



**THURBER** ENGINEERING LTD.

August 19, 2021

File No.: 32122, Task C

Alberta Transportation  
Twin Atria Building  
4999 – 98 Avenue  
Edmonton, Alberta  
T6B 2X3

Attention: Mr. Bernard Ching, P.Eng.

**ALBERTA TRANSPORTATION GRMP (CON0022163)  
NORTH CENTRAL (ATHABASCA AND FORT McMURRAY DISTRICTS)  
INSTRUMENTATION MONITORING RESULTS – SPRING 2021**

**SECTION C**

**SITE NC017A: HWY 63:12 TWINNING PROJECT**

Dear Mr. Ching:

This report provides the results of the bi-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**

The site was visited on June 28, 2021 by Mr. Niraj Regmi, G.I.T. and Mr. Long Le, both of Thurber Engineering Ltd. The only operational slope inclinometer (SI99-2) was found to have sheared at 22.3 m depth below the top of the casing since the fall of 2020 readings. This depth is consistent with the depth of movement previously observed in the SI.

**2. DATA PRESENTATION**

**2.1 General**

SI plots from the previous reading of SI99-2 in the fall of 2020 are included in Appendix A for reference. The slope inclinometer reading summary table is also included below. 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 historical movement in the slope inclinometers are summarized in Table NC017A-1 below. Table NC017A-1 also provides an account of the total movement, the depth of movement and the maximum rate of movement that has occurred in the SIs since initialization.



**TABLE NC017A-1  
 SPRING 2021 – HWY 63:12 TWINNING PROJECT  
 SLOPE INCLINOMETER INSTRUMENTATION READING SUMMARY**

Date Monitored: June 28, 2021

<b>INSTRUMENT #</b>	<b>DATE INITIALIZED</b>	<b>TOTAL CUMULATIVE RESULTANT MOVEMENT AND DEPTH OF MOVEMENT TO DATE (mm)</b>	<b>MAXIMUM RATE OF MOVEMENT (mm/yr)</b>	<b>CURRENT STATUS OF SI</b>	<b>DATE OF PREVIOUS READING</b>	<b>INCREMENTAL MOVEMENT SINCE PREVIOUS READING (mm)</b>	<b>CURRENT RATE OF MOVEMENT (mm/yr)</b>	<b>CHANGE IN RATE OF MOVEMENT SINCE PREVIOUS READING (mm/yr)</b>
SI99-1	Oct. 22, 1999	13.3 over 1.3m to 3.7 m depth in 123° direction	17.8 between Oct. 2008 and May 2009	Sheared off at 3.7m depth	May 26, 2009	N/A	N/A	N/A
		3.3 over 13.5 m to 15.3 m depth in 123° direction	78.5 between Oct. 22, 1999 and Oct. 25, 1999			N/A	N/A	N/A
SI99-2	Nov. 4, 1999	52.5 over 20.9 m to 22.8 m depth in 75° direction	32.8 between Nov. 4 and 10, 1999	Sheared at 22.3 m below top of casing	Sept. 23, 2020	N/A	N/A	N/A
SI99-3	Oct. 22, 1999	N/A	N/A	Sheared off at 2.6m depth	Sept. 22, 2004	N/A	N/A	N/A
SI99-4	Oct. 22, 1999	N/A	N/A	Sheared off at 2.1m depth	Jun. 15, 2007	N/A	N/A	N/A
SI99-4R (replacement for SI99-4)	Sept. 14, 2006	16.3 over 0.3 m to 2.1 m depth in 135° direction	7.3 between May 2009 and Oct 2009	Destroyed	Sept. 19, 2011	N/A	N/A	N/A

Drawing 32122-NC017A-1 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site



### **3. INTERPRETATION OF MONITORING RESULTS**

SI99-2 had previously shown a rate of movement of 1.4 mm/yr over 20.9 m to 22.8 m and a total cumulative movement of 52.5 mm when it was last read in the fall of 2020.

### **4. RECOMMENDATIONS**

#### **4.1 Future Work**

There are no operational instruments at this site. The site should be removed from the instrument monitoring program unless it is planned to replace sheared off slope inclinometers within the actively moving backslope failures.

