THURBER ENGINEERING LTD.

July 26, 2022 File No.: 32121

Alberta Transportation
Provincial Building
9621-96 Avenue
Peace River, Alberta
T8S 1T4

Attention: Mr. Max Shannon

**ALBERTA TRANSPORTATION GRMP (CON0022164)**
**PEACE REGION (PEACE RIVER DISTRICT)**
**INSTRUMENTATION MONITORING RESULTS – SPRING 2022**

**SECTION C**

**SITE PH043-1: HWY 986:01, DAISHOWA EAST HILL PILE WALL**
**SITE PH043-2: HWY 986:01, DAISHOWA EAST HILL SITE B**

Dear Mr. Shannon:

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 Peace Region – Peace River District (CON0022164).

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

Eight slope inclinometers (SI-4, SI-6, SI-7, SI-8, SI-9, SI03-6, SI04-1, and SI04-3) and two pneumatic piezometers (PN03-1 and PN03-2) were read at the Hwy 986:01 Daishowa East Hill retaining wall site on June 12, 2022 by Mr. Niraj Regmi, G.I.T. and Mr. Jayden Del Cid, both of Thurber Engineering Ltd. SI-5 is currently damaged and could not be read.

The SIs were read using two RST Digital Inclinometer probes with 2 ft. wheelbases and RST Pocket PC readouts. Inclinometer reading depths were defined as per cable markings with respect to the top of the inclinometer casings. The pneumatic piezometers were read using a RST C108 pneumatic piezometer reader.

## 2. DATA PRESENTATION

### 2.1 General

SI plots for A and B directions are included in in Appendix A. Where movement has been recorded the resultant plot (X direction, if applicable) and rate of movement have also been provided. Piezometer reading plots are also included in Appendix A.

Slope inclinometer and piezometer reading summary tables are provided below. These tables also include instruments deleted from the GRMP program, for reference.

## 2.2 Zones of Movement

Zones of new movement were not observed in the SIs since the previous readings in the spring of 2021.

Zones of movements are summarized in Tables PH043-1-1 (pile wall site) and PH043-2-1 (Site B) below. Tables PH043-1-1 and PH043-2-1 also provides a historical account of the total movement, the depth of movement and the maximum rate of movement that has occurred in the SIs since initialization.

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## TABLE PH043-1-1
## SPRING 2022 – DAISHOWA EAST HILL PILE WALL (PH043-1)
## SLOPE INCLINOMETER INSTRUMENTATION READING SUMMARY

Date Monitored: June 12, 2022

| 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-4 | Jun. 7, 1996 | 92.3 mm over 2.6 m to 6.3 m depth in 18° Direction | 10.0 mm/yr between May and Sept. 1997 | Operational | July 8, 2021 | 2.0 | 2.1 | 0.7 |
| | | 28.1 mm over 6.3 m to 8.1 m depth in 3° Direction | 2.9 mm/yr between May and Sept. 2003 | | | 1.4 | 1.5 | 0.5 |
| *SI-5* | *Nov. 16, 1994* | *Not Known* | *16.7 mm/yr in May 2003* | *Damaged* | *June 13, 2020* | *N/A* | *N/A* | *N/A* |
| | | *Not Known* | *6.8 mm/yr In September 1997* | | | *N/A* | *N/A* | *N/A* |
| SI-6 | Apr. 9, 1996 | 184.9 mm over 0.1 m to 5.0 m depth in 26° Direction | 48.3 mm/yr in May 2005 | Operational | July 8, 2021 | No discernible movement | N/A | 5.1 |
| | | 43.7 mm over 5.0 m to 6.8 m depth in 26° Direction | 7.9 mm/yr in May 2004 | | | 3.5 | 3.7 | 0.8 |

Drawing 32121-PH043 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.

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## TABLE PH043-1-1 – CONTINUED…
## SPRING 2022 – DAISHOWA EAST HILL PILE WALL (PH043-1)
## SLOPE INCLINOMETER INSTRUMENTATION READING SUMMARY

Date Monitored: June 12, 2022

| 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) |
|---|---|---|---|---|---|---|---|---|
| *SI03-1* | *Sept. 14, 2003* | *Not Known* | *Not Known* | *Sheared off at 11.3 m* | *May 21, 2004* | *N/A* | *N/A* | *N/A* |
| *SI03-2* | *Sept. 14, 2003* | *Not Known* | *Not Known* | *Sheared off at 8.2 m* | *May 21, 2004* | *N/A* | *N/A* | *N/A* |
| *SI03-3* | *Sept. 16, 2003* | *Not Known* | *Not Known* | *Sheared off at 9.5 m* | *Oct. 9, 2003* | *N/A* | *N/A* | *N/A* |
| *SI03-4* | *Sept. 16, 2003* | *Not Known* | *Not Known* | *Sheared off at 7.5 m* | *Oct. 9, 2003* | *N/A* | *N/A* | *N/A* |
| *SI03-5* | *Sept. 16, 2003* | *Not Known* | *Not Known* | *Could not be read (partially covered with asphalt)* | *Aug. 12, 2004* | *N/A* | *N/A* | *N/A* |
| SI03-6 | Sept. 16, 2003 | 13.6 mm over 4.7 m to 6.0 m depth in 346° direction | 9.1 mm/yr Oct. 2003 | Operational | July 8, 2021 | 0.4 | 0.4 | -0.2 |

Drawing 32121-PH043 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.

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## TABLE PH043-1-1 – CONTINUED…
## SPRING 2022 – DAISHOWA EAST HILL PILE WALL (PH043-1)
## SLOPE INCLINOMETER INSTRUMENTATION READING SUMMARY

Date Monitored: June 12, 2022

| 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) |
|---|---|---|---|---|---|---|---|---|
| SI04-1 (In Pile Wall) | Reinitialized on Aug. 12, 2004 | 126.8 mm over 0.1 m to 2.6 m depth in 1° direction | 35.4 mm/yr in September 2019 | Operational | July 8, 2021 | 13.0 | 14.1 | 9.4 |
| | | 61.4 mm over 1.9 m to 22.1 m depth in 1° direction | 20.0 mm/yr in September 2016 | | | 2.4 | 2.6 | 2.7 |
| *SI04-2 (In Pile Wall)* | *Apr. 19, 2004* | *Not Known* | *Not Known* | *Not Read* | *May 21, 2004* | *N/A* | *N/A* | *N/A* |
| SI04-3 (In Pile Wall) | Apr. 19, 2004 | 146.2 mm over 0.1 m to 1.4 m depth in 26° direction | 563.1 mm/yr June 2004 | Operational | July 8, 2021 | 15.1 | 16.2 | 21.5 |
| | | 99.0 mm over 1.4 m to 20.9 m depth in 26° direction | 107.7 mm/yr July 2004 | | | 7.4 | 8.0 | 1.3 |

Drawing 32121-PH043 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.

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## TABLE PH043-1-2
## SPRING 2022 – DAISHOWA EAST HILL PILE WALL (PH043-1)
## PNEUMATIC PIEZOMETER INSTRUMENTATION READING SUMMARY

Date Monitored: June 12, 2022

| INSTRUMENT # | DATE INITIALIZED | TIP DEPTH (m) | GROUND ELEV. (m) | CURRENT STATUS | HIGHEST MEASURED WATER LEVEL (m) | MEASURED PORE PRESSURE (kPa) | CURRENT GROUNDWATER ELEVATION (m) | PREVIOUS GROUNDWATER ELEVATION (m) | CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m) |
|---|---|---|---|---|---|---|---|---|---|
| PN03-1 (27284) | October 21, 2005 (Thurber) | 8.0 | 596.85 | Operational | 592.99 on June 14, 2018 | 38.3 | 592.76 | 592.50 | 0.26 |
| PN03-2 (28177) | October 21, 2005 (Thurber) | 7.2 | 593.41 | Operational | 586.82 on June 14, 2018 | 2.8 | 586.50 | 586.51 | -0.01 |

Drawing 32121-PH043 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.

Notes:
PN - pneumatic piezometer.

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## TABLE PH043-2-1
## SPRING 2022 – DAISHOWA EAST HILL SITE B (PH043-2)
## SLOPE INCLINOMETER INSTRUMENTATION READING SUMMARY

Date Monitored: June 12, 2022

| 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) |
|---|---|---|---|---|---|---|---|---|
| SI7 | Jul. 19, 1996 | No discernible movement | N/A | Operational | July 8, 2021 | N/A | N/A | N/A |
| SI8 | Apr. 9, 1996 | 71.1 mm over 0.3 m to 1.5 m depth in 16° direction | 30.2 mm/yr in May 2001 | Operational | July 8, 2021 | 3.4 | 3.7 | -5.4 |
| | | 18.7 mm over 1.5 m to 4.0 m depth In 16°direction | 10.8 mm/yr in September 2011 | | | 0.2 | 0.2 | 0.2 |
| SI9 | Apr. 9, 1996 | 114.5 mm over 0.3 m to 2.7 m depth in 11° direction | 26.4 mm/yr In May 2003 | Operational | July 8, 2021 | 7.2 | 7.8 | 8.1 |

Drawing 32121-PH043 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.

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## 3. INTERPRETATION OF MONITORING RESULTS

Pile Wall Site (PH043-1)

Slope inclinometers SI-4, and SI-6 are located east of the wall and the main slide block. Slope inclinometer SI-4 showed rates of movement of 2.1 mm/yr and 1.5 mm/yr over 2.6 m to 6.3 m depth and 6.3 m to 8.1 m depth, respectively, since the spring of 2021 readings. SI-6 showed no discernible movement over 0.1 m to 5.0 m depth and a rate of movement of 3.7 mm/yr over 5.0 m to 6.8 m depth.

Slope inclinometer SI03-6, installed upslope of the pile wall and highway, showed a rate of movement of 0.4 mm/yr over 4.7 m to 6.0 m depth since the spring of 2021 readings.

Only two (SI04-1 and SI04-3) of the three slope inclinometers installed in the pile wall are currently operational. Total deflections of 126.8 mm (SI04-1) and 146.2 mm (SI04-3) have been measured in the clay backfill above the wall over the upper portion of each SI since original construction of the wall. SI04-1 showed a rate of movement of 14.1 mm/yr, while SI04-3 showed a rate of movement of 16.2 mm/yr within the upper movement zones since the spring of 2021 readings. The current reading for SI04-1 indicates that the pile head has deflected a total of 61.4 mm to date with a rate of movement of 2.6 mm/yr over the length of the pile. The current reading for SI04-3 indicates 99.0 mm of pile head movement to date with a current rate of movement over the length of the pile of 8.0 mm/yr. There was a noticeable increase in movement in SI04-1 during 2017 and 2018 when a landslide movement occurred downslope of the wall during erosion repairs of erosion and construction of a gabion drop structure at the creek level. A driven steel pile wall and grading were carried out to mitigate those movements. The increased movement rate trend is still observed within the upper 2 m. Some slope flattening was also carried out consisting of removing some soil from the top of the pile wall near SI04-3.

Pneumatic piezometer PN03-1 showed an increase in groundwater level of 0.26 m since the spring of 2021 readings. Pneumatic piezometer PN03-2 showed a decrease in groundwater level of 0.01 m since the spring of 2021 readings. The pneumatic piezometer readings are summarized in Table PH043-1-2 above and are plotted in Figure PH043-1 (by elevation) in Figure PH043-2 (by depth) in Appendix A.

Site B (PH043-2)

Slope inclinometers SI-7, SI-8 and SI-9 are located in the highway side slope (Station 33+820), about 300 m north of the pile wall. SI-7 continued to show no discernible movement. SI-8 showed a rate of movement of 3.7 mm/yr over 0.3 m to 1.5 m depth and a rate of movement of 0.2 mm/yr over 1.5 m to 4.0 m depth since the spring of 2021 readings. SI-9 showed a rate of movement of 7.8 mm/yr over 0.3 m to 2.7 m depth since the spring of 2021 readings.

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## 4. RECOMMENDATIONS

### 4.1 Future Work

According to AT's latest schedule, the instruments should be read again in the spring of 2023. Consideration should be given to reading the instruments at the PH043-1 pile wall (SI04-1 and SI04-3) bi-annually, since these instruments have shown relatively high movement rates during recent reading cycles.

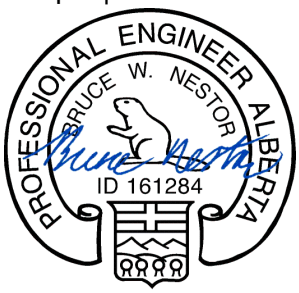
### 4.2 Instrumentation Repairs

Slope Inclinometer SI-5 requires repairs to continue future readings. In order to repair this instrument, it will be required to dig down to splice on a new section of SI casing.

## 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 29, 2022

PERMIT TO PRACTICE
THURBER ENGINEERING LTD.
RM SIGNATURE:
RM APEGA ID #: 91085
DATE: July 29, 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.2121-PH043)
  - SI Reading Plots
  - Figure PH043-1 (Piezometric Elevations)
  - Figure PH043-2 (Piezometric Depths)

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# 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.

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# ALBERTA TRANSPORTATION GRMP (CON0022164)
# PEACE REGION (PEACE RIVER DISTRICT)
# INSTRUMENTATION MONITORING RESULTS

## SPRING 2022

## APPENDIX A
## DATA PRESENTATION

## SITE PH043-1: HWY 986:01, DAISHOWA EAST HILL PILE WALL
## SITE PH043-2: HWY 986:01, DAISHOWA EAST HILL SITE B

**ALBERTA TRANSPORTATION**
**PEACE REGION (PEACE RIVER DISTRICT)**
**INSTRUMENTATION MONITORING FIELD SUMMARY (PH043)**
**SPRING 2022**

| | | | |
|---|---|---|---|
| **Location:** | Daishowa Retaining Wall (HWY 986:01 C1 33.357) | **Readout:** | RST PN C108 Unit 4 |
| **File Number:** | 32121 | **Casing:** | SI03-6, SI04-1 and SI04-3 are 2.75" Ø /Rest SI's3.34" Ø |
| **Probe:** | RST set 5R & 8R | **Temp:** | 21 |
| **Cable:** | RST set 5R & 8R | **Read by:** | NKR/JD |

**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 (m) | Northing (m) | | | | | A+ | A- | B+ | B- | | |
| SI-4 | 491412.57 | 6246098.92 | 12-Jun-22 | 1.02 | 66 to 2 | 2 | 1029 | -1000 | 533 | -559 | 5R/5R | |
| SI-5 | 491402.28 | 6246115.63 | 12-Jun-22 | 0.75 | 66 to 2 | 9 | 255 | -249 | 2502 | -2513 | 5R/5R | ** |
| SI-6 | 491428.09 | 6246136.06 | 12-Jun-22 | 1.12 | 56 to 2 | 5 | 493 | -468 | -868 | 853 | 5R/5R | |
| SI-7 | 491636.72 | 6245933.41 | 12-Jun-22 | 1.20 | 56 to 2 | 3 | -2 | 31 | -1774 | 1745 | 5R/5R | |
| SI-8 | 491651.19 | 6245968.66 | 12-Jun-22 | 0.89 | 66 to 2 | 20 | 775 | -747 | 5 | -34 | 5R/5R | |
| SI-9 | 491662.61 | 6245996.46 | 12-Jun-22 | 0.91 | 66 to 2 | 355 | -177 | 205 | -380 | 356 | 5R/5R | |
| SI03-6 | 491312.58 | 6246058.38 | 12-Jun-22 | 0.75 | 52 to 2 | 10 | 443 | -432 | -617 | 625 | 8R/8R | |
| SI04-1 | 491309.71 | 6246169.69 | 12-Jun-22 | 1.10 | 74 to 2 | 10 | -492 | 499 | 350 | -355 | 8R/8R | |
| SI04-3 | 491374.51 | 6246132.38 | 12-Jun-22 | 1.08 | 68 to 2 | 10 | 352 | -341 | 33 | -26 | 8R/8R | * |

**PNEUMATIC PIEZOMETER READINGS**

| PN# | GPS Location (UTM 11) | | Date | Reading (kPa) | Identification Number |
|---|---|---|---|---|---|
| | Easting (m) | Northing (m) | | | |
| PN03-1 | 491340.54 | 6246138.02 | 12-Jun-22 | 38.3 | 27284 |
| PN03-2 | 491346.76 | 6246156.59 | 12-Jun-22 | 2.8 | 28177 |

**INSPECTOR REPORT**

| |
|---|
| * Bottom of SI04-3 sitting at 69ft |
| ** Damaged by lawnmower. |
| |
| |
| |

