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

THURBER ENGINEERING LTD.

Site Number	Location	Name	Hwy	km
PH045	Hwy 35:08 C1 26.2	Meikle Pile Wall	35:08	Km 26.2
Legal Description:		**UTM Co-ordinates**		
6-7-94-22 W5		11U E 467580.75	N 6333080.85	

Current Monitoring:	20-May-2024	**Previous Monitoring**	10-Oct-2023
Instruments Read By:	Mr. Niraj Regmi, G.I.T., and Mr. Nixson Mationg, Thurber		

Instruments Read During This Site Visit			
Slope Inclinometers (SIs): SI-49 SI-50 SI-51 SI23-100	**Pneumatic Piezometers (PN):** N/A	**Vibration Wire Piezometers (VW):** VW23-100A VW23-100 VW23-101 VW23-102VW23-103	**Standpipe Piezometers (SP):** N/A
Load Cell (LC): N/A	**Strain Gauges:** N/A	**SAAs:** N/A	**Others:** N/A

Readout Equipment Used			
Slope Inclinometers: **T**wo RST Digital Inclinometer probes with 2 ft. wheelbases and RST Pocket PC readouts	**Pneumatic Piezometers:**	**Vibration Wire Piezometers:** Geokon GK404	**Standpipe Piezometers:**
Load Cell:	**Strain Gauges:**	**SAAs:**	**Others:**

Note
An interim set of readings of the 2023 instrumentation was taken on March 27, 2024, as part of the preliminary engineering study.

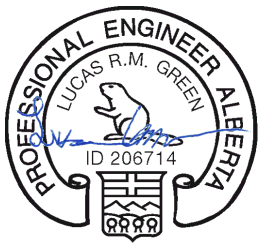
Zones of New Movement:	None
Interpretation of Monitoring Results:	Slope inclinometers SI-49, -50, and -51 were installed inside the pile wall along the south shoulder of the highway. The movement zones for the slope inclinometers installed in the piles are defined over the length of the pile and waler. Since the fall of 2023 readings, slope inclinometer SI-49 showed a rate of movement of 2.6 mm/yr over 1.5 m to 14.3 m depth with a total cumulative deflection to date of 161.5 mm. The current rate of movement in SI-49 is slightly lower than the overall rate of movement of 6.1 mm/yr measured since initialization. Overall, the movement pattern at SI-49 appears to have been unaffected by the repairs undertaken in 2016. SI-50 showed no discernible movement since the fall of 2023 readings with a total cumulative movement to date of 163.7 mm. The overall

	movement rate in this SI since initialization is 6.2 mm/yr. SI-50 showed a marked reduction in movement rate post-construction although the rate has since increased over the last three years SI-51 showed no discernible movement since the fall of 2023 readings with a total cumulative movement to date of 74.6 mm. The overall movement rate at SI-51 since initialization is 2.8 mm/yr. SI-51 is somewhat inconclusive due to the irregular movement trends; however, the overall trend indicates that this inclinometer was also unaffected by the 2016 repairs. Slope inclinometer SI23-100 is located downslope of the pile wall and showed a rate of movement of 7.8 mm/yr over 4.8 m to 7.8 m depth, and a rate of movement of 1.1 mm/yr over 21.9 m to 24.3 m depth since the fall 2023 readings. The lower zone needs more readings to confirm but it is of concern as this depth of movement is below the adjacent pile wall. The vibrating wire piezometers show current groundwater depths ranging from 3.26 m in VW23-100B to 9.22 m below existing ground surface in VW23-100A. Vibrating wire piezometers VW23-100A, VW23-100B, and VW23-101 showed increases in groundwater level of 0.25 m, 0.14 m, and 0.30 m, respectively, since the fall 2023 readings. The current groundwater level reading in VW23-100B is the highest since the instrument was initialized. VW23-102 and VW23-103 have shown decreases in groundwater of 1.25 m and 1.05 m, respectively, since the fall 2023 readings, with the reading at VW23-103 the lowest since installation. The nested piezometers at VW23-100 indicate an upward trend to the groundwater flow pattern. The vibrating wire piezometer readings are summarized in Table PH045-2 above and are plotted on Figure PH045-1 in Appendix A.
Future Work:	The instruments should be read again in the fall of 2024.
Instrumentation Repairs:	No instrument repairs are required at this time.
Additional Comments:	

Attachments:	▪ Table PH045-1: Spring 2024 – Meikle River (Km 26.2 Pile Wall) Slope Inclinometer Instrumentation Reading Summary ▪ Table PH045-2: Spring 2024 – Meikle River (Km 26.2 Pile Wall) Vibrating Wire Piezometer Instrumentation Reading Summary ▪ Statement of Limitations and Conditions ▪ APPENDIX A - PH045 SPRING 2024 □ Field Inspector's report □ Site Plan Showing Approximate Instrument Locations (Drawing No. 32121 PH045) □ SI Reading Plots □ Figure PH045-1 (Vibrating Wire Piezometer Depths)

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.
Don Proudfoot, M.Eng., P. Eng.
Partner | Senior Geotechnical Engineer



2024-07-15
Lucas Green, P.Eng.
Geotechnical Engineer

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)

Table PH045-1: Spring 2024 – Meikle River (Km 26.2 Pile Wall) Slope Inclinometer Instrumentation Reading Summary

Date Monitored: May 24, 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)	CURRENT RATE OF MOVEMENT (mm/yr)	CHANGE IN RATE OF MOVEMENT SINCE PREVIOUS READING (mm/yr)
SI-49	Dec. 15, 1997	161.5 mm over 1.5 m to 14.3 m depth in 216° direction	15.2 mm/y In June 1999	Operational	October 10, 2023	1.6	2.6	0.5
SI-50	Dec. 15, 1997	163.7 mm over 1.7 m to 13.9 m depth in 241° direction	14.2 mm/yr in Sept. 2011	Operational	October 10, 2023	No discernible movement	N/A	-9.2
SI-51	Dec. 15, 1997	74.6 mm over 1.8 m to 12.2 m depth in 267° direction	48.8 mm/yr In May 1998	Operational	October 10, 2023	No discernible movement	N/A	6.4
SI23-100	May 11, 2023	13.3 mm over 4.8 m to 7.8 m depth in the 160° direction	34.1 mm/yr in October 2023	Operational	October 10, 2023	4.9	7.8	-26.5
		4.4 mm over 21.9 m to 24.3 m depth in the 207° direction	23.3 mm/yr in June 2023			0.7	1.1	0.1

Drawing 32121-PH045 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.

THURBER ENGINEERING LTD.

Table PH045-2: Spring 2024 – Meikle River (Km 26.2 Pile Wall) Vibrating Wire Piezometer Instrumentation Reading Summary

Date Monitored: May 24, 2024

INSTRUMENT	DATE INITIALIZED	GROUND ELEVATION (m)	TIP DEPTH (m)	CURRENT STATUS	MAXIMUM GROUNDWATER DEPTH (m)	CURRENT GROUNDWATER DEPTH (m)	PREVIOUS (Oct 10, 2023) GROUNDWATER DEPTH (m)	CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)
VW23-100A	May 10, 2023	463.39	23.37	Operational	8.80 on May 10, 2023	9.22	9.47	0.25
VW23-100B	May 10, 2023	463.39	11.37	Operational	3.26 on May 24, 2024	3.26	3.40	0.14
VW23-101	May 10, 2023	463.06	15.00	Operational	5.10 on May 10, 2023	5.92	6.22	0.30
VW23-102	May 11, 2023	465.26	19.10	Operational	2.76 on May 11, 2023	6.05	4.80	-1.25
VW23-103	May 11, 2023	468.23	15.40	Operational	6.44 on May 11, 2023	9.06	8.01	-1.05

Drawing 32121-PH045 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.

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.

7. INDEPENDENT JUDGEMENTS OF CLIENT

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.

THURBER ENGINEERING LTD.

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

SPRING 2024

APPENDIX A
DATA PRESENTATION

SITE PH045: HWY 35:08, MEIKLE RIVER (km 26.2 PILE WALL)

ALBERTA TRANSPORTATION AND ECONOMIC CORRIDORS
PEACE REGION (PEACE RIVER DISTRICT)
INSTRUMENTATION MONITORING FIELD SUMMARY (PH45)
SPRING 2024

Location:	Meikle Pile Wall (Hwy 35:08 C1 26.2)	**Readout:**	GK404, S/N364
File Number:	32121	**Casing Size:**	3.34
Probe:	RST SET 5R and 8R	**Temp:**	13
Cable:	RST SET 5R and 8R	**Read by:**	NRM/NKR

SLOPE INCLINOMETER (SI) READINGS

SI#	GPS Location (UTM 11)		Date	Stickup (m)	Depth from top of casing (ft)	Magn. North A+ Groove	Current Bottom Depth Readings				Probe/ Reel		Remarks
	Easting	Northing				degree	A+	A-	B+	B-	#	Size (")	
SI-49	467580.75	6333080.85	24-May-24	0.37	78 to 2	215°	113	-99	83	-91	8R/8R	3.34	
SI-50	467545.56	6333099.72	24-May-24	0.1	76 to 2	225°	79	-64	232	-239	8R/8R	3.34	**
SI-51	467545.72	6333120.09	24-May-24	0	70 to 2	145°	172	-161	-319	297	5R/5R	3.34	*
SI23-100	467550	6333091	24-May-24	1	84 to 0	181	506	-493	317	-320	10R	3.34	

VIBRATING WIRE PIEZOMETER (VW) READINGS

VW#	GPS Location (UTM 11)		Date	Reading (B)	Temp (°C)	Identification Number
	Easting	Northing				
VW23-100A	467550	6333091	24-May-24	8328.7	5.6	158306
VW23-100B	467550	6333091	24-May-24	8047.3	6.3	163218
VW23-101	467601	6333093	24-May-24	8787.4	6	160947
VW23-102	467564	6333115	24-May-24	8491.9	5.7	160933
VW23-103	467562	6333140	24-May-24	9001.8	5.5	160869

DAILY INSPECTOR REPORT

* SI-51 probe comes to surface not in grooves, may be damaged at 2 feet depth. Top of casing damaged
*SI-51 Probe did not go past 65 ft, SI was read from 2 ft to 64 ft
** SI-50 - top of SI slightly damaged

H:\32000\32121 AT GRMP Peace River District 2021-2025\CAD\2023 INSTRUMENT\32121 PH045-1.dwg - 1 - Jul. 10, 2023

VW23-103

VW23-102

VW23-101

SI51

SI50

SI49

SI23-100
VW23-100A/B

SI23
(NOT IN USE)

SW7-94-22-W5M

EDGE OF ASPHALT

PASSING LANE

HIGHWAY
OVERLAID AND
CHIP SEALED IN
2016

HWY 35

NEW GUARDRAIL

CABLE BARRIER

DAMAGED FLASHING - REPAIRED

SPALLING COLD JOINT
REPAIRED (2016)

NEW W-BEAM
GUARDRAIL (2016)

CATCHBASIN

H PILES (TYP)

GRAVEL FILL (2016)

GULLY FORMING IN RUT (2022)

REALIGNED 760mm
'ELEPHANT TRUNK'

BARE AREA

SCARPS
INTERFRETED
FROM LIDAR

0.4m HIGH
VERTICAL FACE,
OVERALL 3.5m HIGH

FRESH
MOVEMENT

BACK TILT

CRACK 160mm
WIDE, 200mm DIFF

0.7m HIGH

BURIED GABION CAP BEAM
SITTING ON SCREW PILES
(2.1m CENTRE TO CENTRE)

DIP ~ 400mm, GROUND
SLIGHTLY SOFT

BACKFILLED EROSION GULLY
WITH COMPACTED COMMON
FILL, COVERED WITH TOPSOIL
AND SEEDED

0.7m HIGH

SUBDRAIN FROM LOWER WALL

RILL

NEW SUBDRAIN
OUTFALL PIPE (2016)

473
468
463
458
453
448

N
E
S
W

PH 45

Twin Lakes
Hotchkiss
Notikewin
Manning
North Star
Deadwood
Dixonville
Chinook Valley
Eureka River
Hines Creek
Whitelaw
Peace River
St. Isidore
Meikle River
Rainbow Creek
Whitemud River
Peace River
QUEEN ELIZABETH PROV. PARK
AC CARDINAL

SITE MAP
N.T.S.

