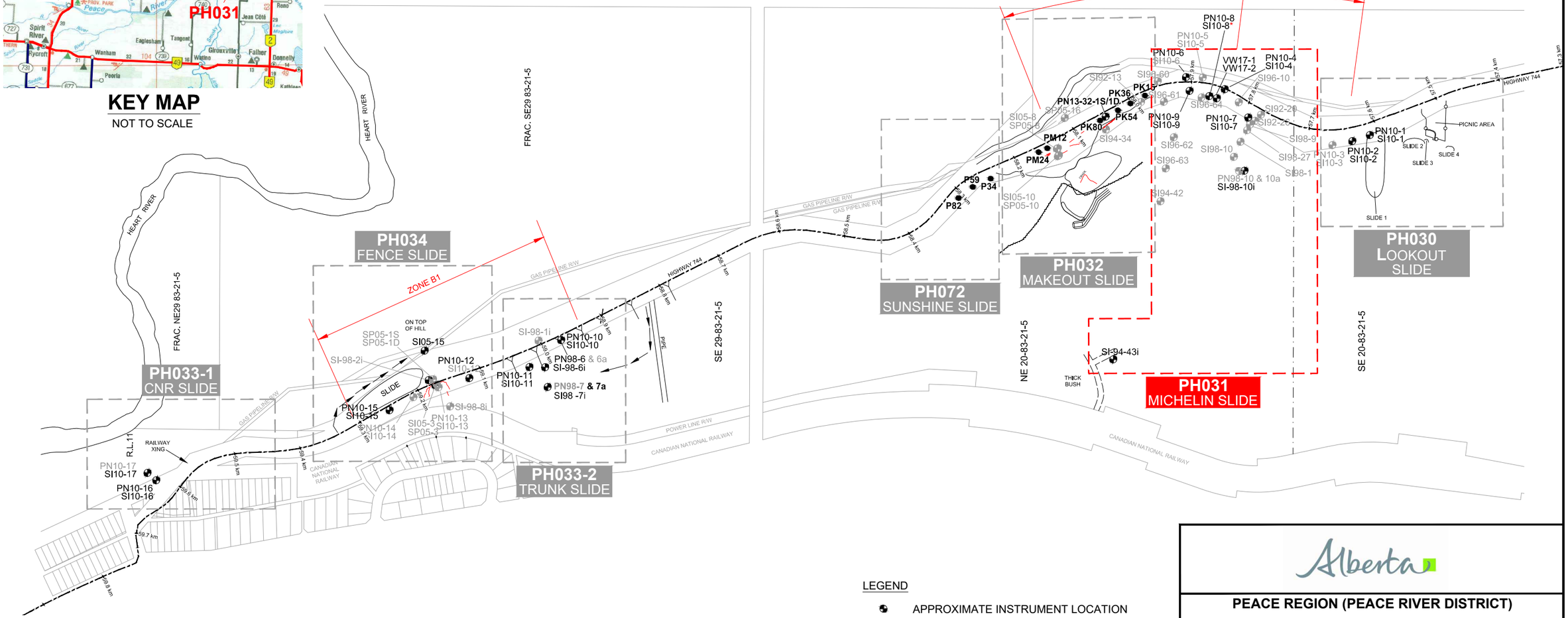


KEY MAP

NOT TO SCALE



NOTE:
* A SHAPE ACCELEROMETER ARRAY (SAA) WAS INSTALLED INSIDE THE **SI10-08** CASING IN DECEMBER 2014.

LEGEND

- APPROXIMATE INSTRUMENT LOCATION
- INSTRUMENT NOT IN USE
- PN PNEUMATIC PIEZOMETER
- SP STANDPIPE PIEZOMETER
- SI SLOPE INCLINOMETER
- VW VIBRATING WIRE PIEZOMETER
- APPROXIMATE PILE LOCATION

Alberta

PEACE REGION (PEACE RIVER DISTRICT)

PH031: HWY 744:04 - JUDAH HILL (MICHELIN SLIDE) INSTRUMENT LOCATIONS

DWG No. 32121-PH031

DRAWN BY	ML
DESIGNED BY	BWN
APPROVED BY	DWP
SCALE	APPROX. 1:6000
DATE	SEPTEMBER 2021
FILE No.	32121

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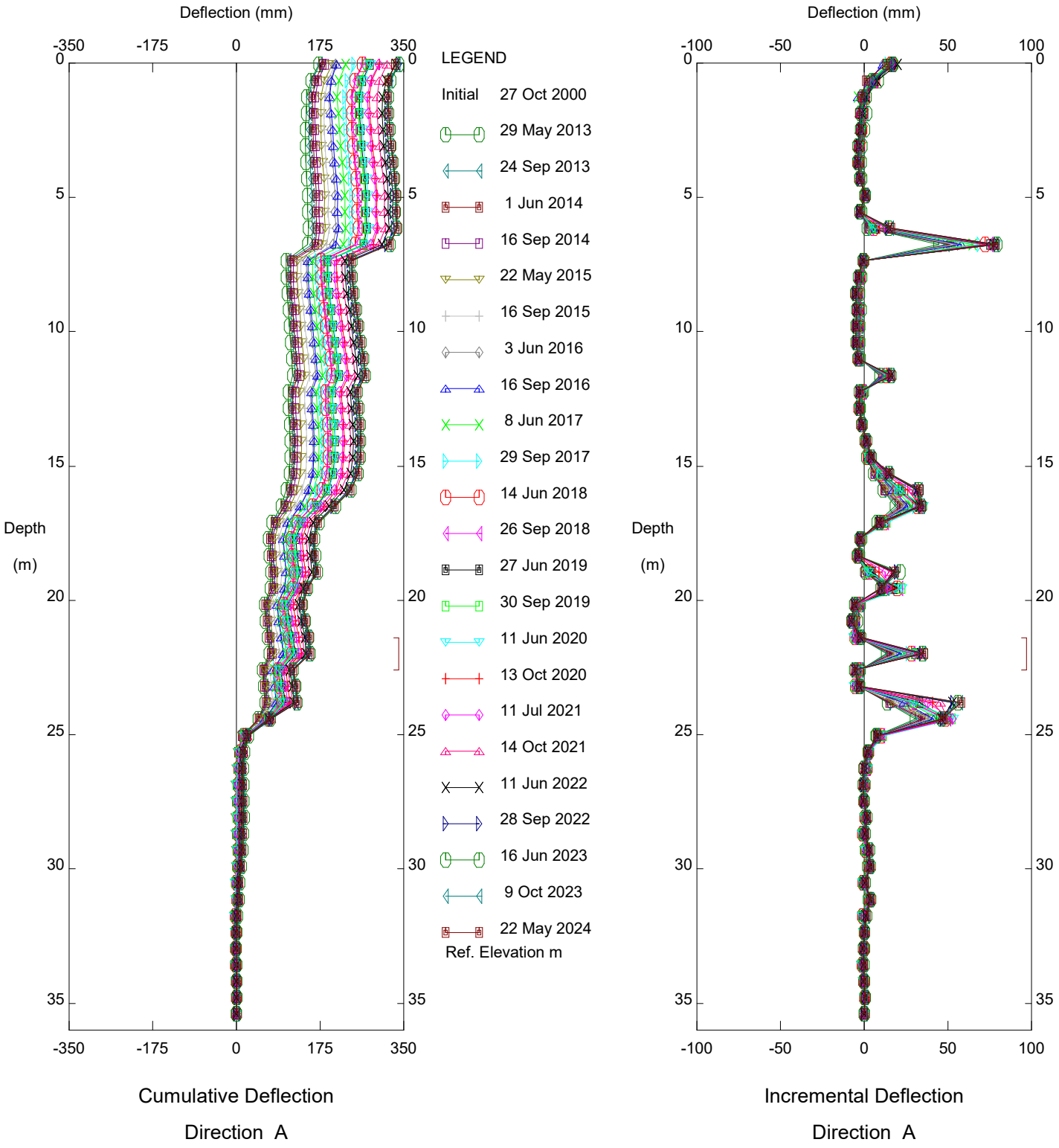

Cumulative Deflection

Direction A

Incremental Deflection

Direction A

HWY 744:04 - STA. 57+700 to 58+000, Inclinometer SI98-10i

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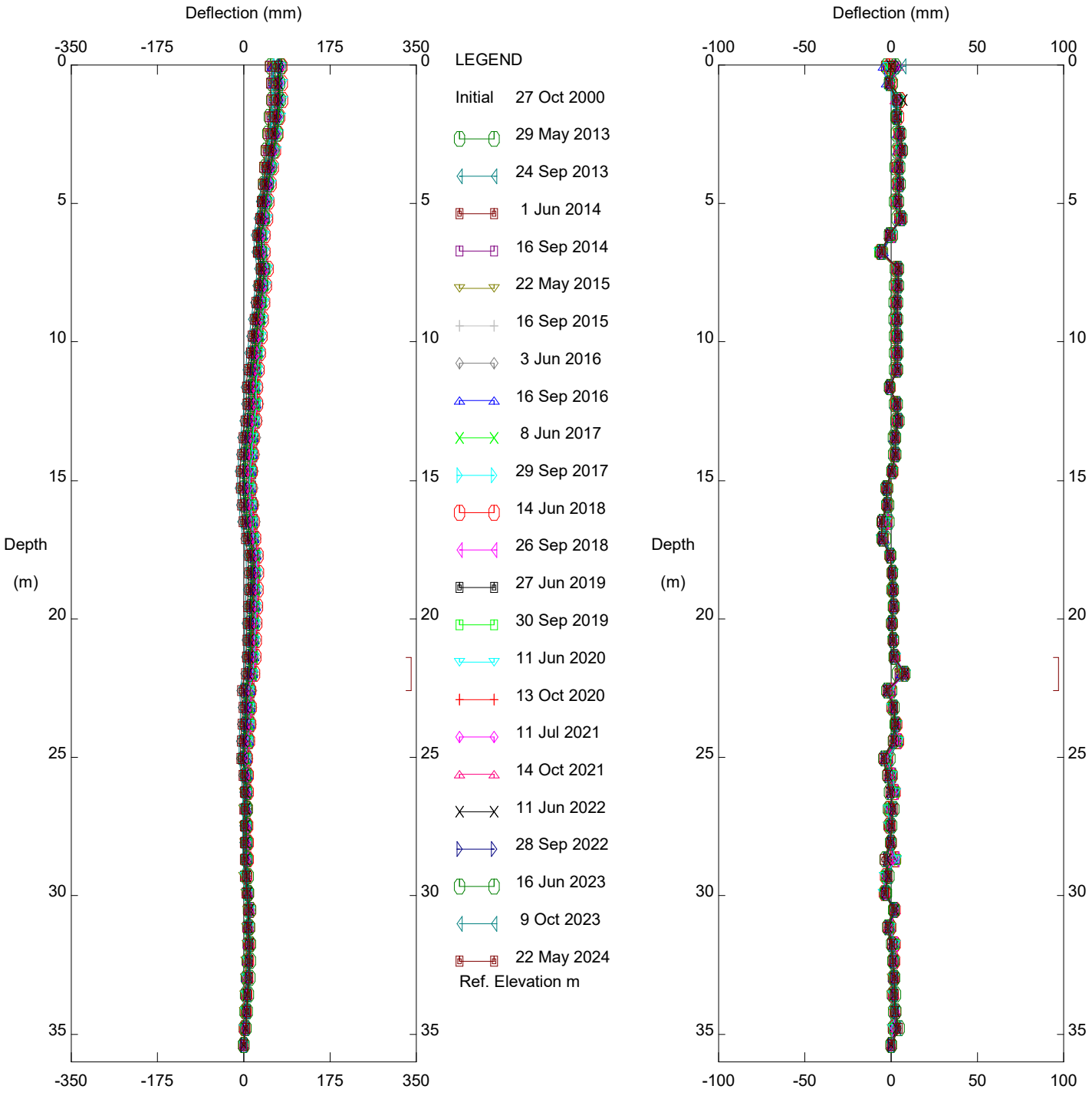

Cumulative Deflection

Direction B

Incremental Deflection

Direction B

HWY 744:04 - STA. 57+700 to 58+000, Inclinometer SI98-10i

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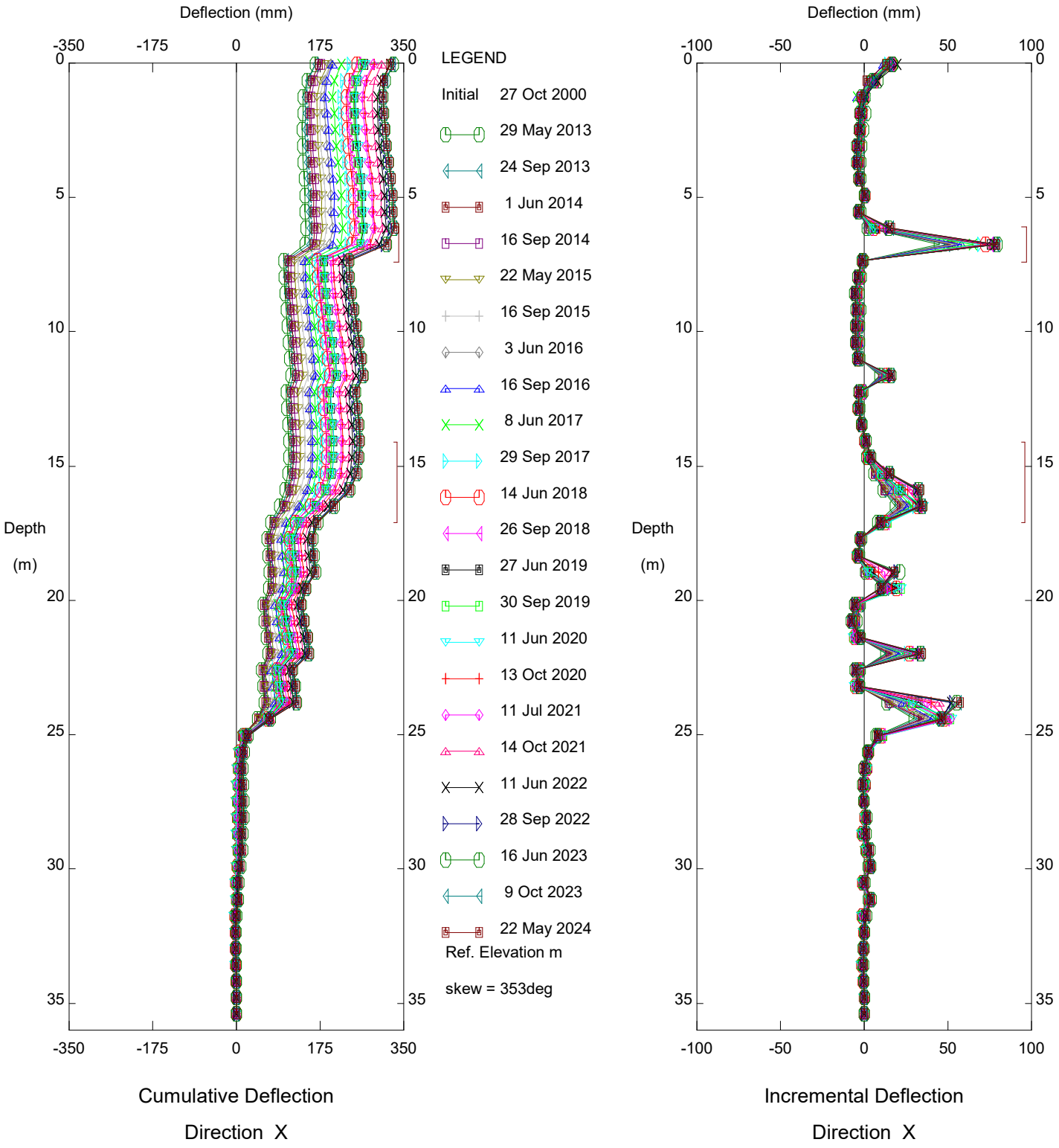

