THURBER ENGINEERING LTD.

July 5, 2022 File No.: 32122

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

Attention: Ms. Amy Driessen, P.Eng.

ALBERTA TRANSPORTATION GRMP (CON0022163)
NORTH CENTRAL (ATHABASCA AND FORT McMURRAY DISTRICTS)
INSTRUMENTATION MONITORING RESULTS – SPRING 2022

SECTION C

SITE NC017B: HWY 63:12 SUPERTEST 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's 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 (SI1 through SI4) were read at the Highway 63:12 Supertest Hill site on June 1, 2022 by Mr. Niraj Regmi, G.I.T. and Mr. Jayden Del Cid, both of Thurber Engineering Ltd.

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

The SIs were read using two RST probes with 2-ft. wheelbases and RST handheld readouts. Inclinometer reading depths were defined as per cable markings with respect to the top of the inclinometer casing.

2. DATA PRESENTATION

2.1 General

SI plots for A and B directions are presented in Appendix A and are summarized below. Where movement has been recorded the resultant plot (X direction, if applicable) and rate of movement

have also been provided. Table NC017B below summarizes the slope inclinometer readings. This table also includes instruments deleted from the GRMP or not read during this monitoring even for future reference.

2.2 Zones of Movement

Zones of new movement were not observed in the operational SIs since the last set of readings in the spring of 2021.

THURBER

TABLE NC017B-1
SPRING 2022 – HWY 63:12 SUPERTEST HILL
SLOPE INCLINOMETER INSTRUMENTATION READING SUMMARY

Date Monitored: June 1, 2022

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)
SI-1	Jun. 5, 2001	No discernible movement	N/A	Operational	June 28, 2021	N/A	N/A	N/A
SI-2	Jun. 7, 2001	No discernible movement	N/A	Operational	June 28, 2021	N/A	N/A	N/A
SI-3	Jun. 7, 2001	17.6 over 42.5 m to 46.2 m depth in 108° direction	81.7 mm/yr in April 2000	Operational	June 28, 2021	0.4	0.4	-1.1
SI-4	Jun. 7, 2001	11.3 over 37.6 m to 41.3 m depth in 110° direction	219.2 mm/yr in April 2000	Operational	June 28, 2021	0.2	0.2	-0.8
SI-5	*Jun. 7, 2001*	*41.4 over 9.9 m to 13.0 m depth in 97° direction (elev. 290 m)*	*28.4 mm/yr in May 2000*	*Sheared off at 12.8 m depth*	*May 21, 2004*	*N/A*	*N/A*	*N/A*
SI-5R (Replacement for SI5)	*Sept. 14, 2006*	*21.6 over 11.3 m to 13 m depth in 146° direction*	*13.7 mm/yr in Oct 2009*	*Sheared off at 12.0 m depth*	*Sept. 20, 2011*	*N/A*	*N/A*	*N/A*
SI-6	*Jun. 7, 2001*	*24.7 over 21.5 m to 22.7 m depth in 45° direction*	*19.1 mm/yr in Apr. 2000*	*Broken, needs to be repaired*	*October 7, 2008*	*N/A*	*N/A*	*N/A*

Drawing 32122-NC017B in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site

THURBER

3. INTERPRETATION OF MONITORING RESULTS

Slope inclinometers SI-1 and SI-2 continued to show no discernible movement. SI-3 showed a rate of movement of 0.4 mm/yr over 42.5 m to 46.2 m depth since the spring of 2021 readings. SI-4 showed a rate of movement of 0.2 mm/yr over 37.6 m to 41.3 depth since the spring of 2021 readings.

4. RECOMMENDATIONS

4.1 Future Work

The instruments should be read again in the spring of 2023.

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 6, 2022

PERMIT TO PRACTICE
THURBER ENGINEERING LTD.
RM SIGNATURE:
RM APEGA ID #: 91085
DATE: July 7, 2022
PERMIT NUMBER: P005186
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

Bruce Nestor, P.Eng.
Geotechnical Engineer
/jf

Attachments
- Statement of Limitations and Conditions
- Appendix A
  - Field Inspector's report
  - Site Plan Showing Approximate Instrument Locations (Drawing No. 32122-NC017B)
  - SI Reading Plots

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

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

SPRING 2022

APPENDIX A
DATA PRESENTATION AND SITE PLANS

SITE NC017B: HWY 63:12 SUPERTEST HILL

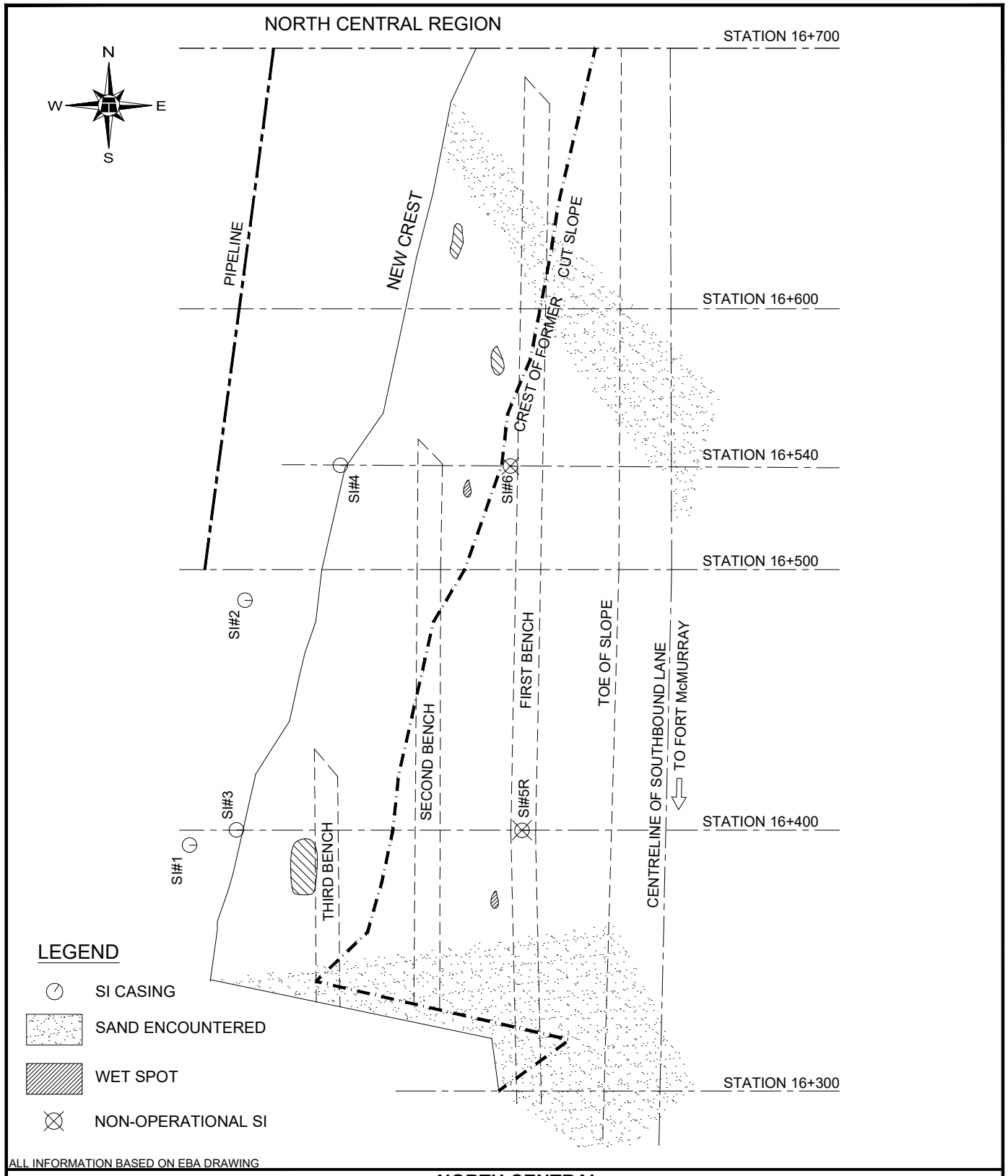
ALBERTA TRANSPORTATION
NORTH CENTRAL REGION - ATHABASCA AND FORT McMURRAY DISTRICTS
INSTRUMENTATION MONITORING FIELD SUMMARY (NC107B)
SPRING 2022