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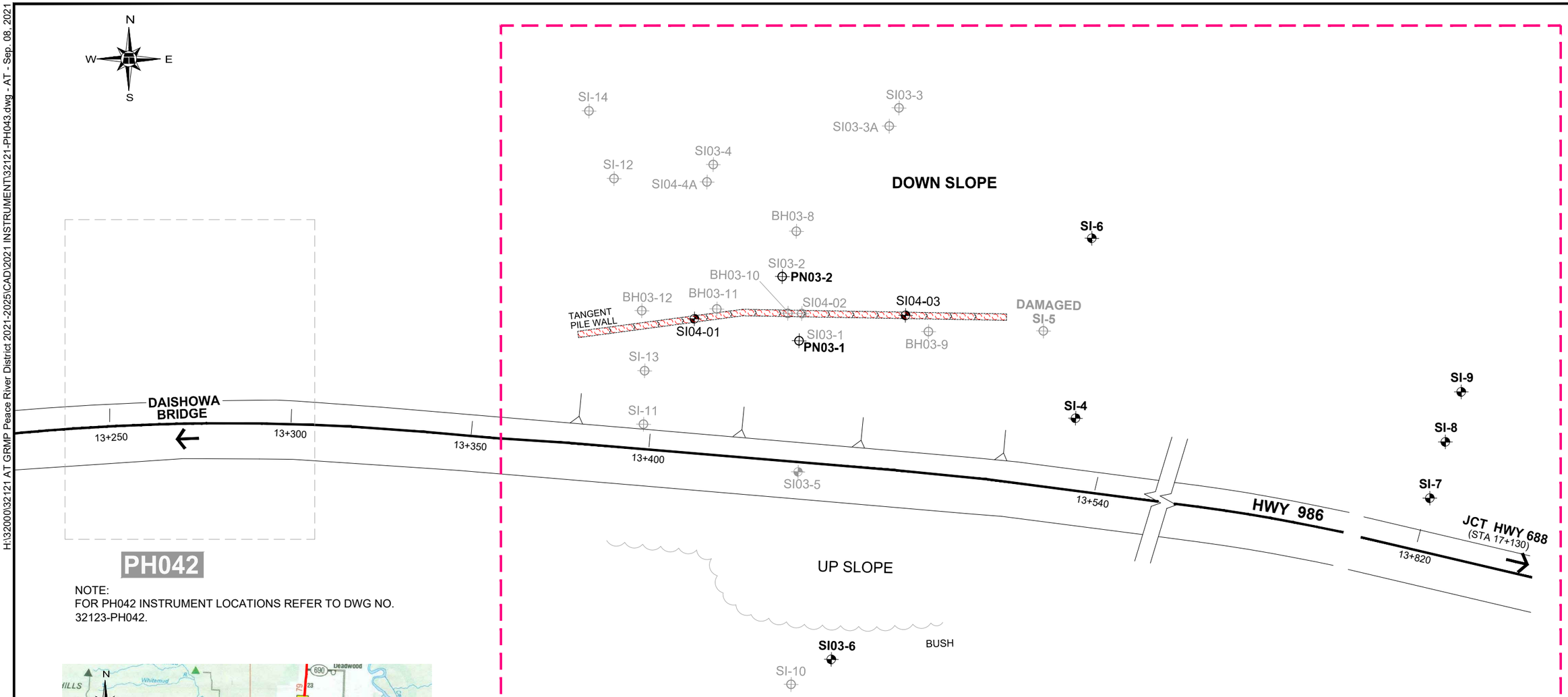
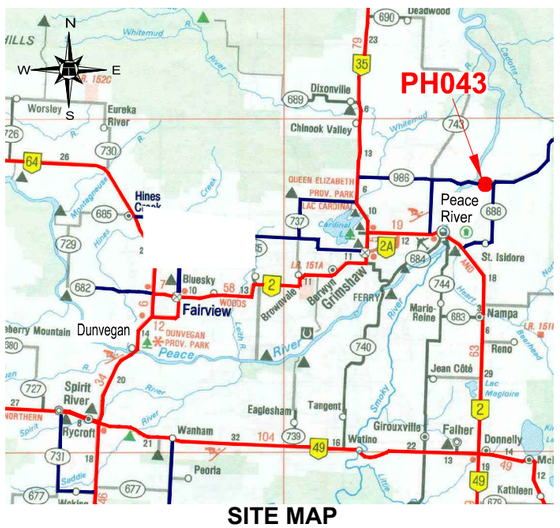



PH042

NOTE:
FOR PH042 INSTRUMENT LOCATIONS REFER TO DWG NO. 32123-PH042.




SITE MAP
NOT TO SCALE

PH043

## SITE PLAN
NOT TO SCALE

### LEGEND :

- SLOPE INCLINOMETERS *(currently using)*
- SLOPE INCLINOMETERS *(Installed in 2001, not in use)*
- SLOPE INCLINOMETER *(not in use)*
- PN PNEUMATIC PIEZOMETER

### NOTES :

1. BASE PLAN COPIED FROM "GAEA ENGINEERING" DRAWING (DATED MAY. 1997)
2. LOCATIONS OF 2003 SLOPE INDICATORS OBTAINED FROM AMEC DRAWING NO. : EG08628.37-002.dwg DATED MARCH 2004.

Alberta

**PEACE REGION (PEACE RIVER DISTRICT)**

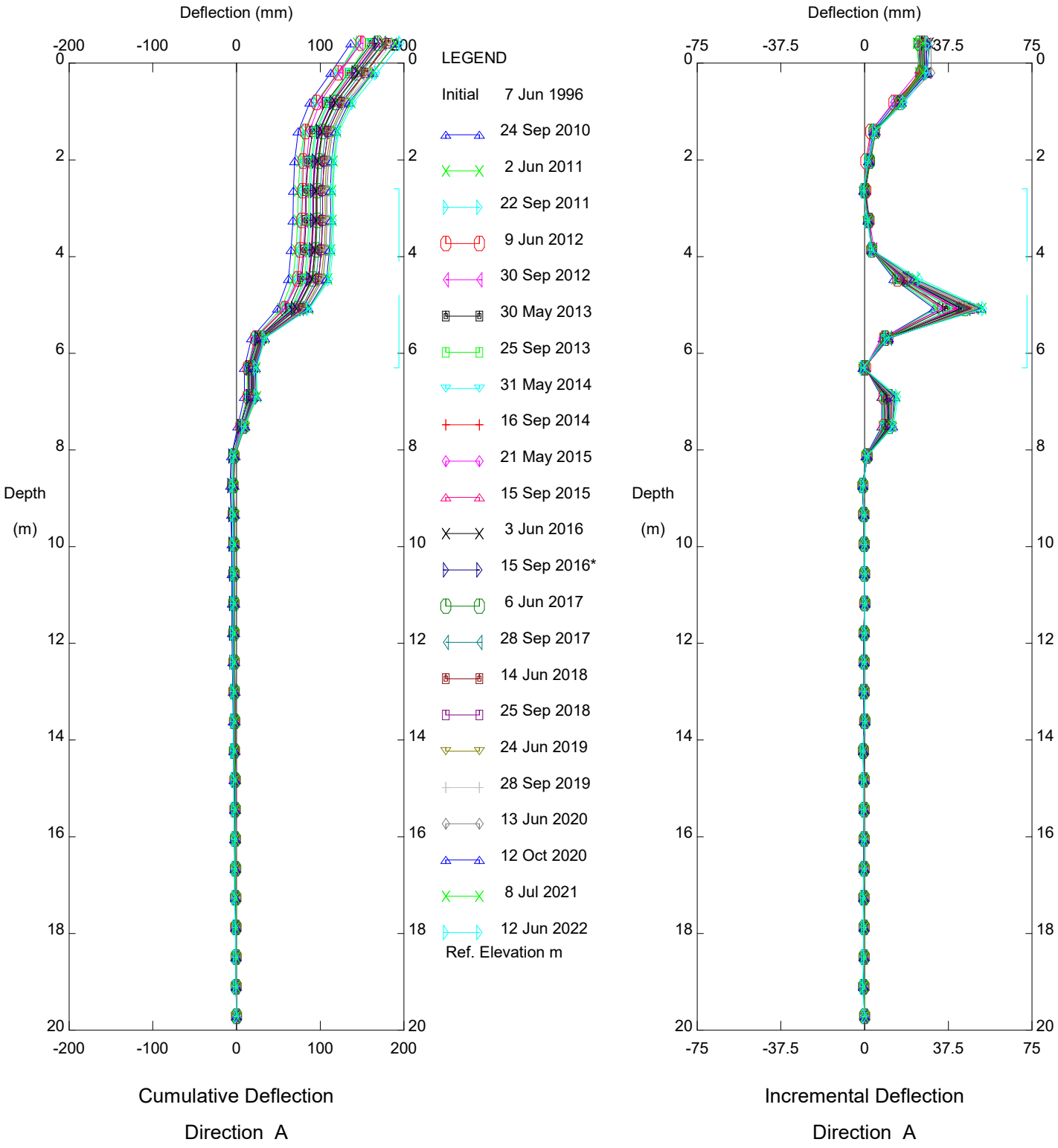
**PH043: HWY 986:01 - DAISHOWA EAST HILL INSTRUMENT LOCATIONS**

**DWG No. 32121-PH043**

| | |
|---|---|
| DRAWN BY | ML |
| DESIGNED BY | BWN |
| APPROVED BY | DWP |
| SCALE | N.T.S. |
| DATE | SEPTEMBER 2021 |
| FILE No. | 32121 |

THURBER ENGINEERING LTD.

Thurber Engineering Ltd.




Cumulative Deflection

Direction A

Incremental Deflection

Direction A

HWY 986:01 - STA. 13+540, Inclinometer SI-4

Alberta Transportation

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

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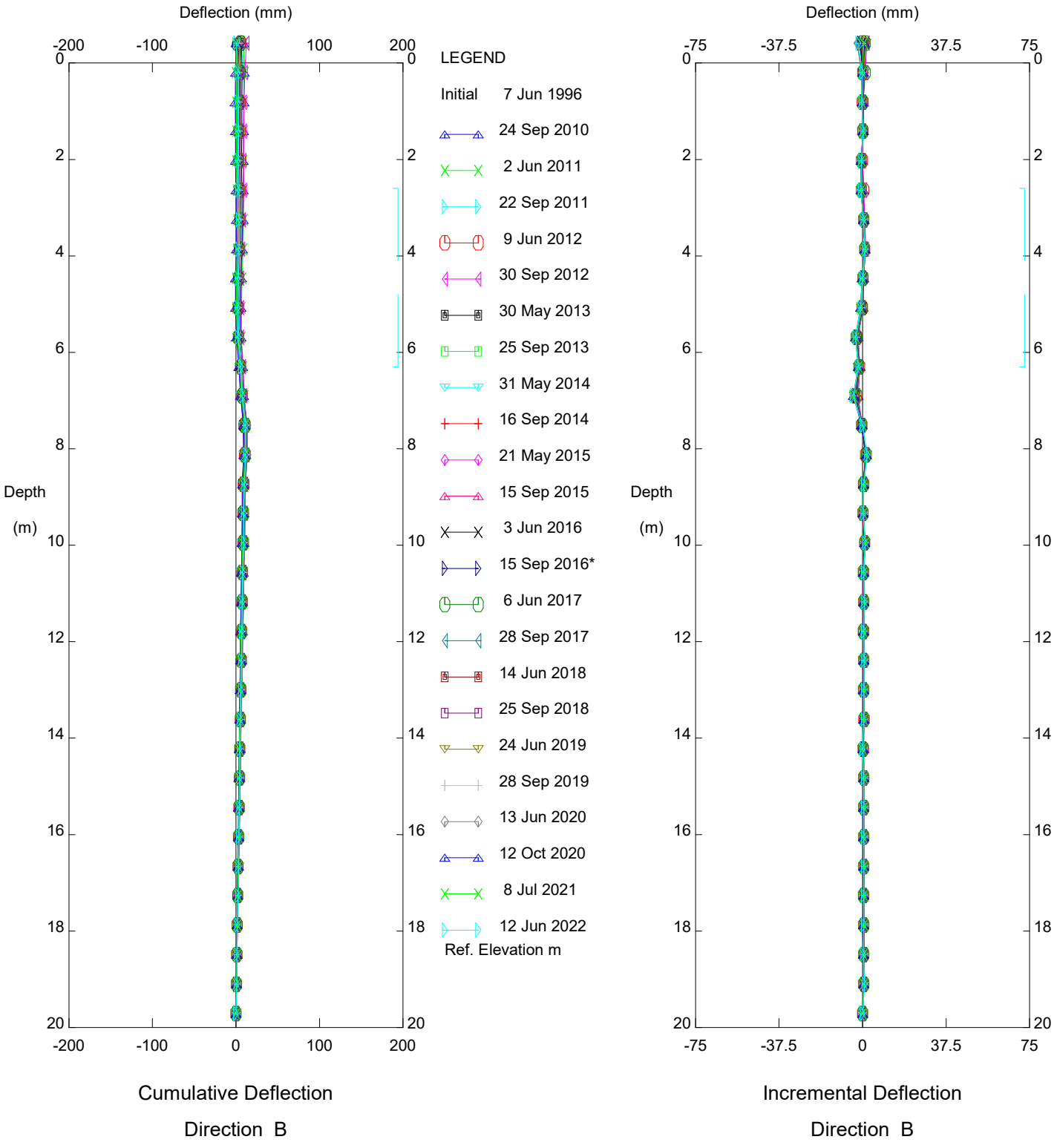
Thurber Engineering Ltd.




Cumulative Deflection

Direction B

Incremental Deflection

Direction B

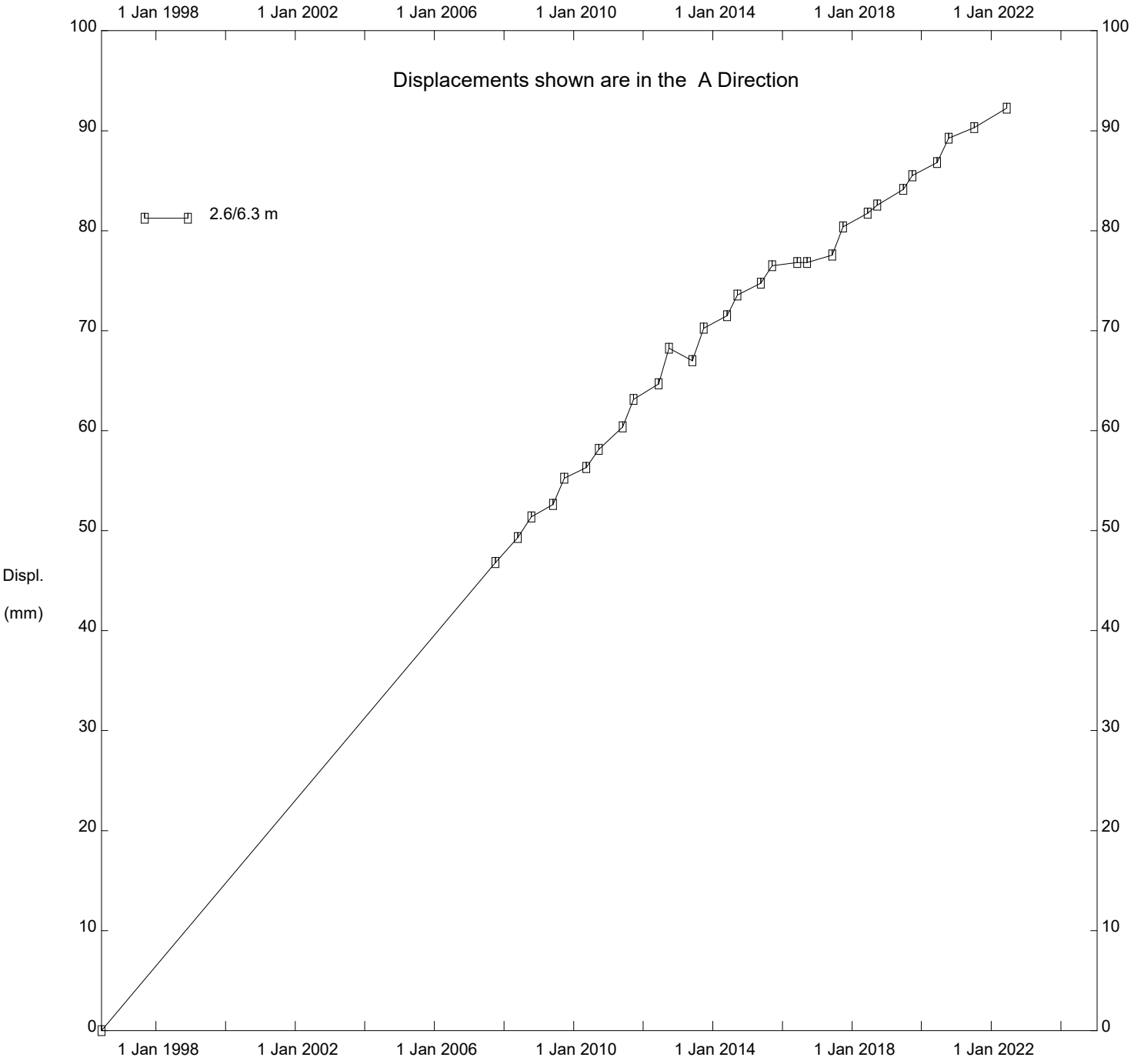
HWY 986:01 - STA. 13+540, Inclinometer SI-4

Alberta Transportation

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

H:\32000\32121 AT GRMP Peace River District 2021-2025\Section C\2022A-Spring\SI Readings\PH043\SH986-04.GTL

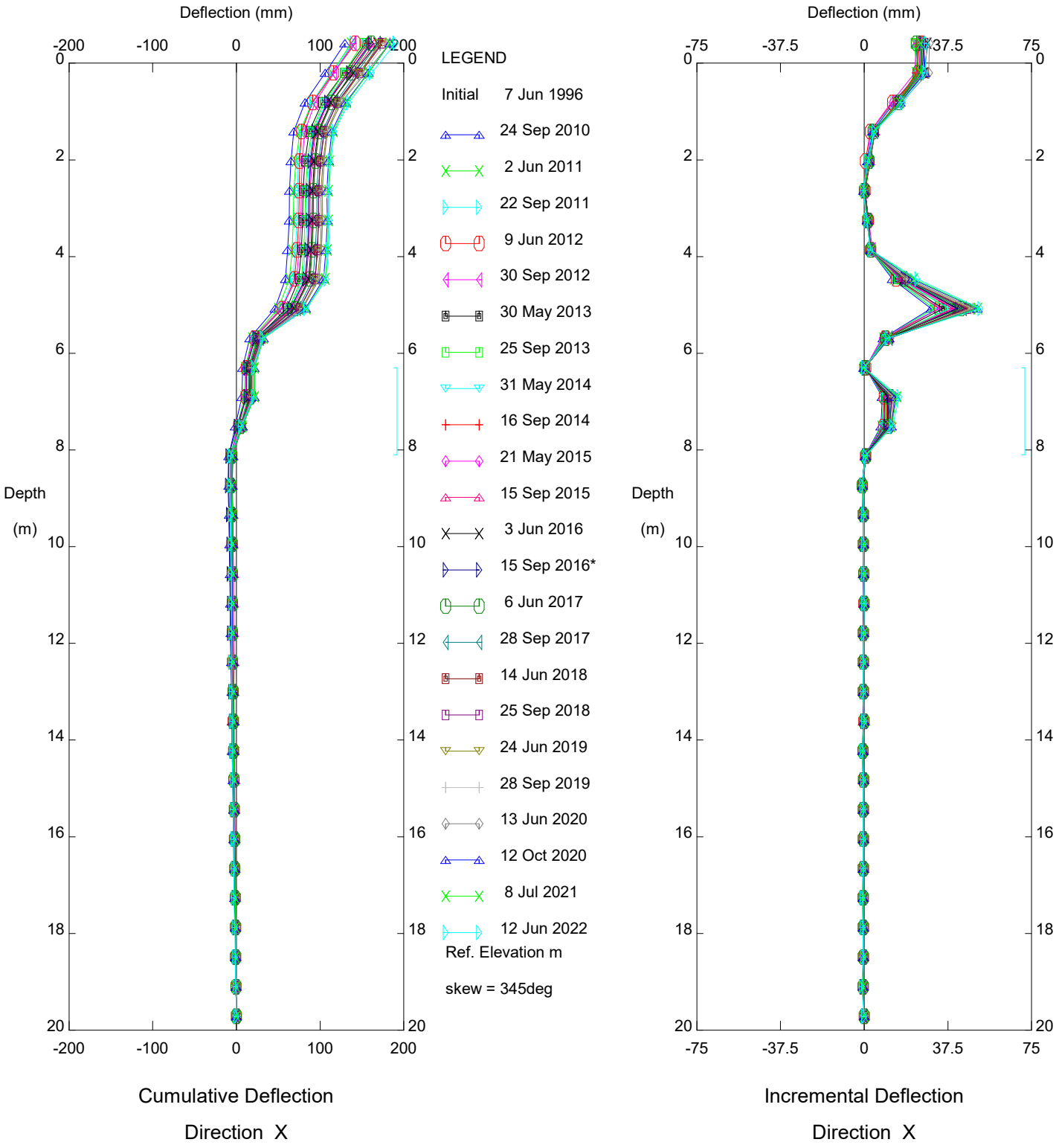
Thurber Engineering Ltd.