Cumulative Deflection

Direction X

Incremental Deflection

Direction X

HWY 744:04 - STA. 57+700 to 58+000, Inclinometer SI98-10i

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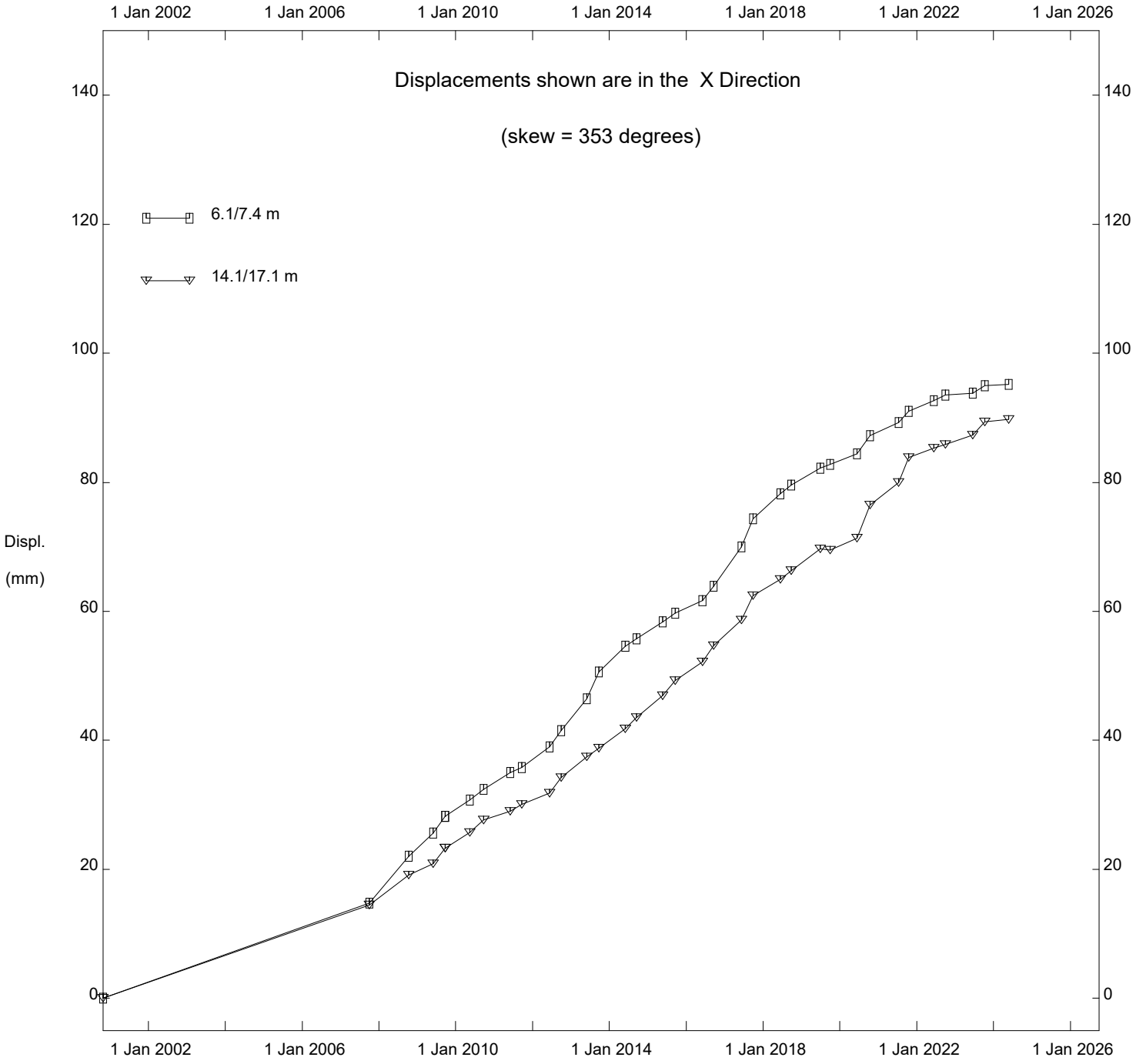
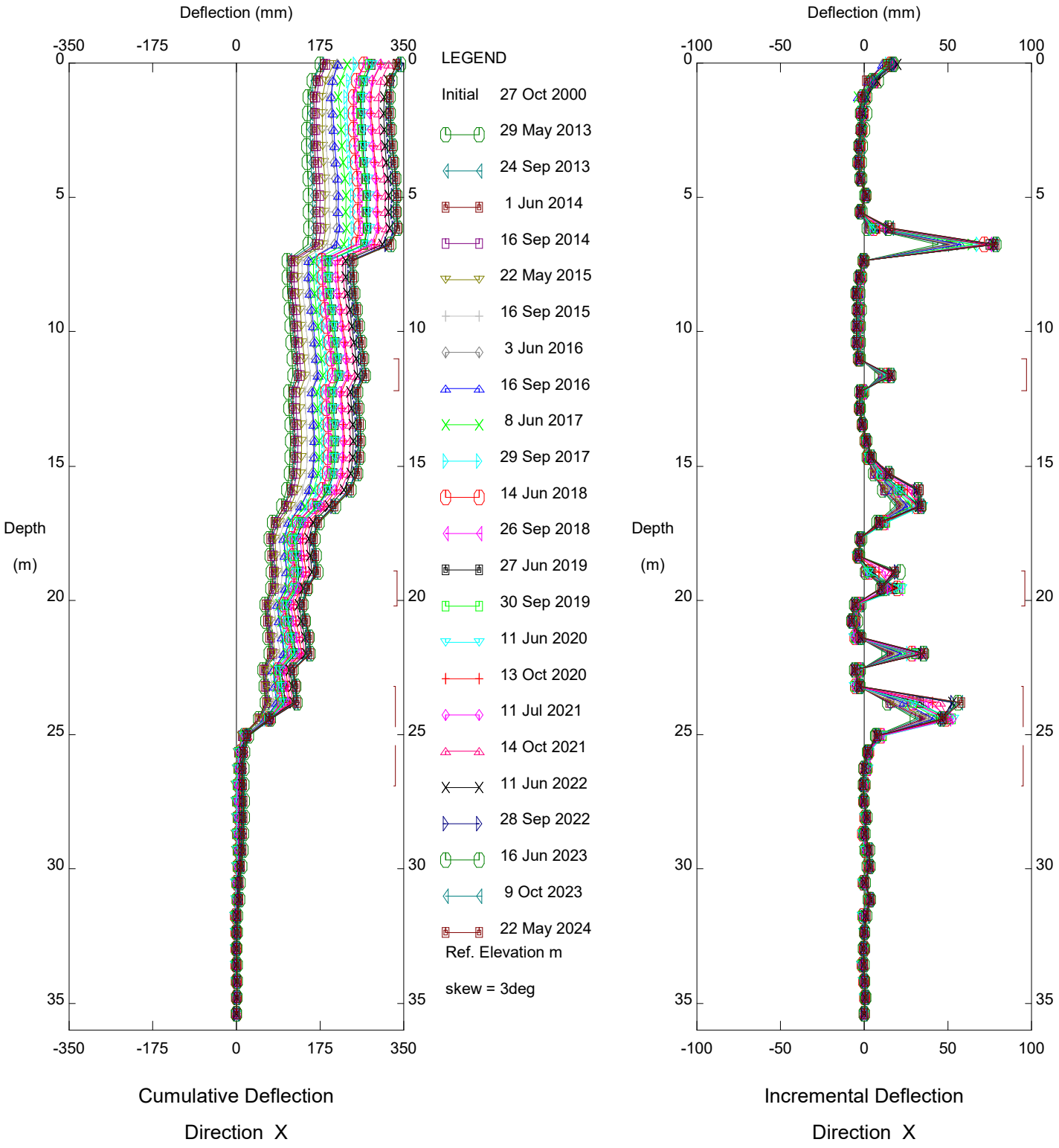


HWY 744:04 - STA. 57+700 to 58+000, Inclinometer SI98-10i

Alberta Transportation

Thurber Engineering Ltd.



Cumulative Deflection

Direction X

Incremental Deflection

Direction X

HWY 744:04 - STA. 57+700 to 58+000, Inclinometer SI98-10i

Alberta Transportation

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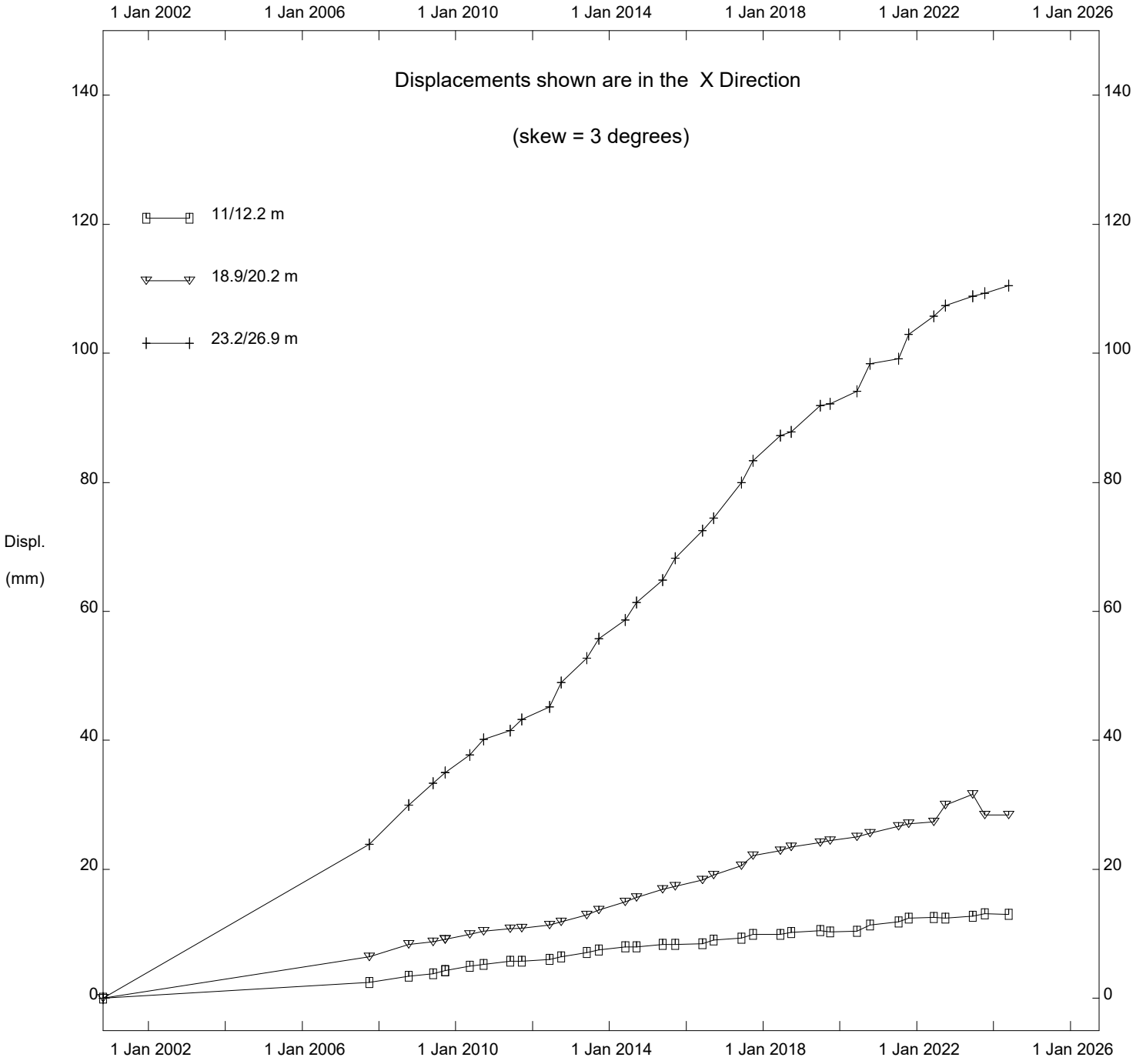
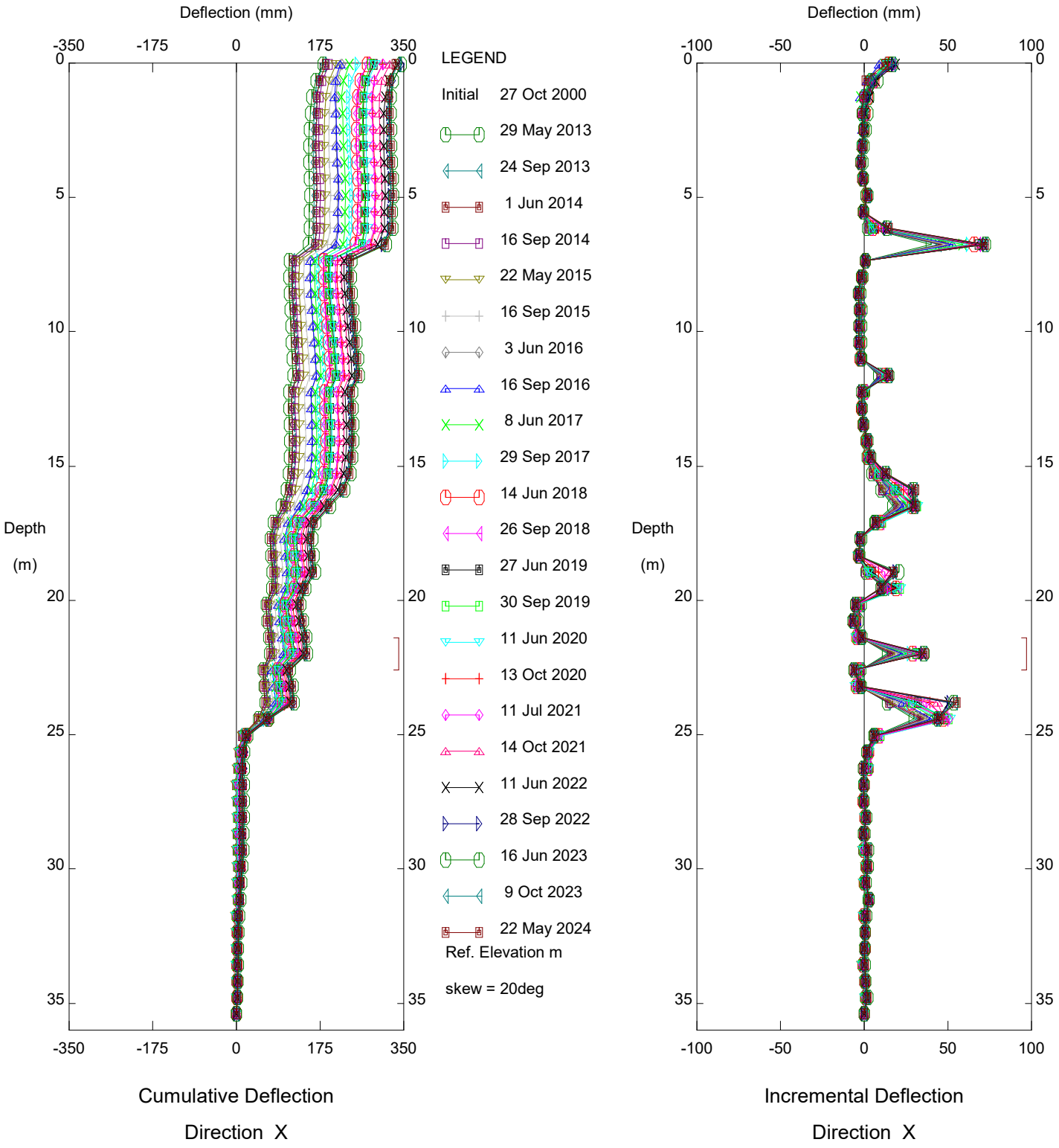
Thurber Engineering Ltd.