LEGEND

- INSTRUMENT LOCATION
- LANDSLIDE CRACK
- TREELINE (APPROX.)
- \+ ANCHOR (APPROX, BASED ON HISTORICAL DOCUMENTS)
- EROSION LINE
- GUARDRAIL
- CAP BEAM ATTACHED TO PILE WALL
- SCARP
- SI SLOPE INCLINOMETER
- VW VIBRATING WIRE PIEZOMETER

0 5 10 15 20 30m
SCALE 1:600

SURVEYED BY ARA ENGINEERING (2016, 19-2831-50);
ORTHOIMAGE BY THURBER FROM DRONE IMAGERY FLOWN JUNE 2, 2022

Alberta

PEACE REGION (PEACE RIVER / HIGH LEVEL)
PH045: HWY 35:08 - MEIKLE RIVER

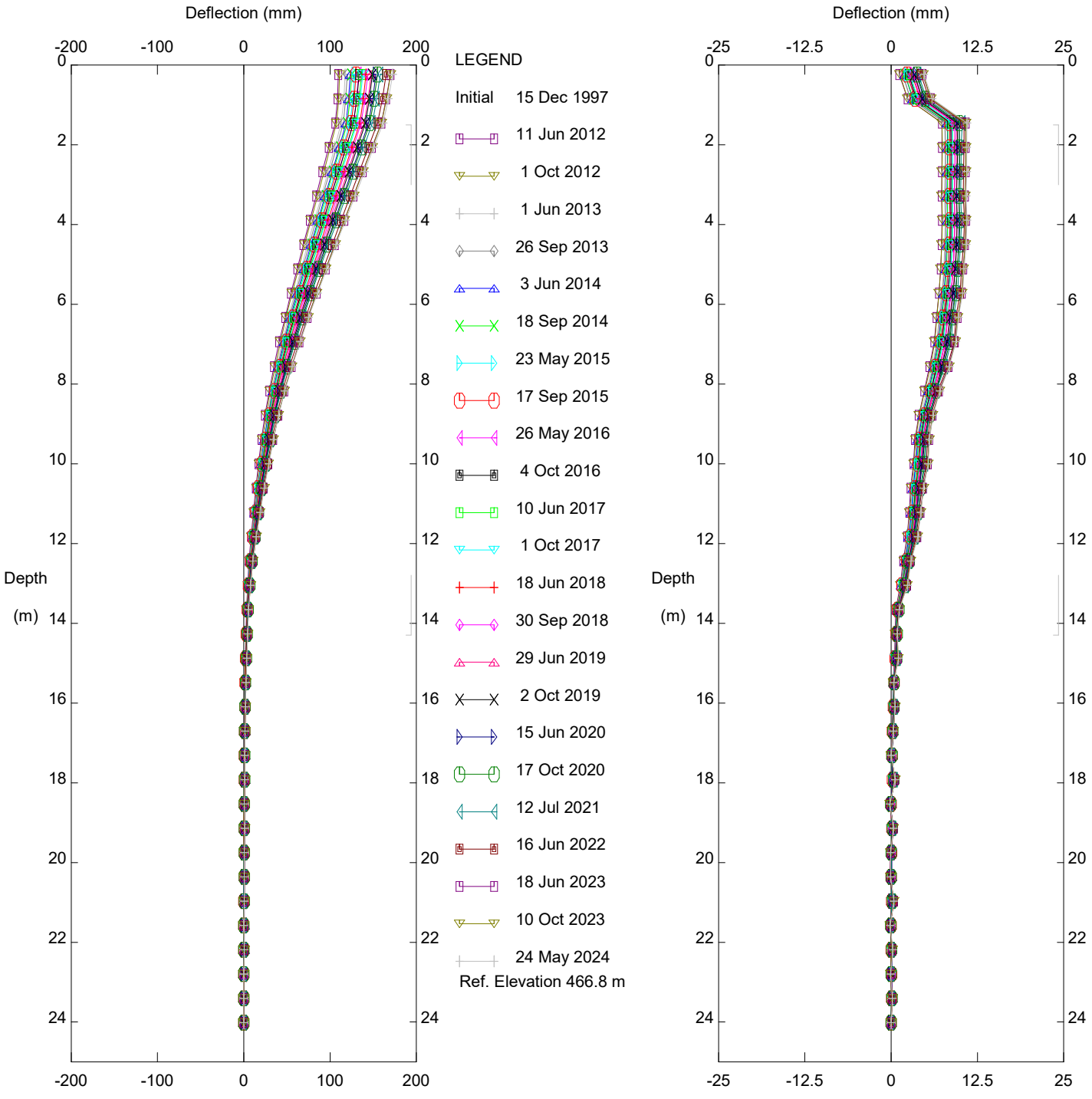
SITE PLAN SHOWING APPROXIMATE INSTRUMENT LOCATIONS

DWG No. 32121-PH045-1

DRAWN BY	ML
DESIGNED BY	KEF
APPROVED BY	DWP
SCALE	1:600
DATE	JULY 2023
FILE No.	32121

THURBER ENGINEERING LTD.

Thurber Engineering Ltd.



Cumulative Deflection

Direction A

Incremental Deflection

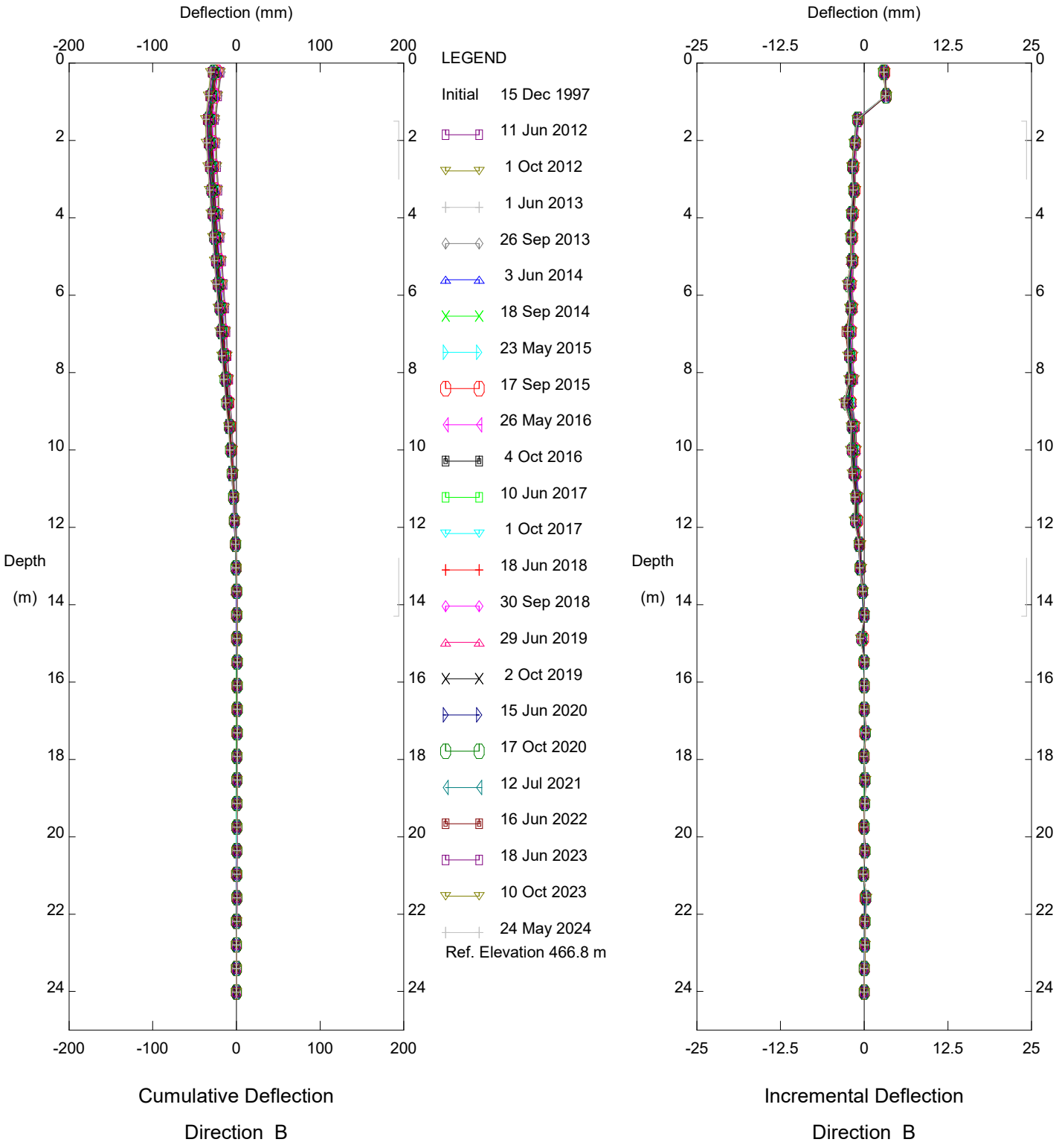
Direction A

HWY 35:08 (PH045), Inclinometer SI-49

Alberta Transportation

H:\32000\32121 AT GRMP Peace River District 2021-2025\Section C\2024A-Spring\SI Readings\PH045\MEIK49.GTL

Thurber Engineering Ltd.