HWY 986:01 - STA. 13+540, Inclinometer SI-4

Alberta Transportation

Thurber Engineering Ltd.




Cumulative Deflection

Direction X

Incremental Deflection

Direction X

HWY 986:01 - STA. 13+540, Inclinometer SI-4

Alberta Transportation

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

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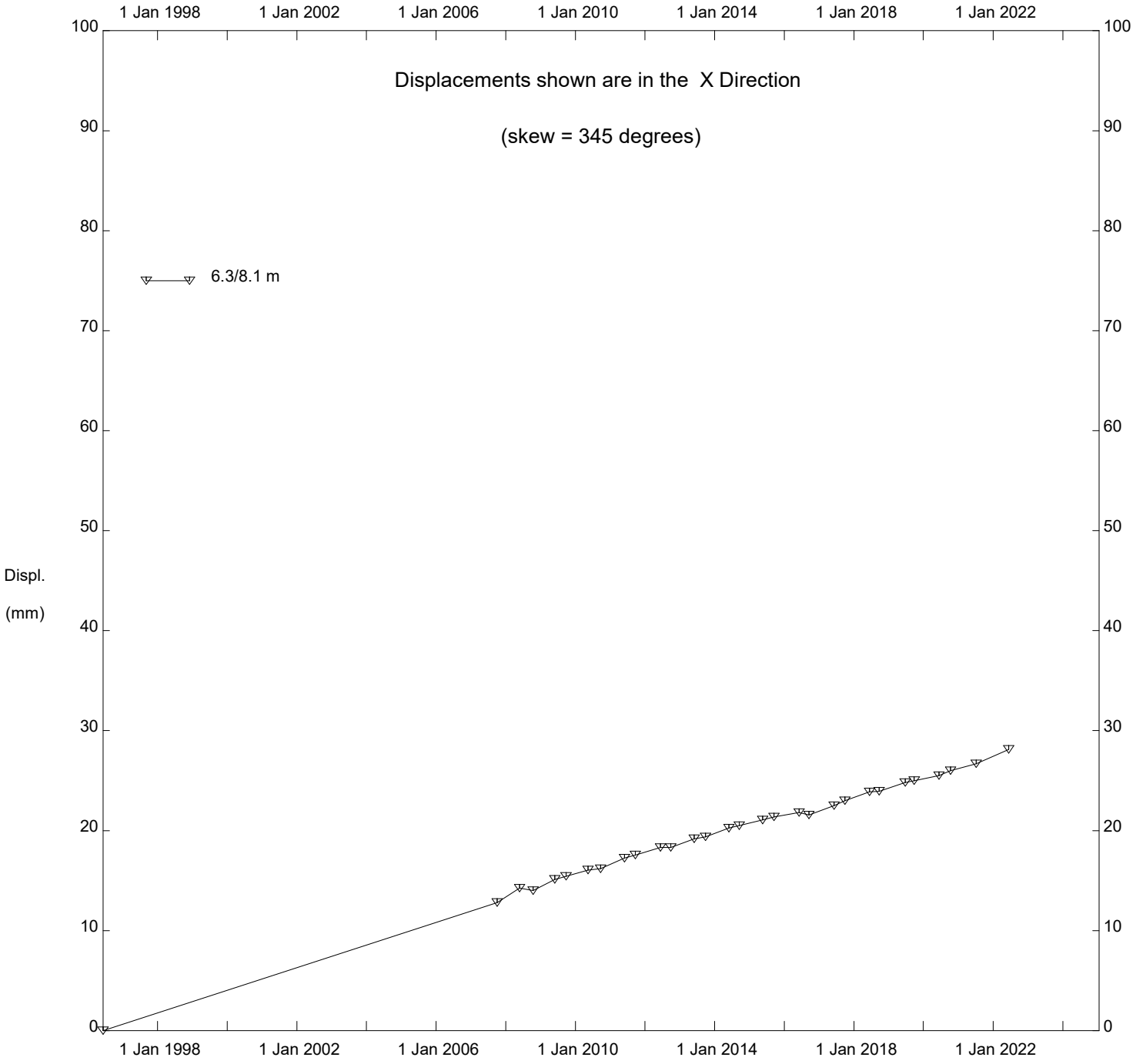
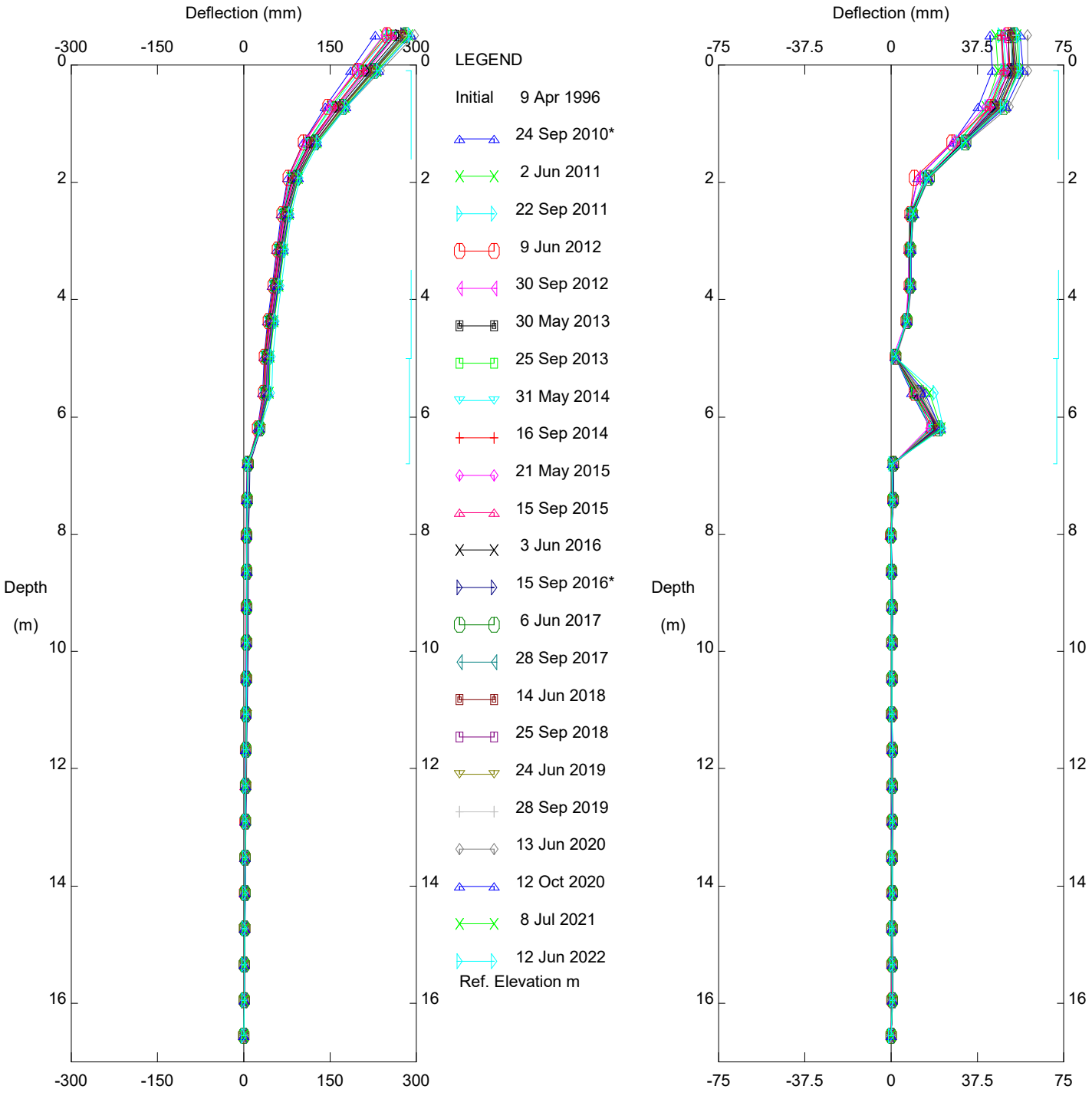



HWY 986:01 - STA. 13+540, Inclinometer SI-4

Alberta Transportation

Thurber Engineering Ltd.




Cumulative Deflection

Direction A

Incremental Deflection

Direction A

HWY 986:01 - STA. 13+540, Inclinometer SI-6

Alberta Transportation

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

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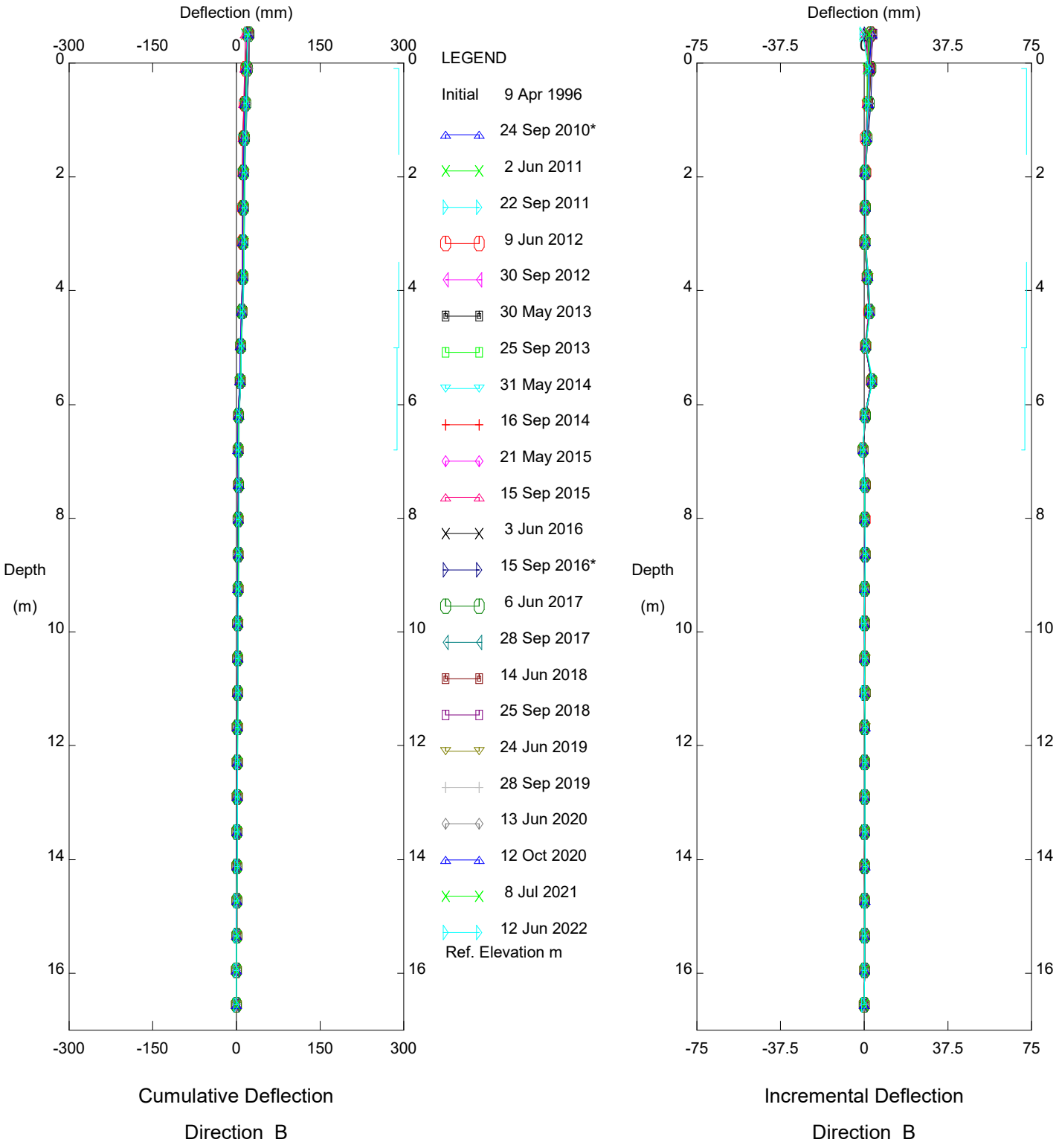


Cumulative Deflection

Direction B

Incremental Deflection

Direction B

HWY 986:01 - STA. 13+540, Inclinometer SI-6

Alberta Transportation

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

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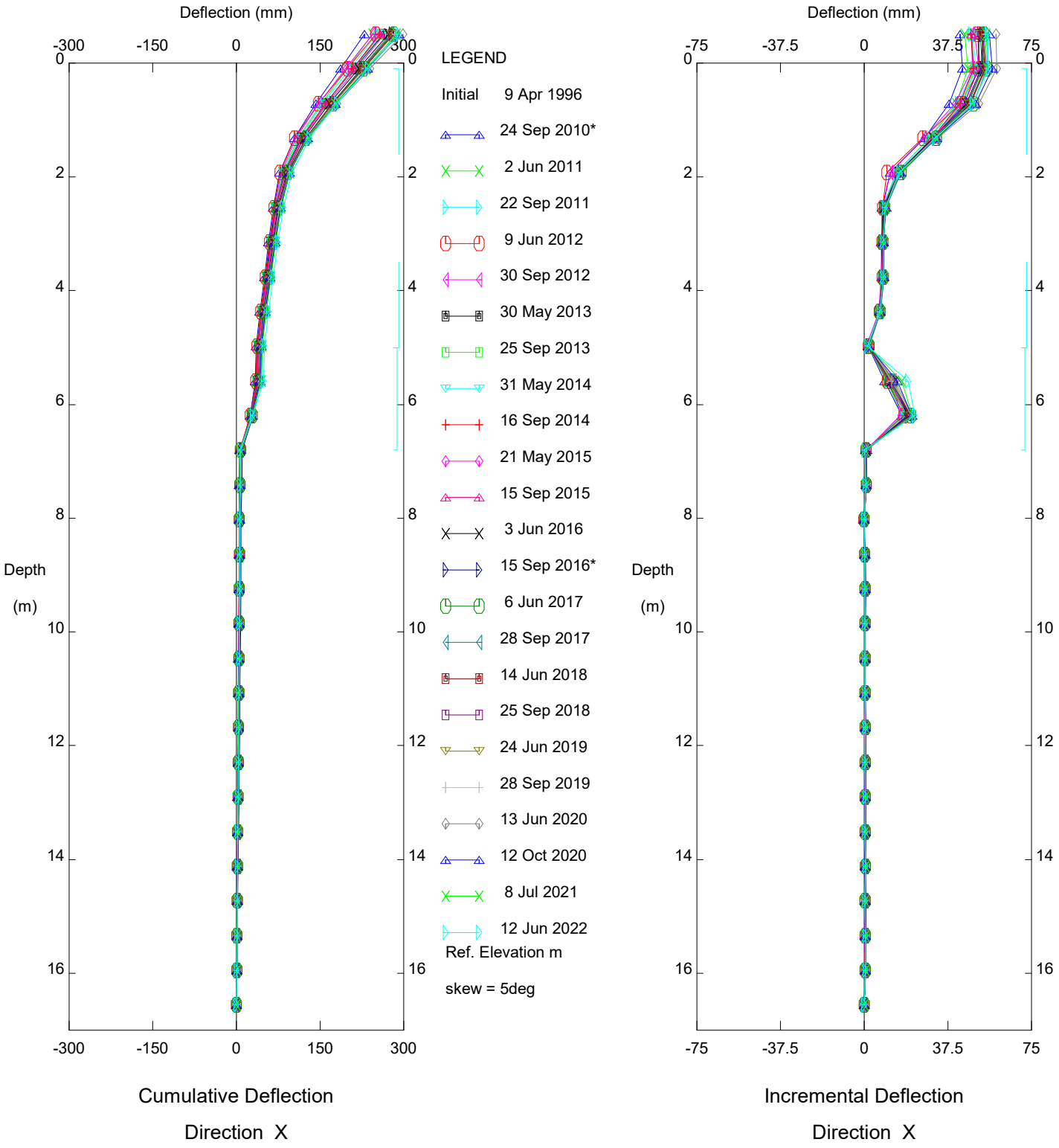
Thurber Engineering Ltd.