Location: Poplar Creek Cut Slope (HWY 63:12 L1 14.902)	**Readout:**
File Number: 32122	**Casing Diameter:** 2.75"
Probe: RST SI SET 5R and 8R	**Temp:** 12
Cable: RST SI SET 5R and 8R	**Read by:** 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)				degree	A+	A-	B+	B-	#	
SI-1	471521.39	6308392.60	01-Jun-22	0.57	77 to 3	15	994	-993	-1002	988	5R/5R	Read with 1 ft extension
SI-2	471539.16	6308516.15	01-Jun-22	0.77	77 to 3	95	305	-283	-549	552	8R/8R	Read with 1 ft extension
SI-3	471538.53	6308423.43	01-Jun-22	0.44	196 to 2	45	978	-963	-491	490	8R/8R	
SI-4	471573.43	6308577.81	01-Jun-22	0.47	184 to 2	61	363	-355	672	-689	5R/5R	

INSPECTOR REPORT



ALL INFORMATION BASED ON EBA DRAWING

NORTH CENTRAL
(ATHABASCA AND FORT MCMURRAY DISTRICTS)
NC017B - HWY 63:12 SUPERTEST HILL
SITE PLAN SHOWING APPROXIMATE
INSTRUMENT LOCATIONS

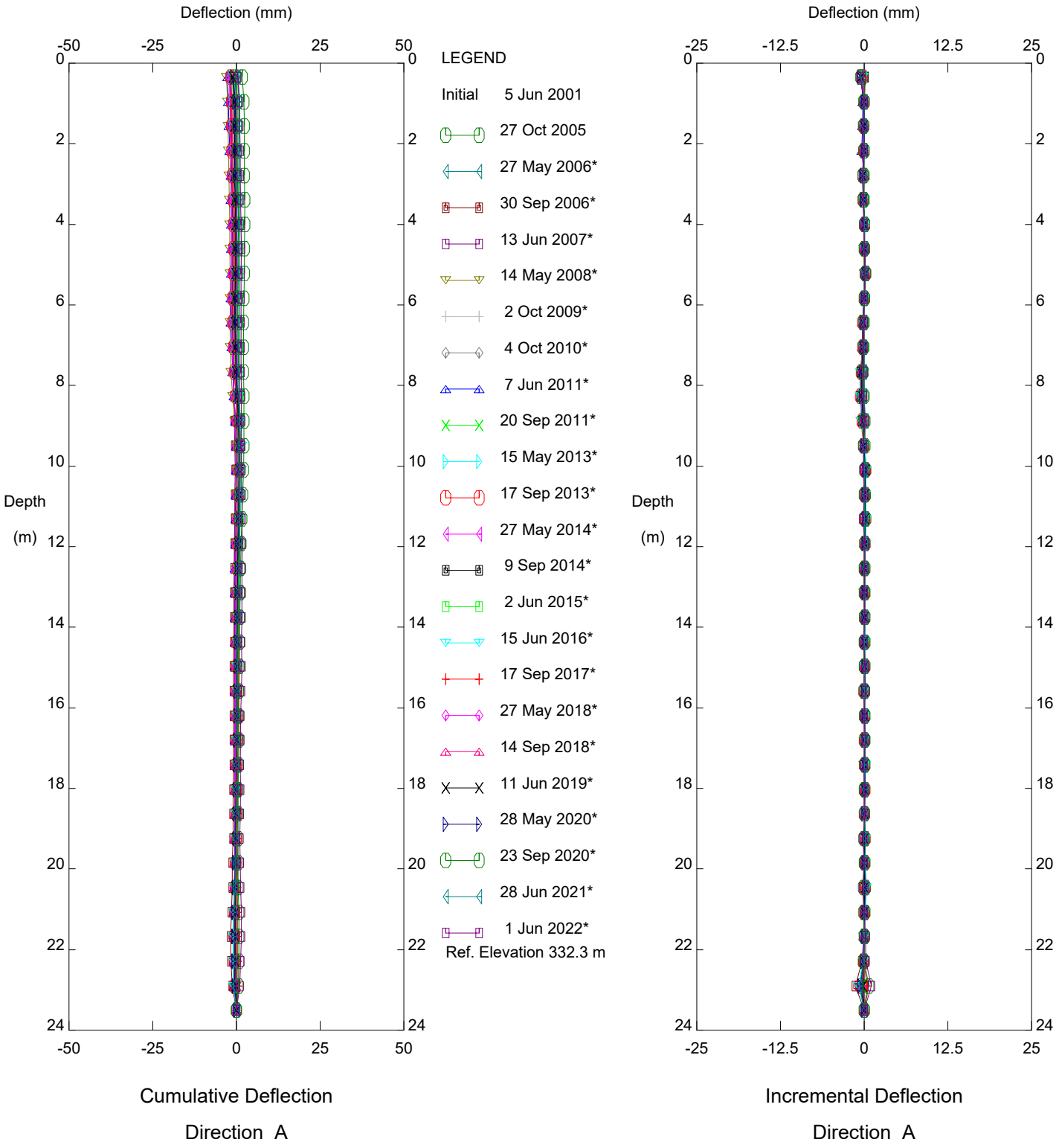
DWG No. 32122-NC17B

DRAWN BY	ML
DESIGNED BY	BWN
APPROVED BY	TSA
SCALE	N.T.S.
DATE	JULY 2018
FILE No.	32122

Alberta

THURBER ENGINEERING LTD.