HWY 744:04 - STA. 57+700 to 58+000, Inclinometer SI98-10i

Alberta Transportation

Thurber Engineering Ltd.



Cumulative Deflection

Direction X

Incremental Deflection

Direction X

HWY 744:04 - STA. 57+700 to 58+000, Inclinometer SI98-10i

Alberta Transportation

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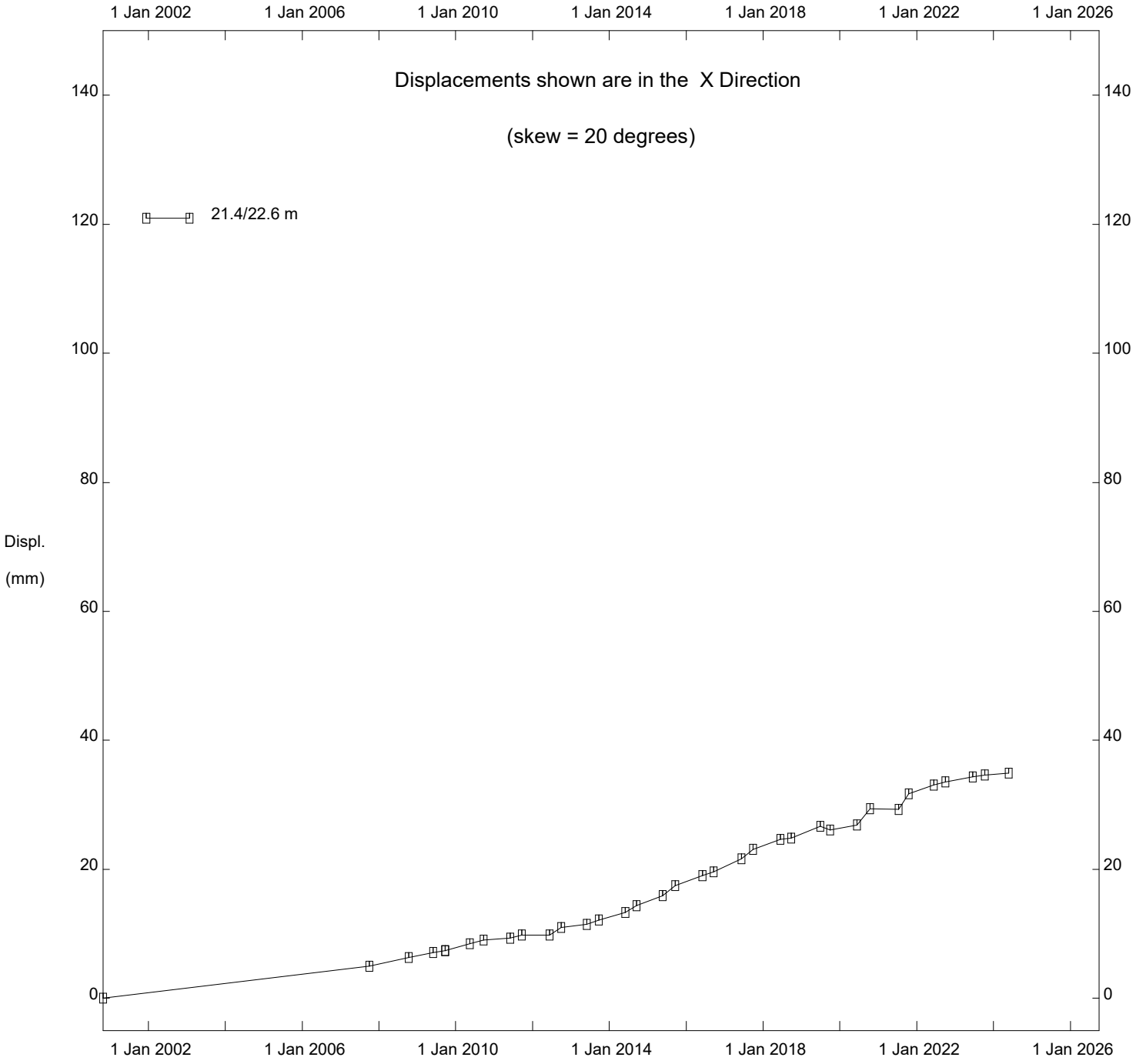
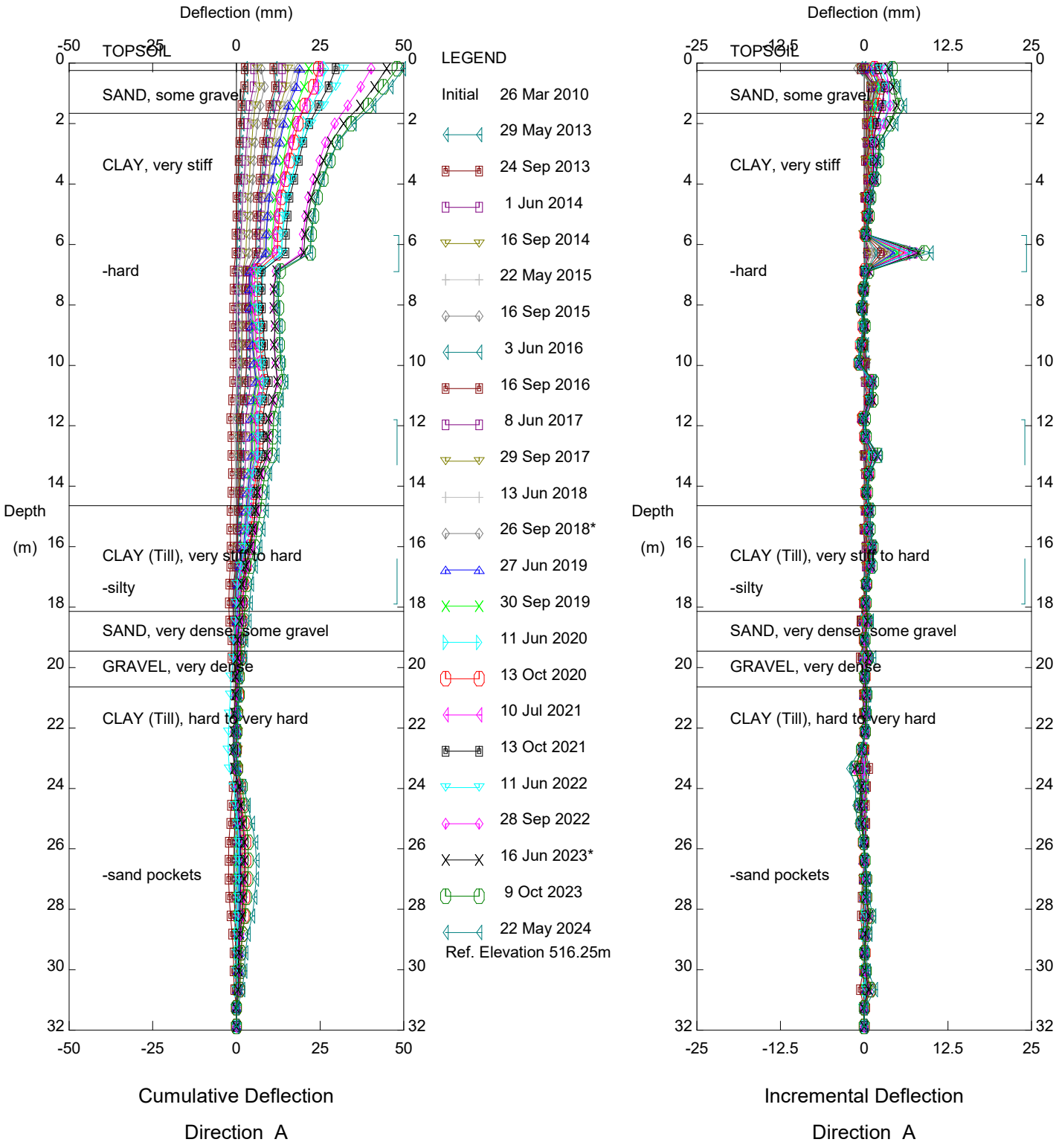
Thurber Engineering Ltd.



HWY 744:04 - STA. 57+700 to 58+000, Inclinometer SI98-10i

Alberta Transportation

Thurber Engineering Ltd.



Cumulative Deflection

Direction A

Incremental Deflection

Direction A

PH031 Judah Hill Michelin Slide, Inclinometer SI10-4

Alberta Transportation

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

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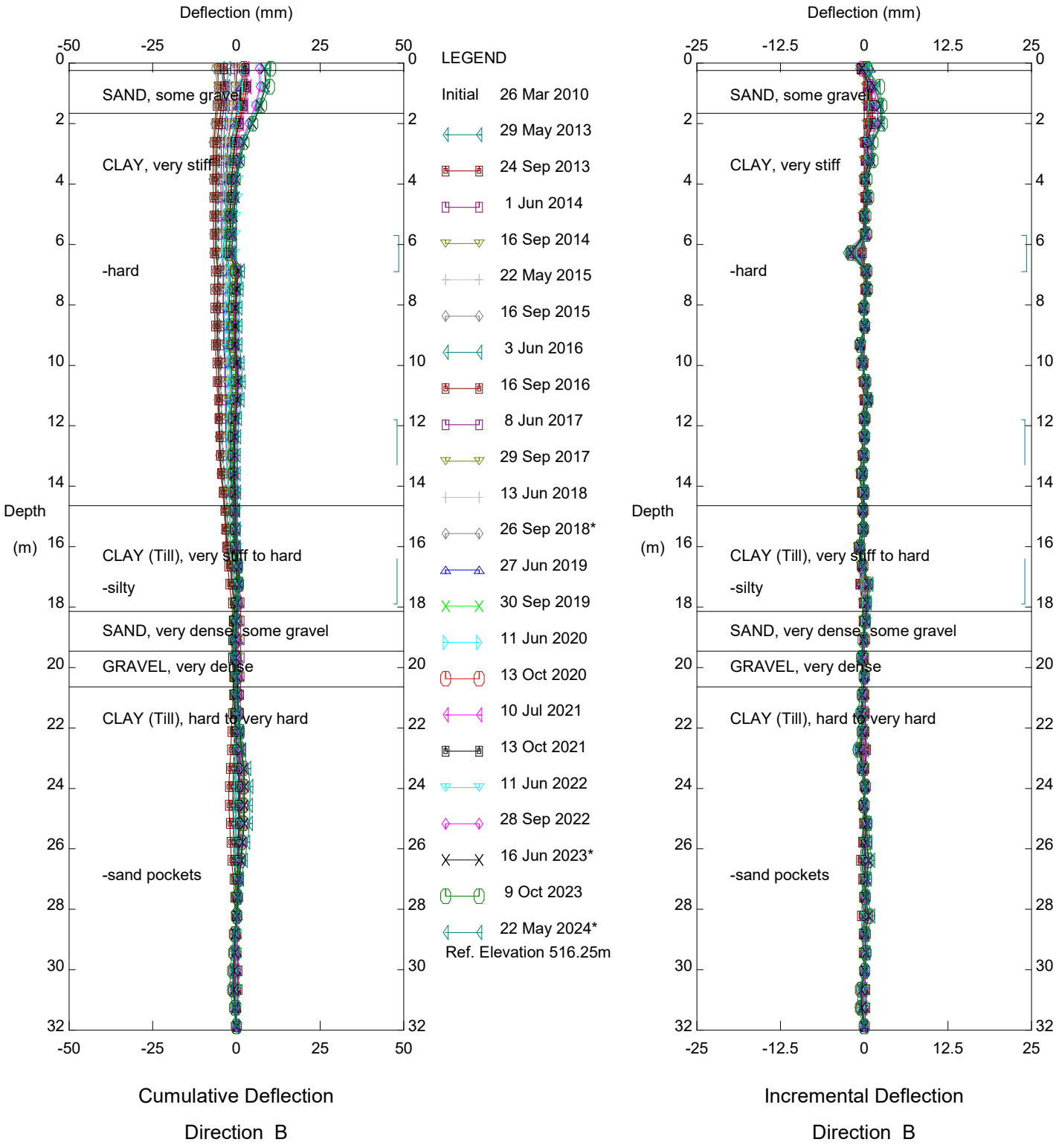
Thurber Engineering Ltd.