Cumulative Deflection

Direction X

Incremental Deflection

Direction X

HWY 986:01 - STA. 13+540, Inclinometer SI-6

Alberta Transportation

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

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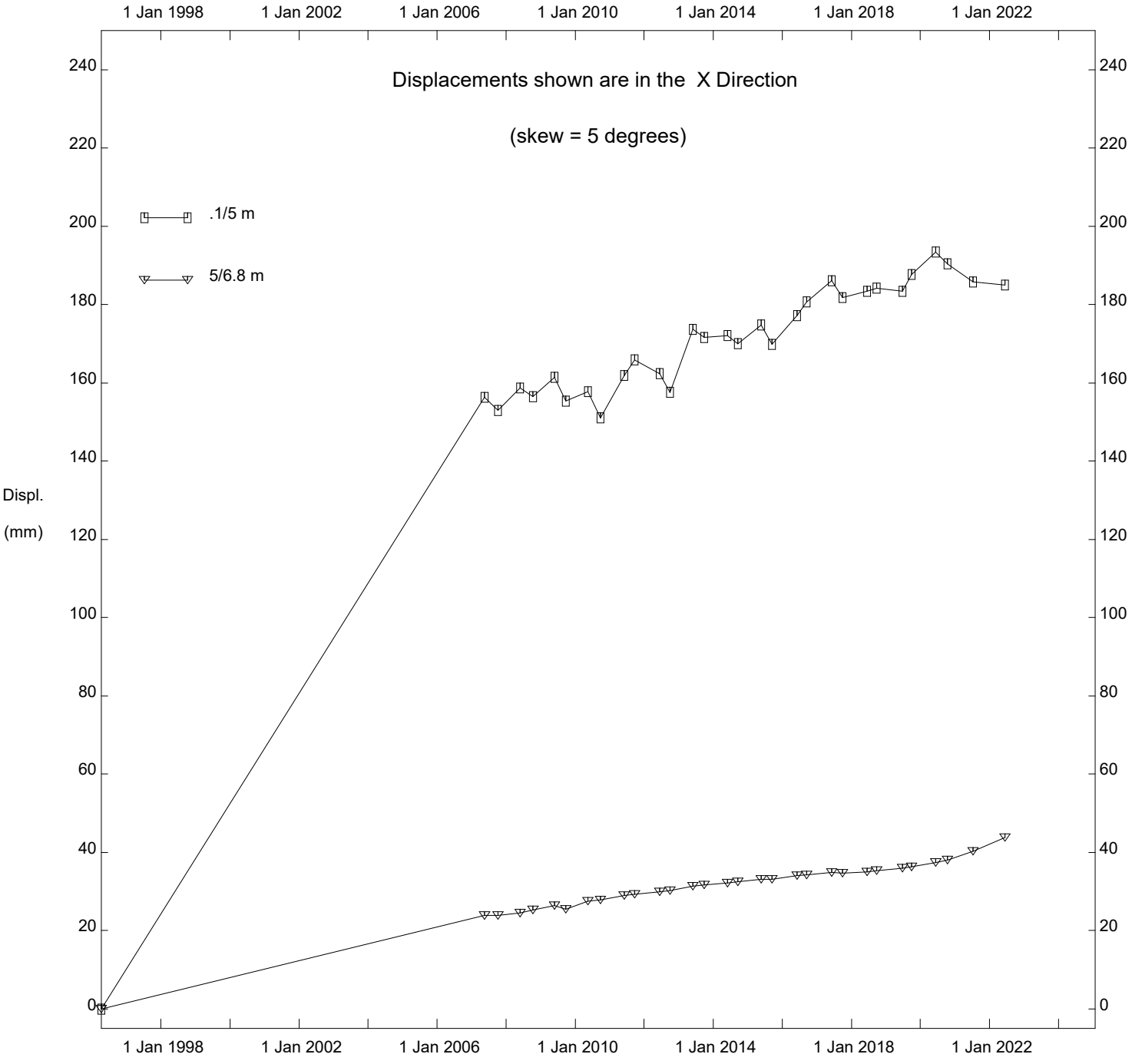
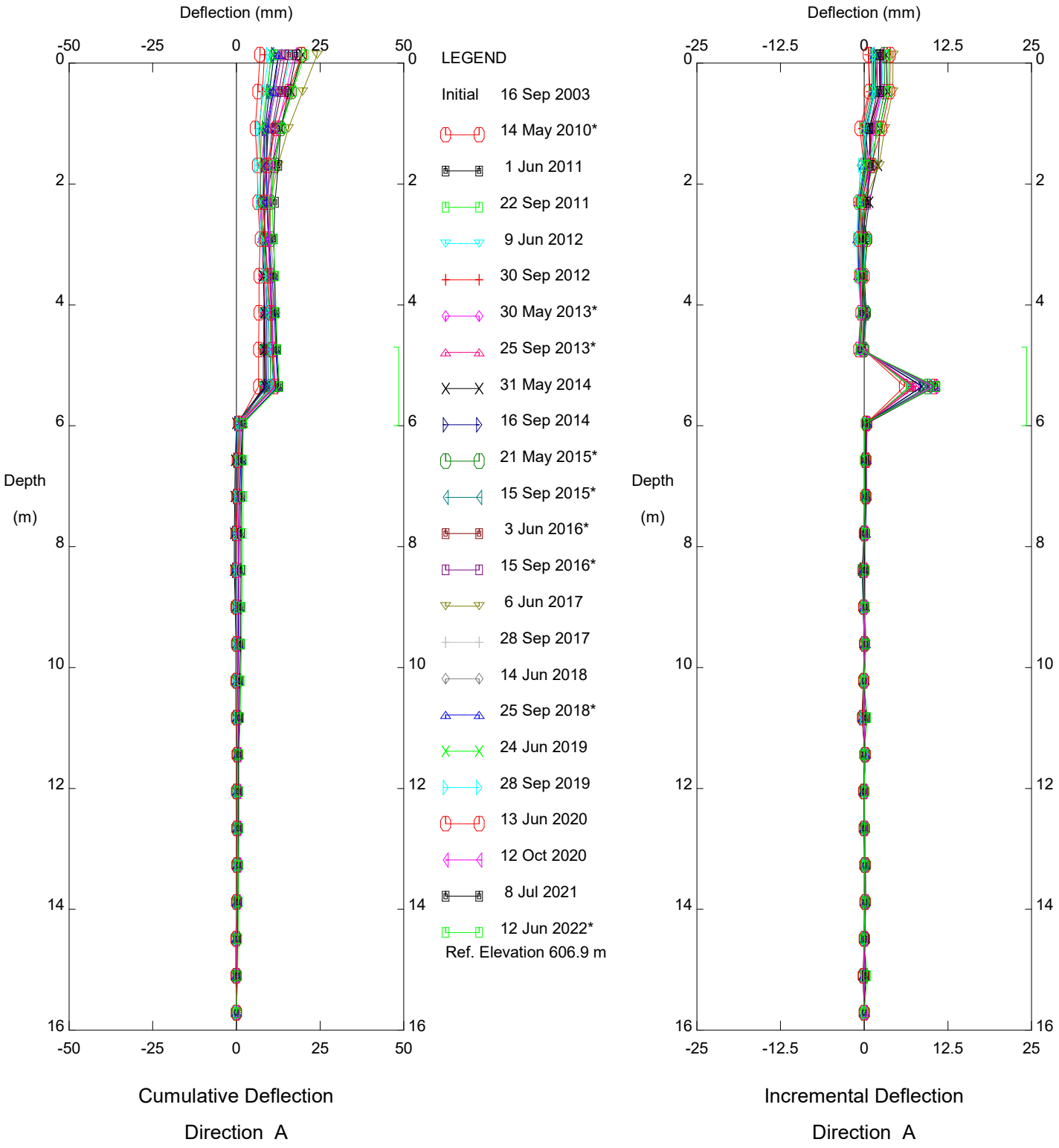



HWY 986:01 - STA. 13+540, Inclinometer SI-6

Alberta Transportation

Thurber Engineering Ltd.




Cumulative Deflection

Direction A

Incremental Deflection

Direction A

HWY 986:01 - STA. 13+540, Inclinometer SI03-6

Alberta Transportation

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

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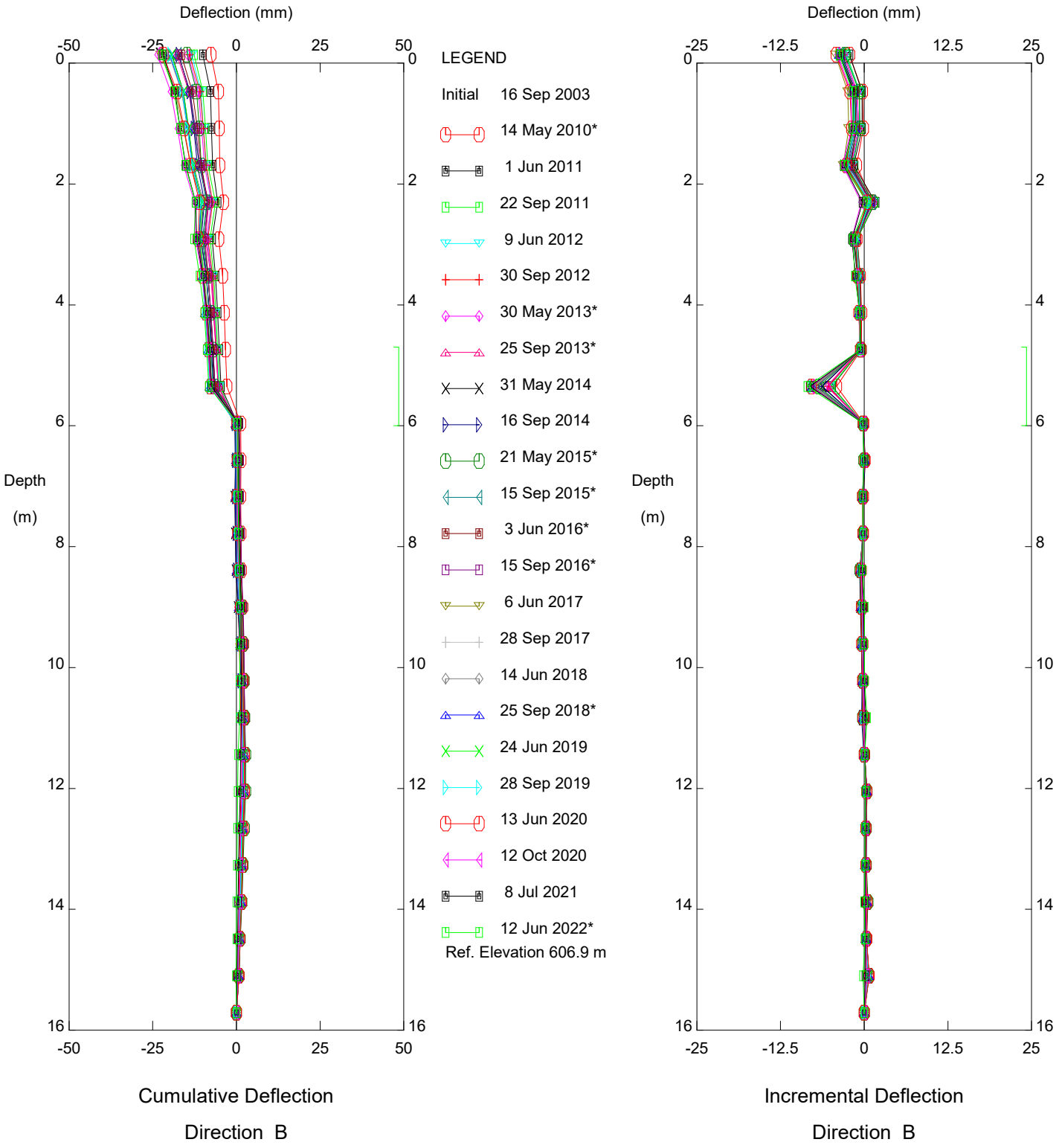


Cumulative Deflection

Direction B

Incremental Deflection

Direction B

HWY 986:01 - STA. 13+540, Inclinometer SI03-6

Alberta Transportation

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

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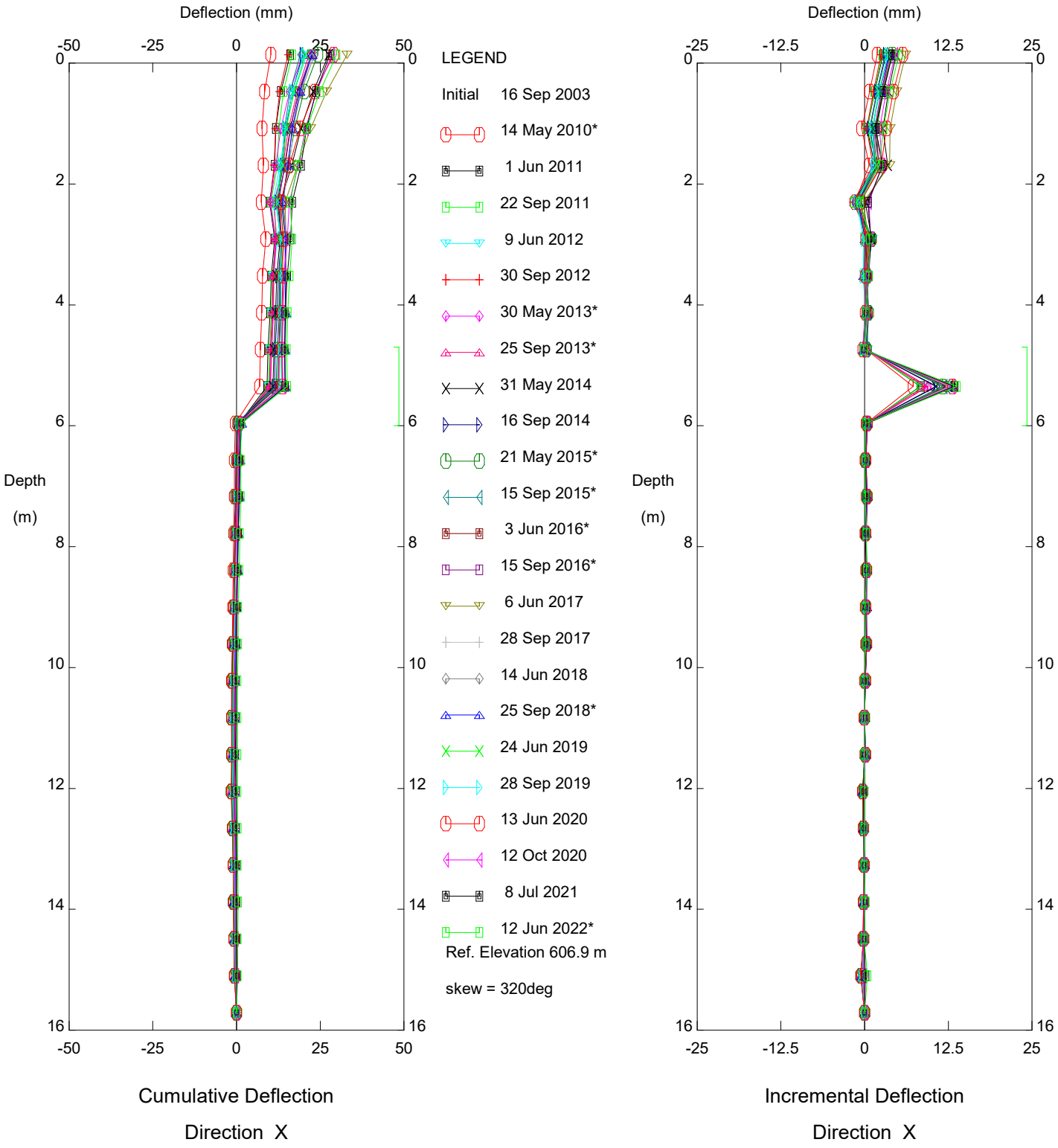