Thurber Engineering Ltd



Cumulative Deflection

Direction A

Incremental Deflection

Direction A

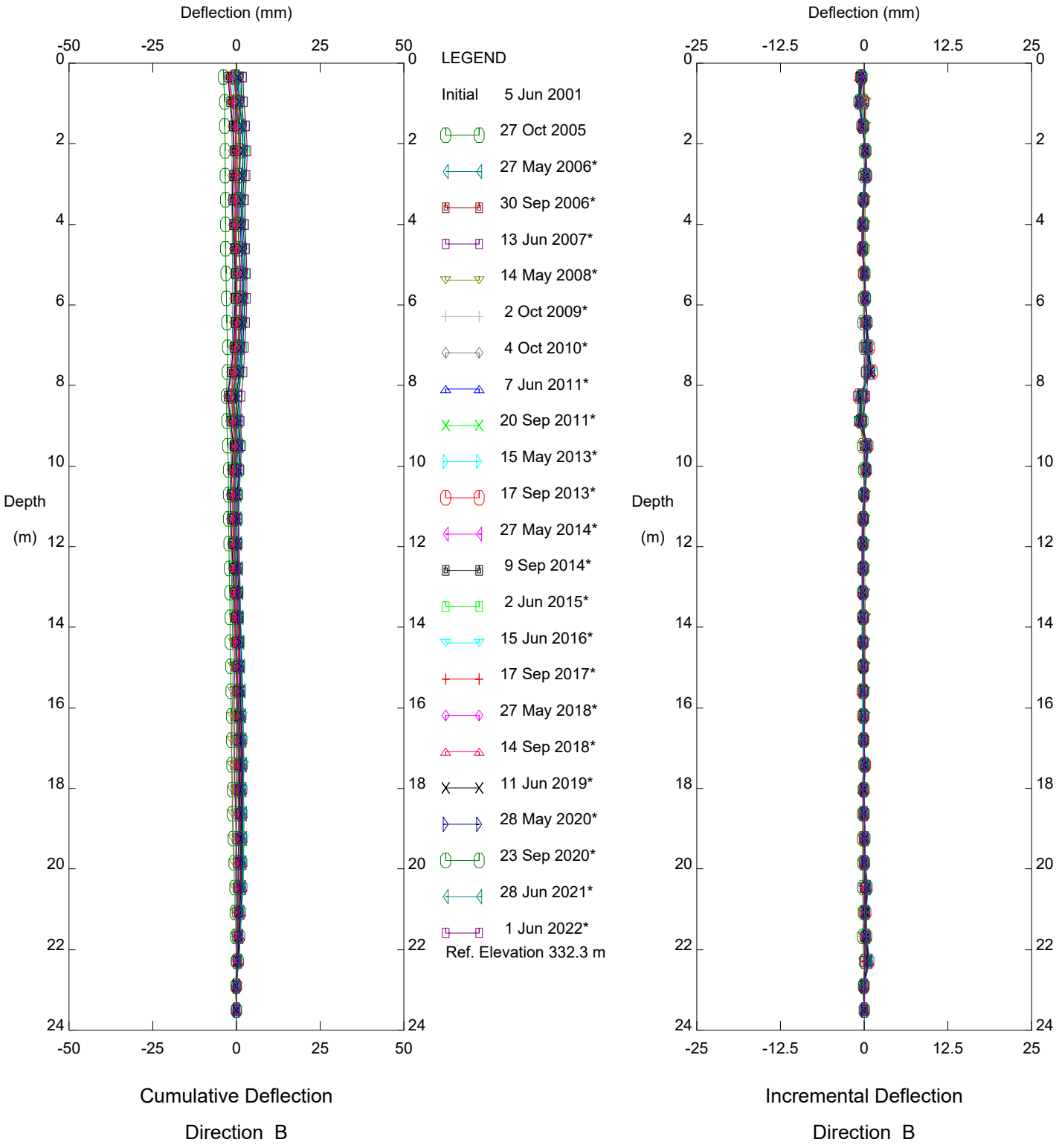
Hwy 63:12 Supertest Hill (NC017B), Inclinometer SI-1

Alberta Transportation

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

H:\32000\32122 AT GRMP Athabasca and Fort McMurray Districts 2021-2025\Section C\2022A-Spring\SI Readings\NC17B\17bSI-1.GTL

Thurber Engineering Ltd



Cumulative Deflection

Direction B

Incremental Deflection

Direction B

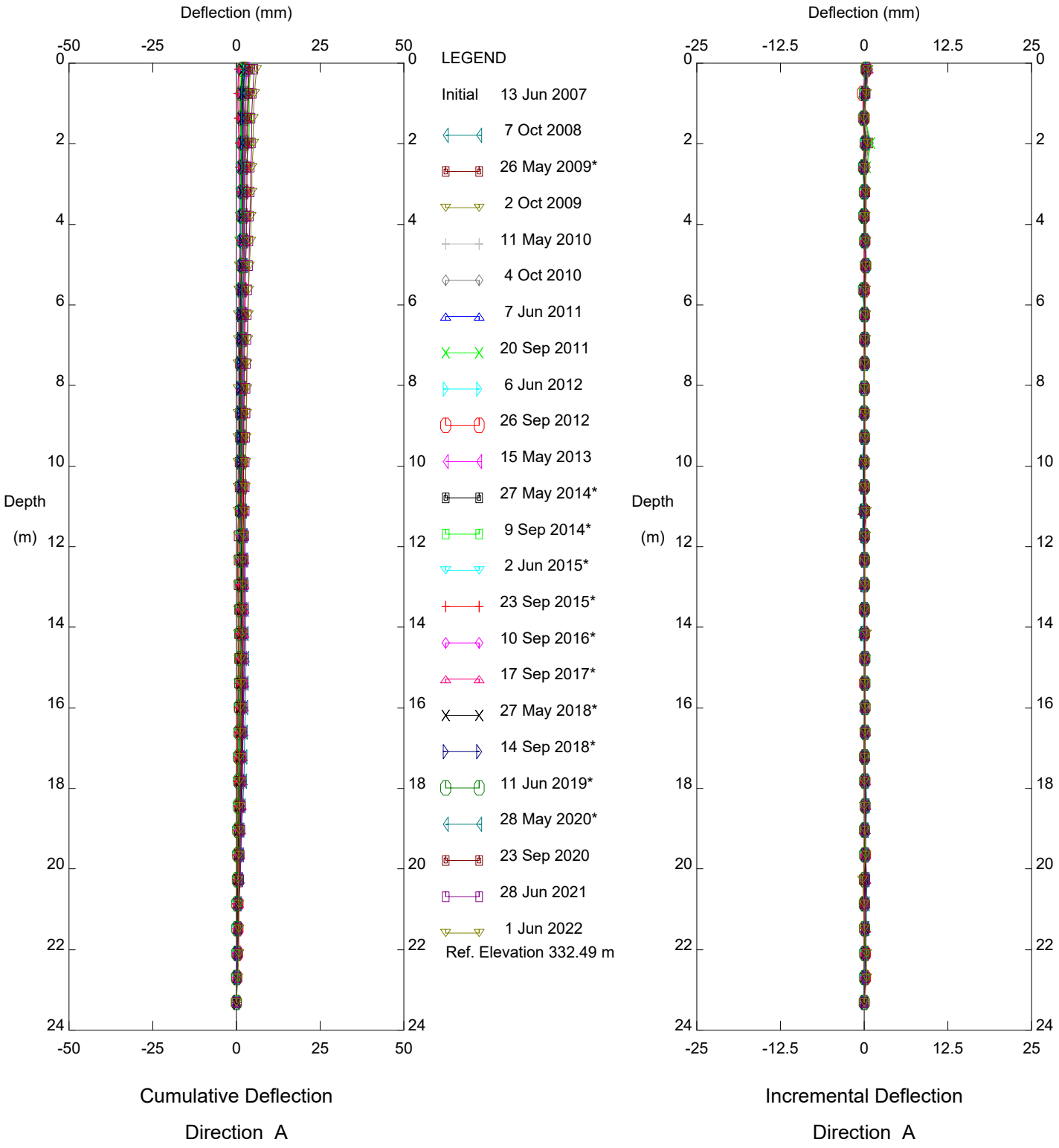
Hwy 63:12 Supertest Hill (NC017B), Inclinometer SI-1

Alberta Transportation

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

H:\32000\32122 AT GRMP Athabasca and Fort McMurray Districts 2021-2025\Section C\2022A-Spring\SI Readings\NC17B\17bSI-1.GTL