Cumulative Deflection

Direction B

Incremental Deflection

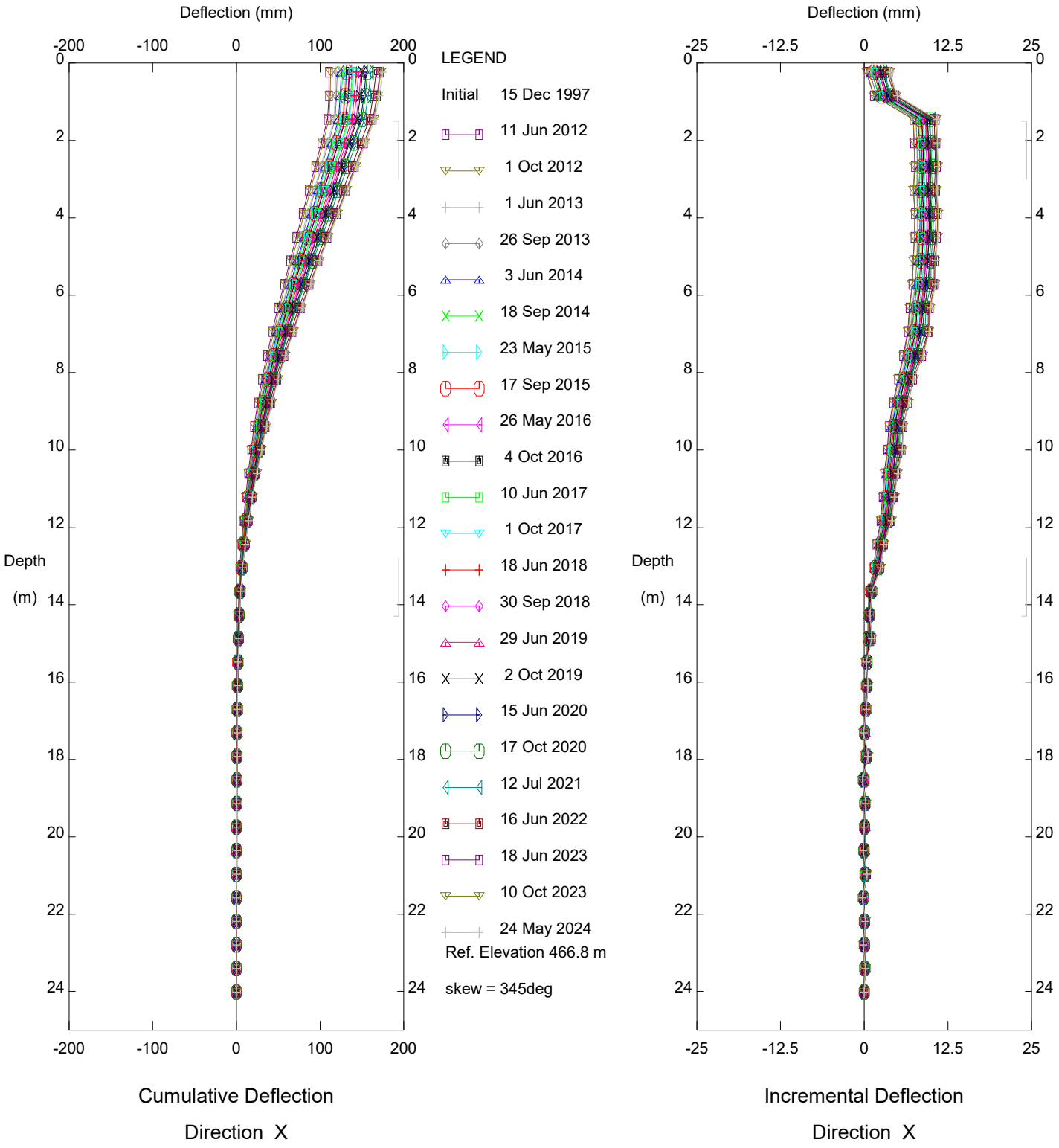
Direction B

HWY 35:08 (PH045), Inclinometer SI-49

Alberta Transportation

H:\32000\32121 AT GRMP Peace River District 2021-2025\Section C\2024A-Spring\SI Readings\PH045\MEIK49.GTL

Thurber Engineering Ltd.



Cumulative Deflection

Direction X

Incremental Deflection

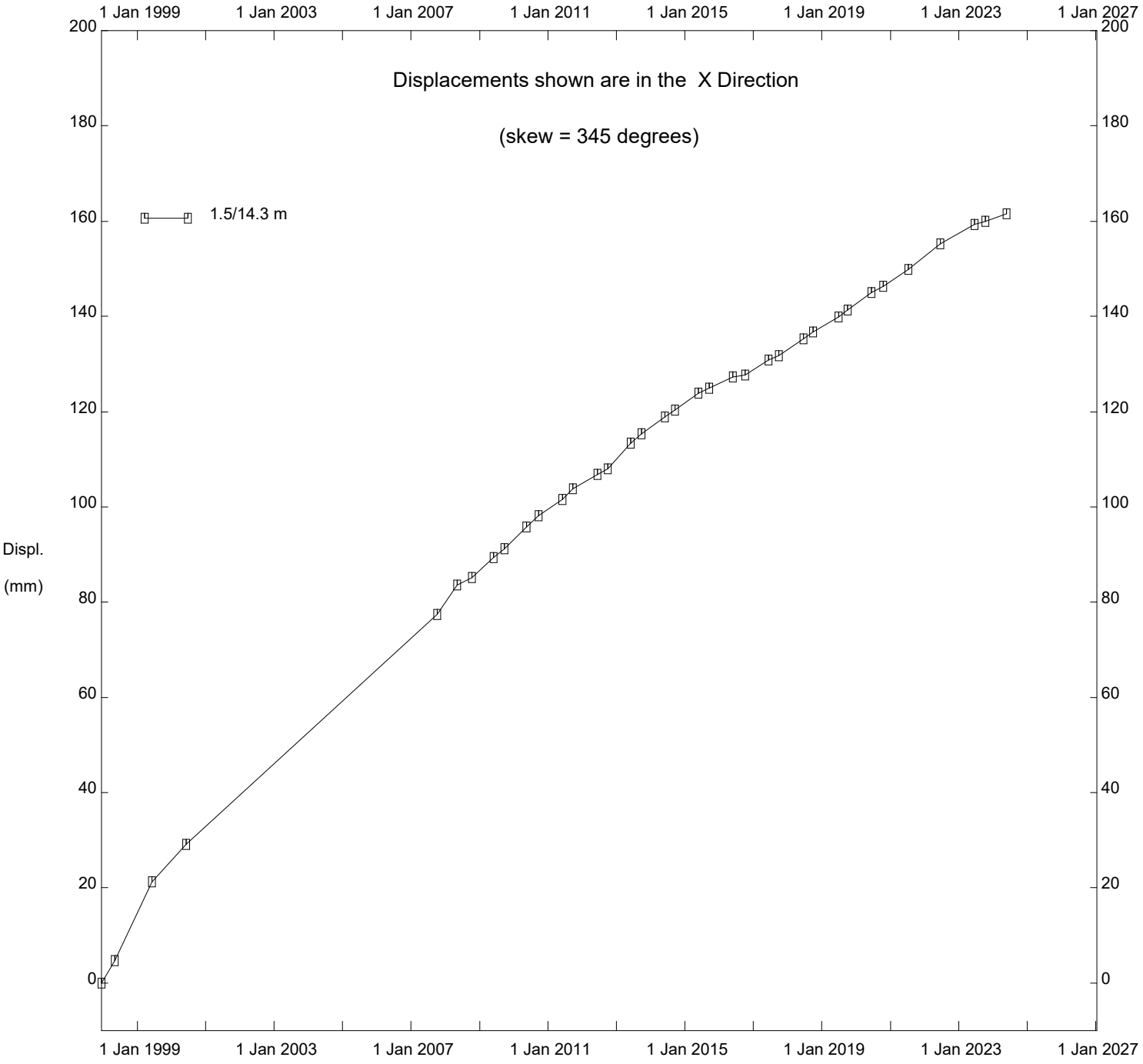
Direction X

HWY 35:08 (PH045), Inclinometer SI-49

Alberta Transportation

H:\32000\32121 AT GRMP Peace River District 2021-2025\Section C\2024A-Spring\SI Readings\PH045\MEIK49.GTL

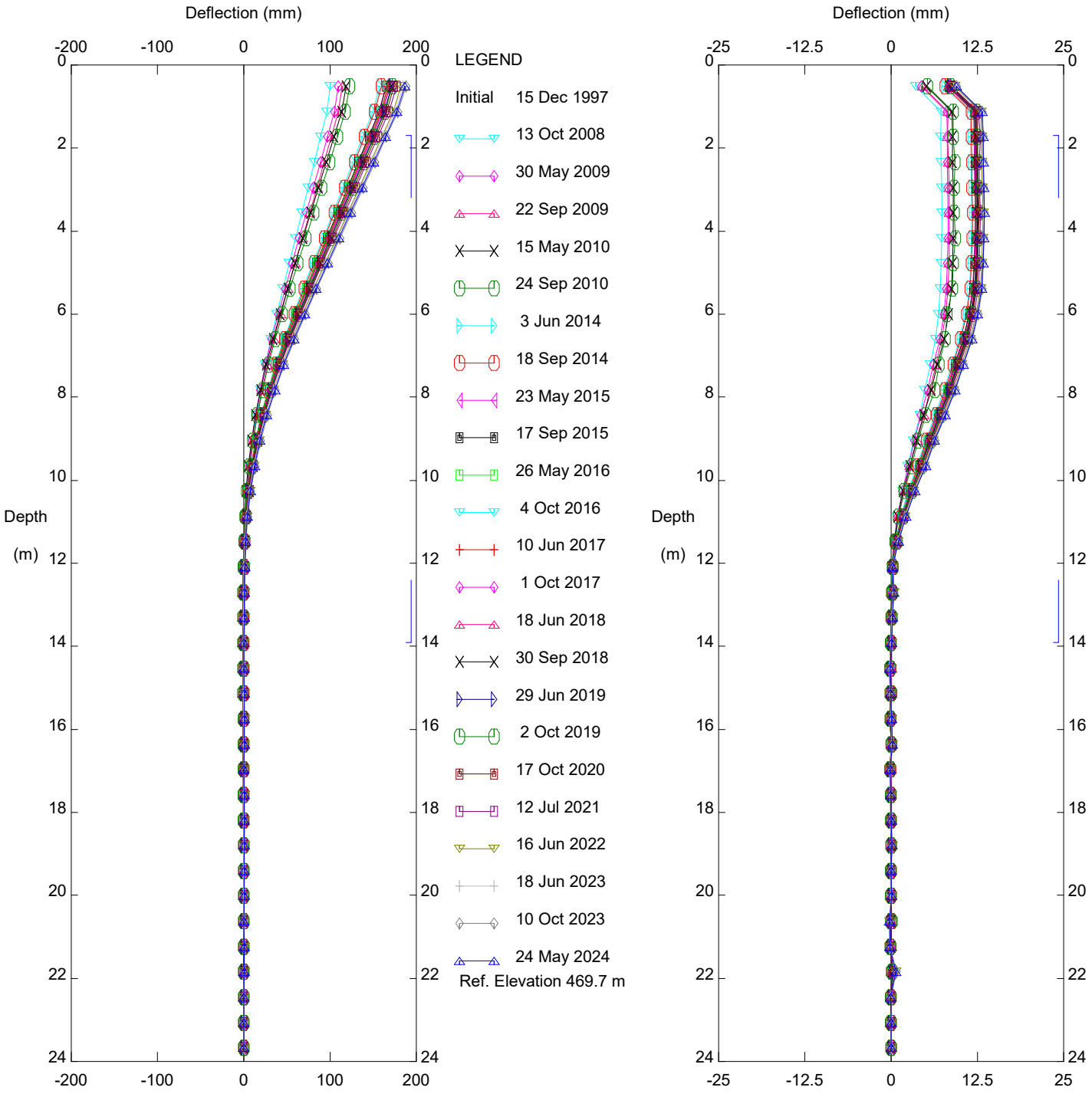
Thurber Engineering Ltd.