Cumulative Deflection

Direction X

Incremental Deflection

Direction X

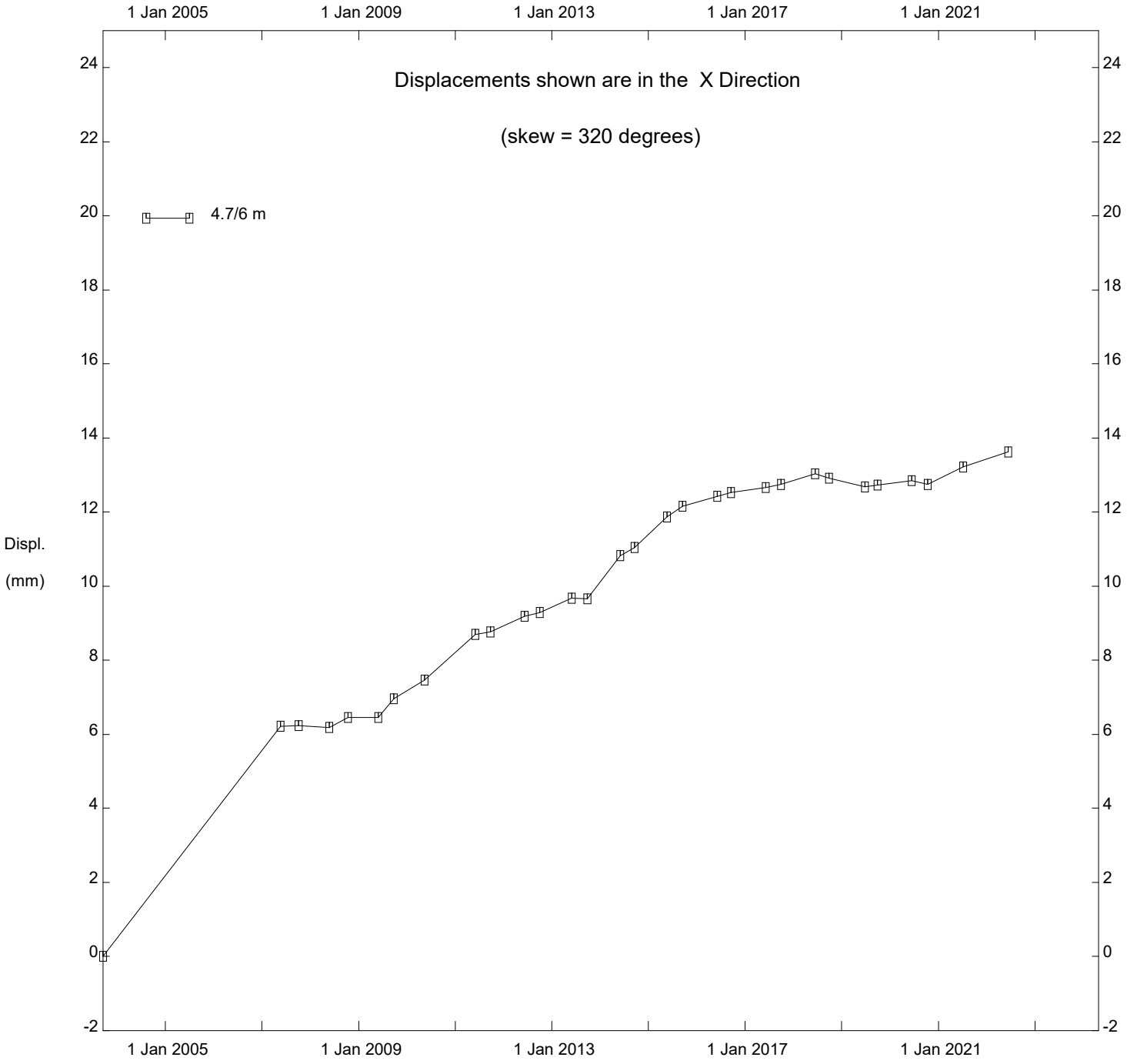
HWY 986:01 - STA. 13+540, Inclinometer SI03-6

Alberta Transportation

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

H:\32000\32121 AT GRMP Peace River District 2021-2025\Section C\2022A-Spring\SI Readings\PH043\SI03-6.GTL

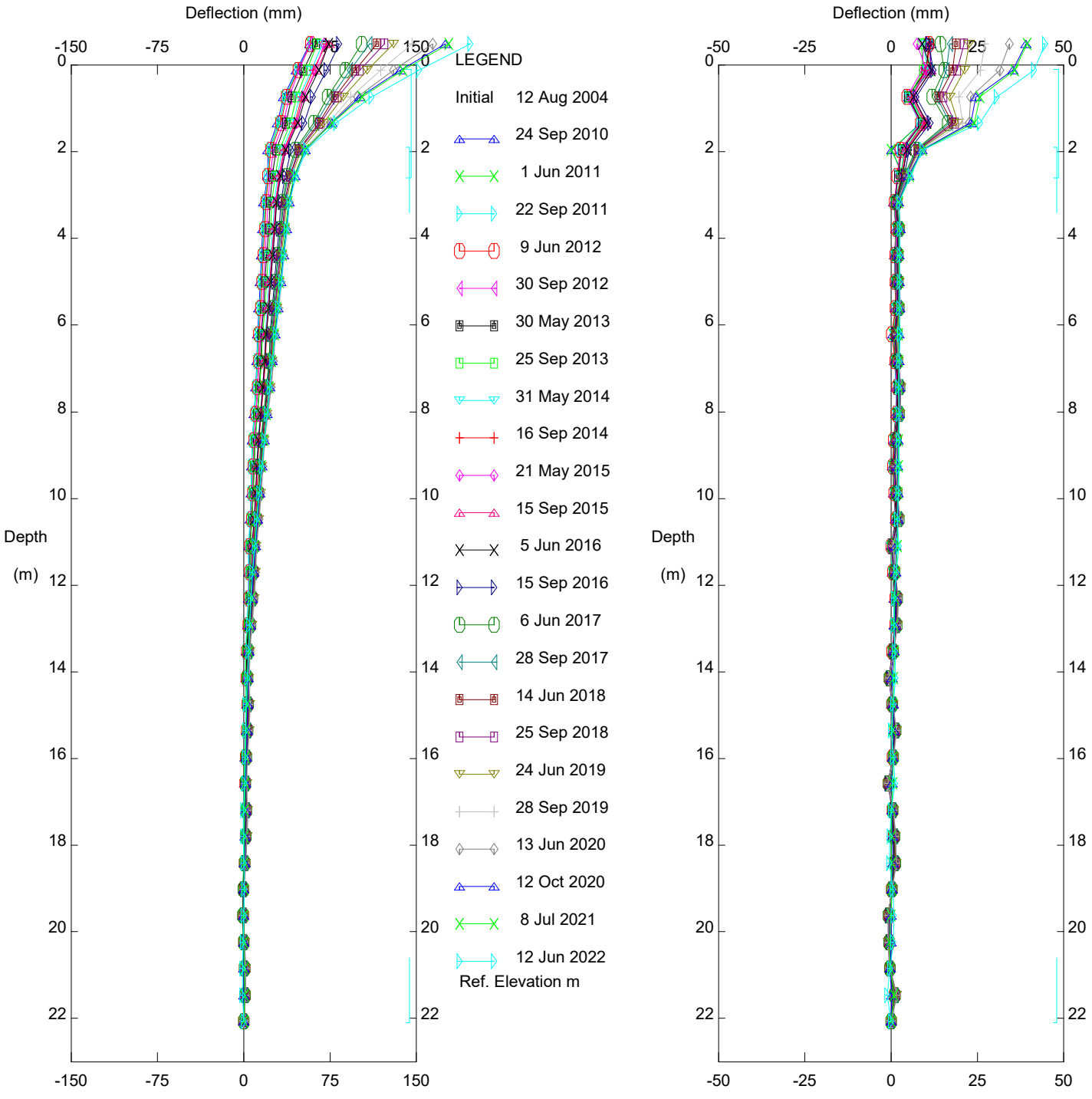
Thurber Engineering Ltd.




HWY 986:01 - STA. 13+540, Inclinometer SI03-6

Alberta Transportation

Thurber Engineering Ltd.




Cumulative Deflection

Direction A

Incremental Deflection

Direction A

HWY 986:01 - STA. 13+540, Inclinometer SI04-1

Alberta Transportation

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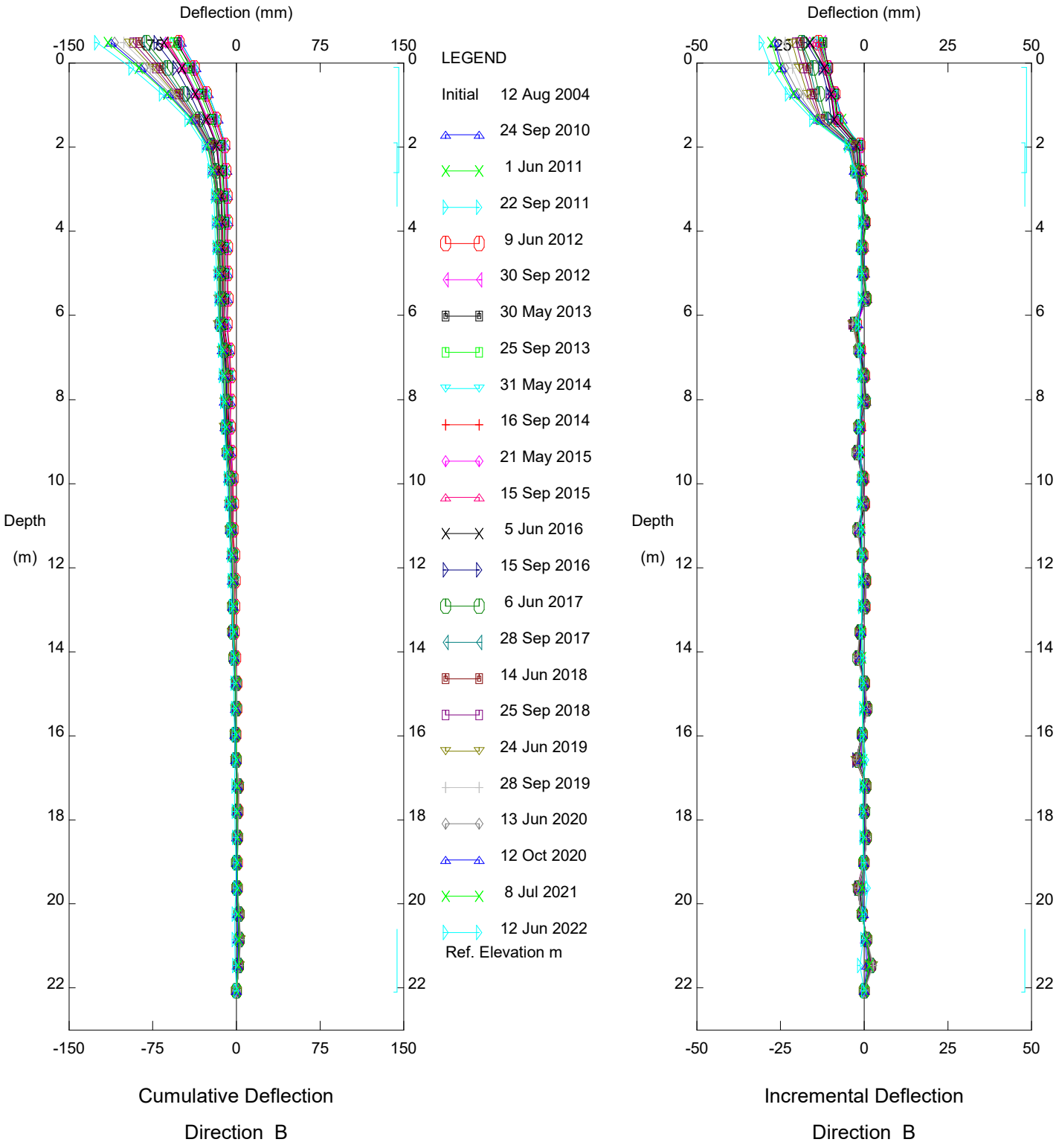


Cumulative Deflection

Direction B

Incremental Deflection

Direction B

HWY 986:01 - STA. 13+540, Inclinometer SI04-1

Alberta Transportation

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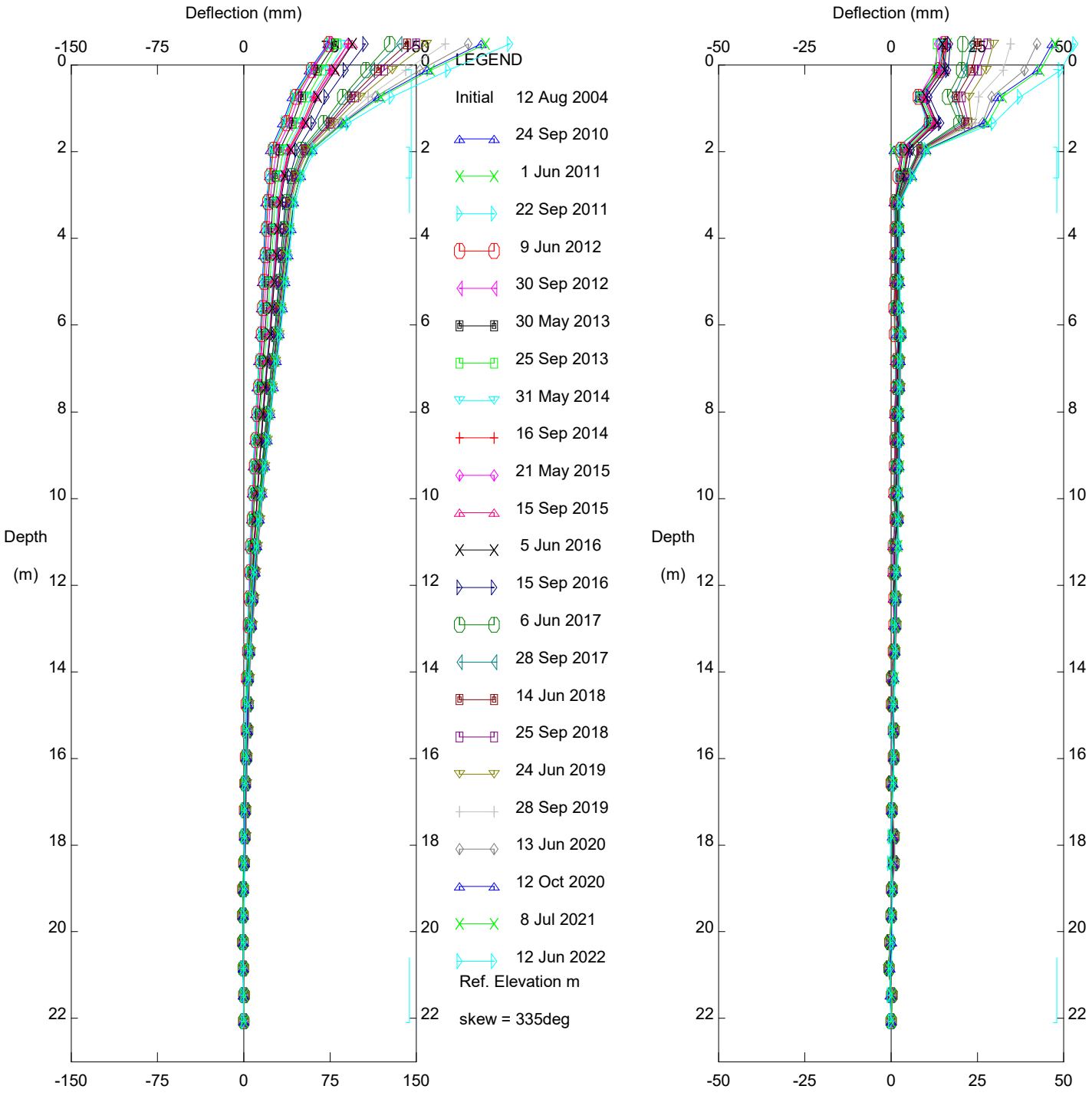


Cumulative Deflection

Direction X

Incremental Deflection

Direction X

HWY 986:01 - STA. 13+540, Inclinometer SI04-1

Alberta Transportation

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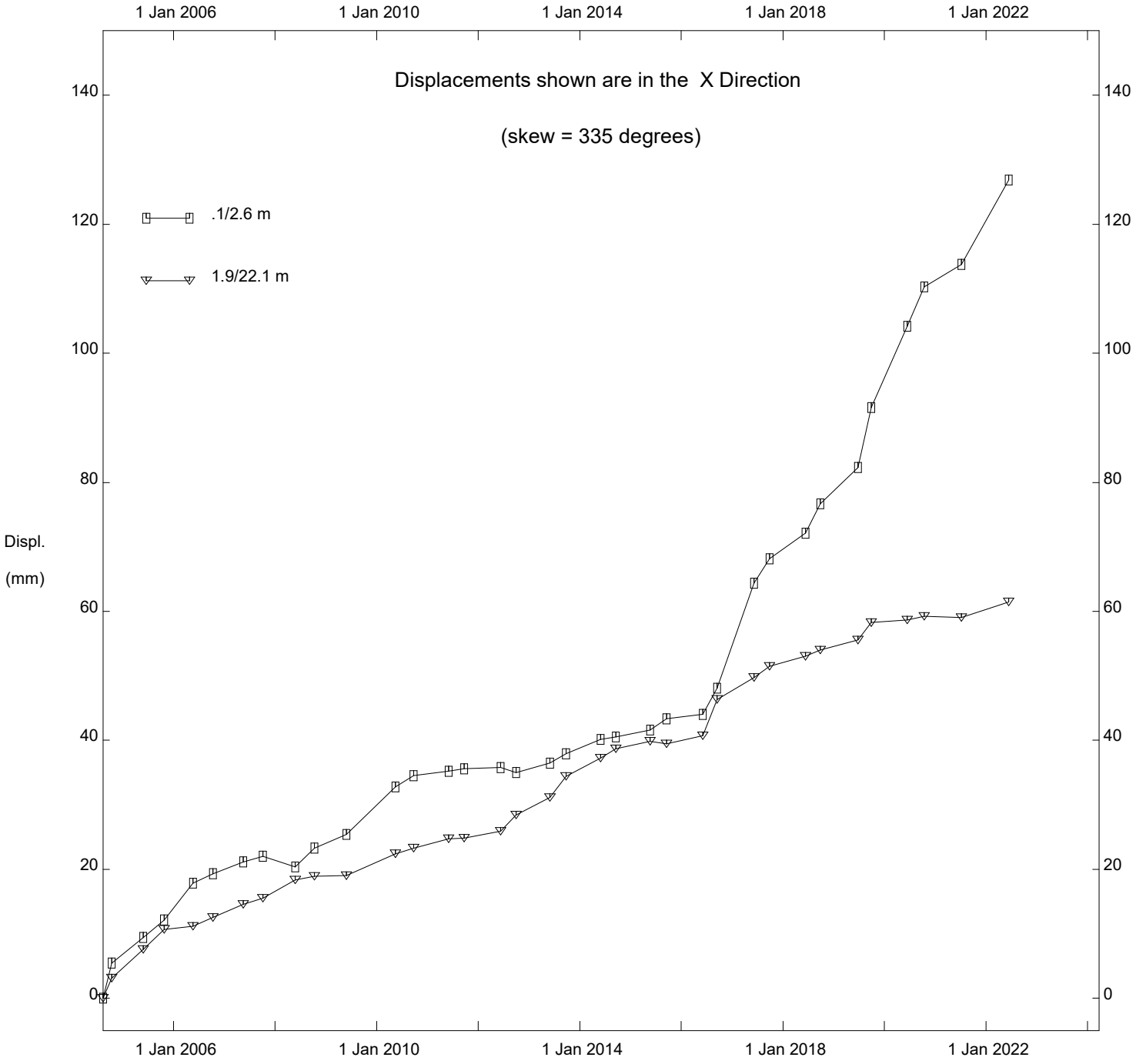