#### **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.

Bruce Nestor, P.Eng.  
Geotechnical Engineer

#### **Attachments**

- Statement of Limitations and Conditions
- Appendix A
  - Field Inspector's report
  - Site Plan Showing Approximate Instrument Locations (Drawing No. 32122-NC017A)
  - SI Reading Plots (from Fall 2020)



## 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.



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

**SPRING 2021**

**APPENDIX A  
DATA PRESENTATION**

**SITE NC017A: HWY 63:12 TWINNING PROJECT**

ALBERTA TRANSPORTATION  
 NORTH CENTRAL REGION - ATHABASCA AND FORT McMURRAY DISTRICTS  
 INSTRUMENTATION MONITORING FIELD SUMMARY (NC017A)  
 SPRING 2021

<b>Location:</b> 2+710 Backslope Failure (HWY 63:12 L1 1.478) <b>File Number:</b> 32122 <b>Probe:</b> RST Set 5R <b>Cable:</b> RST Set 5R	<b>Readout:</b> None <b>Casing Diameter:</b> 3.34" <b>Temp:</b> 29 <b>Read by:</b> NKR / LL
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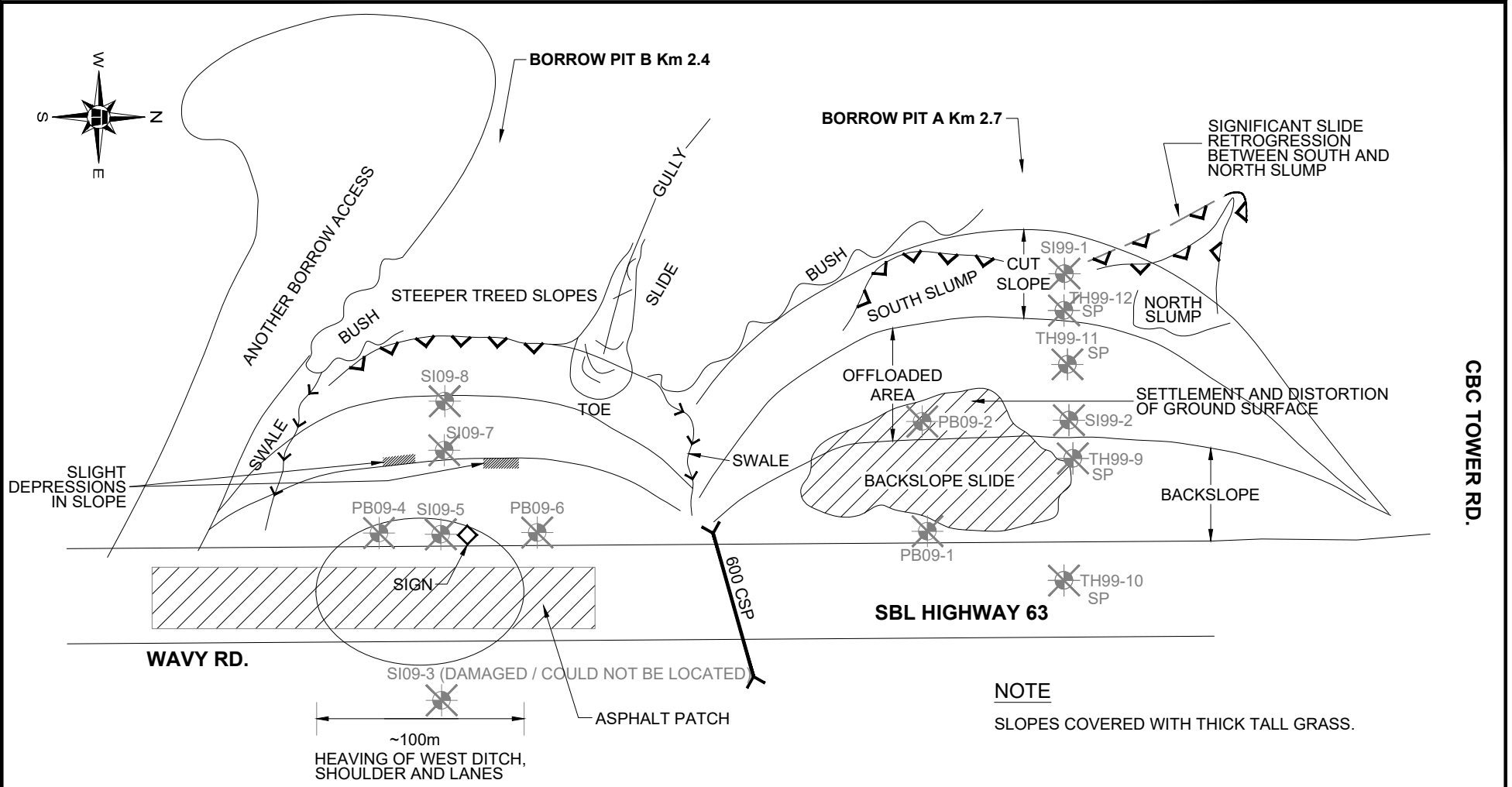
**SLOPE INCLINOMETER (SI) READINGS**