Thurber Engineering Ltd



Cumulative Deflection

Direction A

Incremental Deflection

Direction A

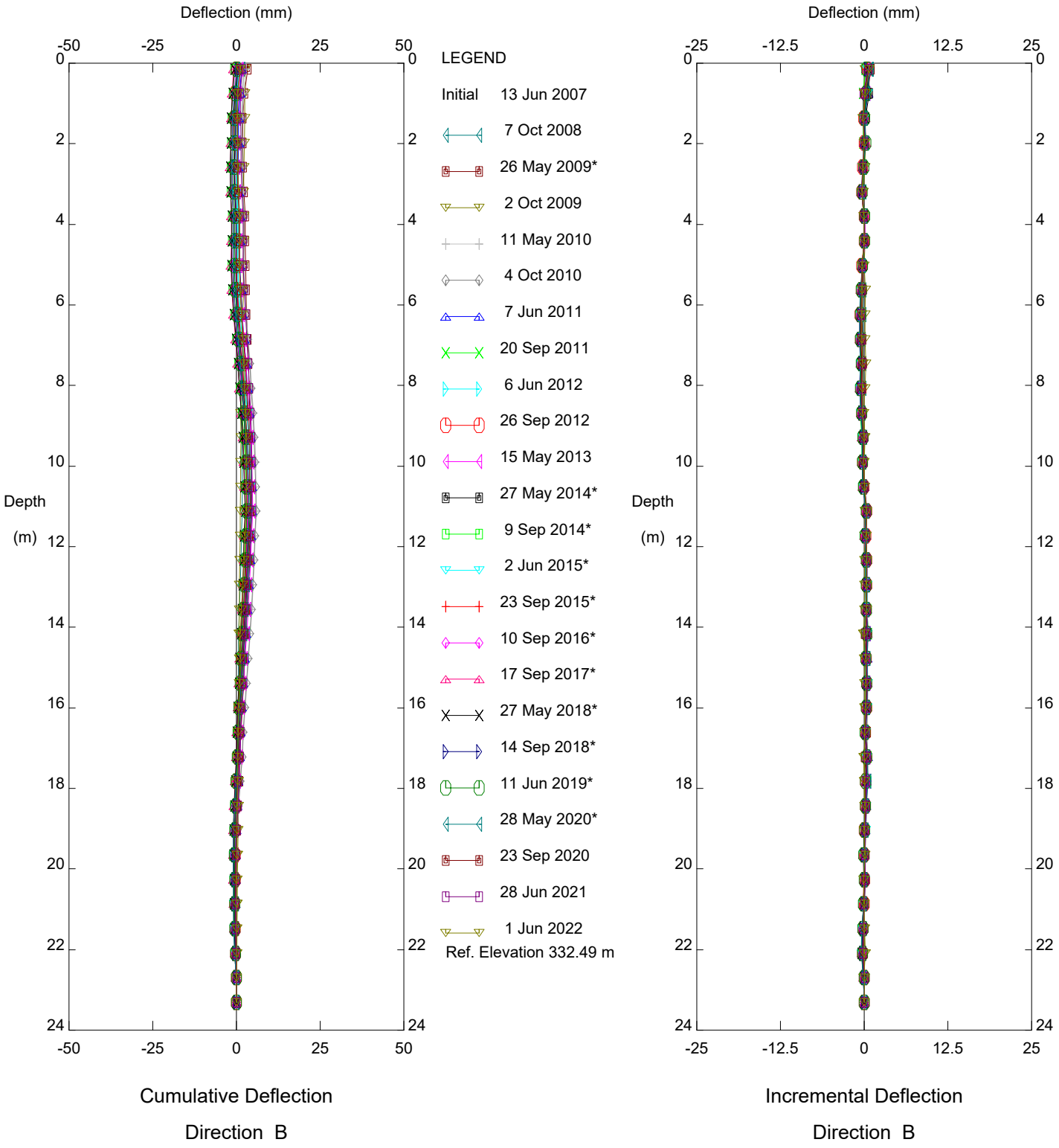
Hwy 63:12 Supertest Hill (NC017B), Inclinometer SI-2

Alberta Transportation

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

H:\32000\32122 AT GRMP Athabasca and Fort McMurray Districts 2021-2025\Section C\2022A-Spring\SI Readings\NC17B\17bSI-2.GTL

Thurber Engineering Ltd



Cumulative Deflection

Direction B

Incremental Deflection

Direction B

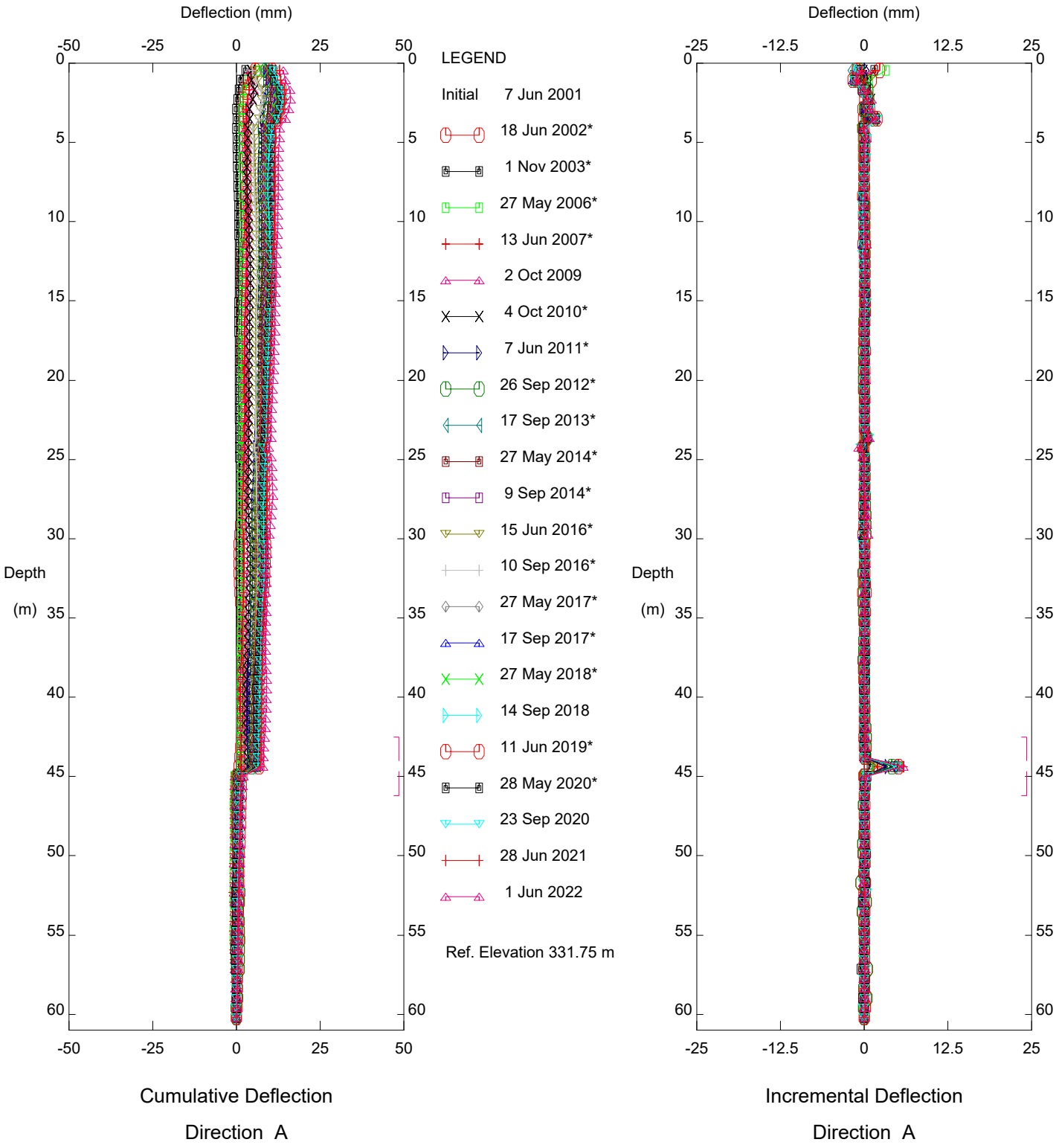
Hwy 63:12 Supertest Hill (NC017B), Inclinometer SI-2