Cumulative Deflection

Direction B

Incremental Deflection

Direction B

PH031 Judah Hill Michelin Slide, Inclinometer SI10-4

Alberta Transportation

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

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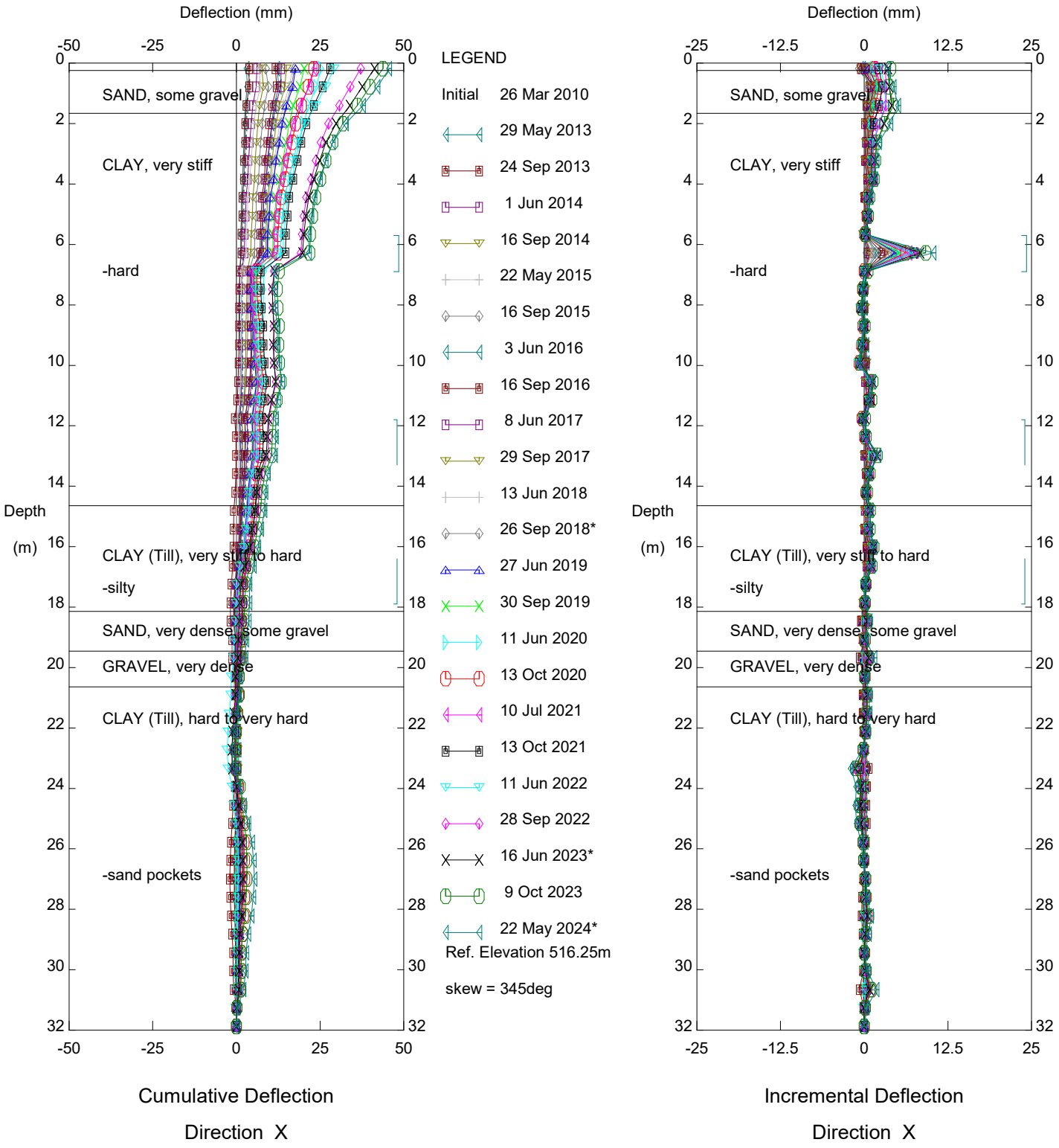
Thurber Engineering Ltd.



Cumulative Deflection

Direction X

Incremental Deflection

Direction X

PH031 Judah Hill Michelin Slide, Inclinometer SI10-4

Alberta Transportation

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

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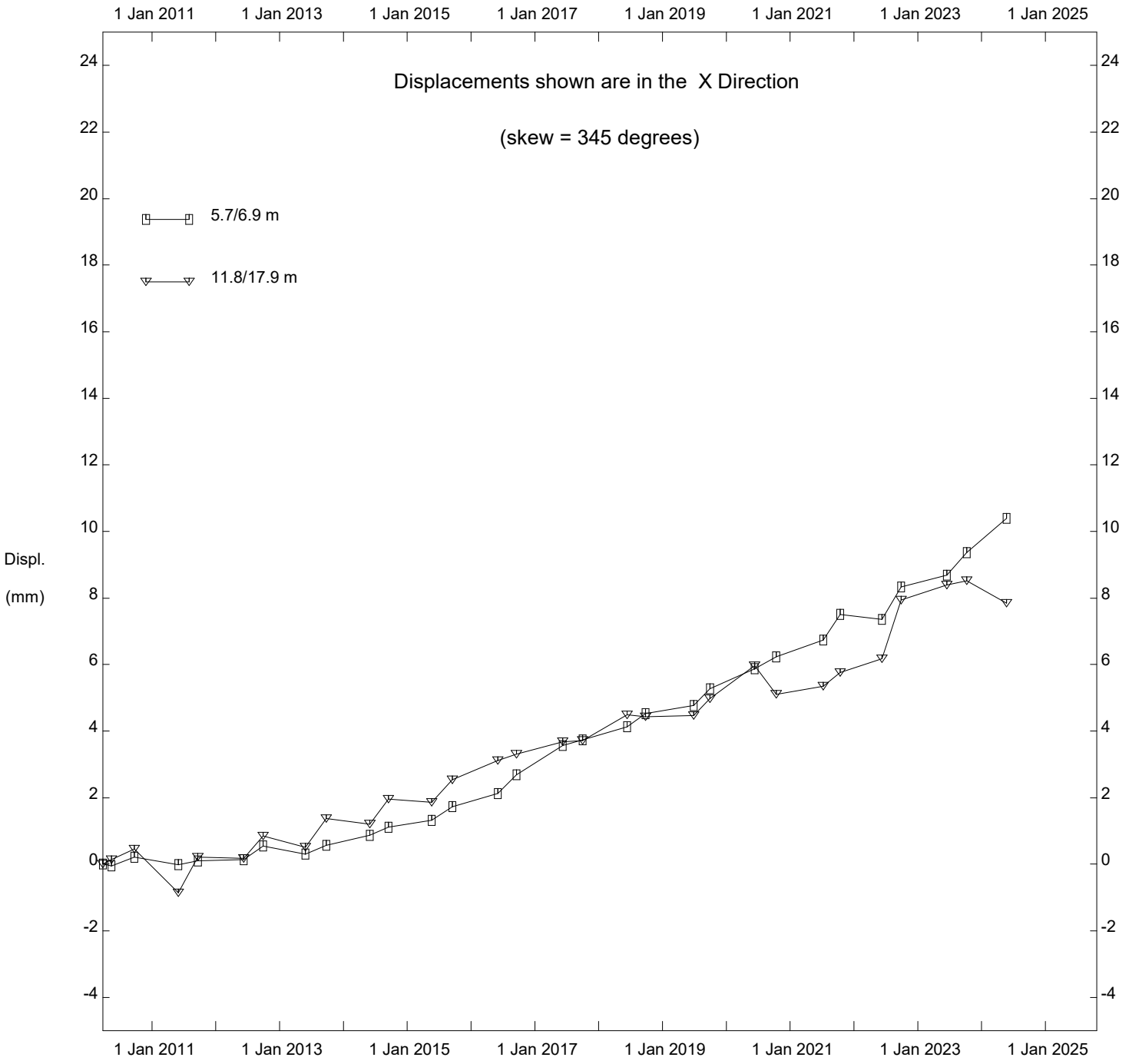
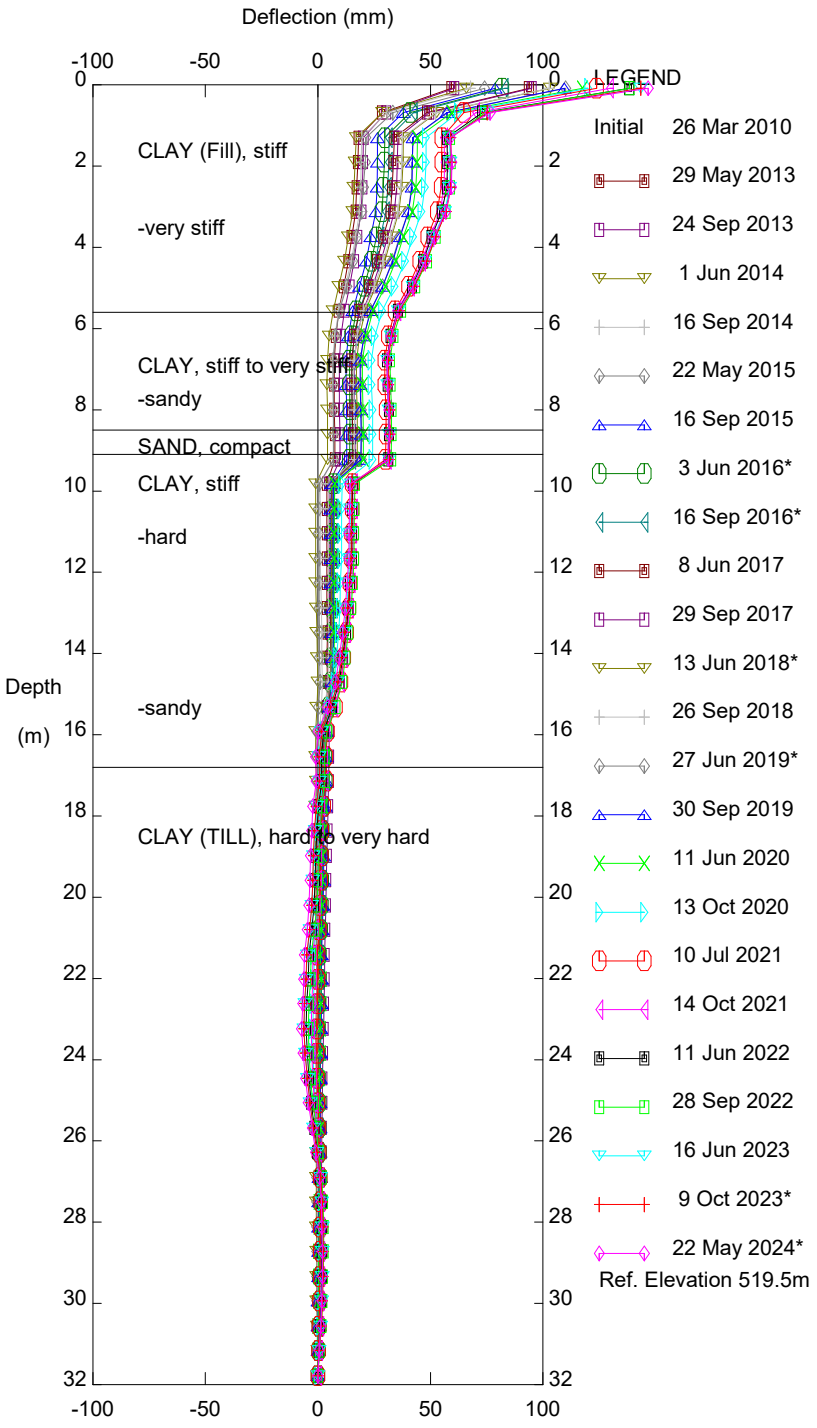
Thurber Engineering Ltd.



PH031 Judah Hill Michelin Slide, Inclinometer SI10-4

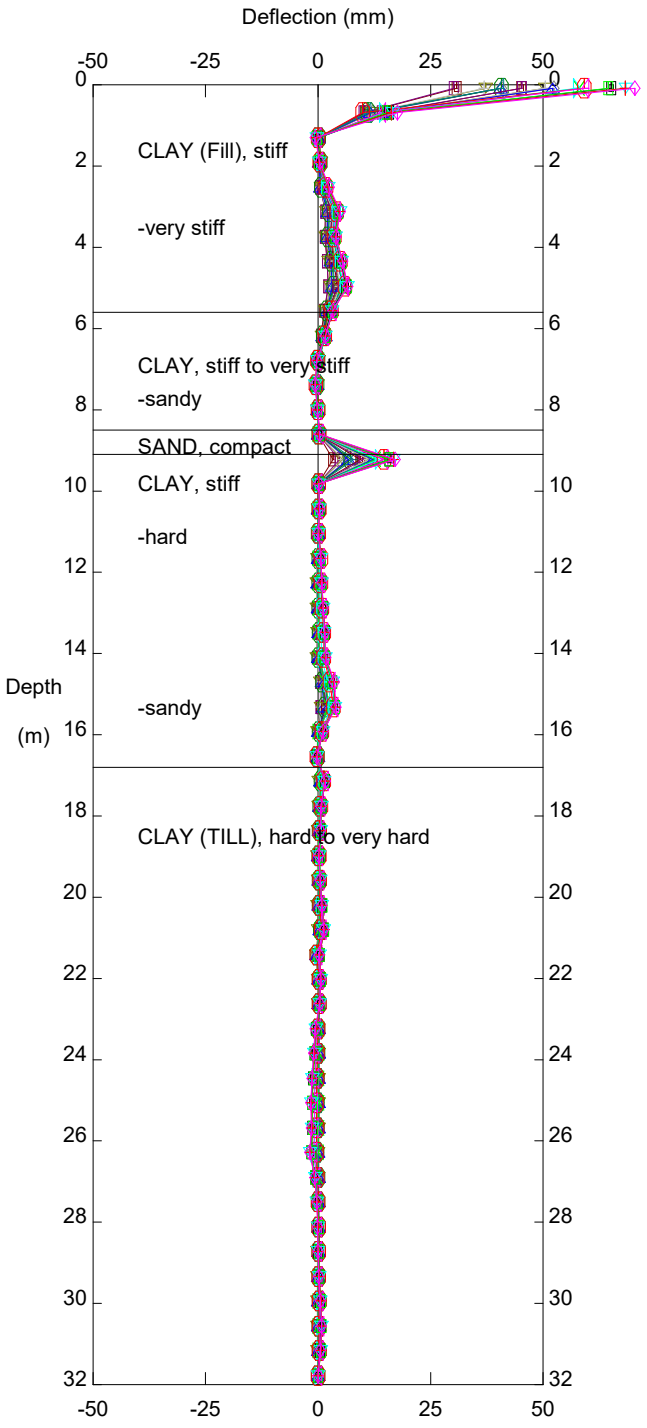
Alberta Transportation

Thurber Engineering Ltd.