HWY 35:08 (PH045), Inclinometer SI-49

Alberta Transportation

Thurber Engineering Ltd.



Cumulative Deflection

Direction A

Incremental Deflection

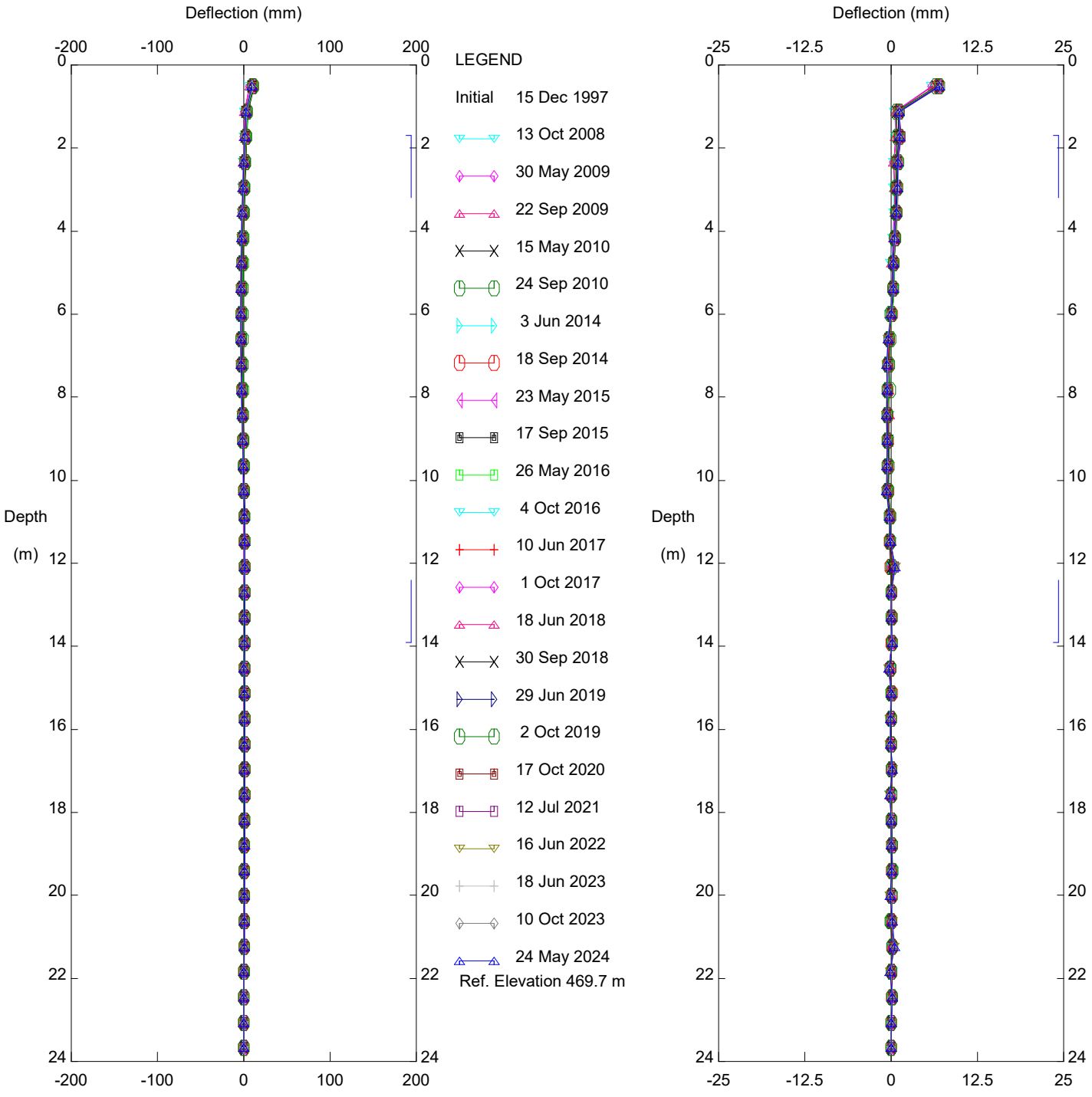
Direction A

HWY 35:08 (PH045), Inclinometer SI-50

Alberta Transportation

H:\32000\32121 AT GRMP Peace River District 2021-2025\Section C\2024A-Spring\SI Readings\PH045\MEIK50.GTL

Thurber Engineering Ltd.



Cumulative Deflection

Direction B

Incremental Deflection

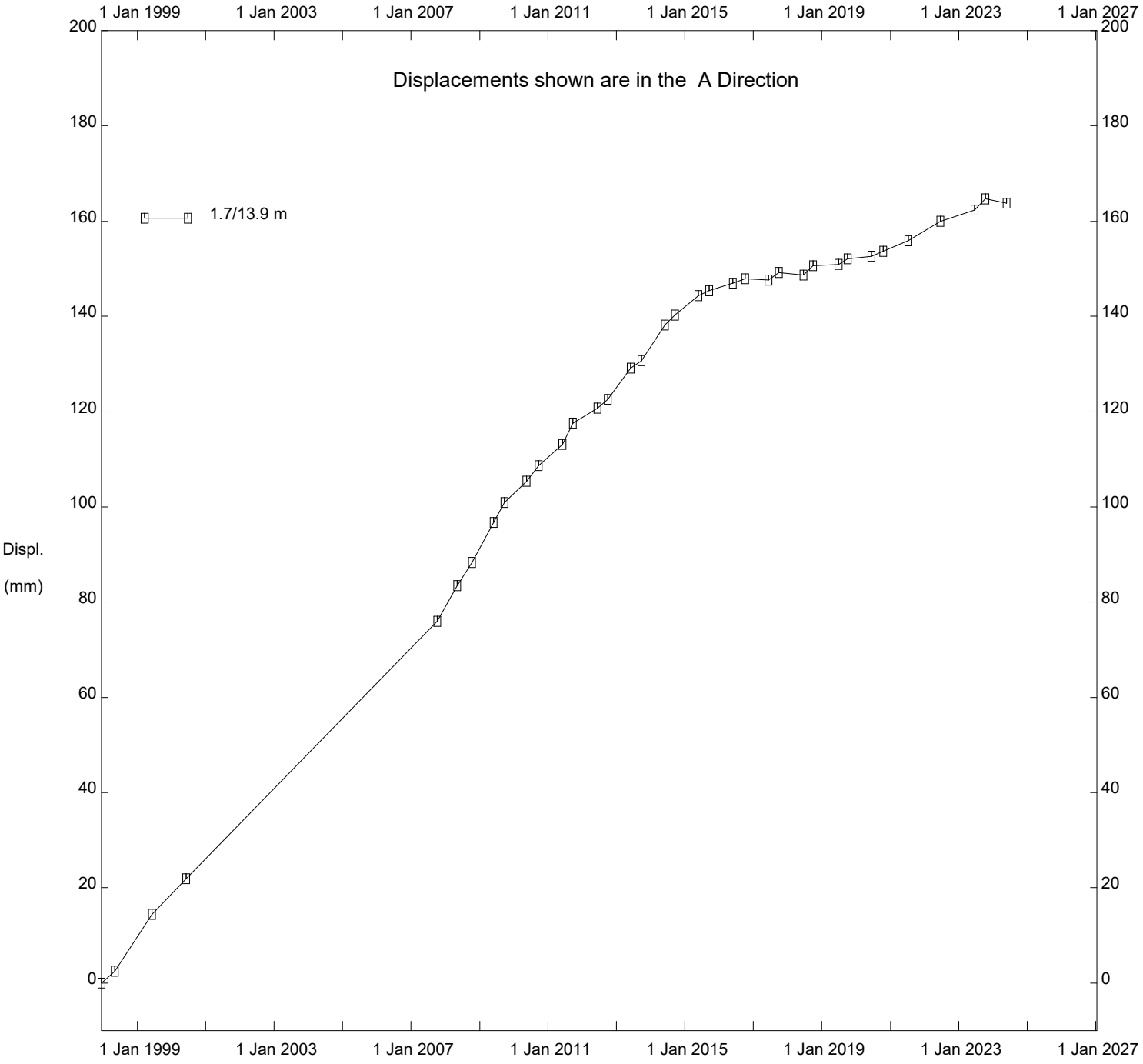
Direction B

HWY 35:08 (PH045), Inclinometer SI-50

Alberta Transportation

H:\32000\32121 AT GRMP Peace River District 2021-2025\Section C\2024A-Spring\SI Readings\PH045\MEIK50.GTL