HWY 986:01 - STA. 13+540, Inclinometer SI04-1

Alberta Transportation

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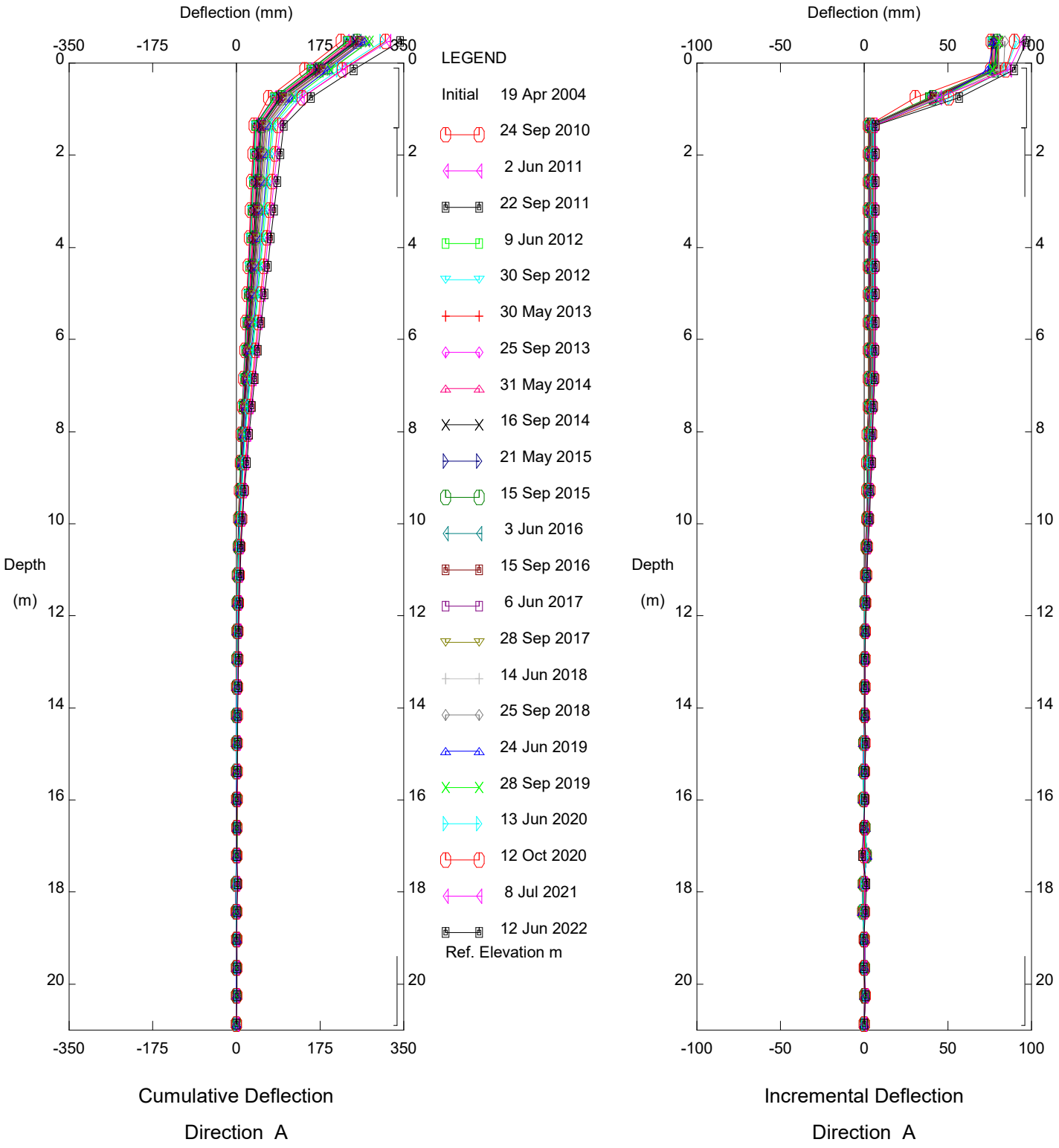


Cumulative Deflection

Direction A

Incremental Deflection

Direction A

HWY 986:01 - STA. 13+540, Inclinometer SI04-3

Alberta Transportation

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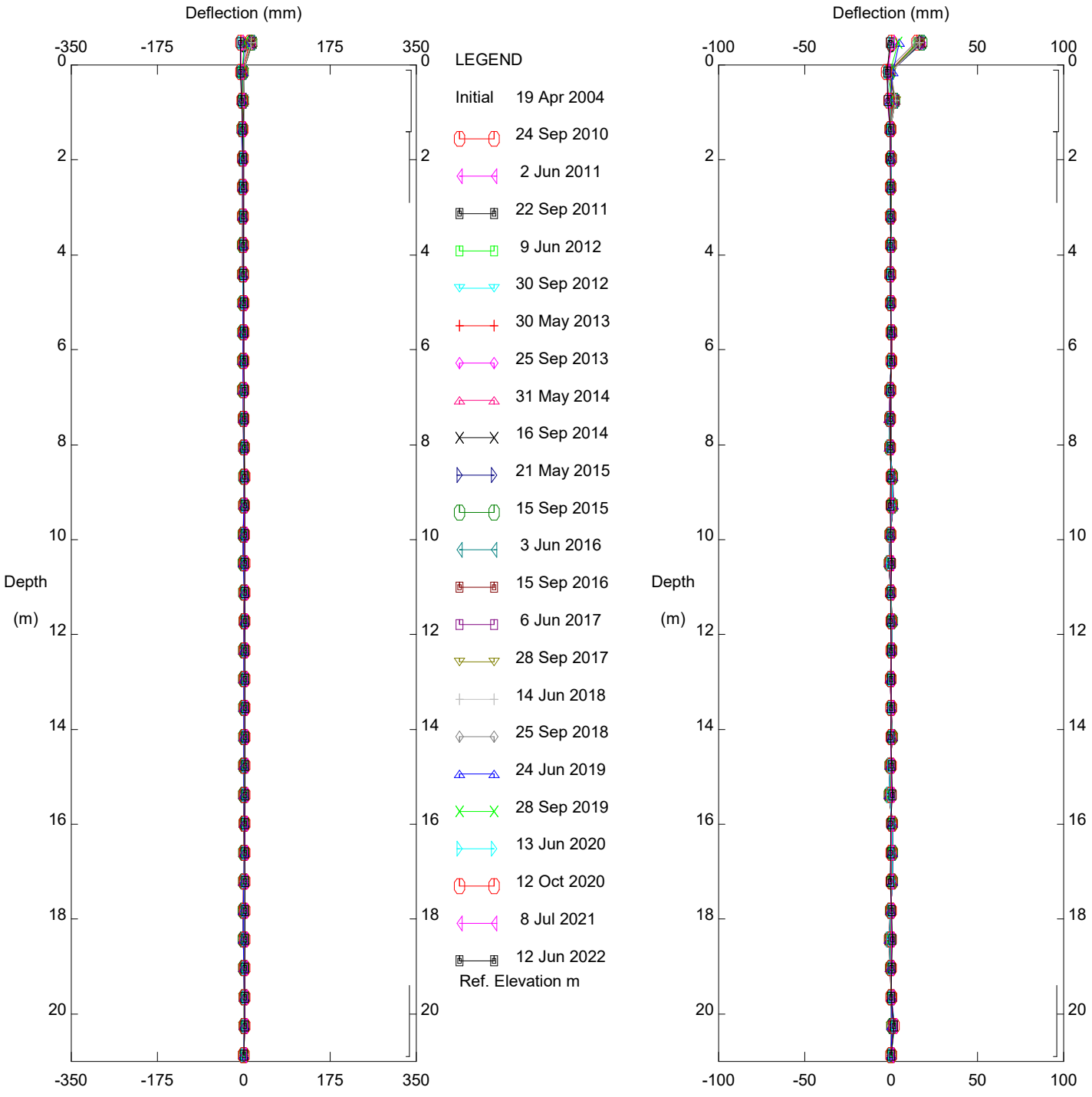


Cumulative Deflection

Direction B

Incremental Deflection

Direction B

HWY 986:01 - STA. 13+540, Inclinometer SI04-3

Alberta Transportation

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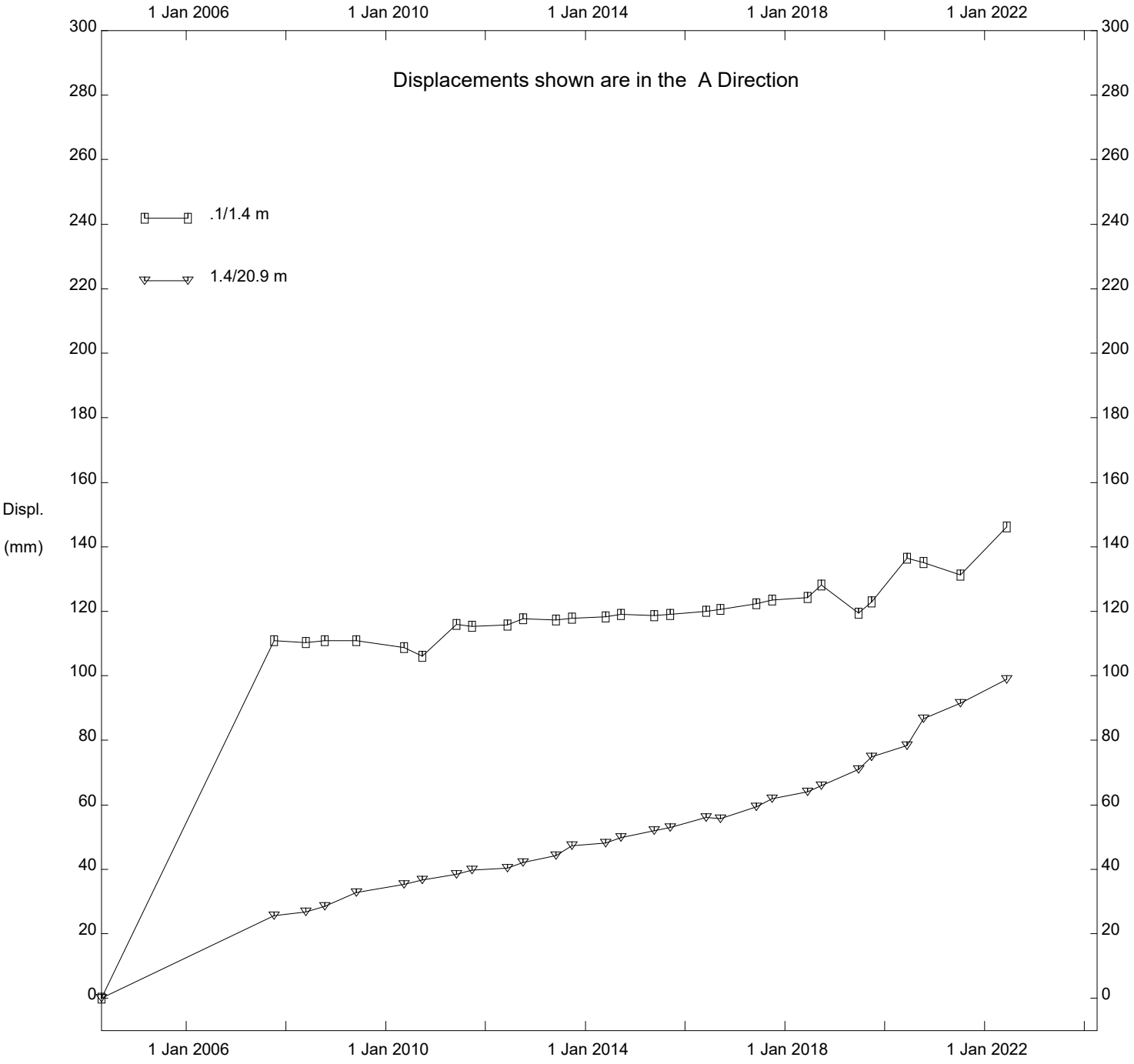


HWY 986:01 - STA. 13+540, Inclinometer SI04-3

Alberta Transportation

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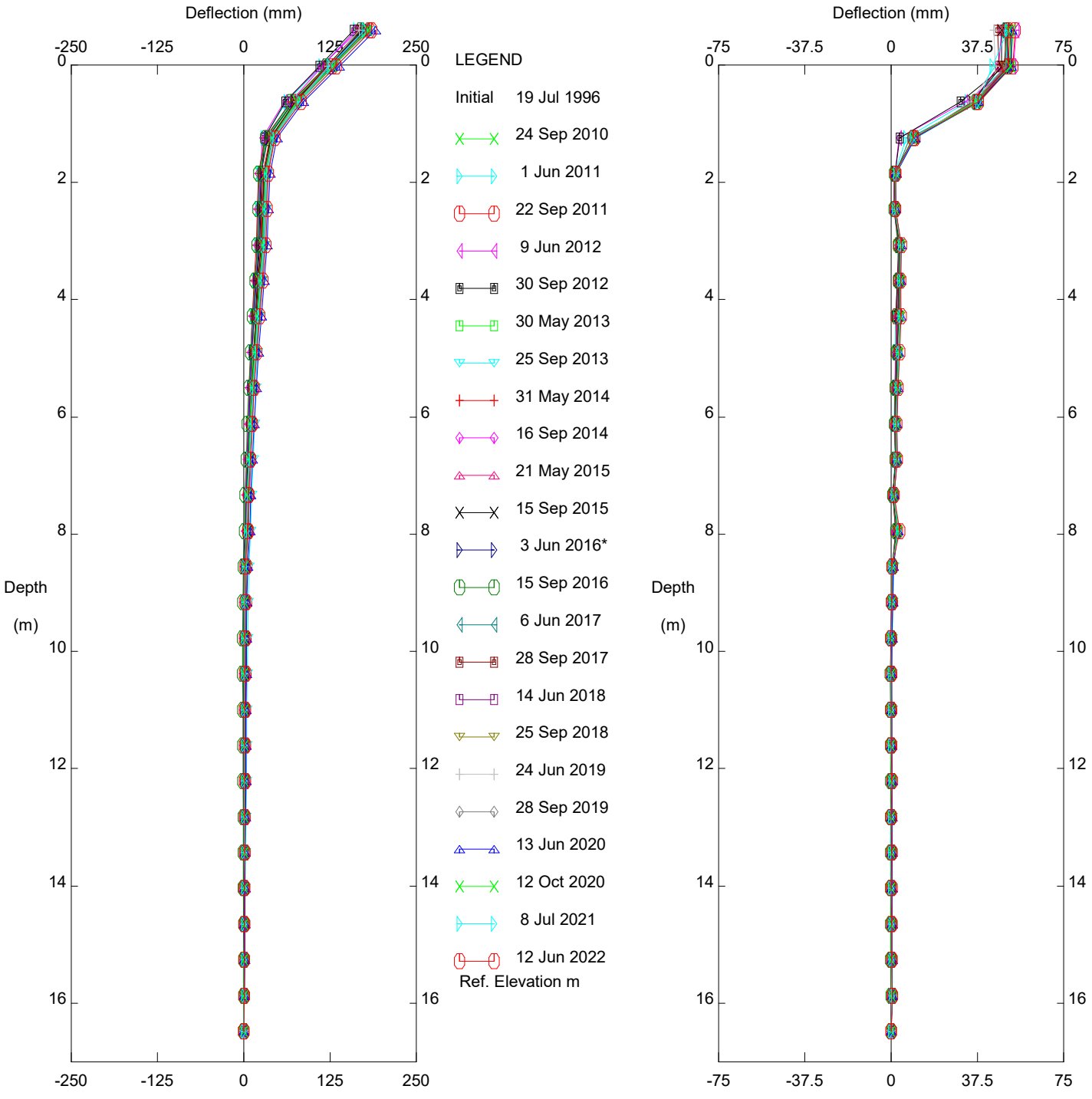