Cumulative Deflection

Direction A



Incremental Deflection

Direction A

PH031 Judah Hill Michelin Slide, Inclinometer SI10-7

Alberta Transportation

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

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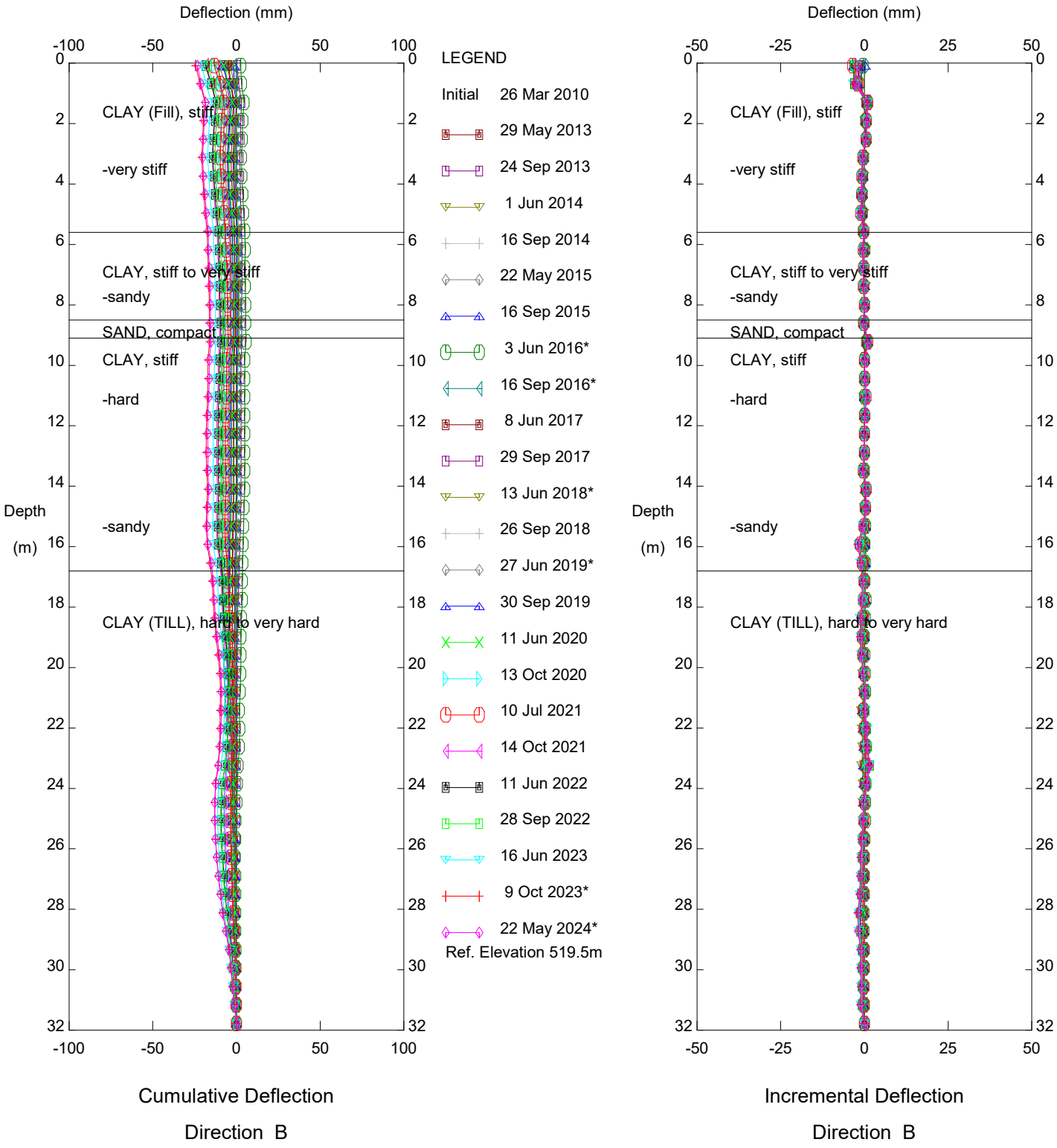

Cumulative Deflection

Direction B

Incremental Deflection

Direction B

PH031 Judah Hill Michelin Slide, Inclinometer SI10-7

Alberta Transportation

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

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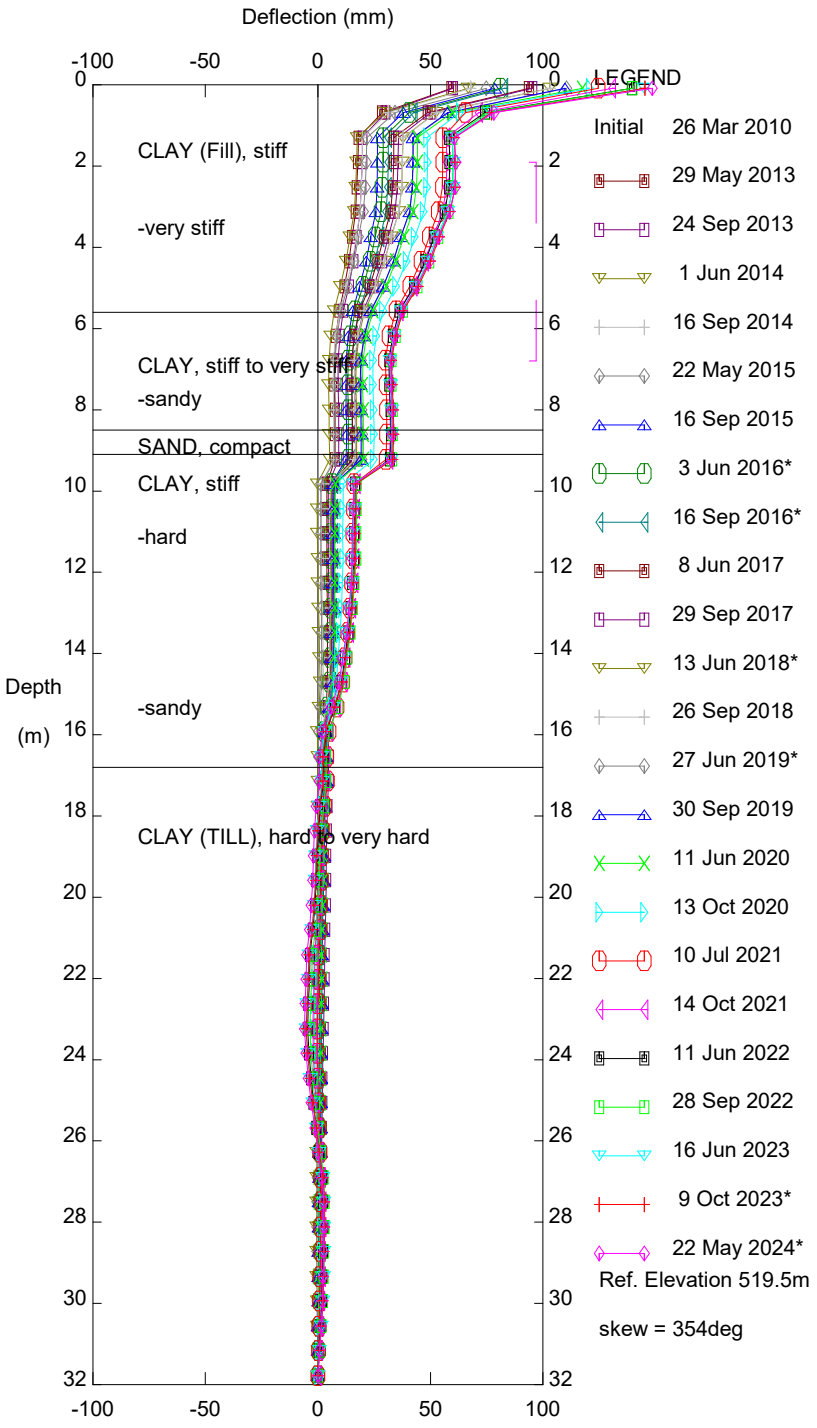
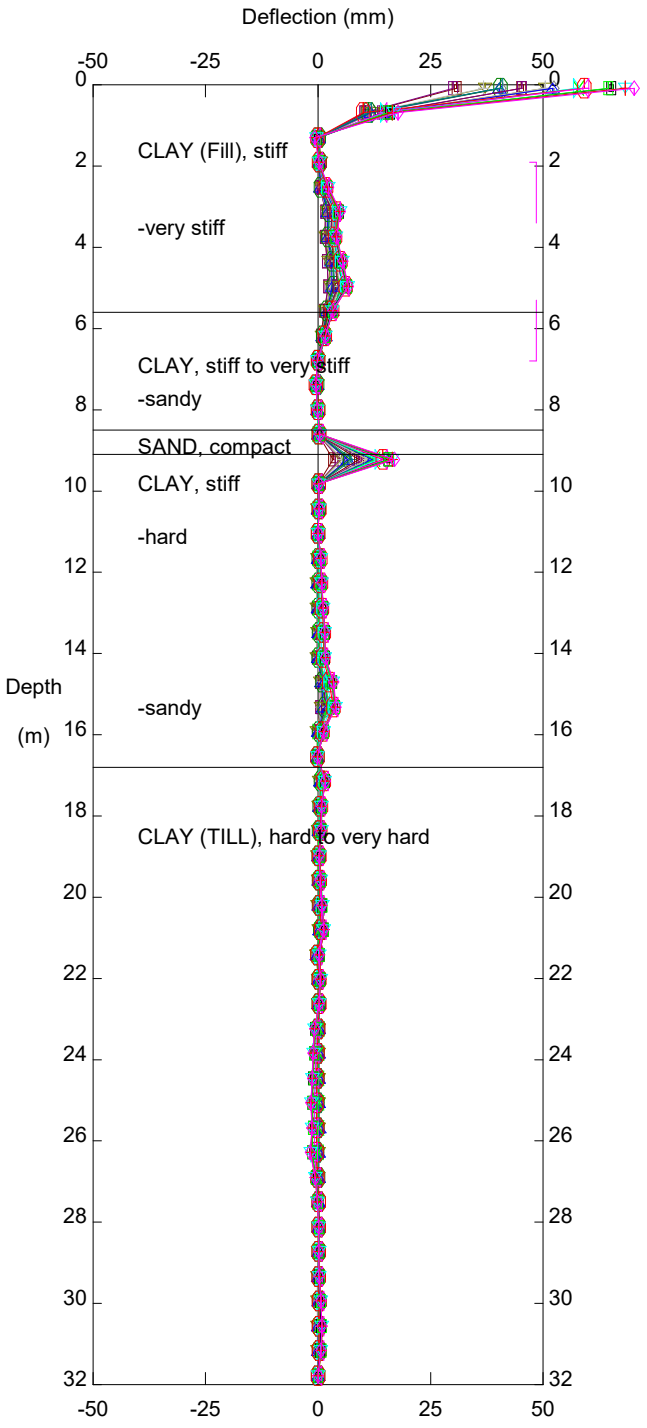
Thurber Engineering Ltd.



Cumulative Deflection

Direction X



Incremental Deflection

Direction X

PH031 Judah Hill Michelin Slide, Inclinometer SI10-7

Alberta Transportation

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

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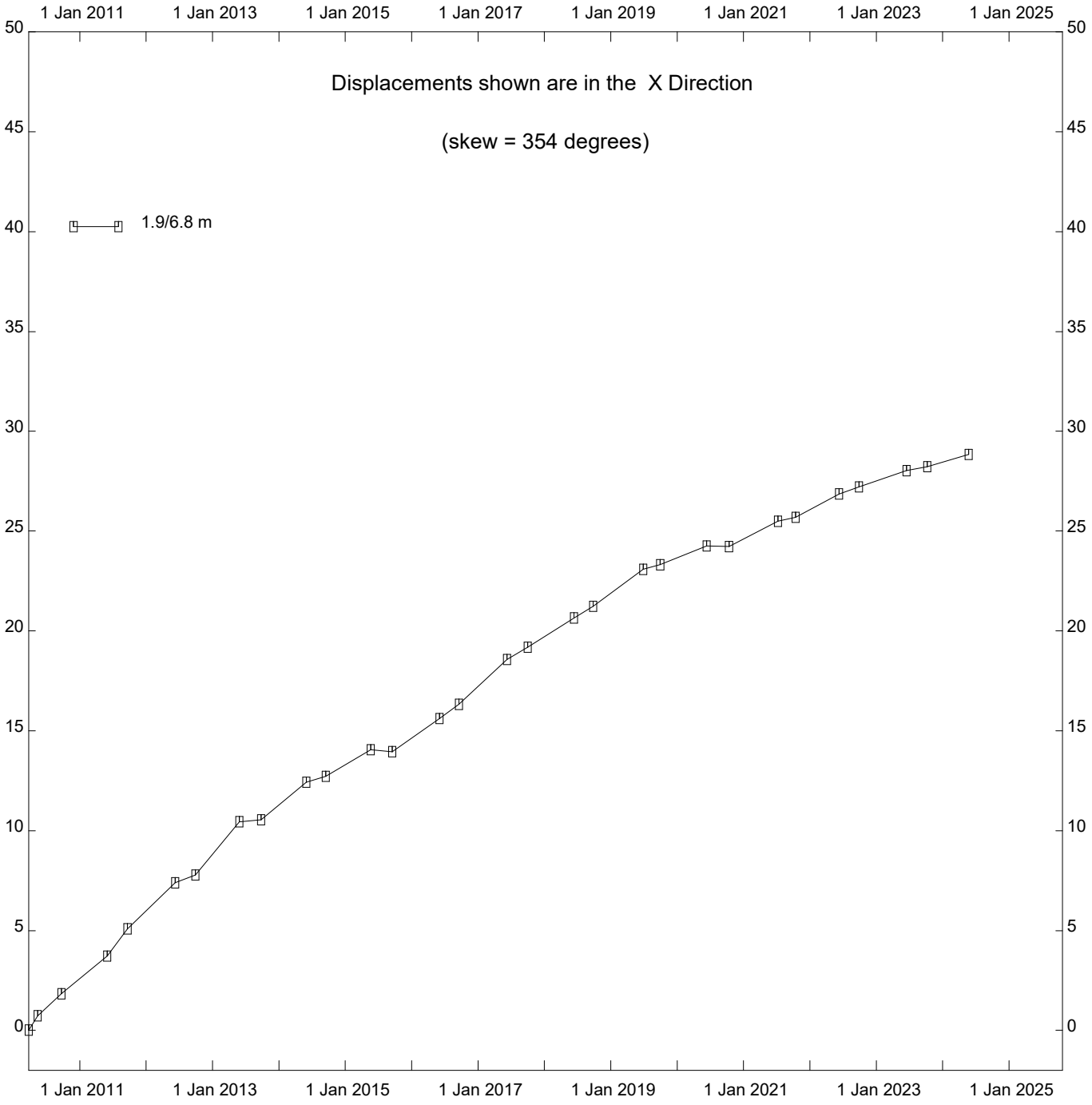