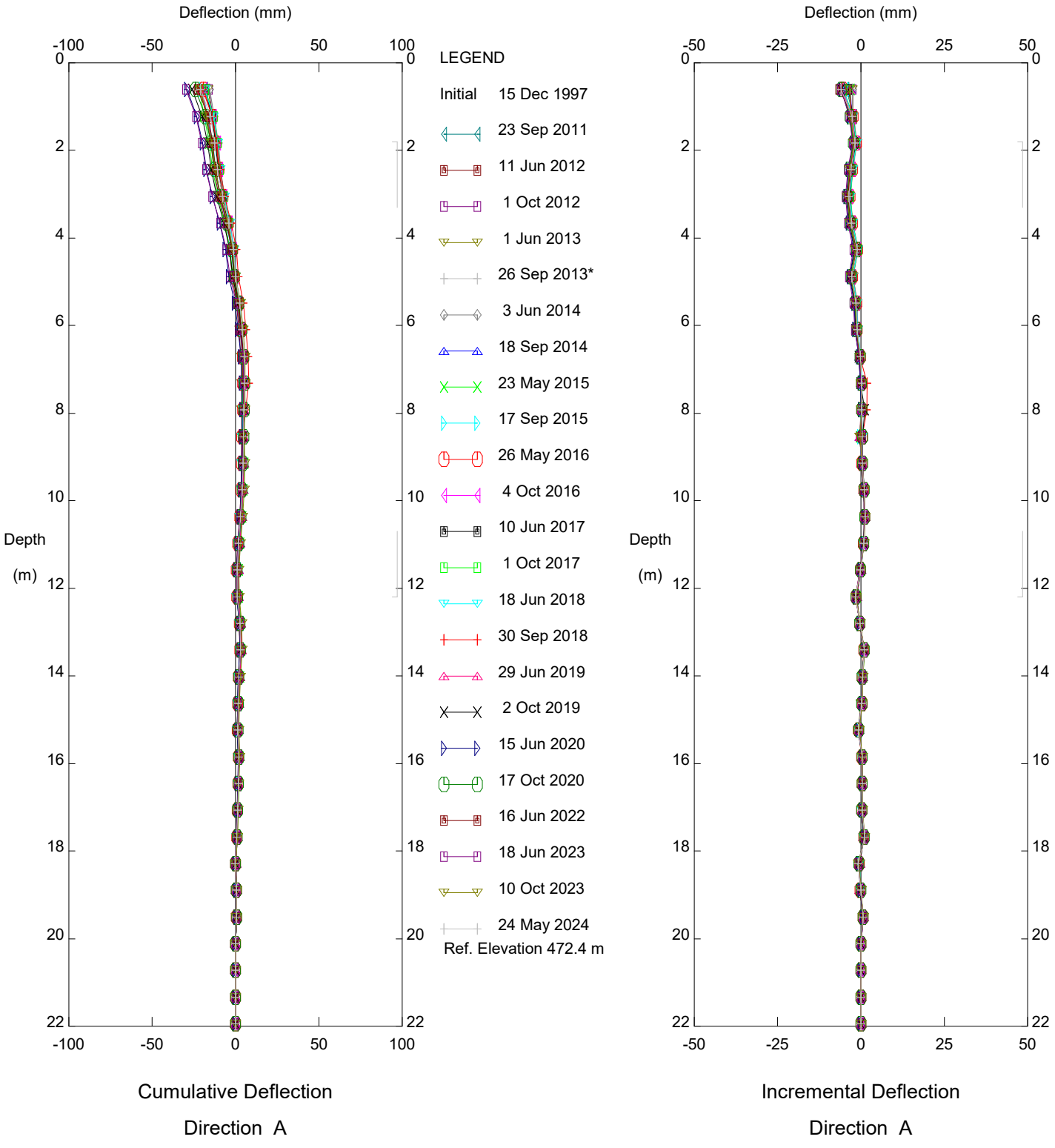
Thurber Engineering Ltd.



HWY 35:08 (PH045), Inclinometer SI-50

Alberta Transportation

Thurber Engineering Ltd.



Cumulative Deflection

Direction A

Incremental Deflection

Direction A

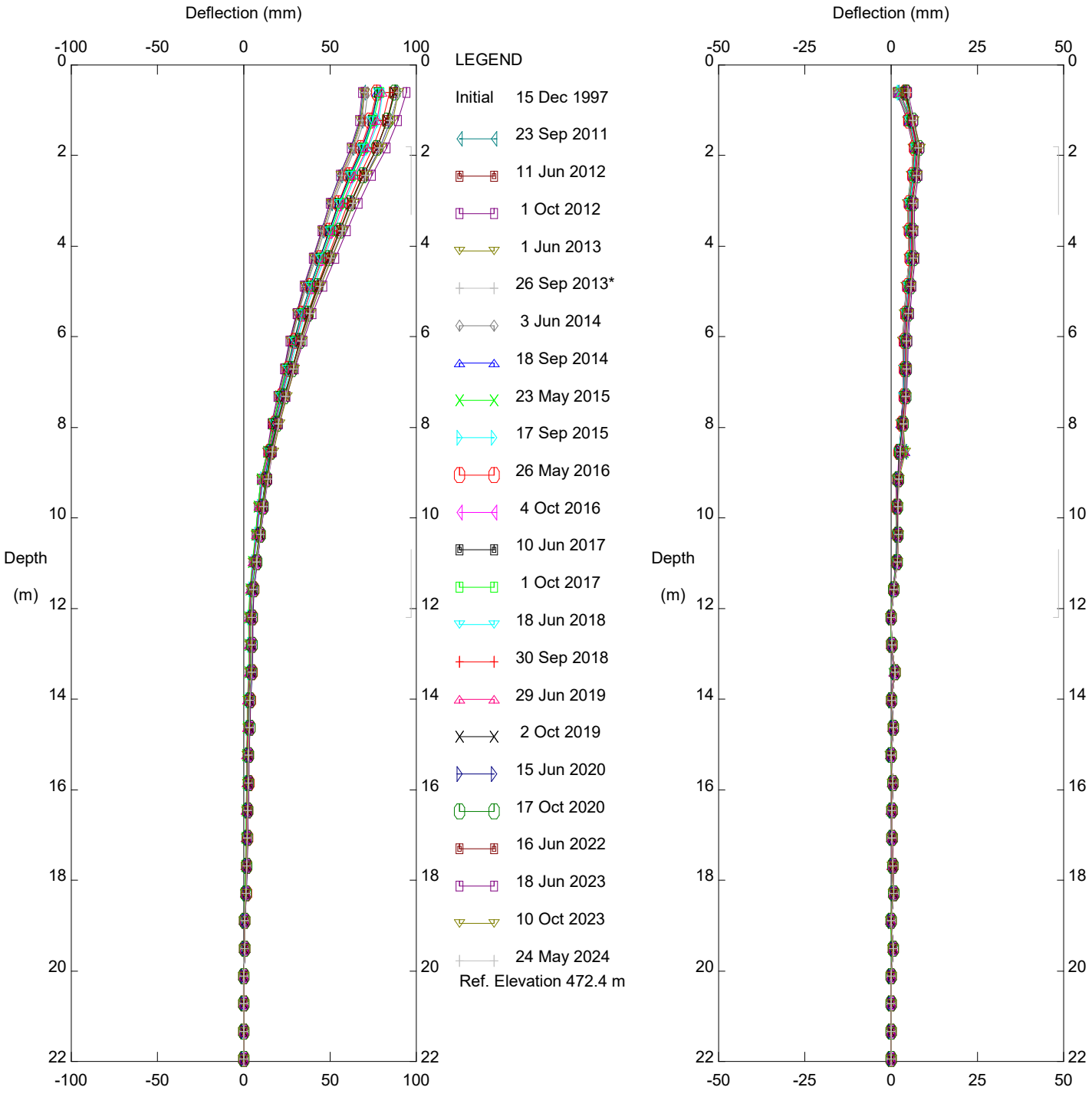
HWY 35:08 (PH045), Inclinometer SI-51

Alberta Transportation

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

H:\32000\32121 AT GRMP Peace River District 2021-2025\Section C\2024A-Spring\SI Readings\PH045\MEIK51-shortened.gtl

Thurber Engineering Ltd.



Cumulative Deflection

Direction B

Incremental Deflection

Direction B

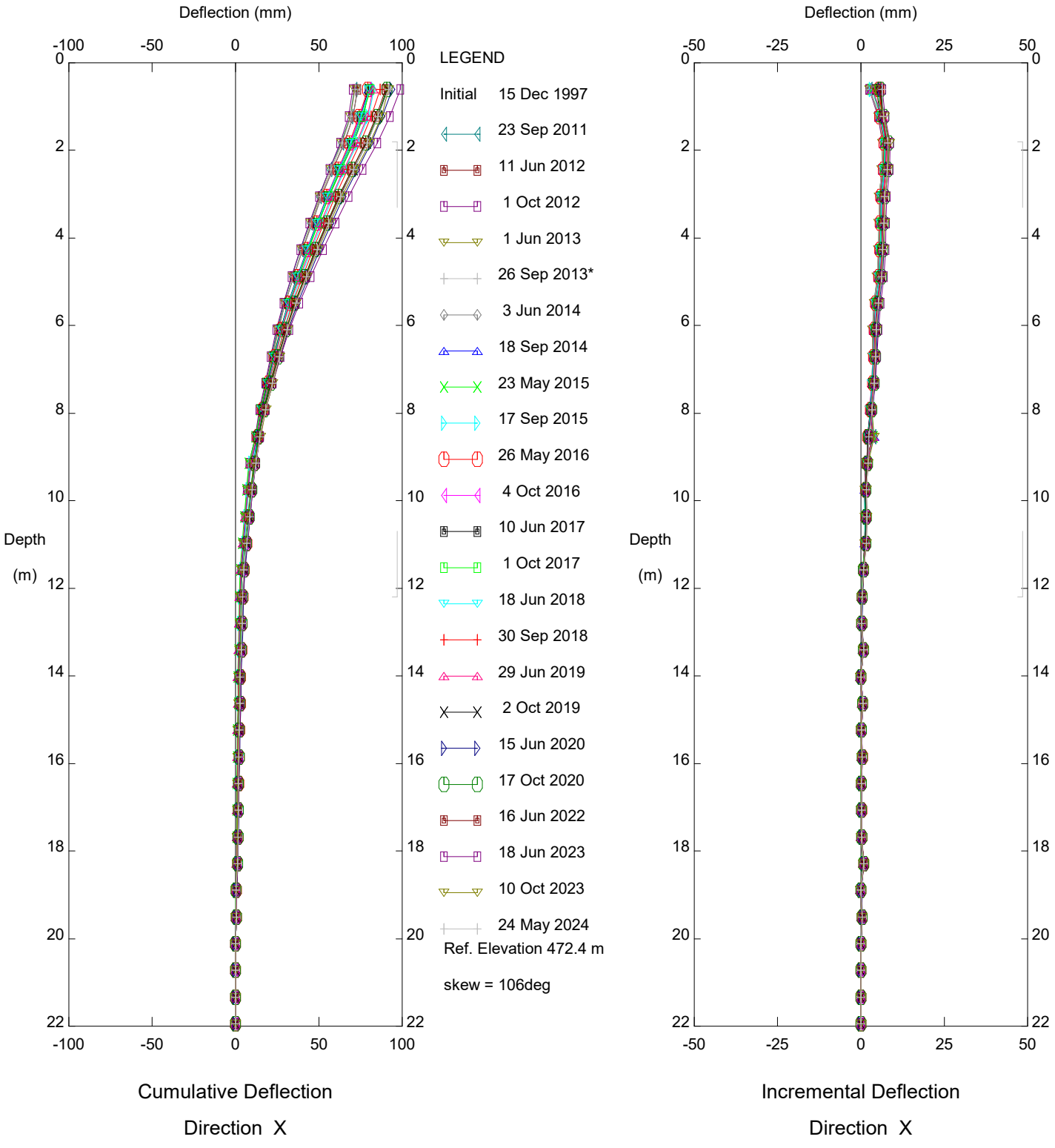
HWY 35:08 (PH045), Inclinometer SI-51

Alberta Transportation

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

H:\32000\32121 AT GRMP Peace River District 2021-2025\Section C\2024A-Spring\SI Readings\PH045\MEIK51-shortened.gtl

Thurber Engineering Ltd.