SI#	GPS Location (UTM 12)		Date	Stickup (m)	Depth from top of casing (ft)	Azimuth of A+ Groove degree	Current Bottom Depth Readings				Probe/ Reel #	Remarks
	Easting (m)	Northing (m)					A+	A-	B+	B-		
S199-2	473364.6	6295274.83	28-Jun-21	0.71	77 to 5	55	624	-612	-4	-17	SR/SR	* Read with 1 ft extension

**INSPECTOR REPORT**

Hard to push the probe past 75 to 76 ft depth. Use dummy probe for Spring readings * Sheared at 73 ft

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**NOTE**  
SLOPES COVERED WITH THICK TALL GRASS.

**NOTES**

- 1. PREVIOUS OBSERVATIONS ARE SHOWN IN BLACK

**LEGEND**

- EXISTING TEST HOLE
- SHEARED INSTRUMENT
- SI = SLOPE INCLINOMETER / PNEUMATIC PIEZOMETER
- PB = POORBOY / STANDPIPE PIEZOMETER
- SP = STANDPIPE PIEZOMETER



**NORTH CENTRAL  
(ATHABASCA AND FORT MCMURRAY DISTRICTS)  
NC017A - HWY 63:12 NORTH OF FORT MCMURRAY  
SITE PLAN SHOWING APPROXIMATE  
INSTRUMENT LOCATIONS  
DWG No. 32122-NC017A**

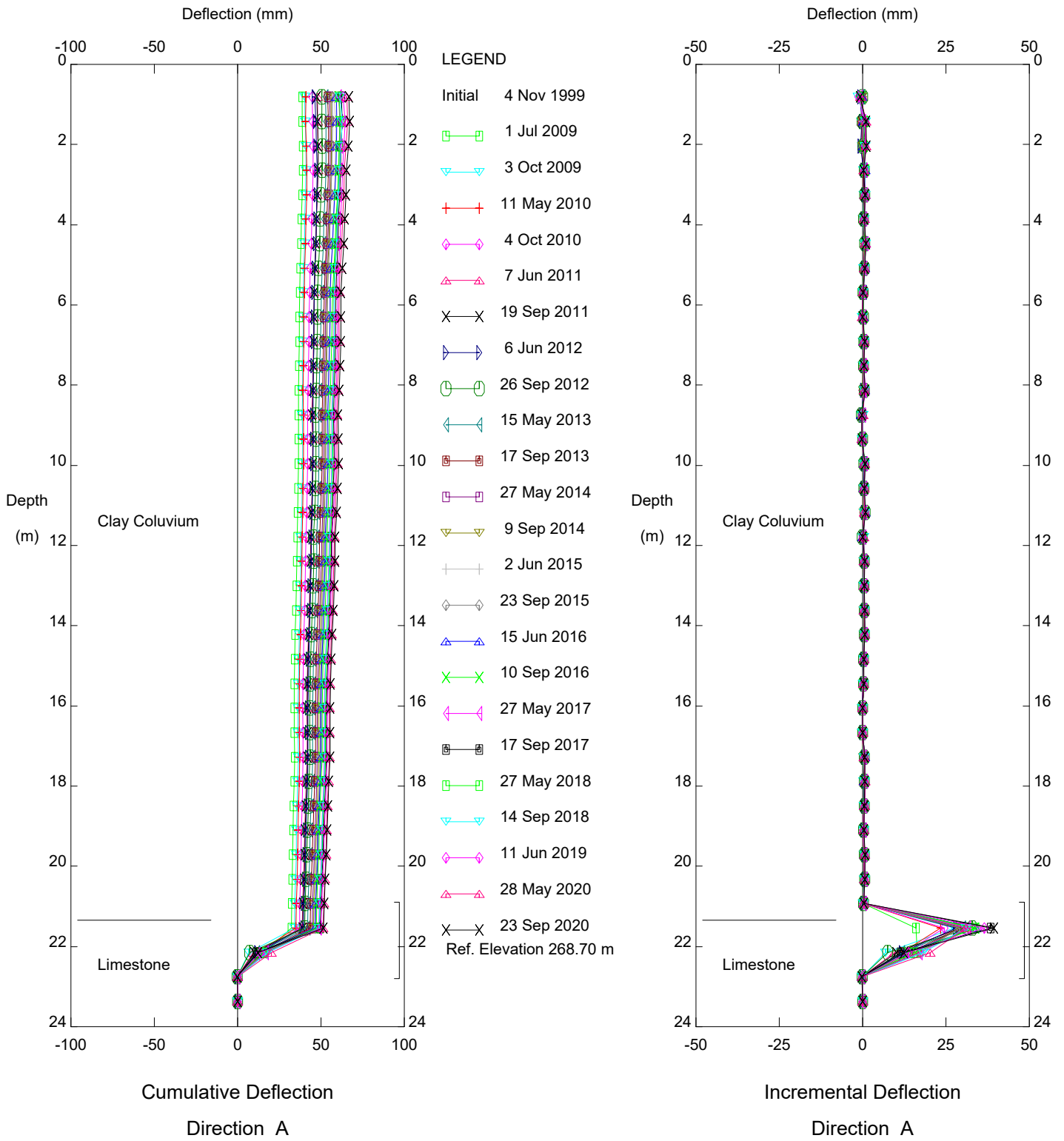
DRAWN BY	ML
DESIGNED BY	BWN
APPROVED BY	TSA
SCALE	N.T.S.
DATE	JULY 2021
FILE No.	32122