PH031 Judah Hill Michelin Slide, Inclinometer SI10-7

Alberta Transportation

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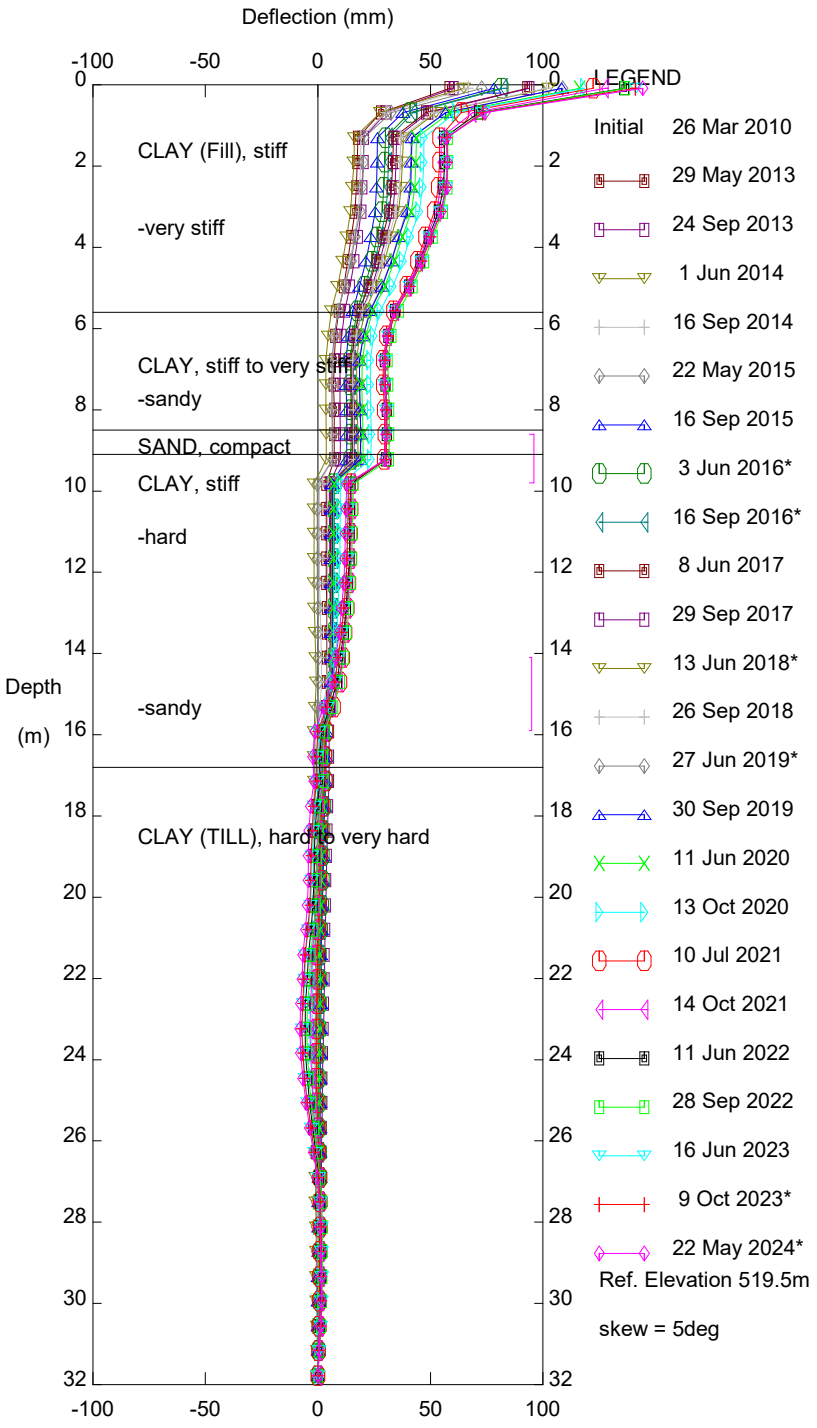
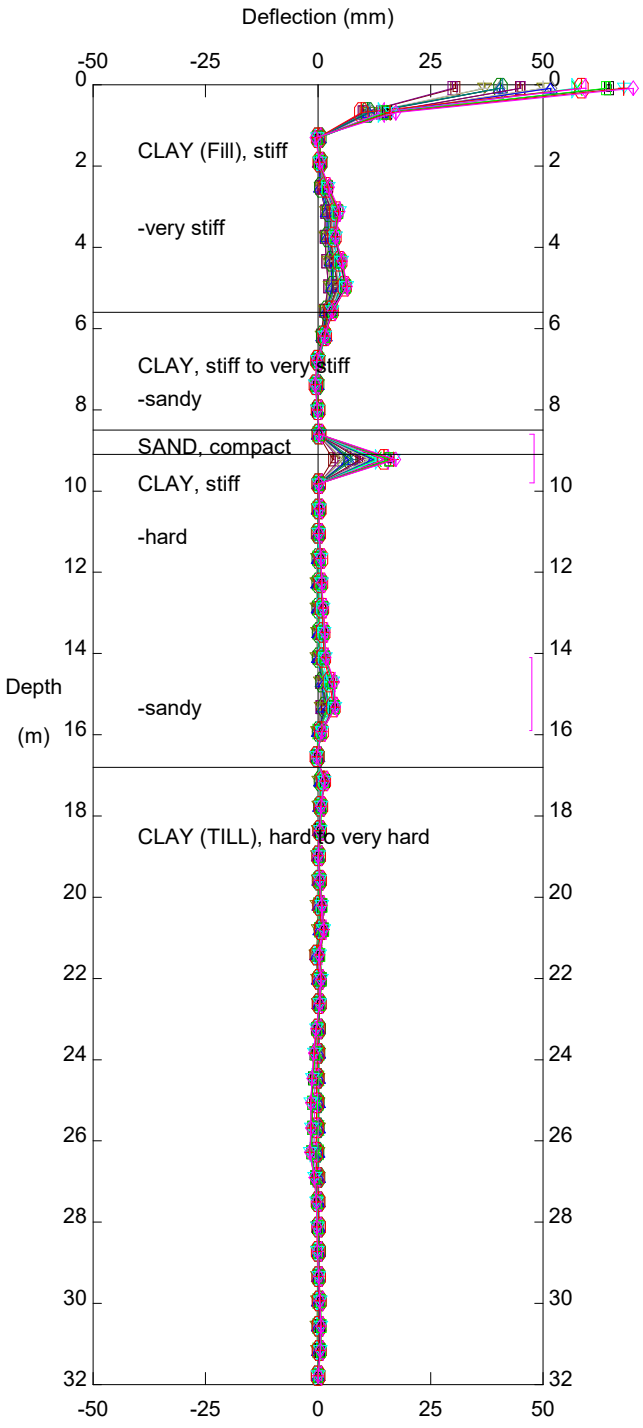


Cumulative Deflection

Direction X



Incremental Deflection

Direction X

PH031 Judah Hill Michelin Slide, Inclinometer SI10-7

Alberta Transportation

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

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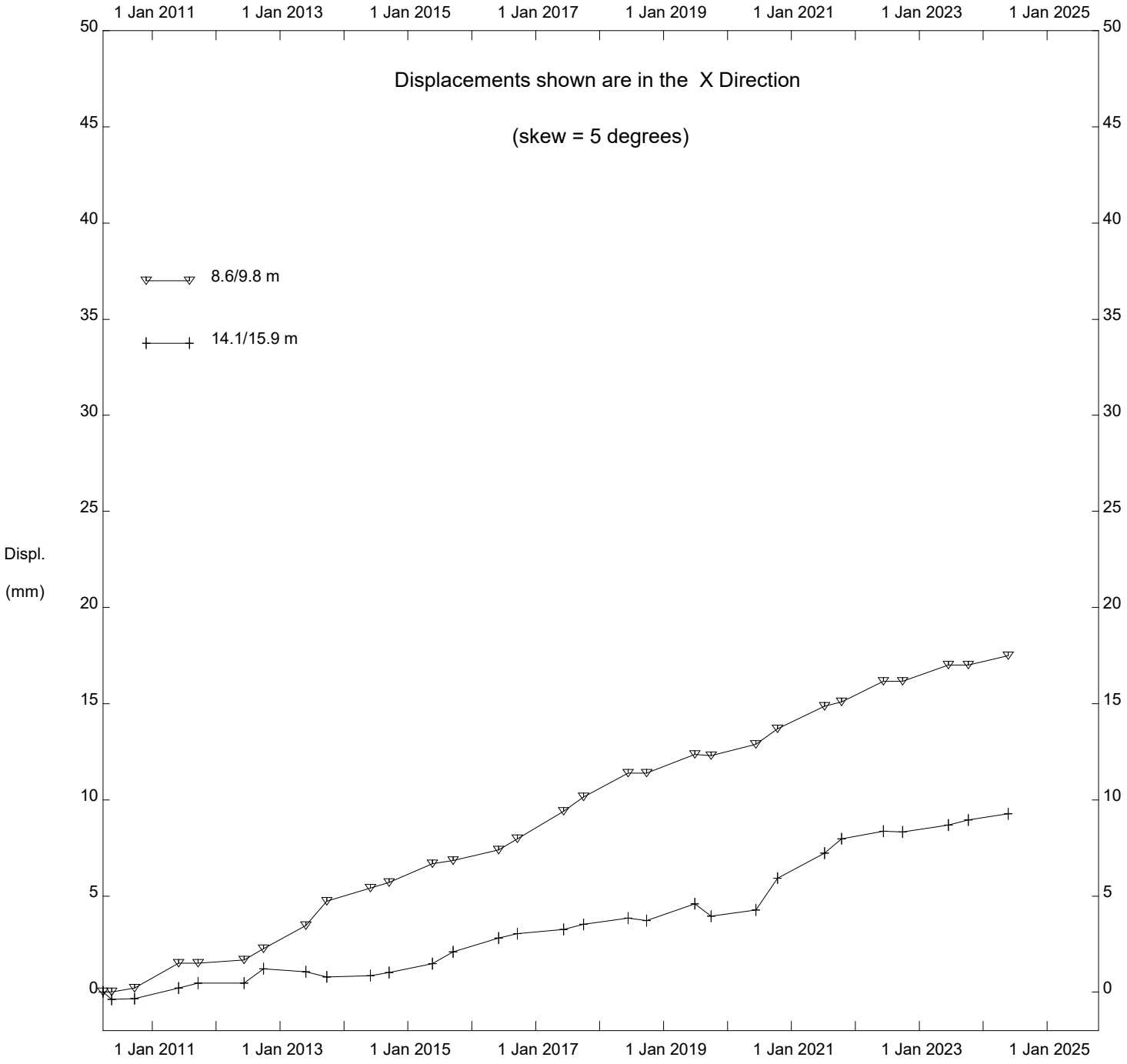
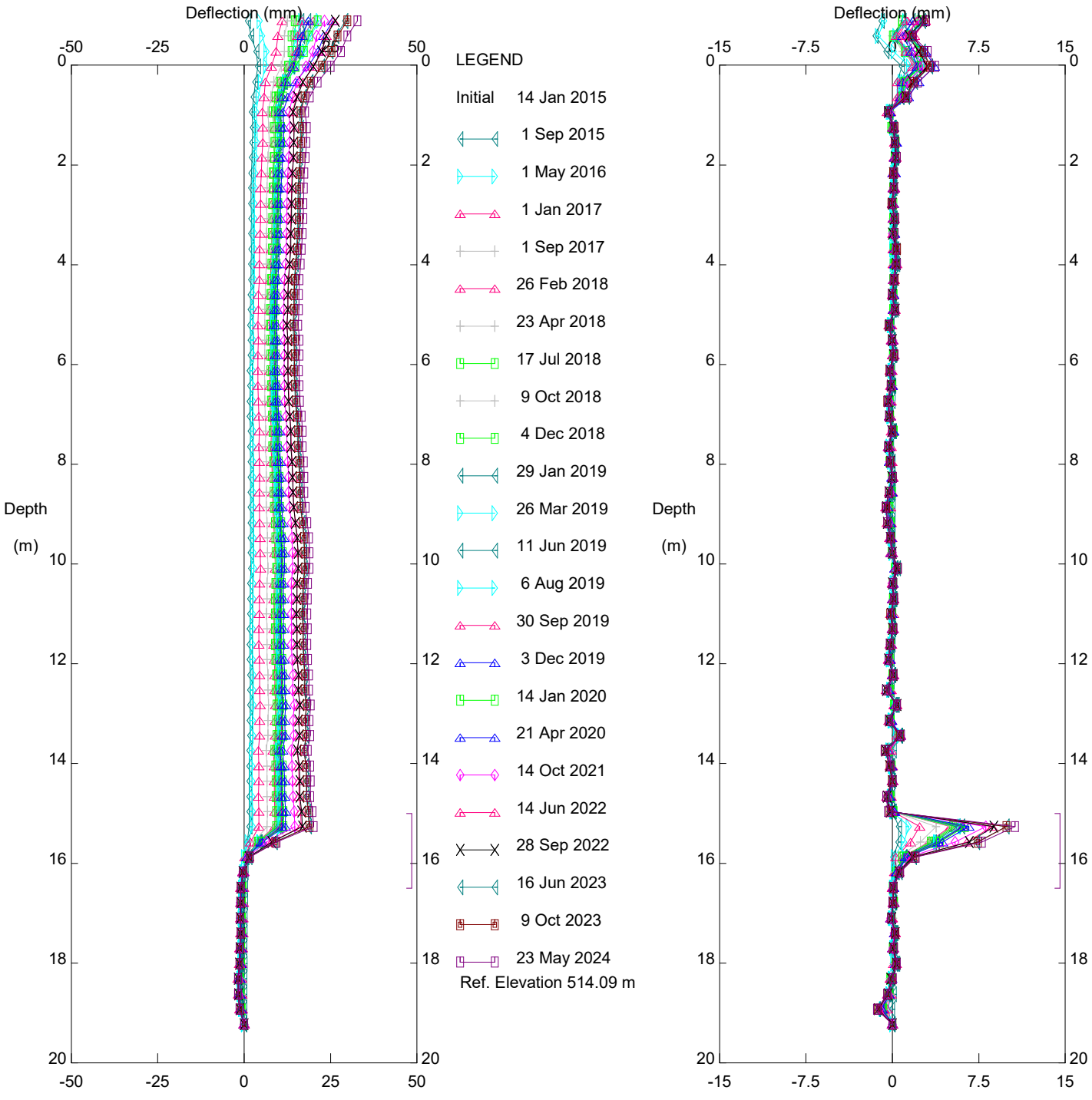


PH031 Judah Hill Michelin Slide, Inclinometer SI10-7

Alberta Transportation

Thurber Engineering Ltd.