Cumulative Deflection

Direction X

Incremental Deflection

Direction X

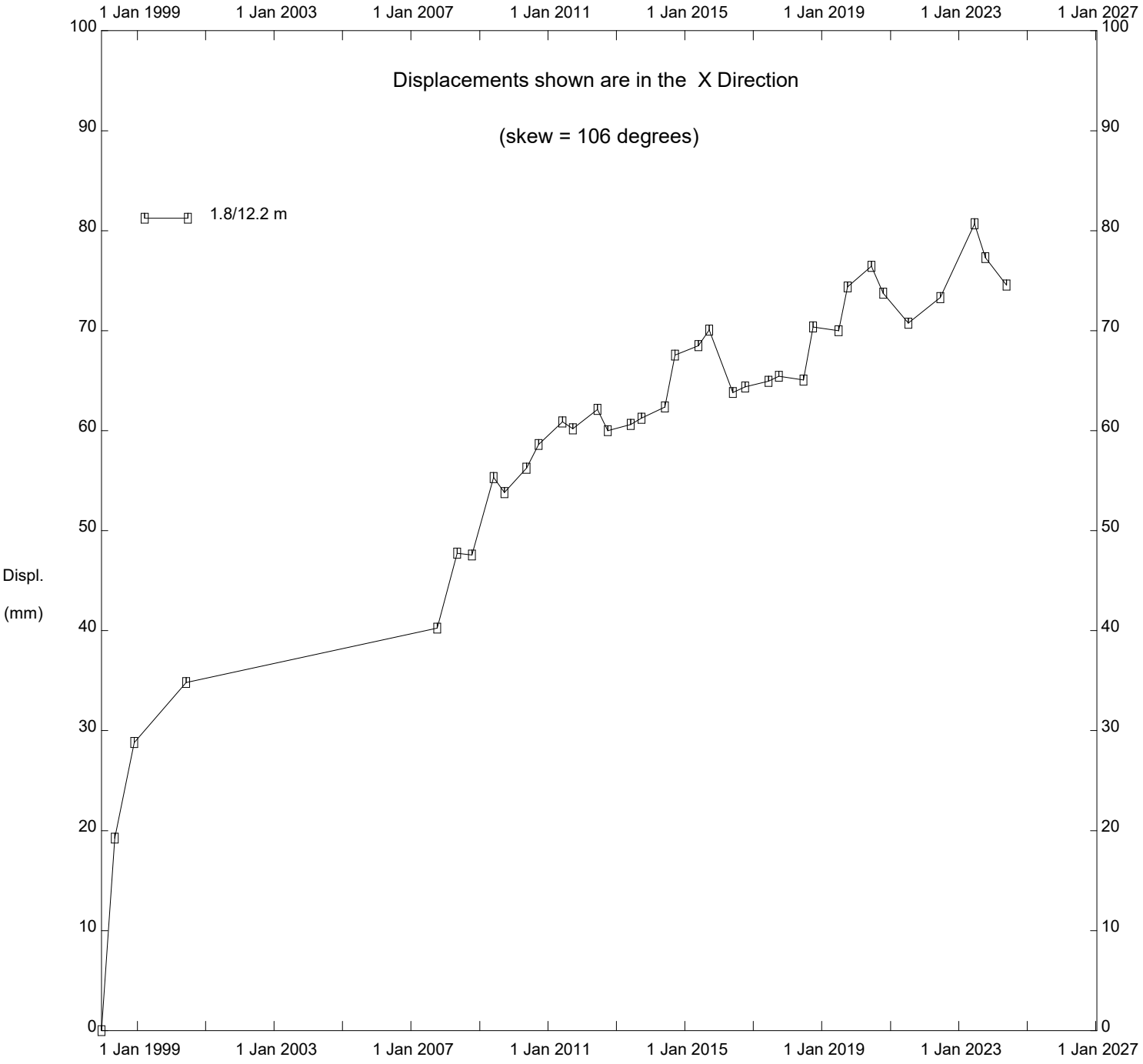
HWY 35:08 (PH045), Inclinometer SI-51

Alberta Transportation

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

H:\32000\32121 AT GRMP Peace River District 2021-2025\Section C\2024A-Spring\SI Readings\PH045\MEIK51-shortened.gtl

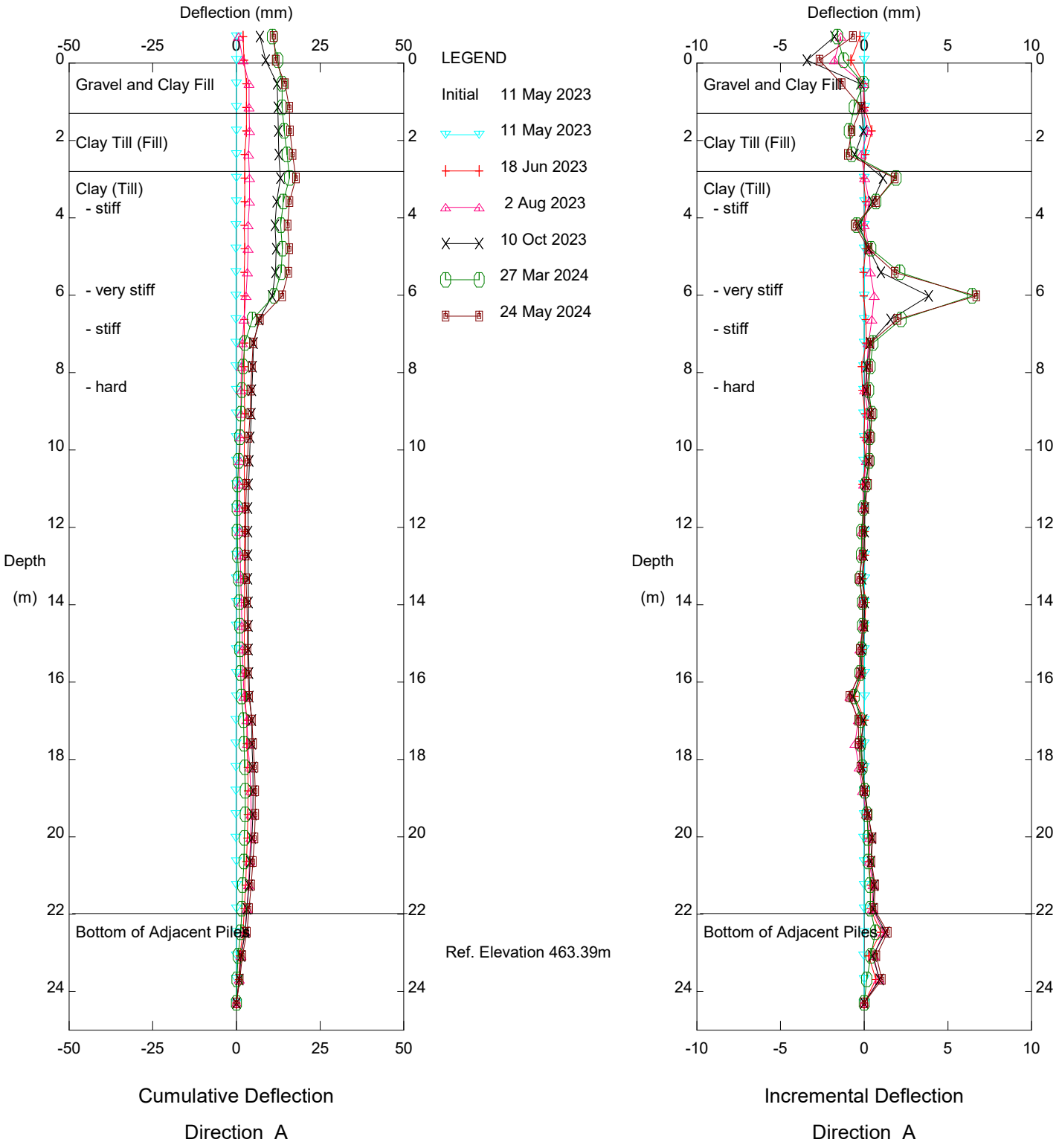
Thurber Engineering Ltd.



HWY 35:08 (PH045), Inclinometer SI-51

Alberta Transportation

Thurber Engineering Ltd.



Cumulative Deflection

Direction A

Incremental Deflection

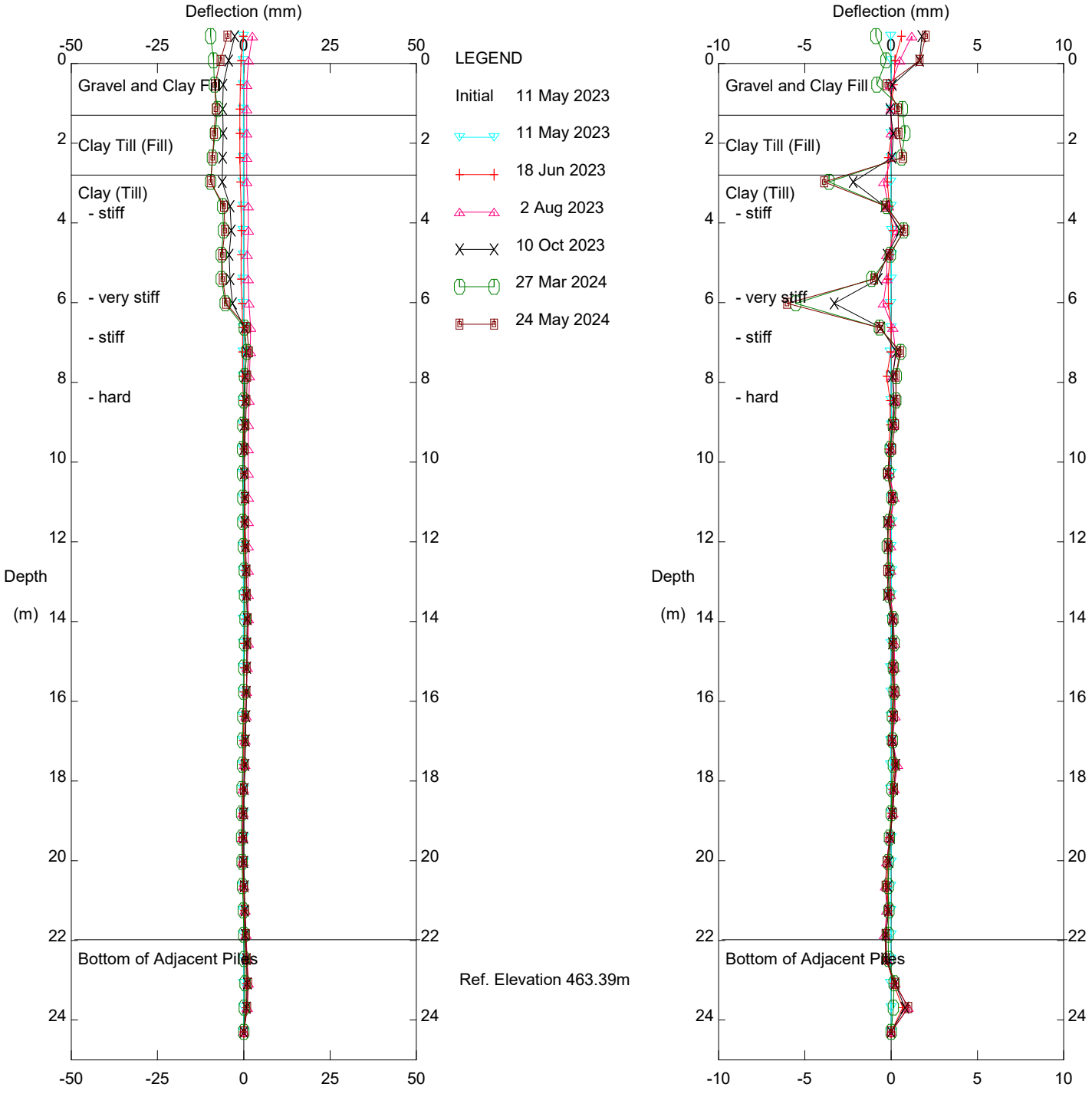
Direction A

PH045 Hwy 35:08 Meikle River Pile Wall, Inclinometer SI23-100

TEC

H:\32000\32121 AT GRMP Peace River District 2021-2025\Section C\2024A-Spring\SI Readings\PH045\SI23-100-lrg.gtl

Thurber Engineering Ltd.