Alberta Transportation

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

H:\32000\32122 AT GRMP Athabasca and Fort McMurray Districts 2021-2025\Section C\2022A-Spring\SI Readings\NC17B\17bSI-2.GTL

Thurber Engineering Ltd



Cumulative Deflection

Direction A

Incremental Deflection

Direction A

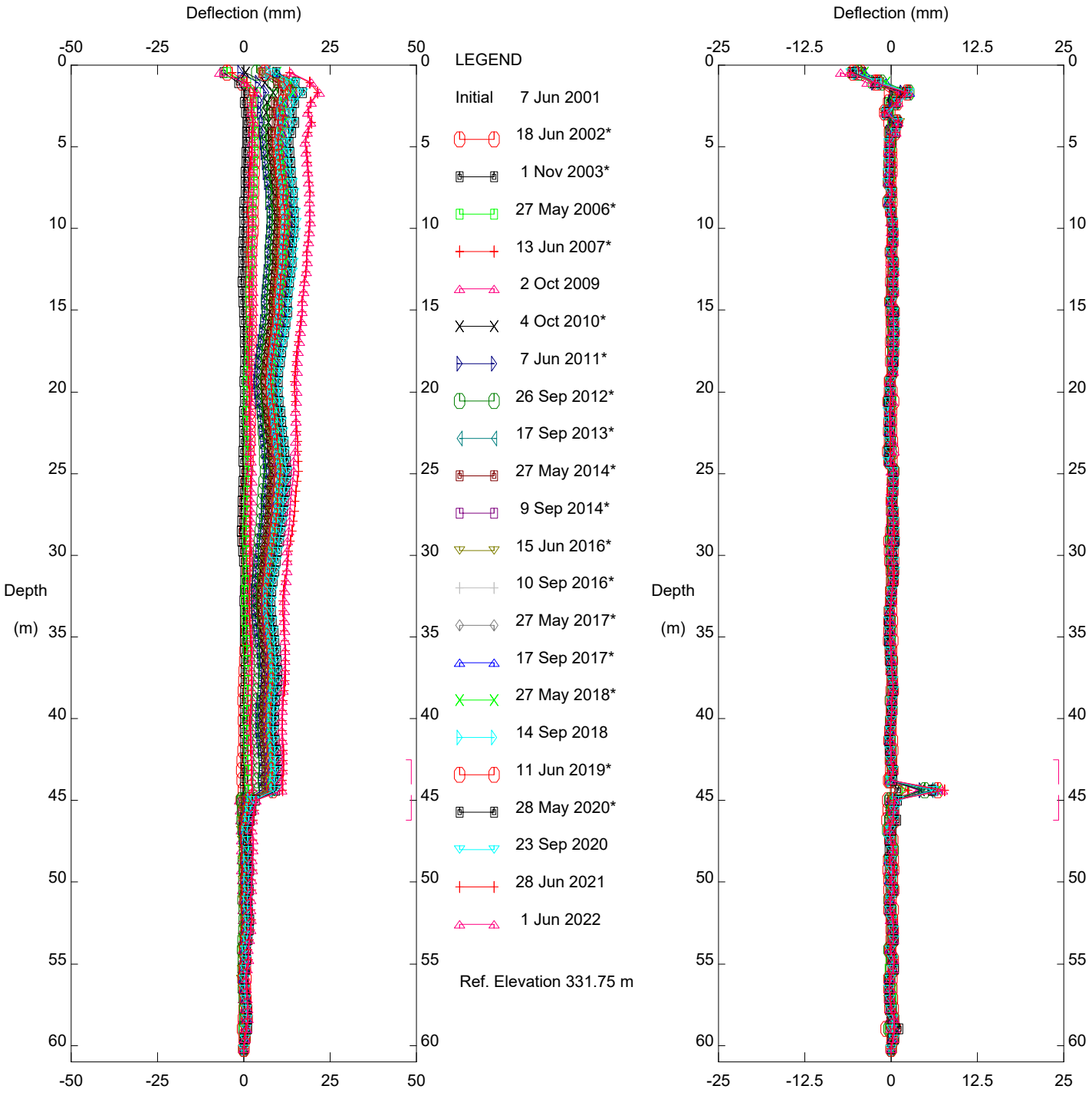
Hwy 63:12 Supertest Hill (NC017B), Inclinometer SI-3

Alberta Transportation

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

H:\32000\32122 AT GRMP Athabasca and Fort McMurray Districts 2021-2025\Section C\2022A-Spring\SI Readings\NC17B\17bSI-3.GTL

Thurber Engineering Ltd



Cumulative Deflection

Direction B

Incremental Deflection

Direction B

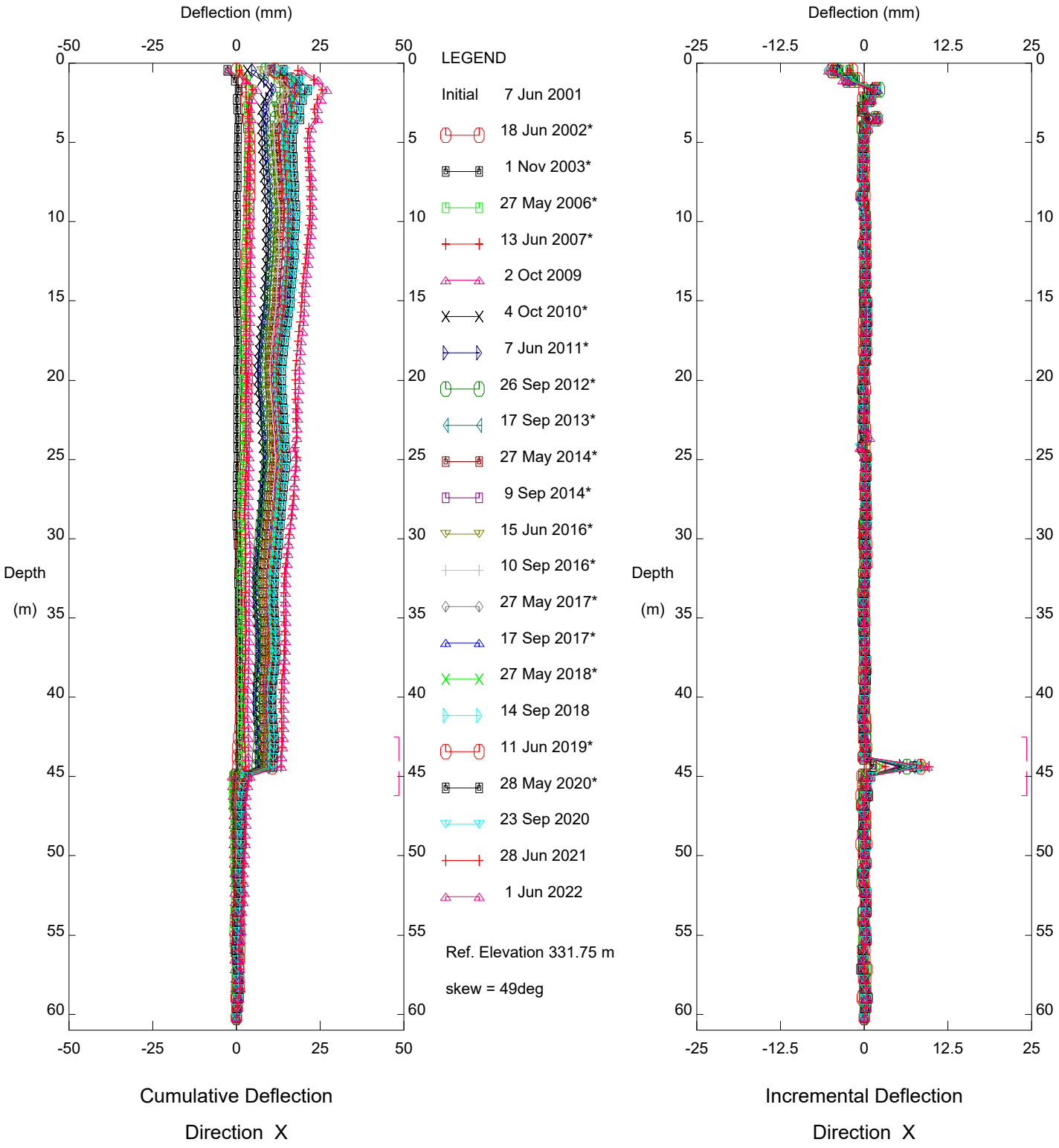
Hwy 63:12 Supertest Hill (NC017B), Inclinometer SI-3