Cumulative Deflection

Direction A

Incremental Deflection

Direction A

HWY 986:01 - STA. 13+820, Inclinometer SI-7

Alberta Transportation

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

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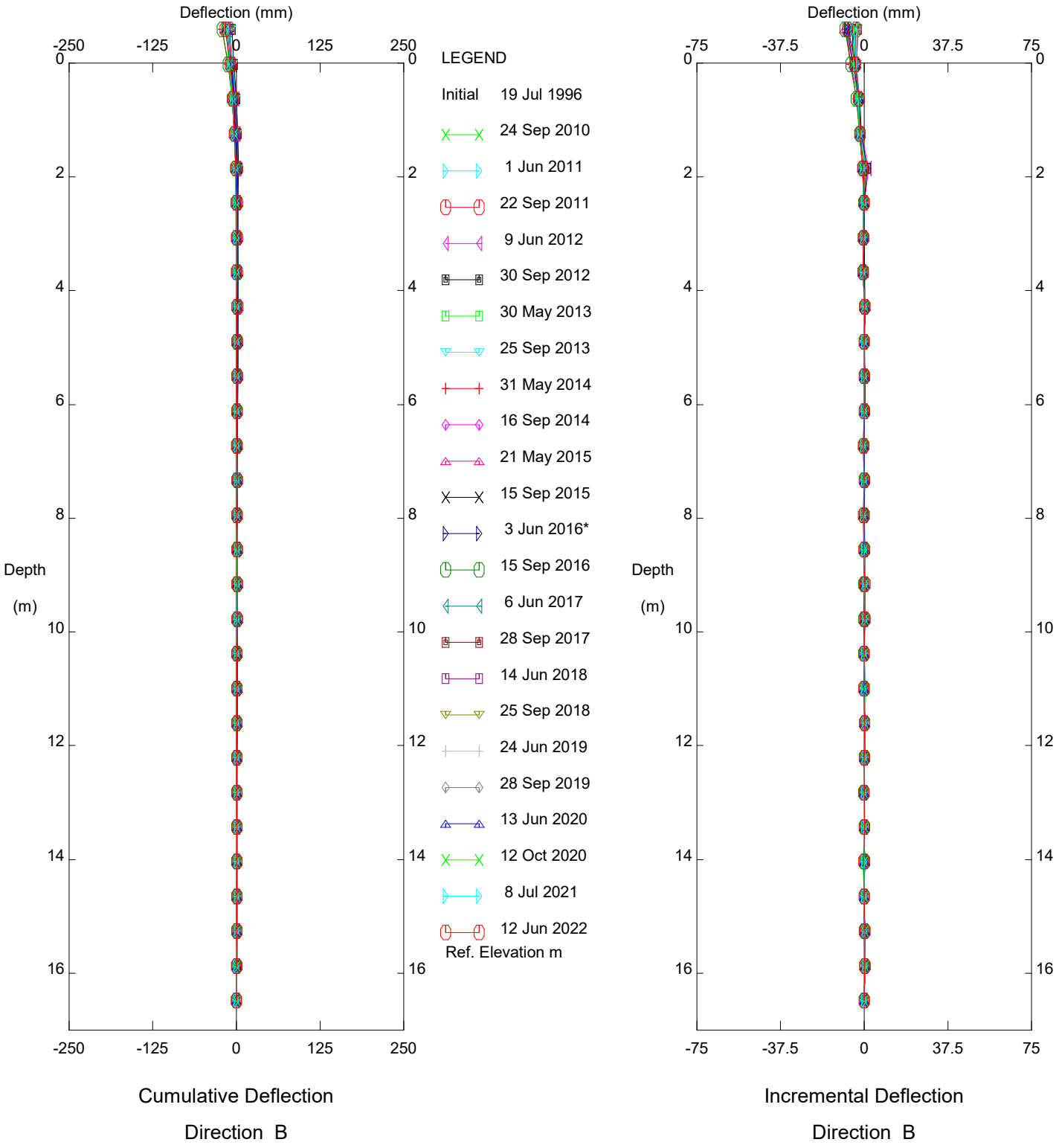


Cumulative Deflection

Direction B

Incremental Deflection

Direction B

HWY 986:01 - STA. 13+820, Inclinometer SI-7

Alberta Transportation

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

H:\32000\32121 AT GRMP Peace River District 2021-2025\Section C\2022A-Spring\SI Readings\PH043\SH986-07.GTL

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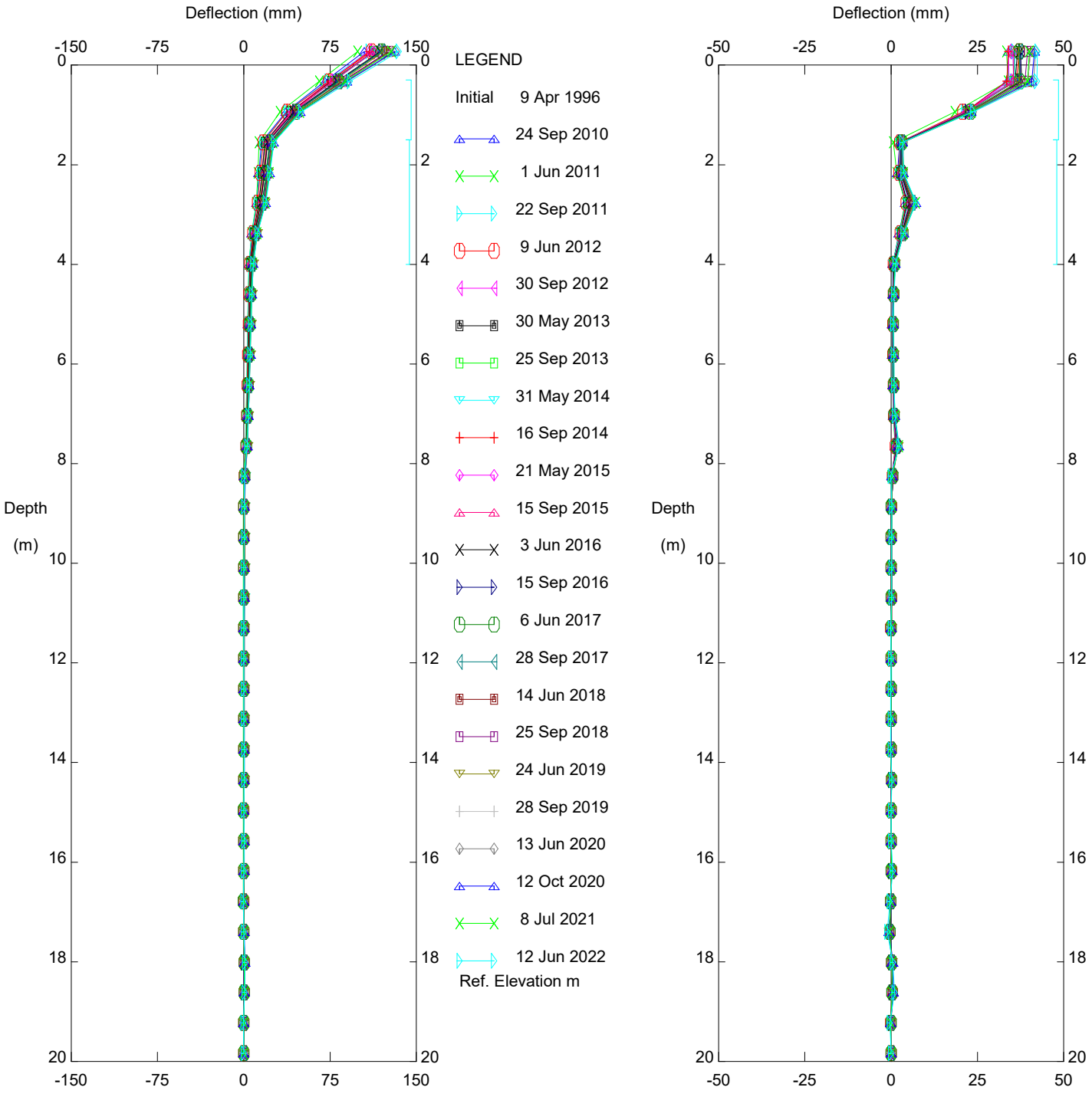


Cumulative Deflection

Direction A

Incremental Deflection

Direction A

HWY 986:01 - STA. 13+820, Inclinometer SI-8

Alberta Transportation

H:\32000\32121 AT GRMP Peace River District 2021-2025\Section C\2022A-Spring\SI Readings\PH043\SH986-08.GTL

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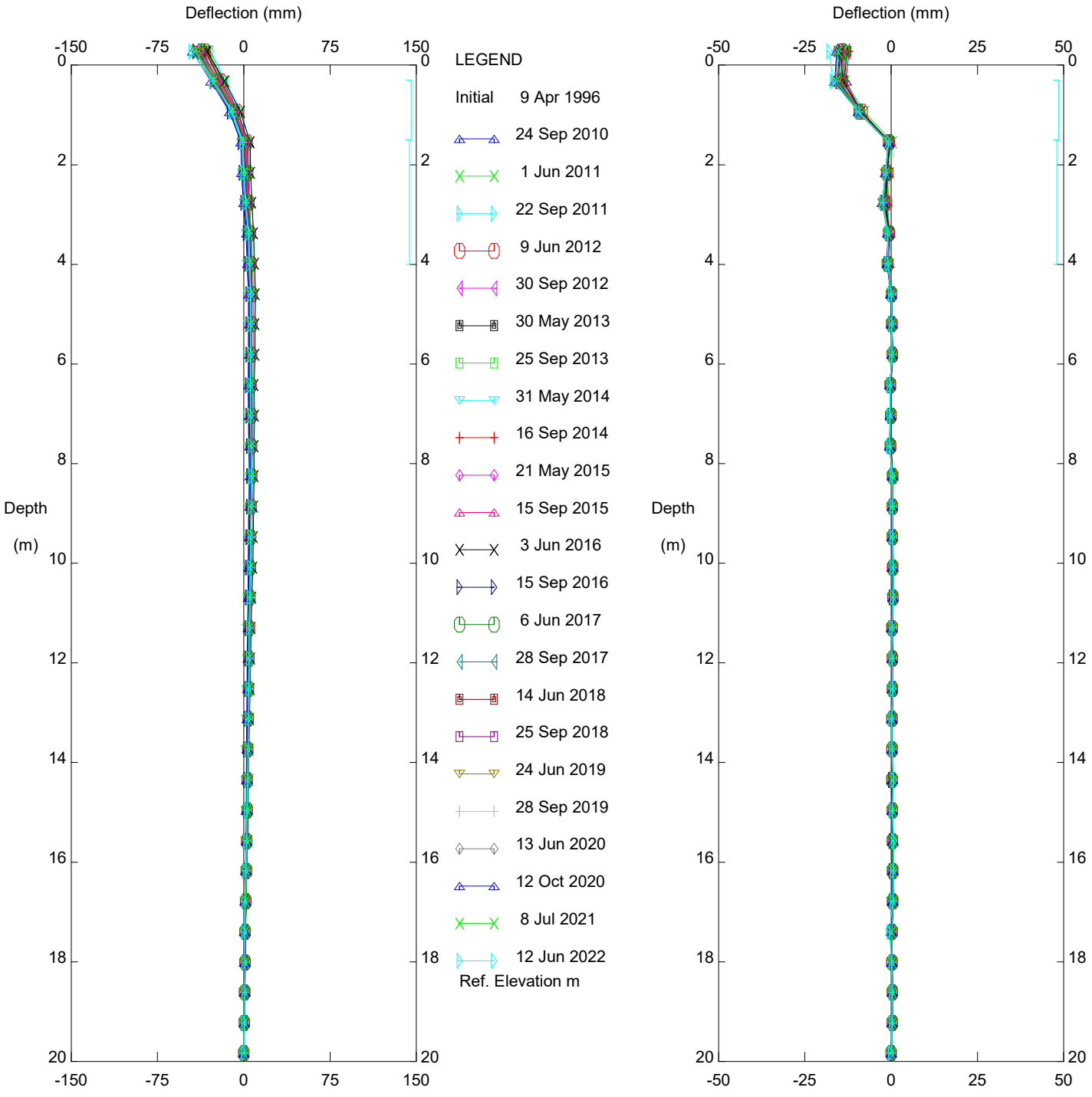


Cumulative Deflection

Direction B

Incremental Deflection

Direction B

HWY 986:01 - STA. 13+820, Inclinometer SI-8

Alberta Transportation

H:\32000\32121 AT GRMP Peace River District 2021-2025\Section C\2022A-Spring\SI Readings\PH043\SH986-08.GTL

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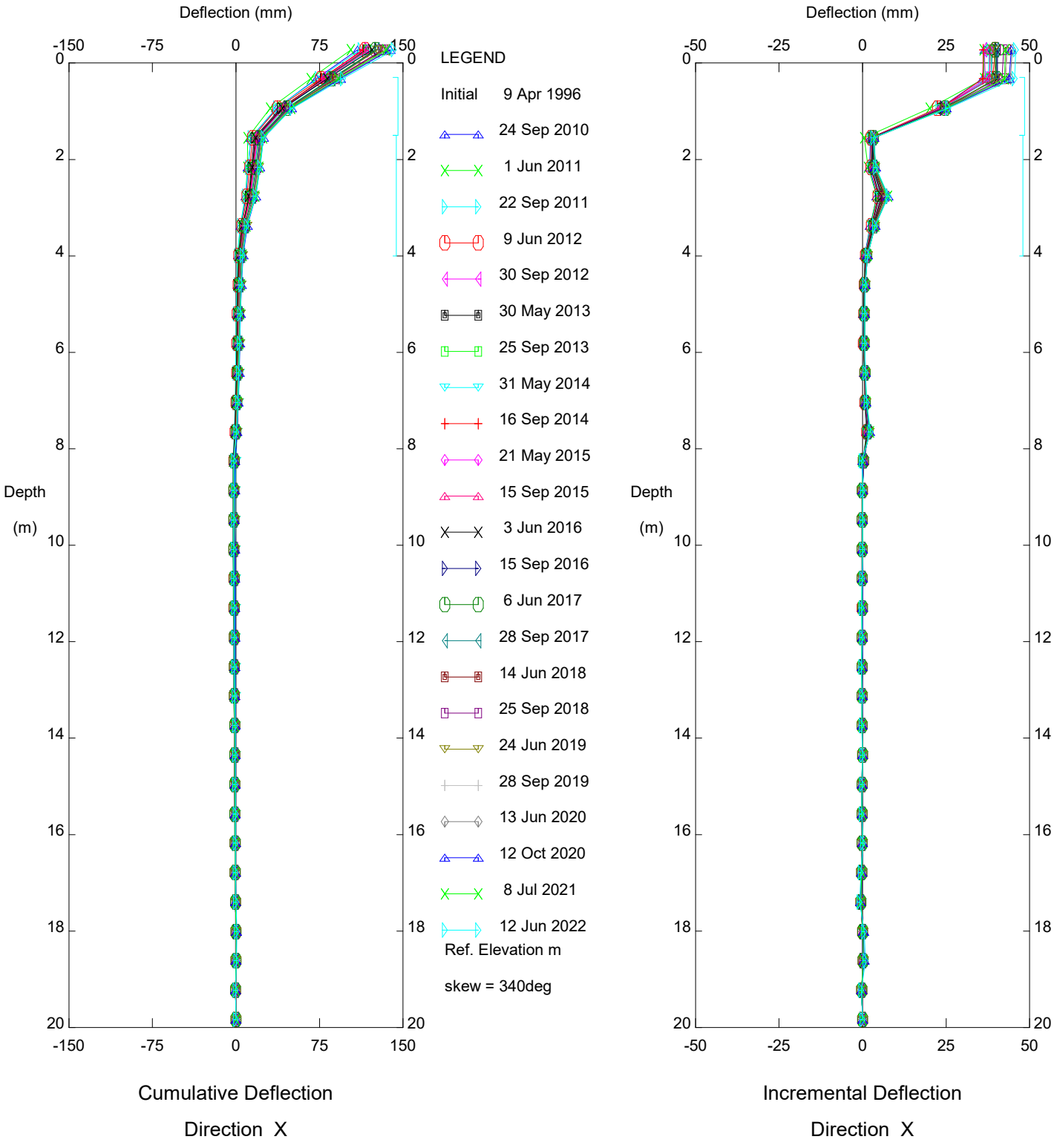


Cumulative Deflection

Direction X

Incremental Deflection

Direction X

HWY 986:01 - STA. 13+820, Inclinometer SI-8

Alberta Transportation

H:\32000\32121 AT GRMP Peace River District 2021-2025\Section C\2022A-Spring\SI Readings\PH043\SH986-08.GTL