Cumulative Deflection

Direction B

Incremental Deflection

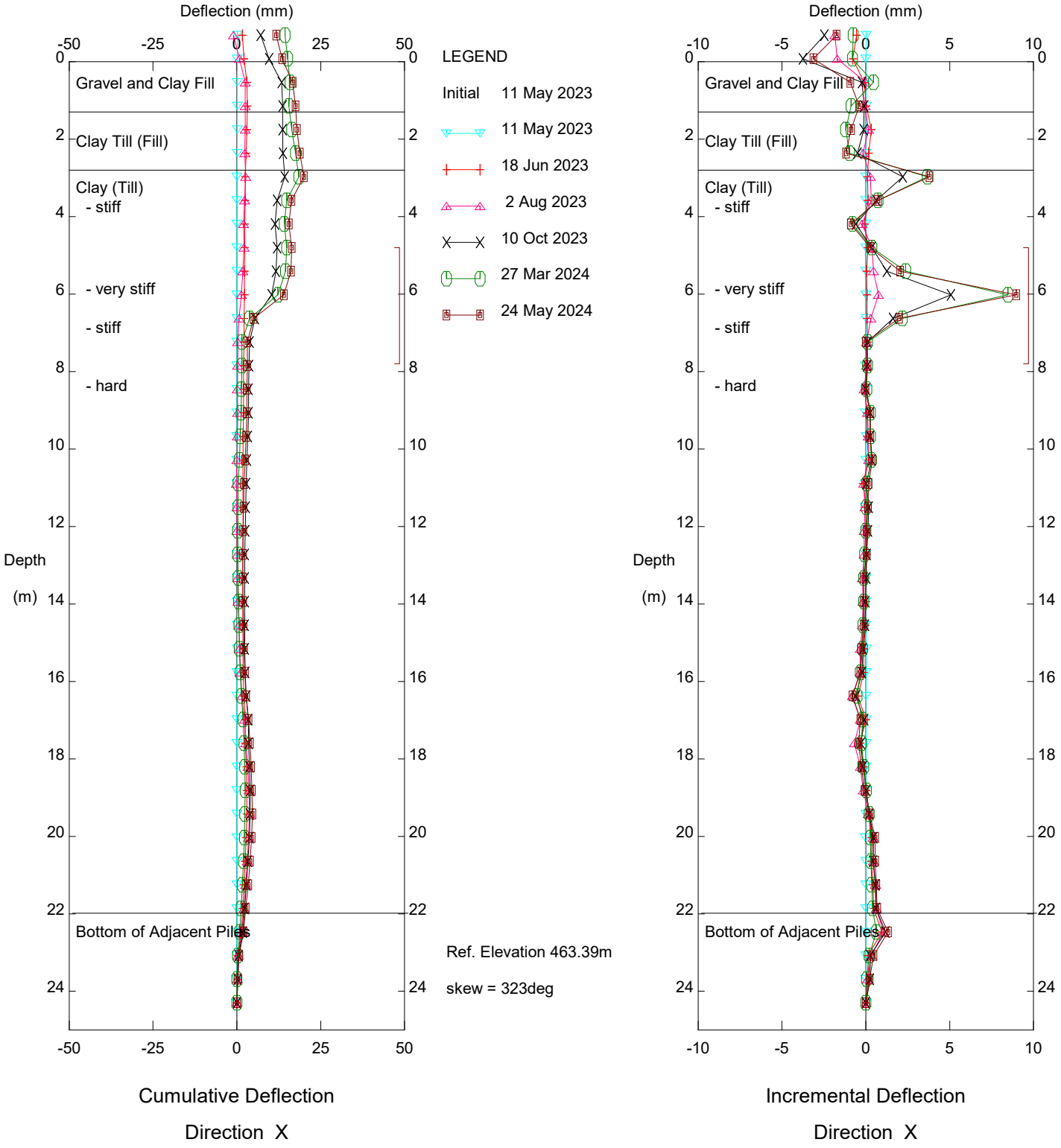
Direction B

PH045 Hwy 35:08 Meikle River Pile Wall, Inclinometer SI23-100

TEC

H:\32000\32121 AT GRMP Peace River District 2021-2025\Section C\2024A-Spring\SI Readings\PH045\SI23-100-lrg.gtl

Thurber Engineering Ltd.



Cumulative Deflection

Direction X

Incremental Deflection

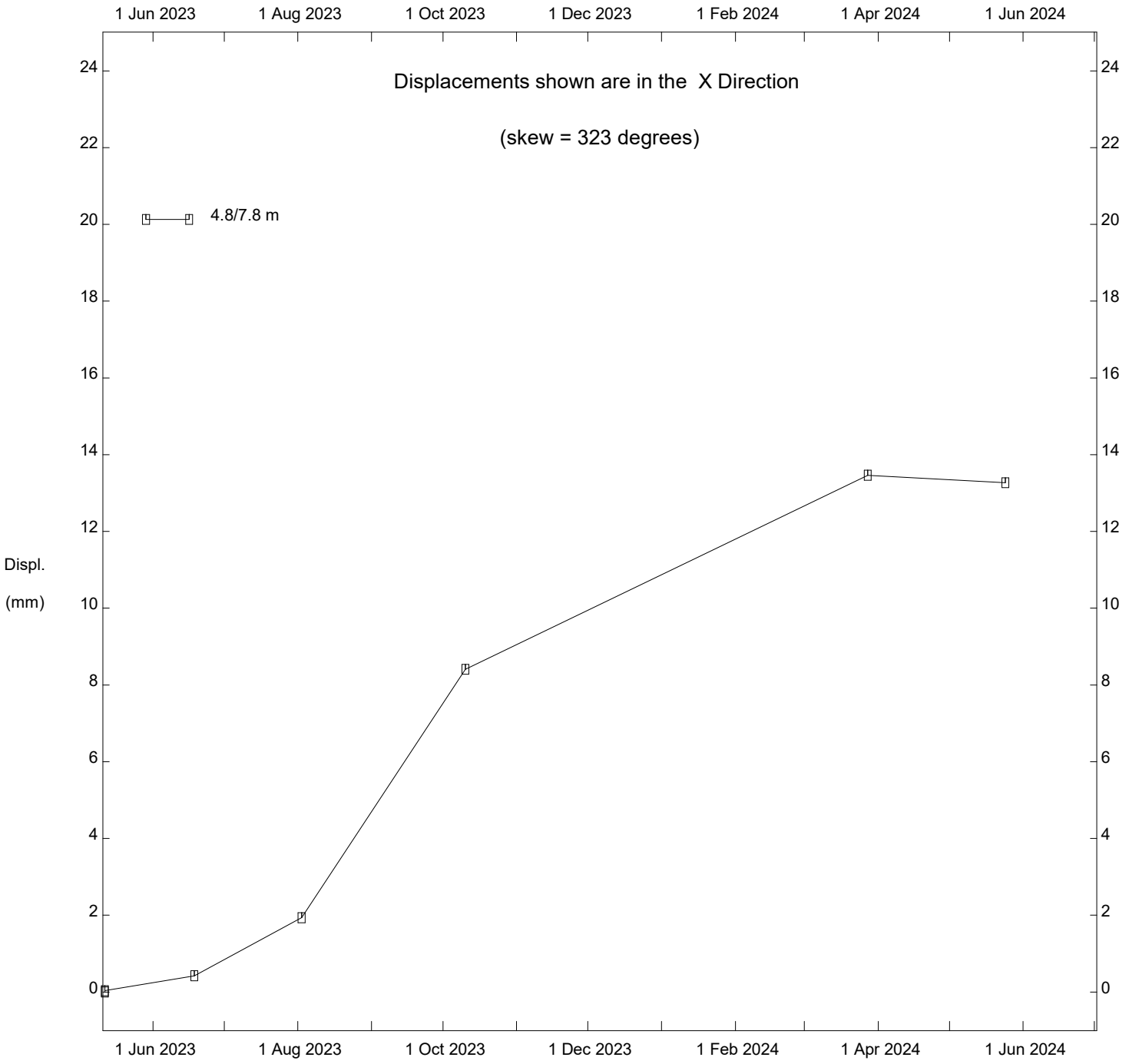
Direction X

PH045 Hwy 35:08 Meikle River Pile Wall, Inclinometer SI23-100

TEC

H:\32000\32121 AT GRMP Peace River District 2021-2025\Section C\2024A-Spring\SI Readings\PH045\SI23-100-lrg.gtl