Cumulative Deflection

Direction A

Incremental Deflection

Direction A

PH031 Judah Hill Michelin Slide, Inclinometer SAA10-8

Alberta Transportation

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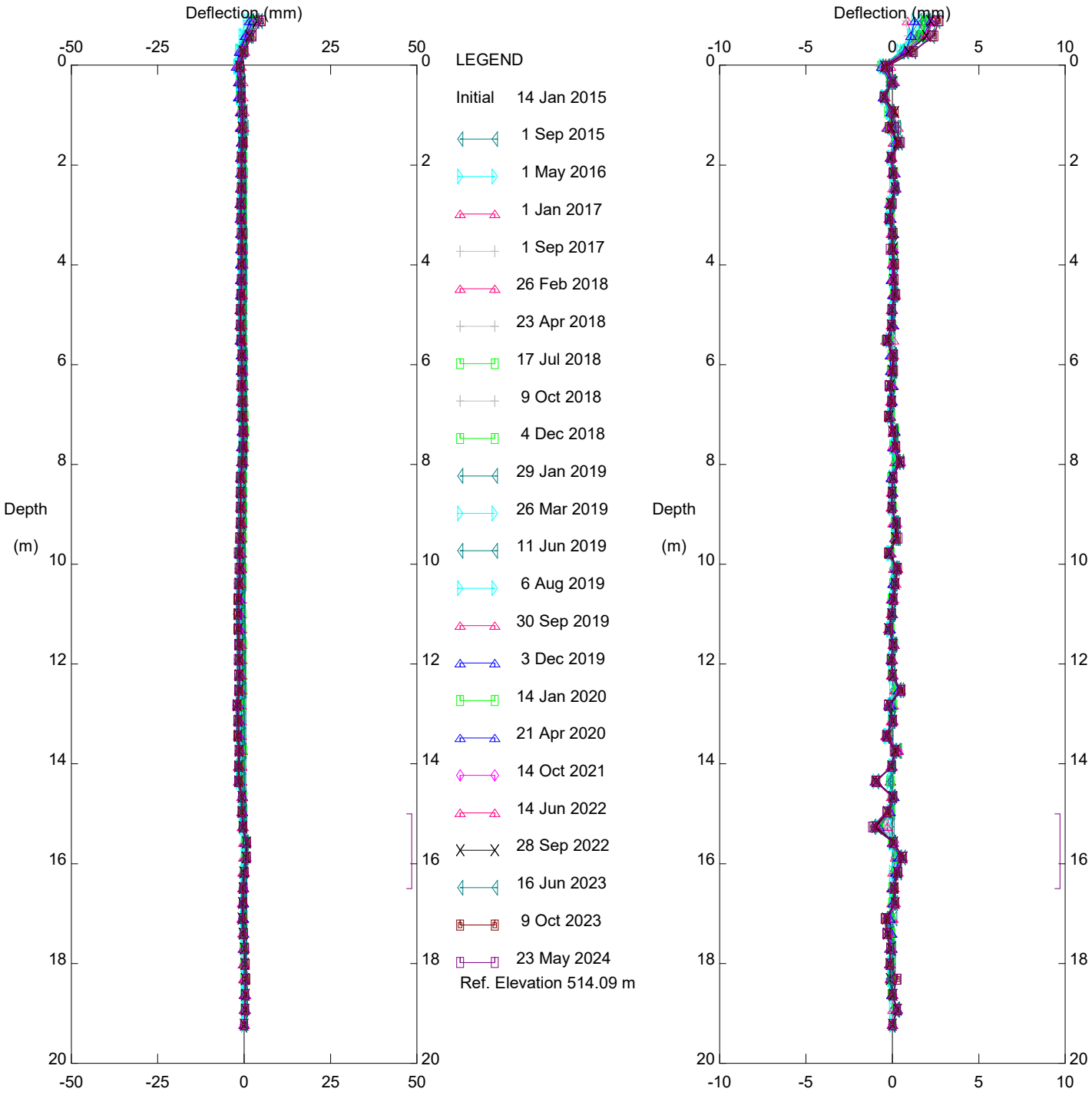

Cumulative Deflection

Direction B

Incremental Deflection

Direction B

PH031 Judah Hill Michelin Slide, Inclinometer SAA10-8

Alberta Transportation

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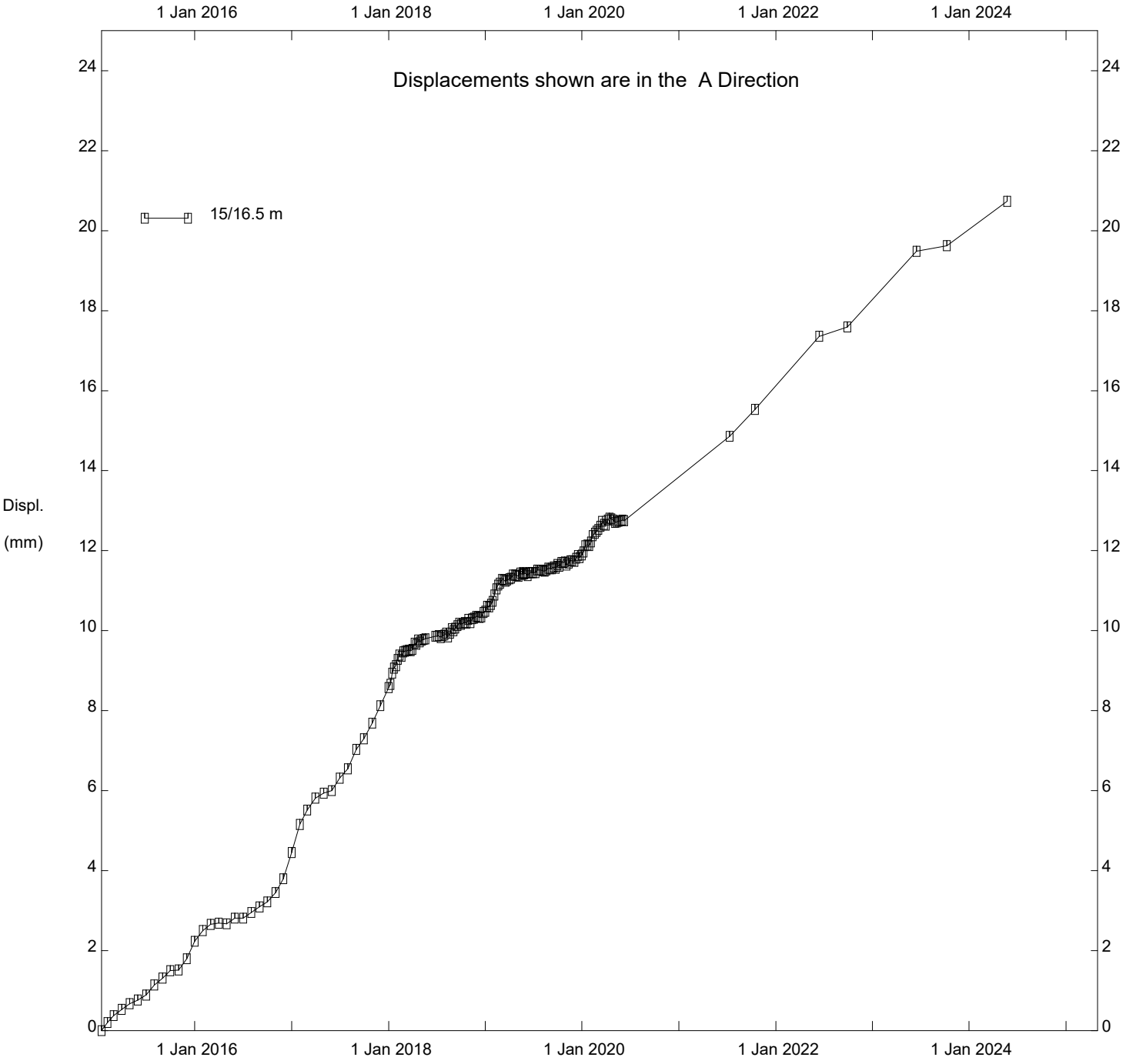
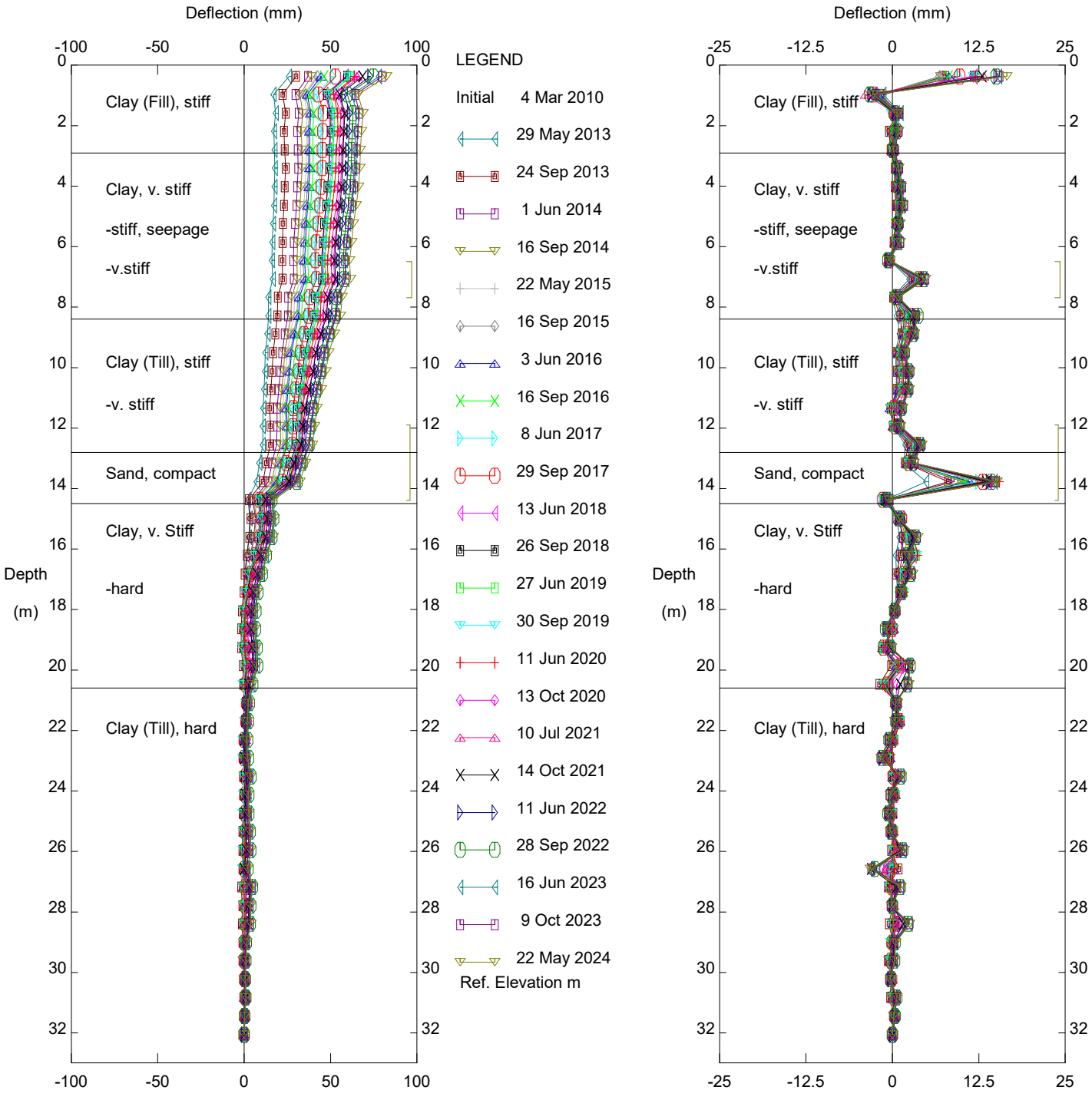
Thurber Engineering Ltd.



PH031 Judah Hill Michelin Slide, Inclinometer SAA10-8

Alberta Transportation

Thurber Engineering Ltd.