CBC TOWER RD.



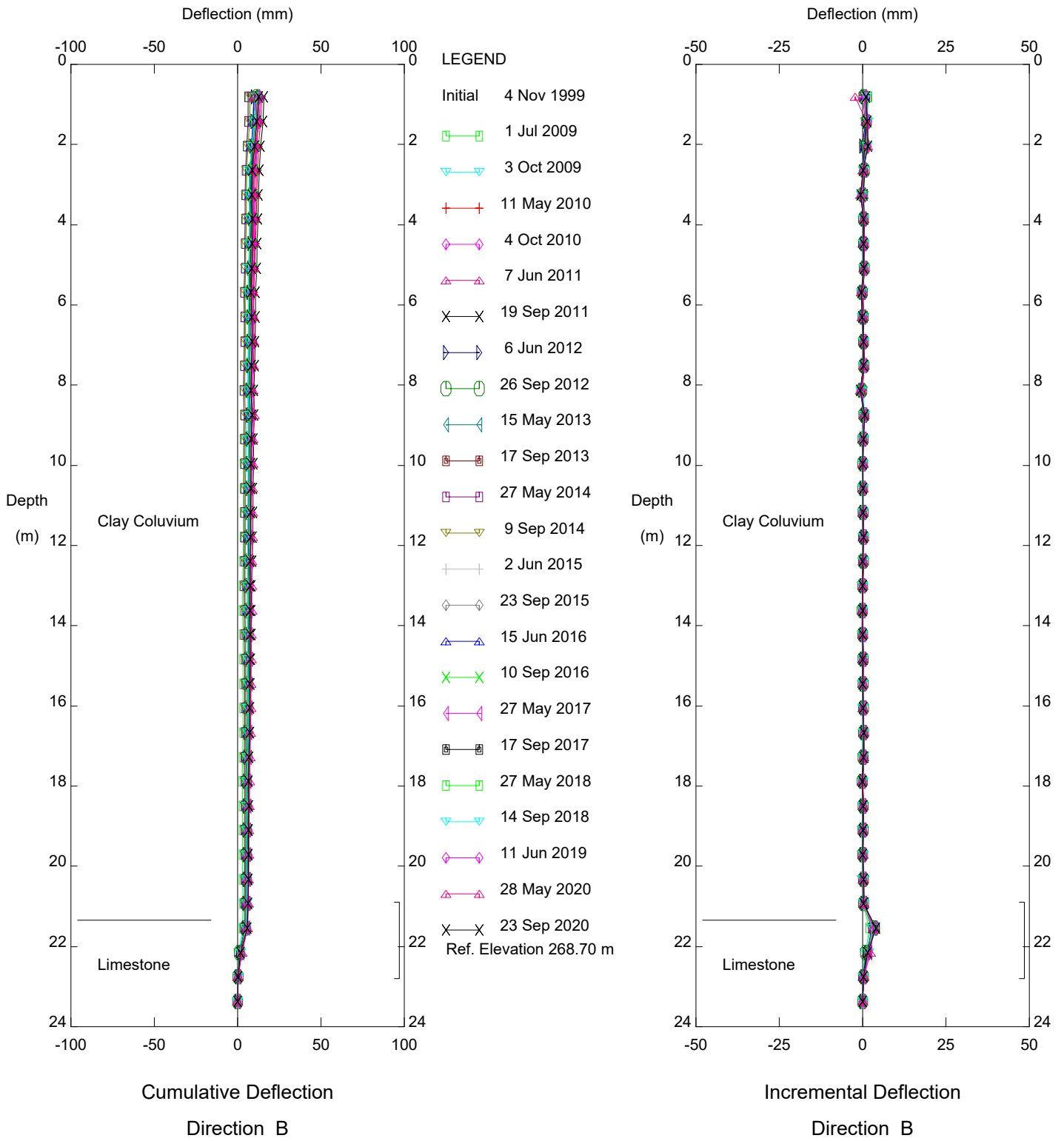
Thurber Engineering Ltd



Hwy 63:12 Twinning (NC017A-1), Inclinometer SI99-2

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