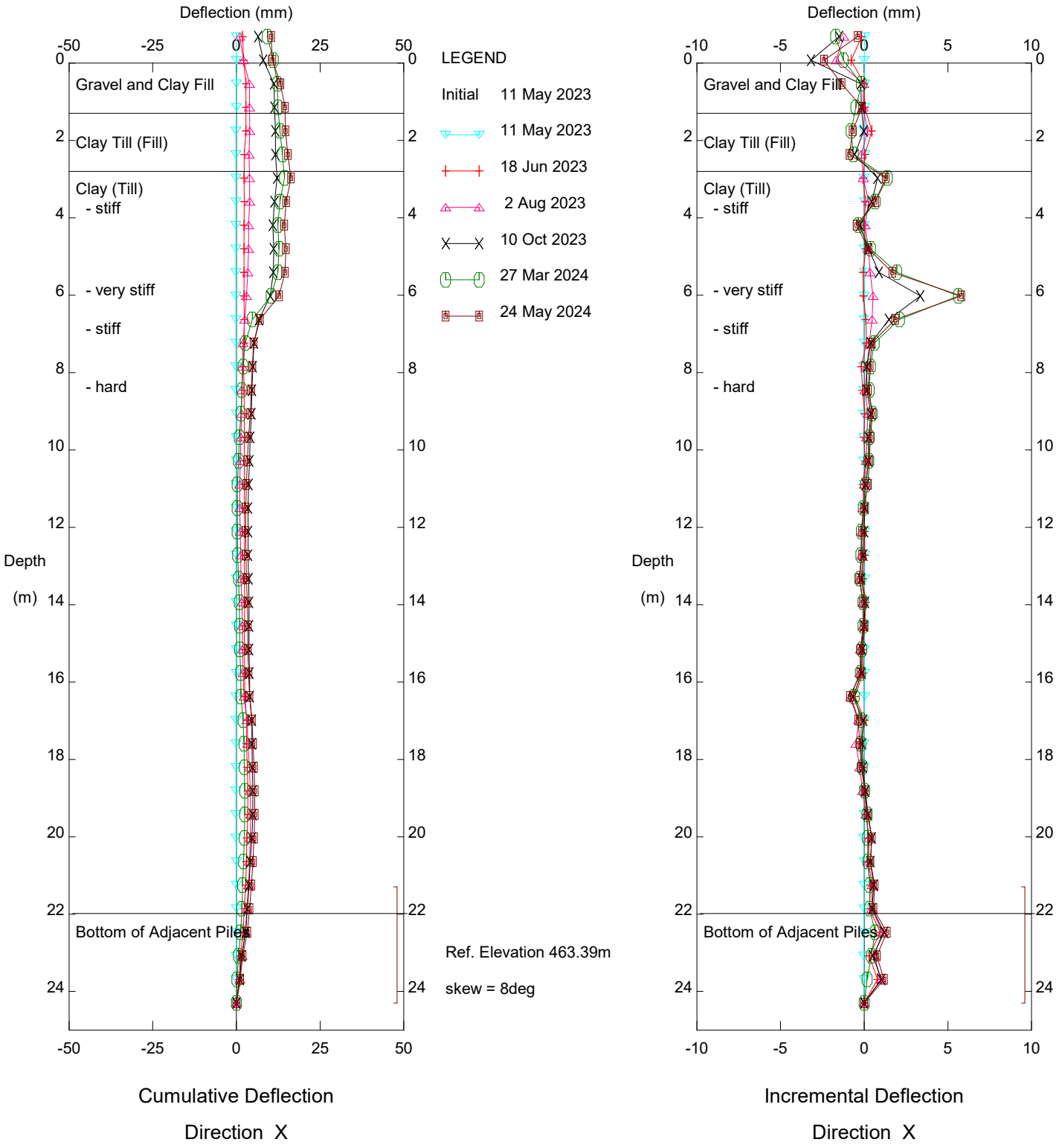
Thurber Engineering Ltd.



PH045 Hwy 35:08 Meikle River Pile Wall, Inclinometer SI23-100

TEC

Thurber Engineering Ltd.



Cumulative Deflection

Direction X

Incremental Deflection

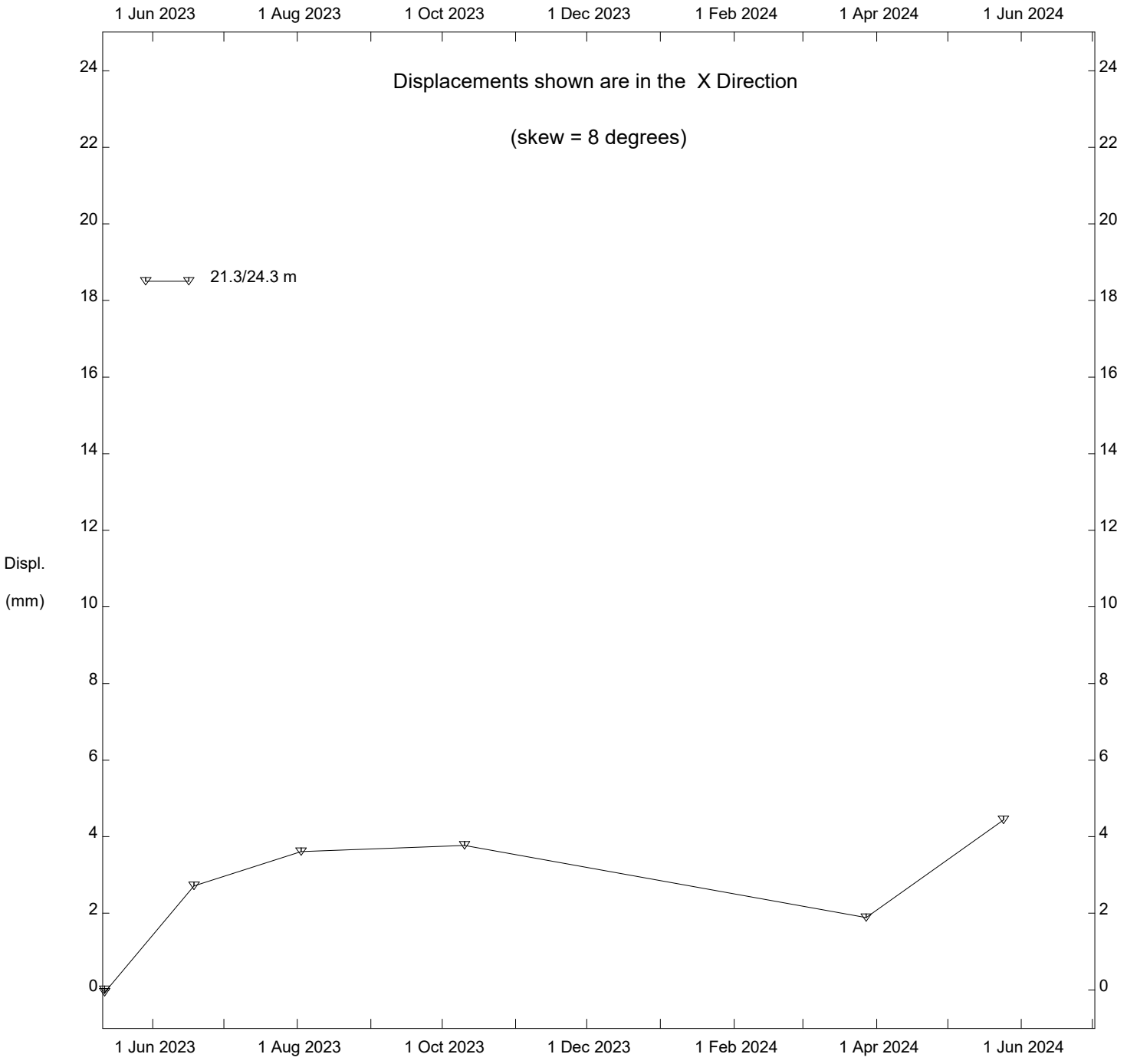
Direction X

PH045 Hwy 35:08 Meikle River Pile Wall, Inclinometer SI23-100

TEC

H:\32000\32121 AT GRMP Peace River District 2021-2025\Section C\2024A-Spring\SI Readings\PH045\SI23-100-lrg.gtl

Thurber Engineering Ltd.



PH045 Hwy 35:08 Meikle River Pile Wall, Inclinometer SI23-100

TEC

FIGURE PH045-1
HWY 35:08 MEIKLE RIVER PILE WALL VIBRATING WIRE PIEZOMETER DATA

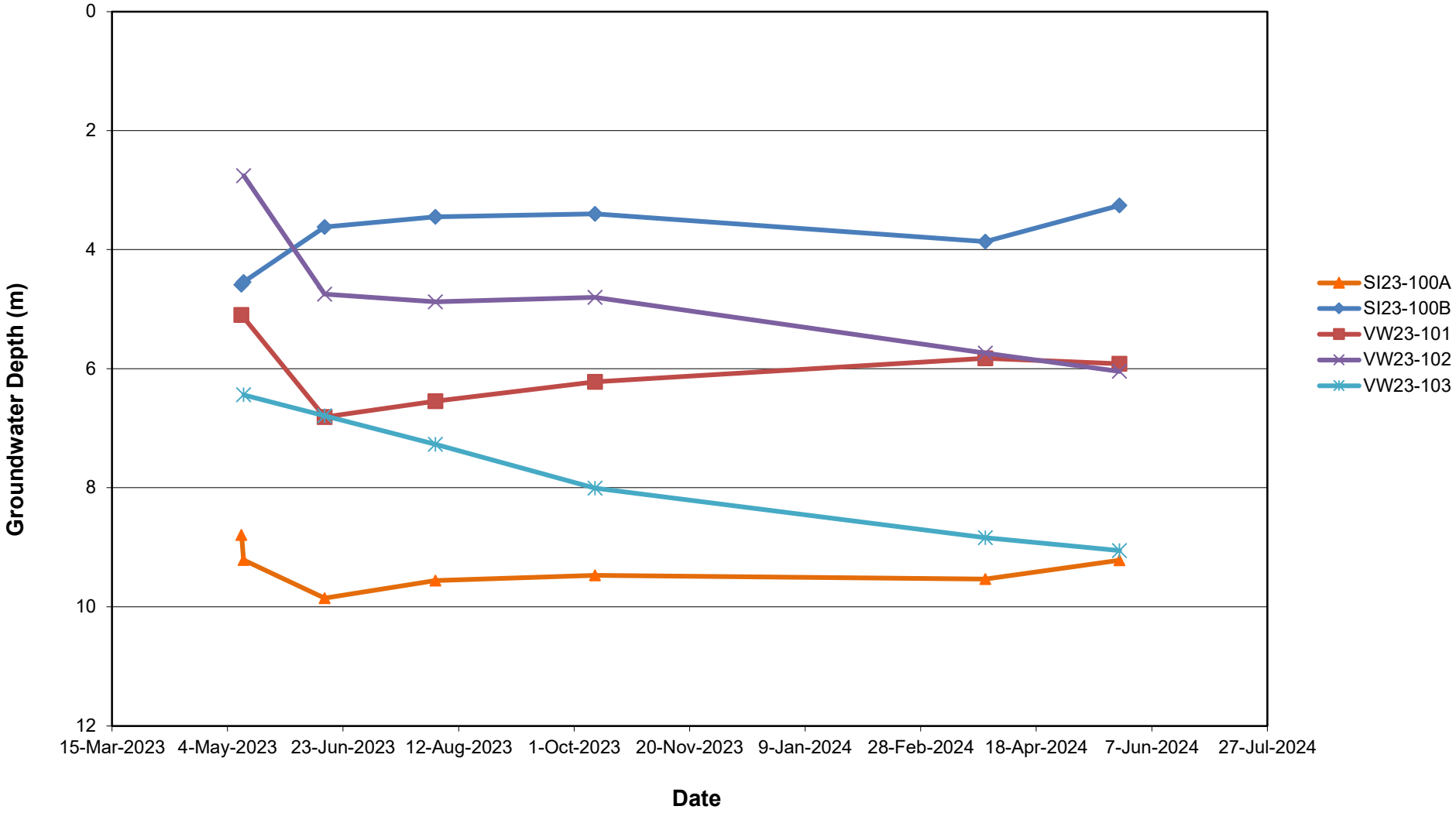


FIGURE PH045-2
HWY 35:08 MEIKLE RIVER PILE WALL VIBRATING WIRE PIEZOMETER DATA