Cumulative Deflection

Direction A

Incremental Deflection

Direction A

PH031 Judah Hill Michelin Slide, Inclinometer SI10-9

Alberta Transportation

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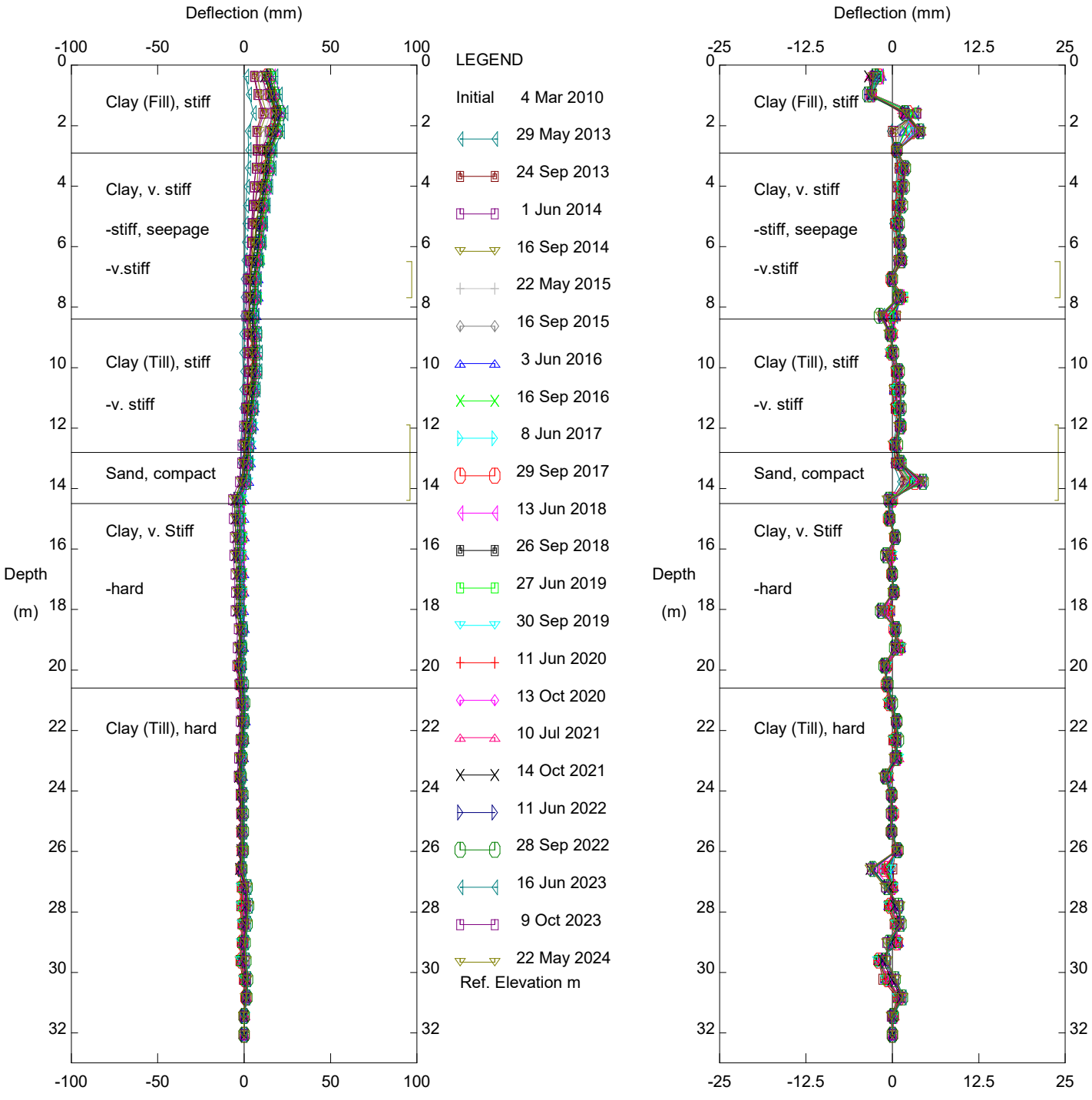

Cumulative Deflection

Direction B

Incremental Deflection

Direction B

PH031 Judah Hill Michelin Slide, Inclinometer SI10-9

Alberta Transportation

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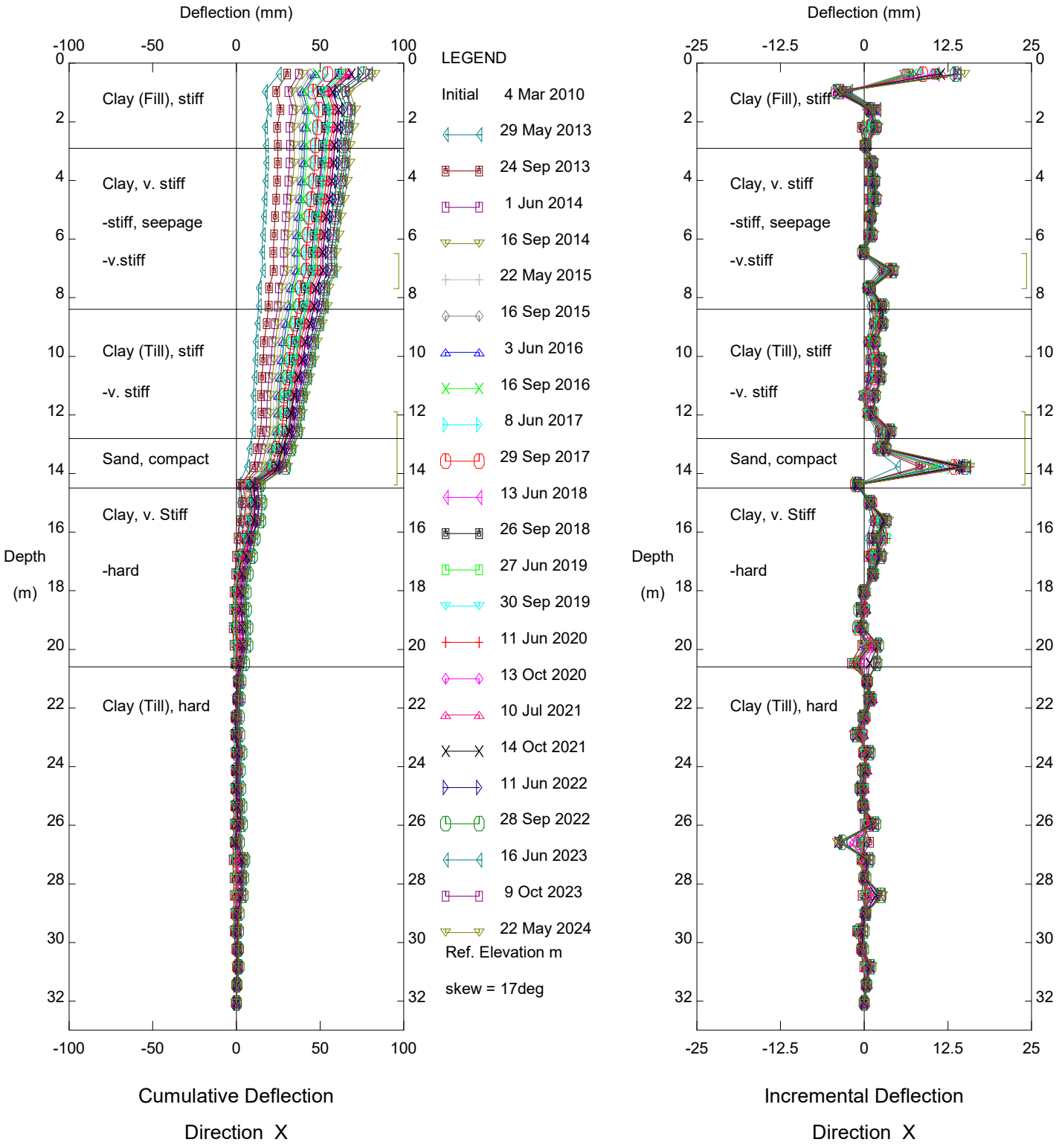

Cumulative Deflection

Direction X

Incremental Deflection

Direction X

PH031 Judah Hill Michelin Slide, Inclinometer SI10-9

Alberta Transportation

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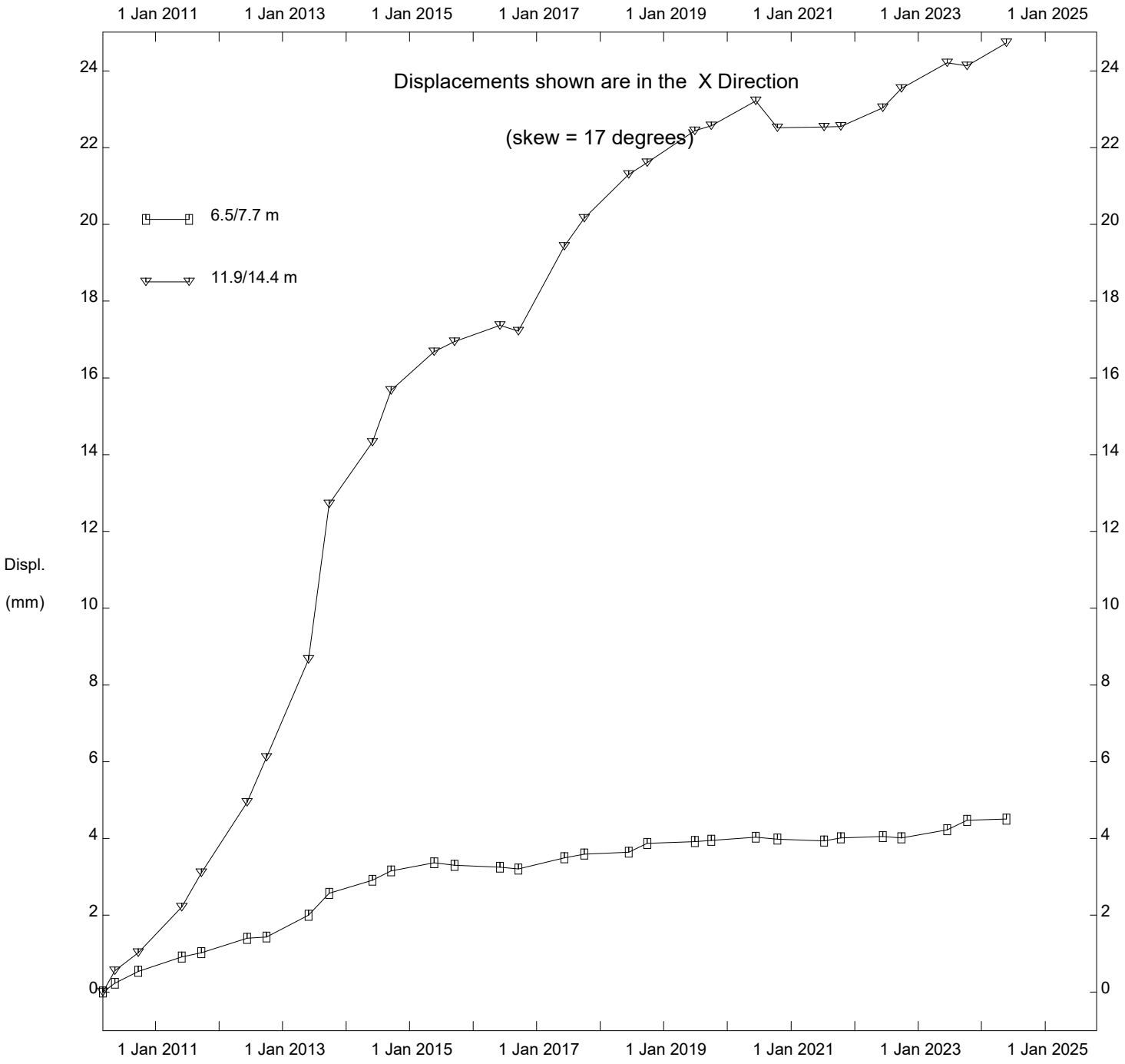

PH031 Judah Hill Michelin Slide, Inclinometer SI10-9

Alberta Transportation

FIGURE PH031-1
PIEZOMETRIC DEPTHS FOR HWY 744:04 JUDAH HILL (MICHELIN SLIDE)

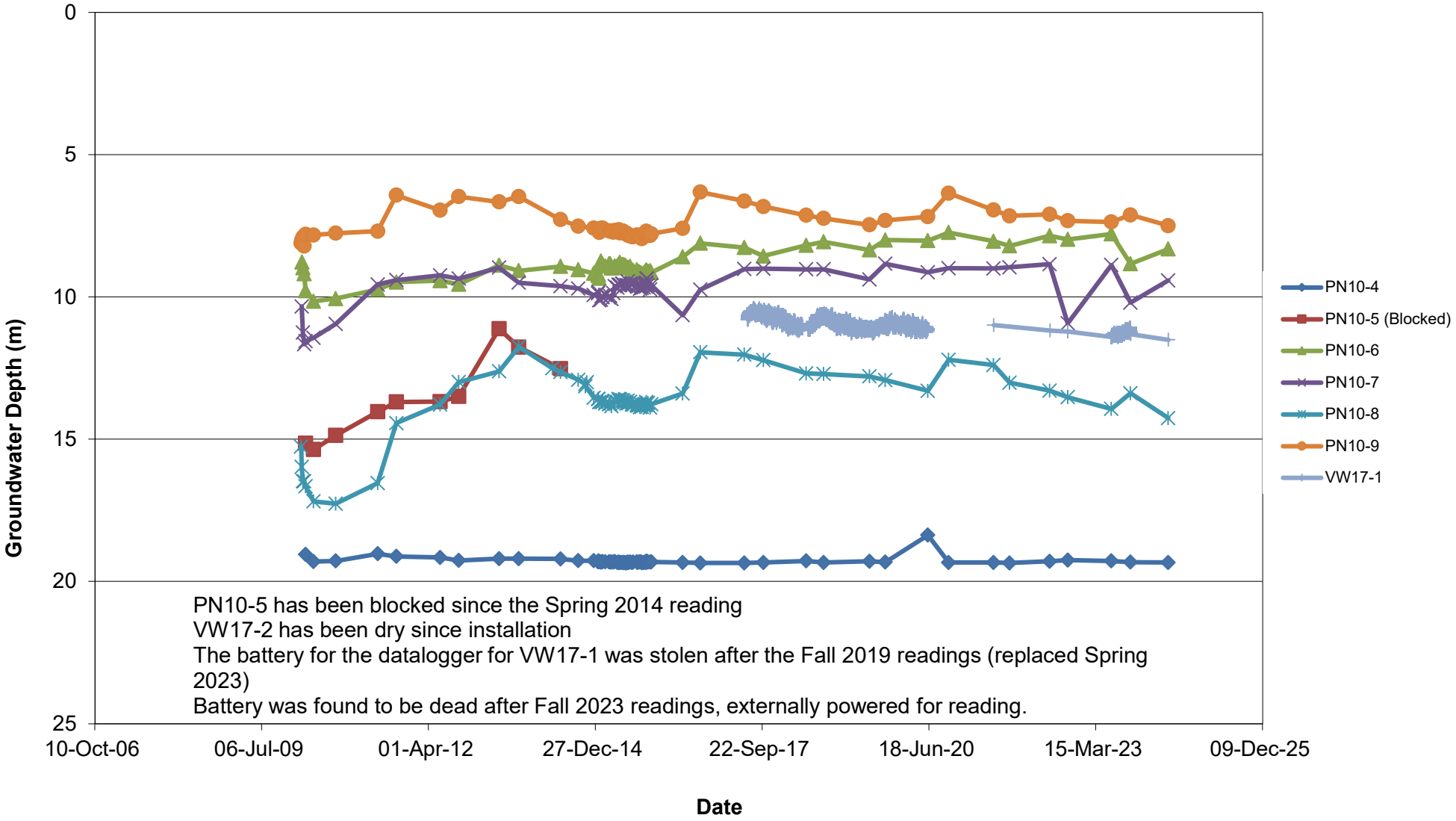

FIGURE PH031-2
PIEZOMETRIC ELEVATIONS FOR HWY 744:04 JUDAH HILL (MICHELIN SLIDE)