Alberta Transportation

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

H:\32000\32122 AT GRMP Athabasca and Fort McMurray Districts 2021-2025\Section C\2022A-Spring\SI Readings\NC17B\17bSI-3.GTL

Thurber Engineering Ltd



Cumulative Deflection

Direction X

Incremental Deflection

Direction X

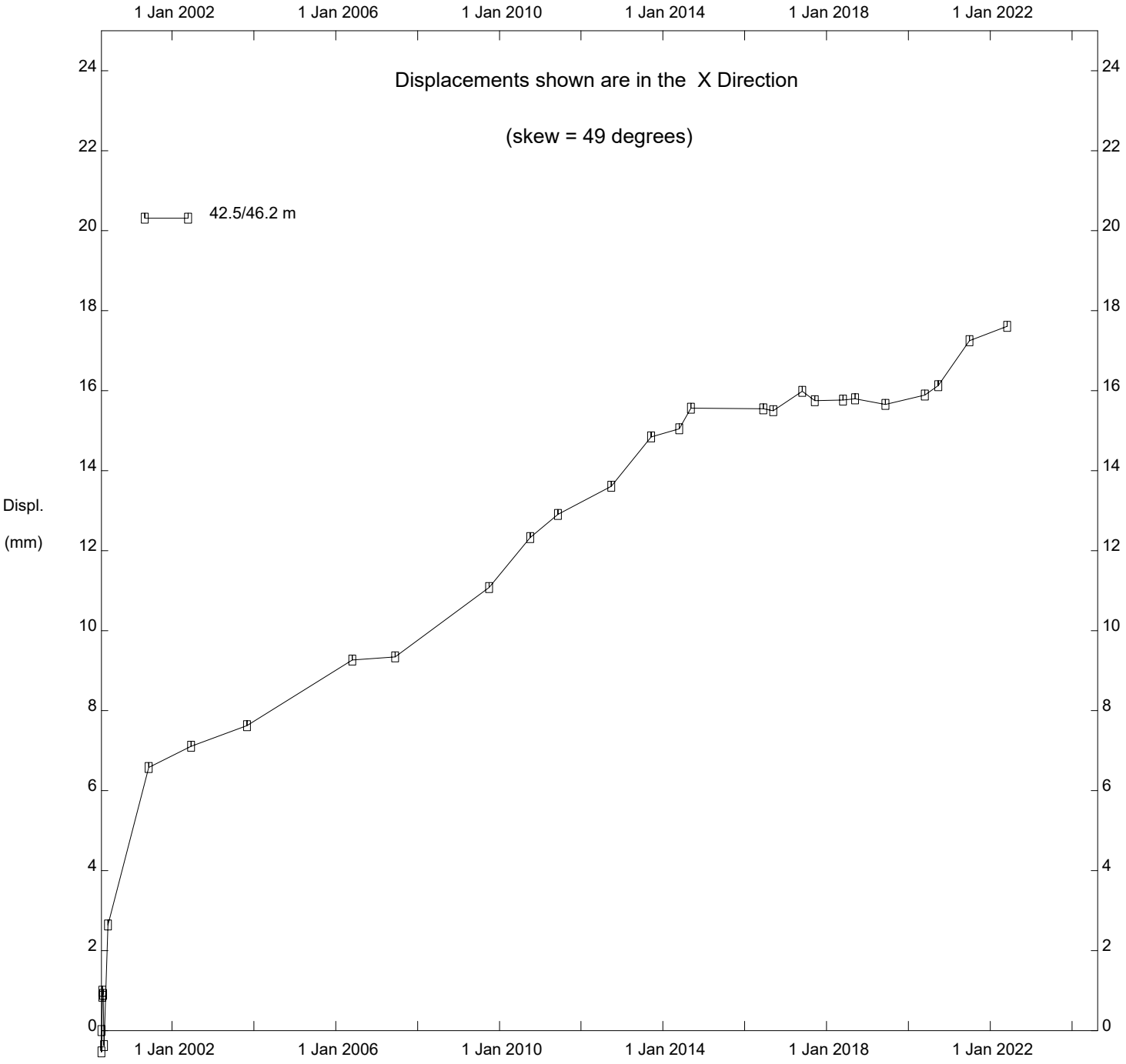
Hwy 63:12 Supertest Hill (NC017B), Inclinometer SI-3

Alberta Transportation

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

H:\32000\32122 AT GRMP Athabasca and Fort McMurray Districts 2021-2025\Section C\2022A-Spring\SI Readings\NC17B\17bSI-3.GTL