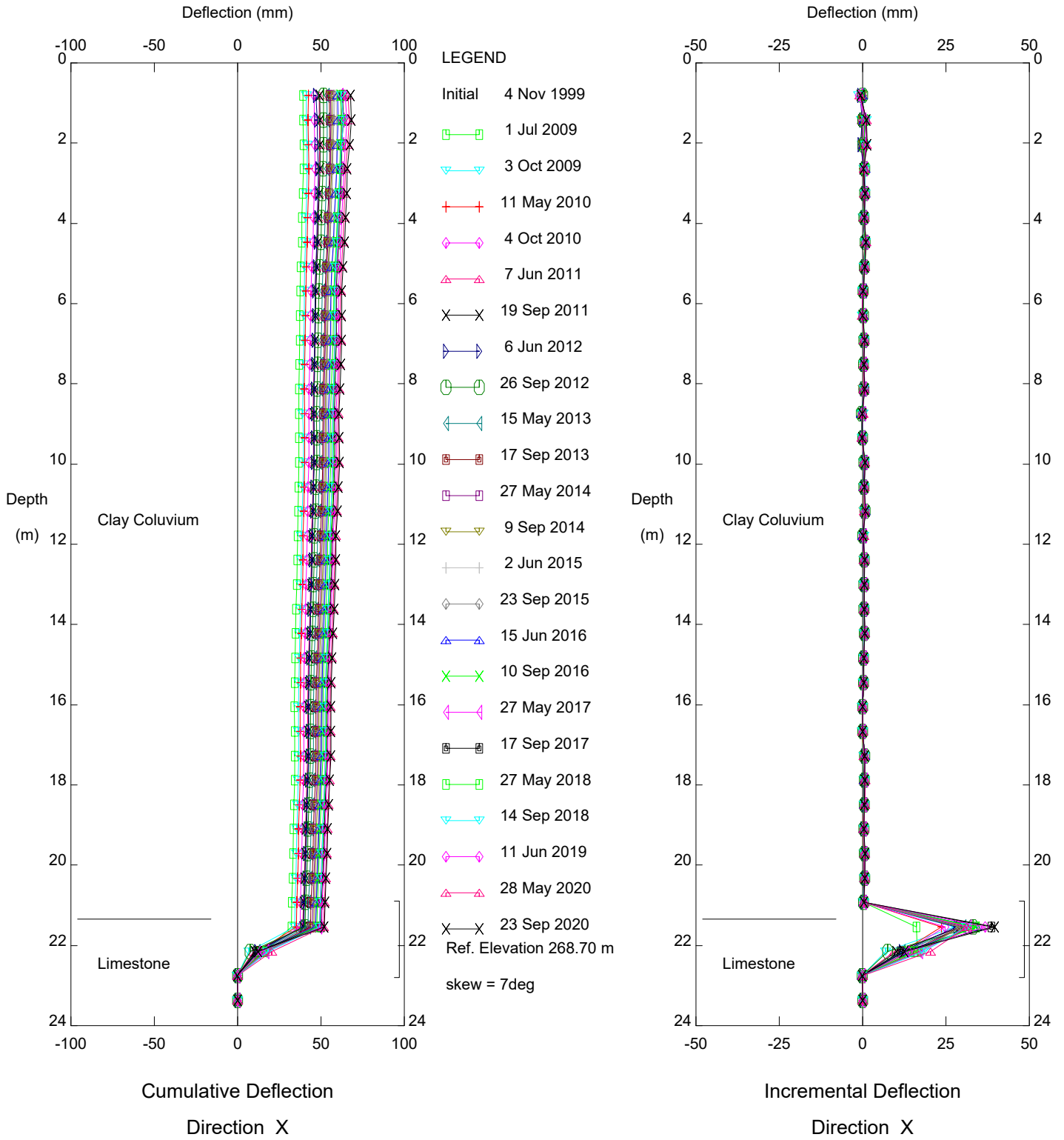
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Hwy 63:12 Twinning (NC017A-1), Inclinometer SI99-2