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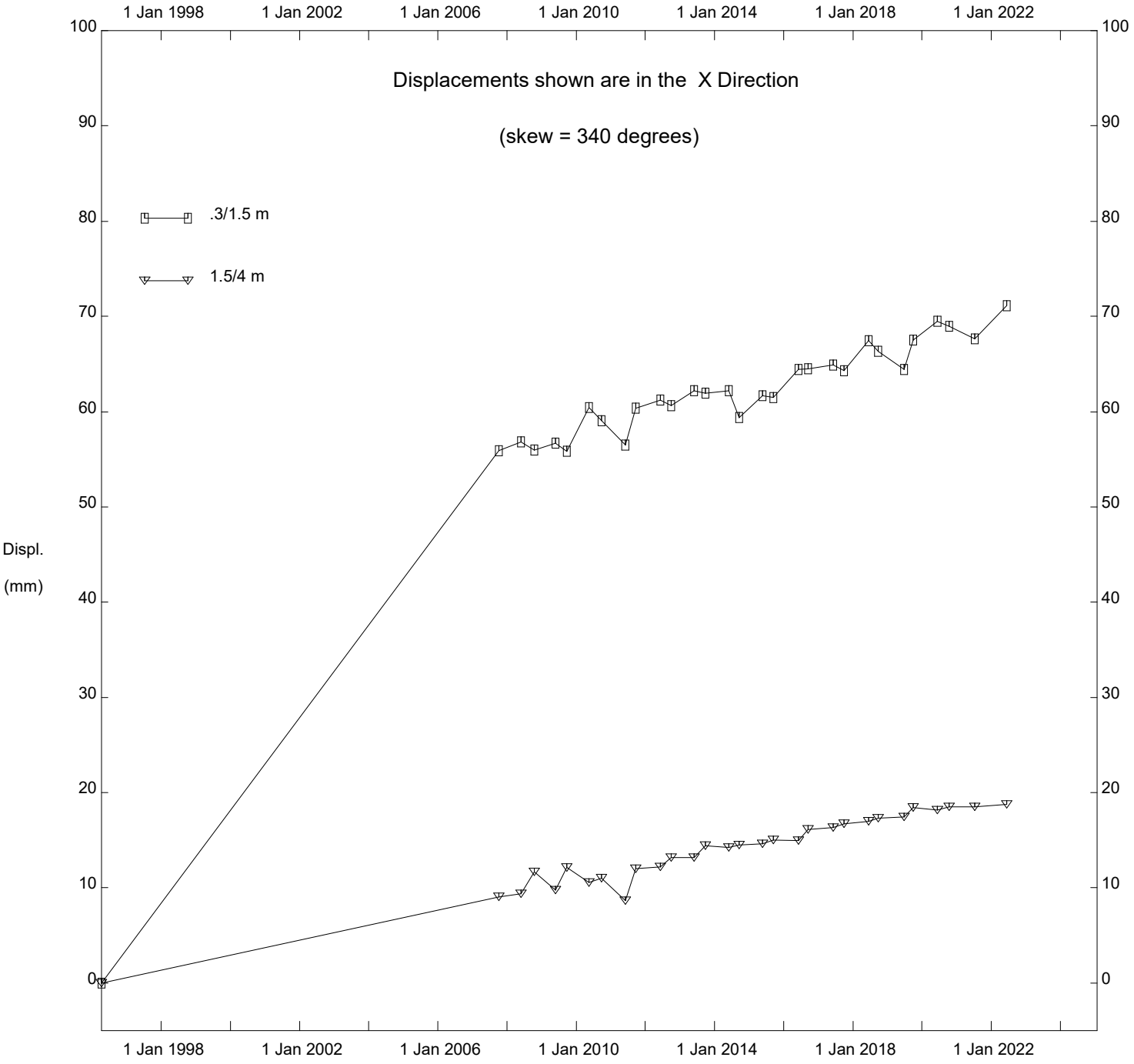
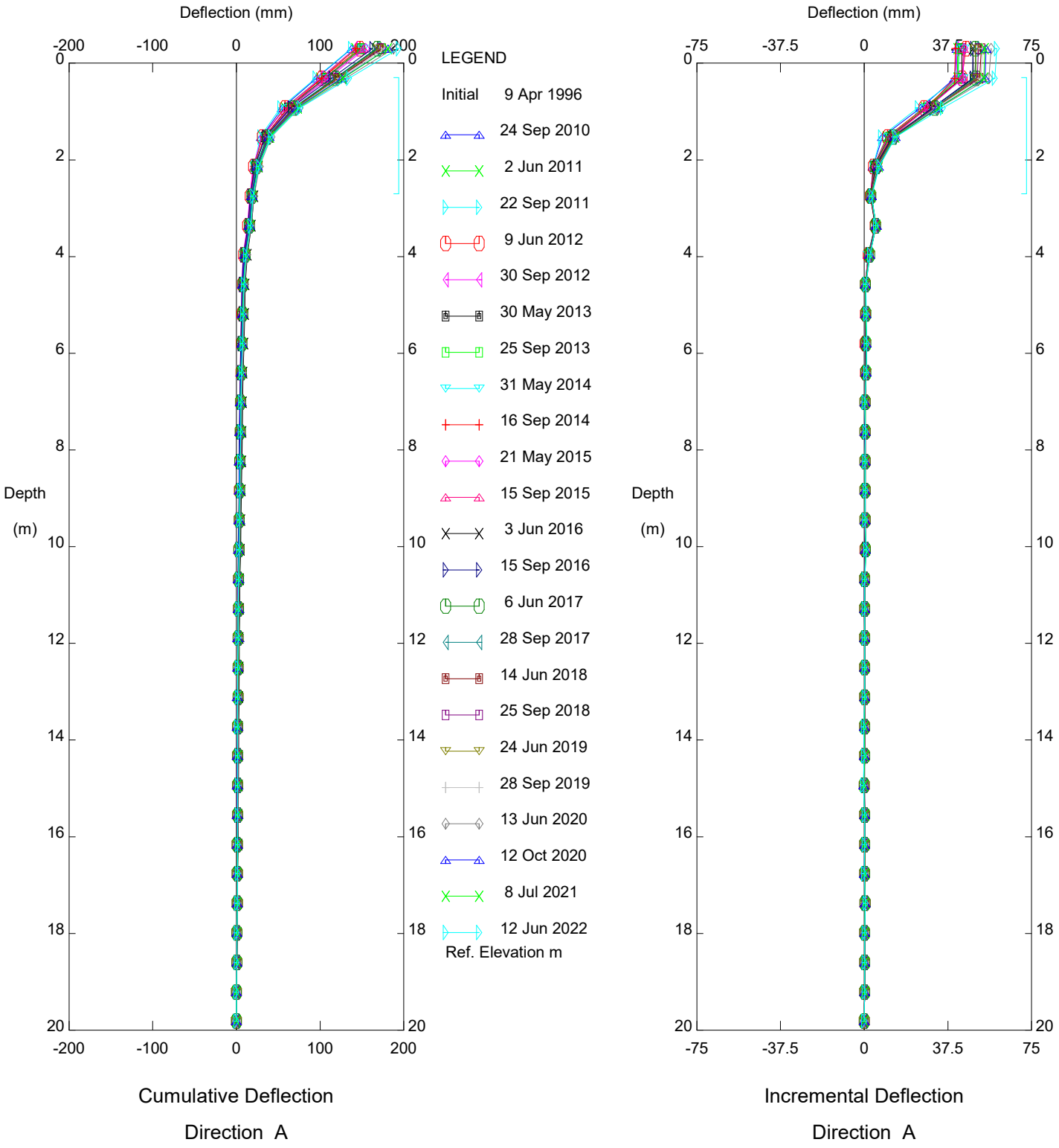



HWY 986:01 - STA. 13+820, Inclinometer SI-8

Alberta Transportation

Thurber Engineering Ltd.




Cumulative Deflection

Direction A

Incremental Deflection

Direction A

HWY 986:01 - STA. 13+820, Inclinometer SI-9

Alberta Transportation

H:\32000\32121 AT GRMP Peace River District 2021-2025\Section C\2022A-Spring\SI Readings\PH043\SH986-09.GTL

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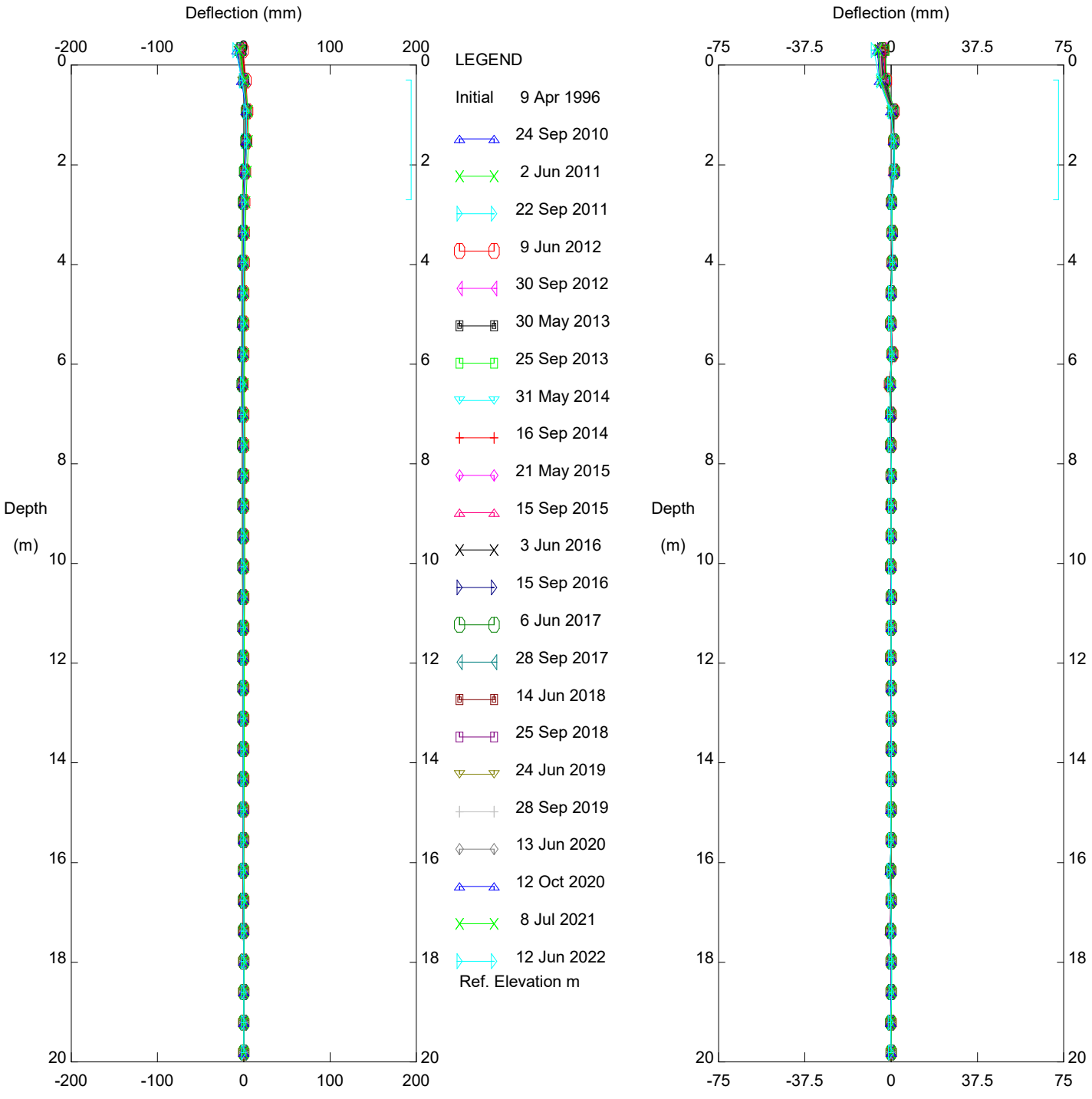


Cumulative Deflection

Direction B

Incremental Deflection

Direction B

HWY 986:01 - STA. 13+820, Inclinometer SI-9

Alberta Transportation

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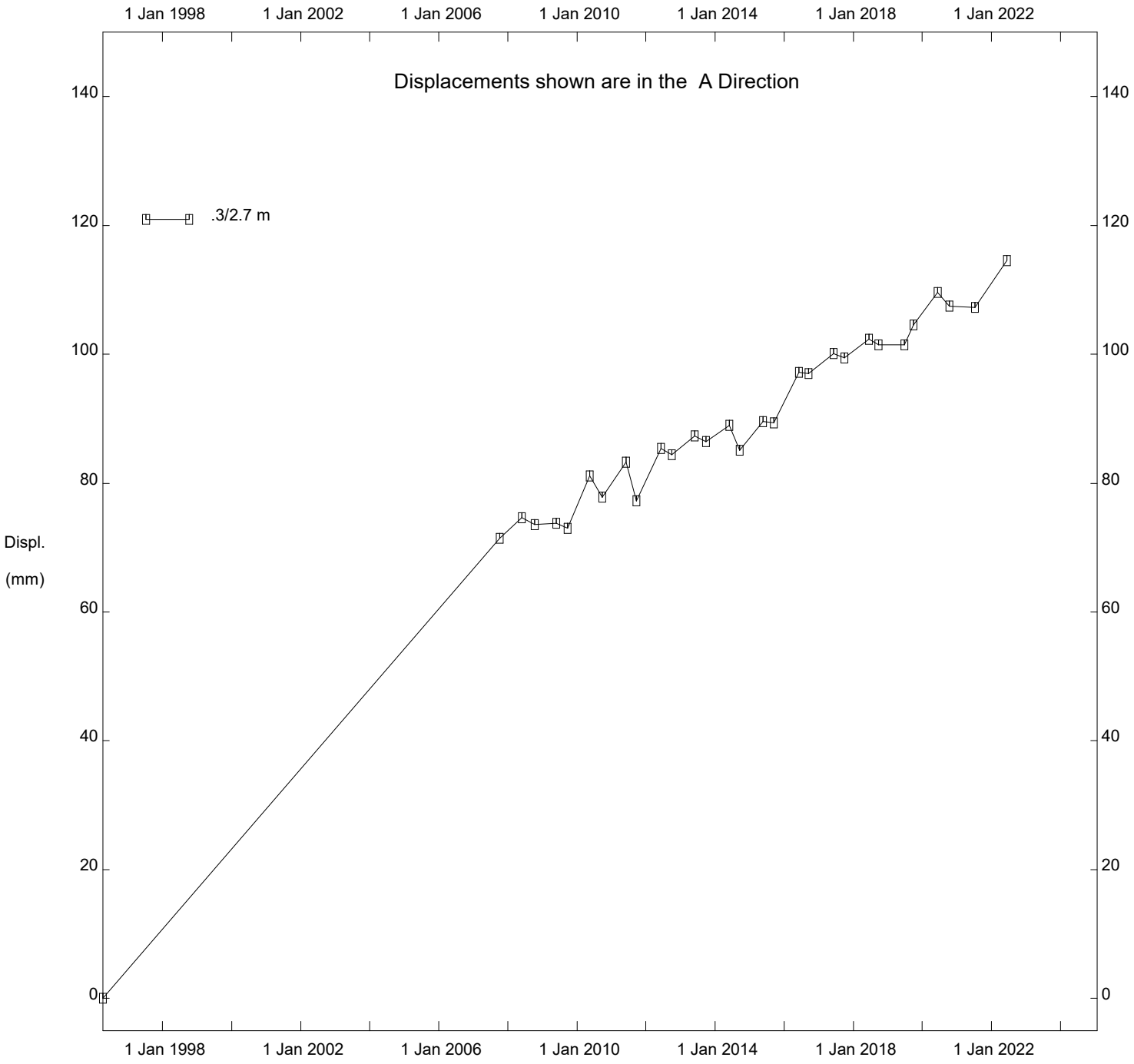


HWY 986:01 - STA. 13+820, Inclinometer SI-9

Alberta Transportation

# FIGURE PH043-1
# PIEZOMETRIC ELEVATIONS FOR HWY 986:01 DAISHOWA EAST HILL

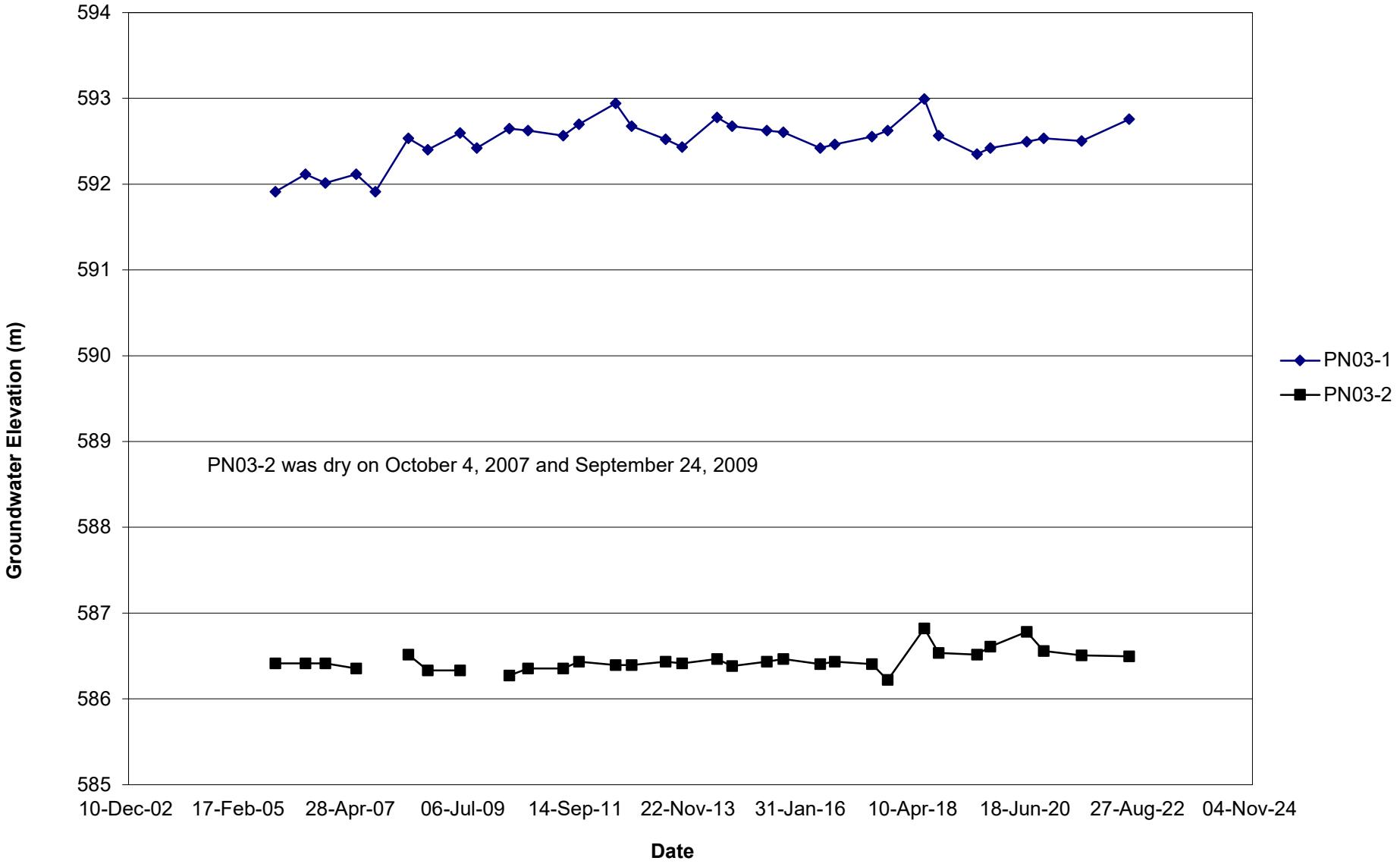

**FIGURE PH043-2**
**PIEZOMETRIC DEPTHS FOR HWY 986:01 DAISHOWA EAST HILL**