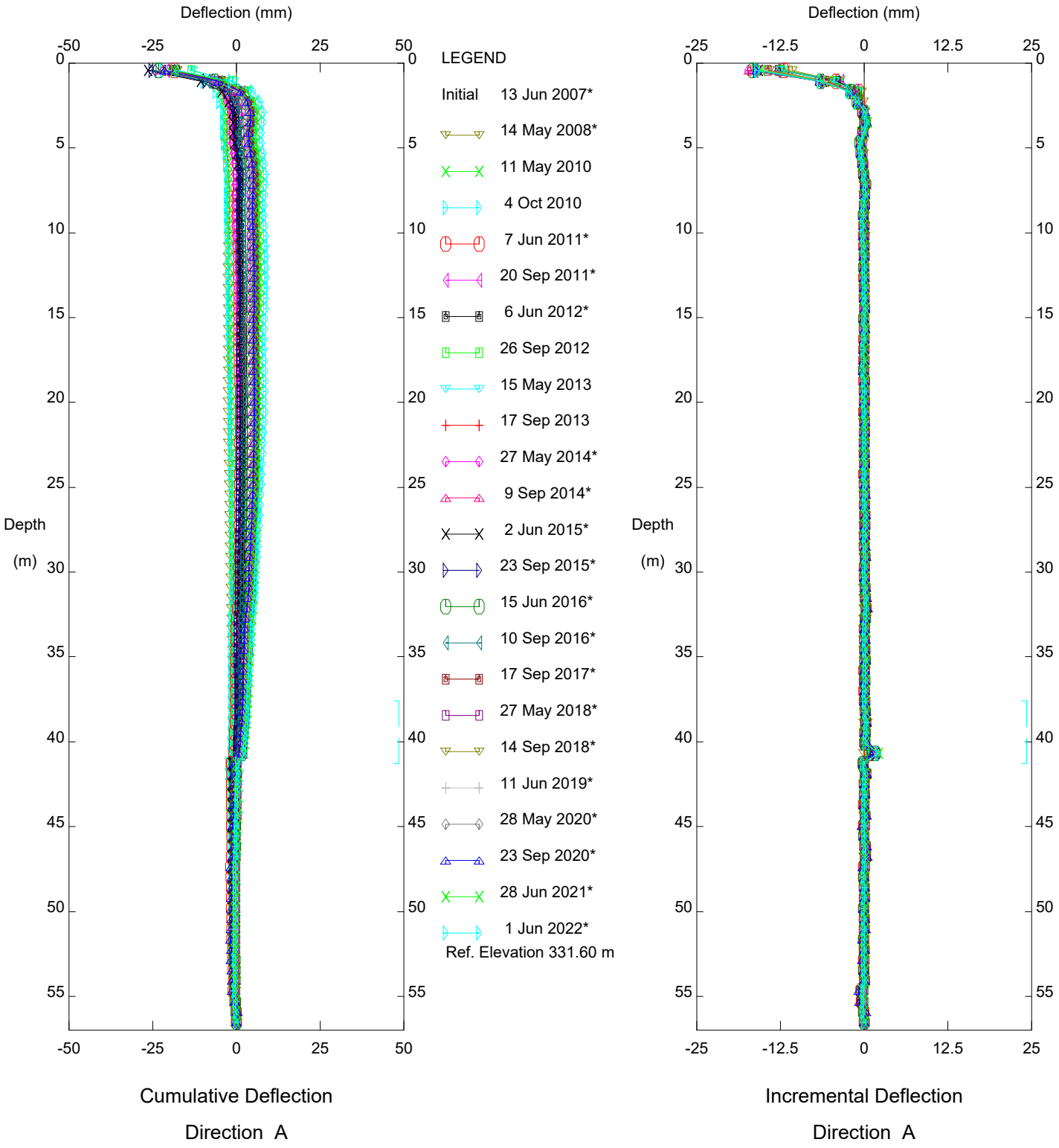
Thurber Engineering Ltd



Hwy 63:12 Supertest Hill (NC017B), Inclinometer SI-3

Alberta Transportation

Thurber Engineering Ltd



Cumulative Deflection

Direction A

Incremental Deflection

Direction A

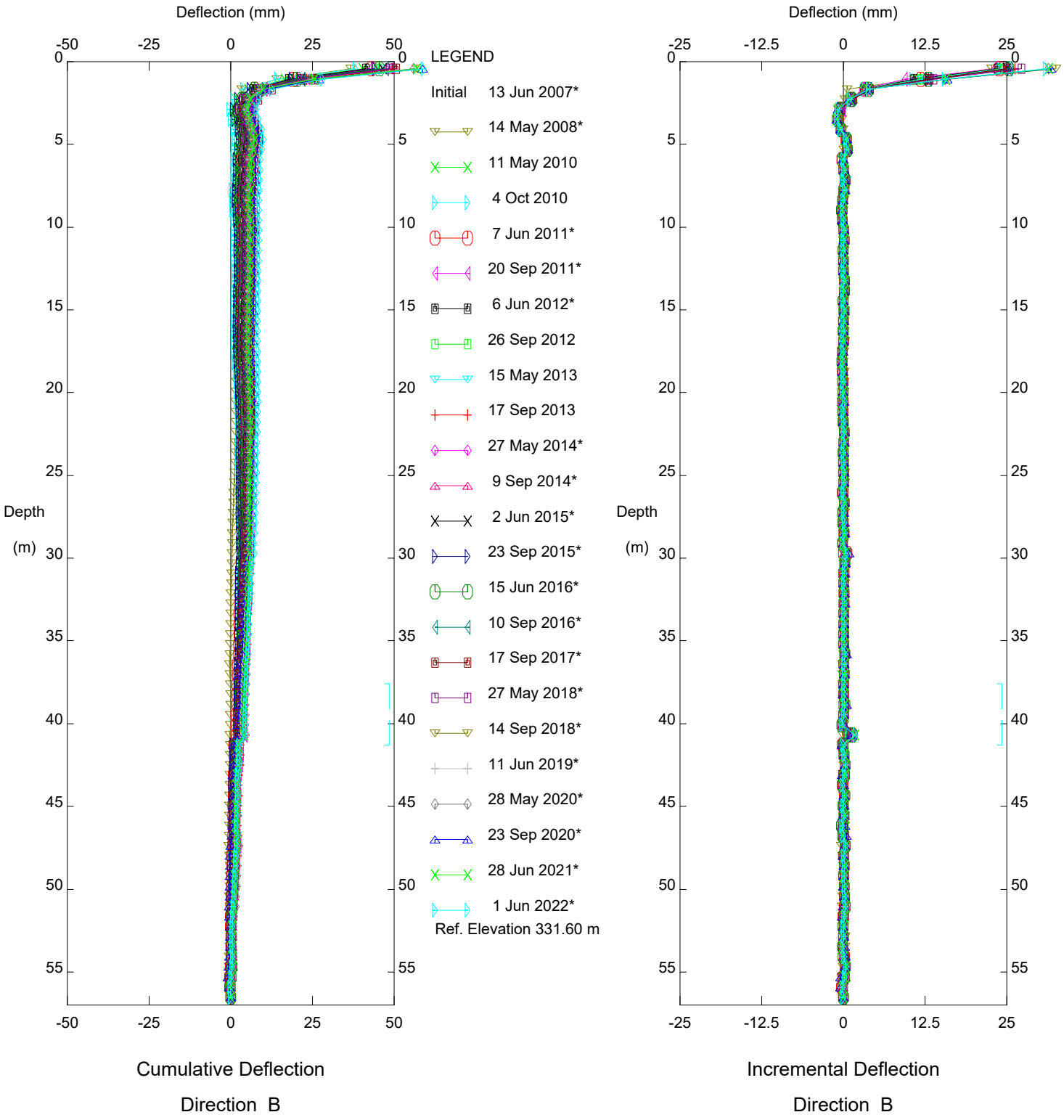
Hwy 63:12 Supertest Hill (NC017B), Inclinometer SI-4

Alberta Transportation

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

H:\32000\32122 AT GRMP Athabasca and Fort McMurray Districts 2021-2025\Section C\2022A-Spring\SI Readings\NC17B\17bSI-4.GTL