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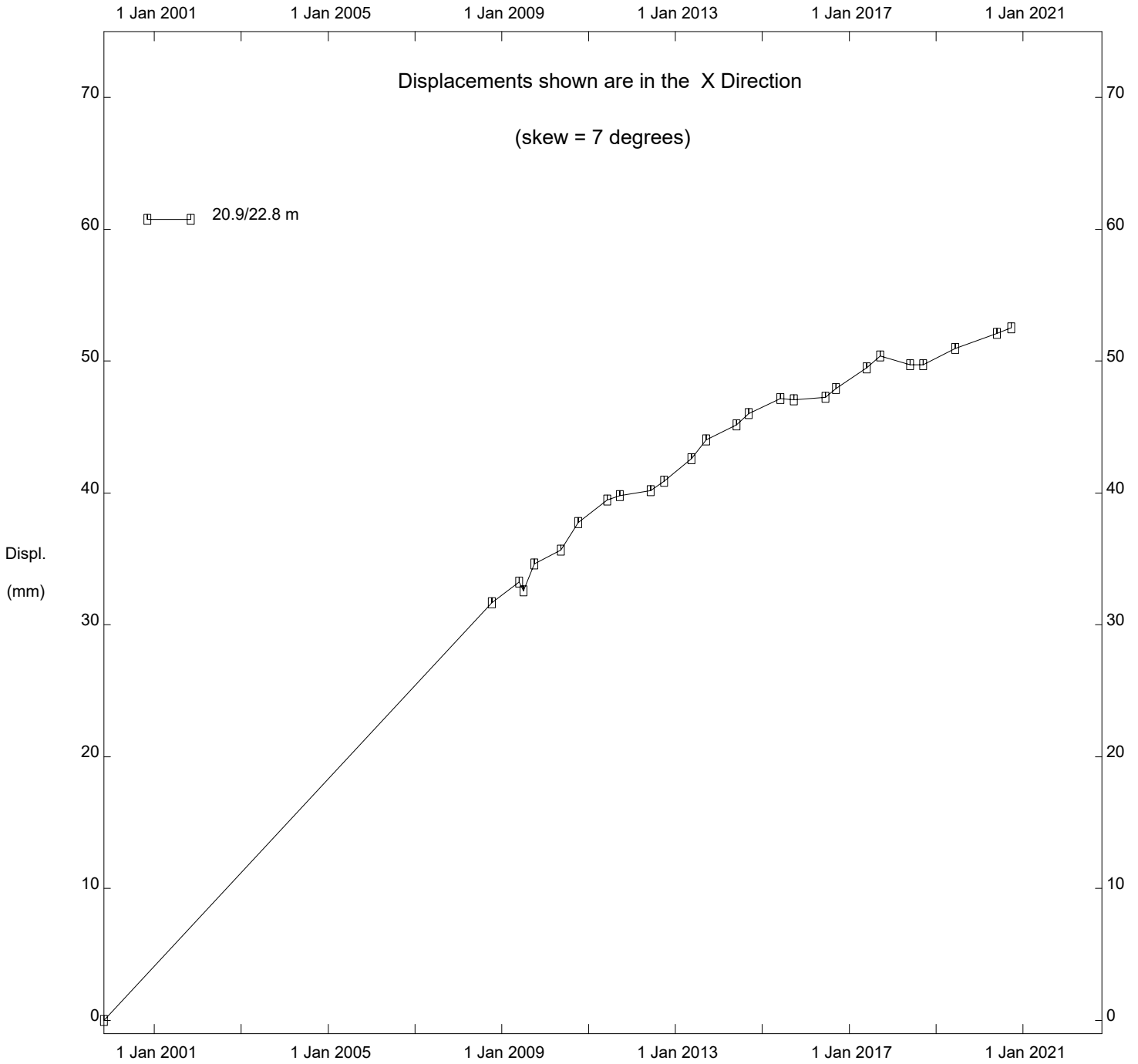
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