Thurber Engineering Ltd



Cumulative Deflection

Direction B

Incremental Deflection

Direction B

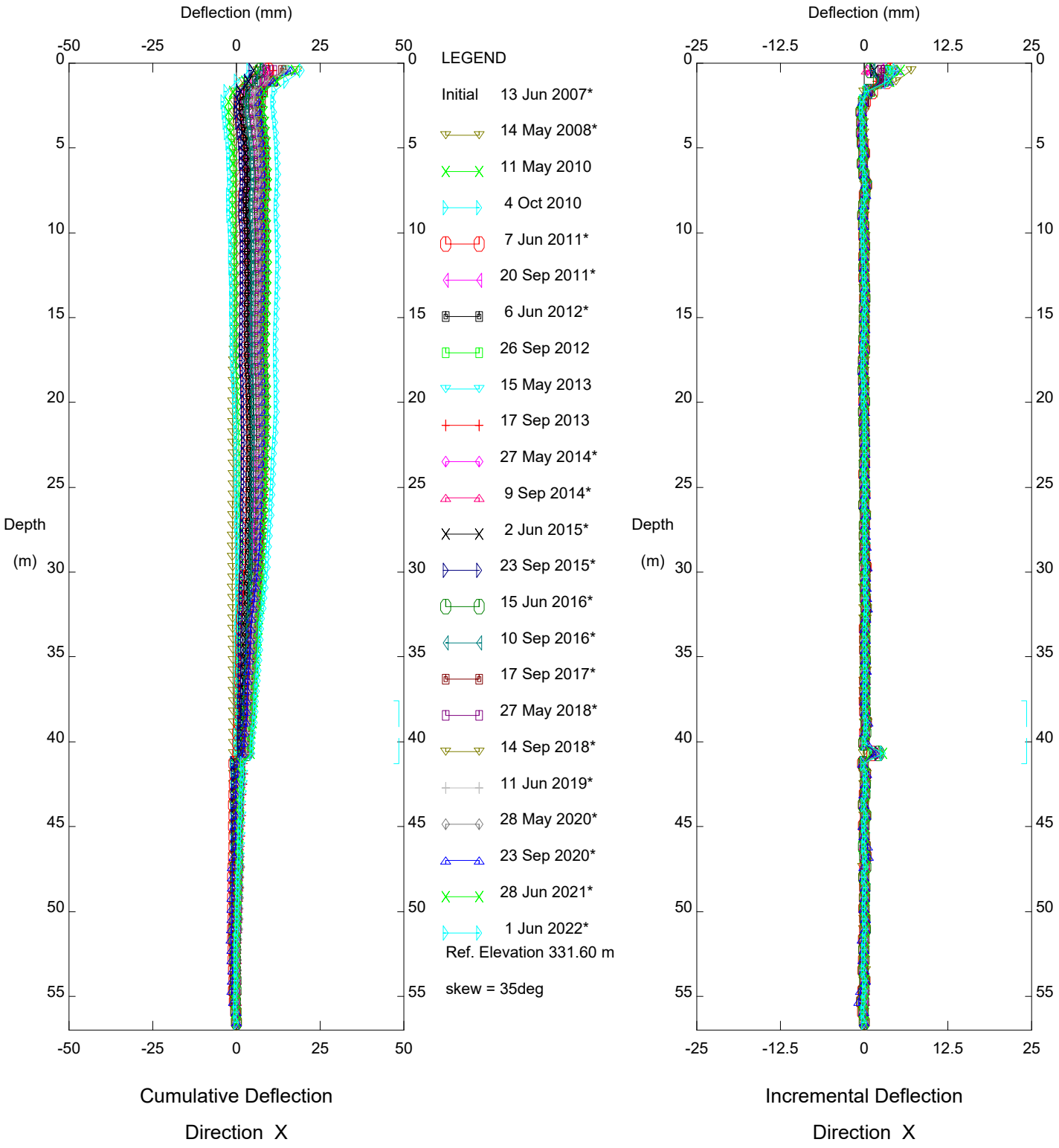
Hwy 63:12 Supertest Hill (NC017B), Inclinometer SI-4

Alberta Transportation

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

H:\32000\32122 AT GRMP Athabasca and Fort McMurray Districts 2021-2025\Section C\2022A-Spring\SI Readings\NC17B\17bSI-4.GTL

Thurber Engineering Ltd



Cumulative Deflection

Direction X

Incremental Deflection

Direction X

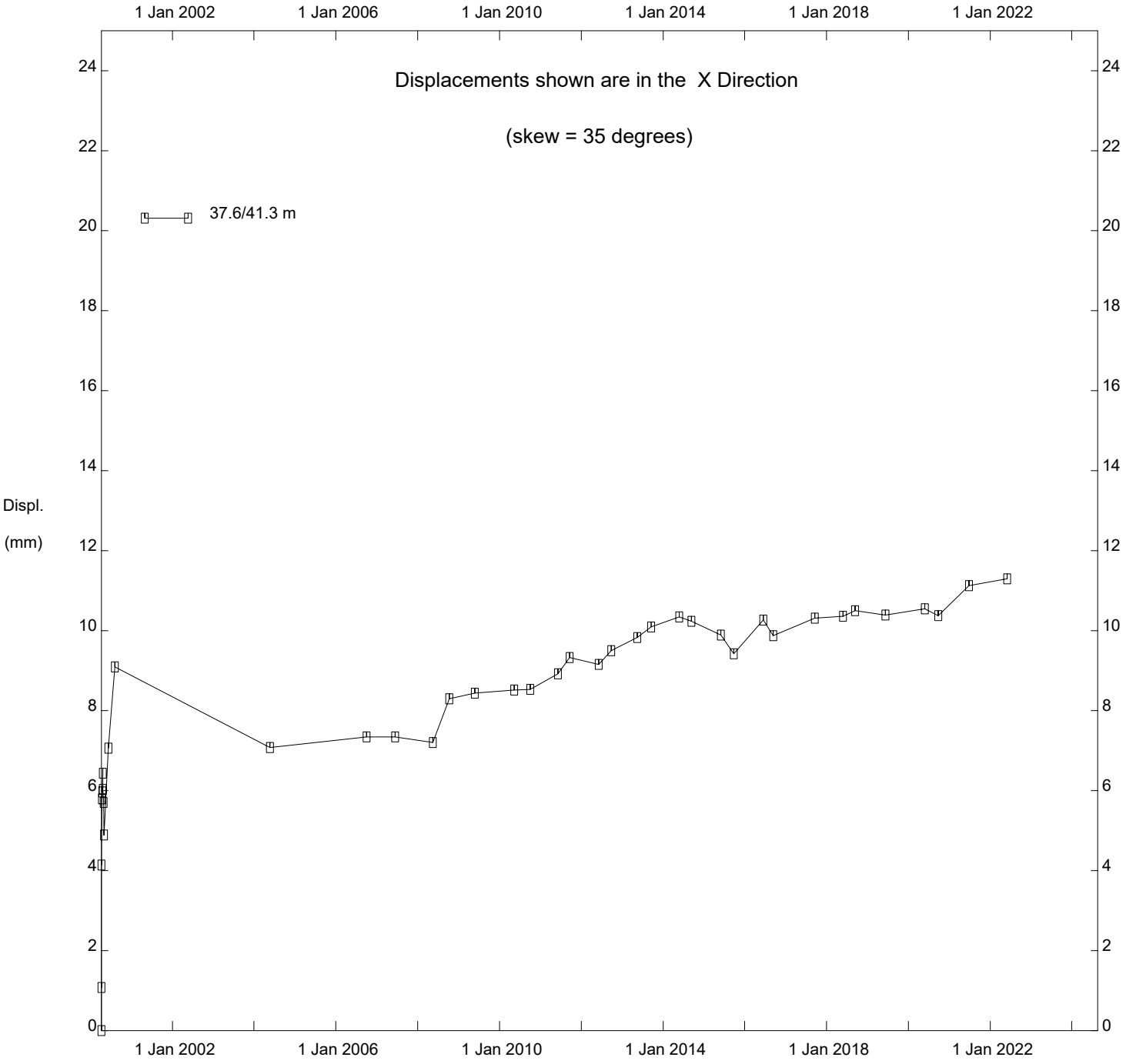
Hwy 63:12 Supertest Hill (NC017B), Inclinometer SI-4

Alberta Transportation

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

H:\32000\32122 AT GRMP Athabasca and Fort McMurray Districts 2021-2025\Section C\2022A-Spring\SI Readings\NC17B\17bSI-4.GTL

Thurber Engineering Ltd



Hwy 63:12 Supertest Hill (NC017B), Inclinometer SI-4

Alberta Transportation