THURBER ENGINEERING LTD.

November 22, 2022 File No.: 32123

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

Attention: Mr. Ed Szmata

ALBERTA TRANSPORTATION GRMP (CON0022165)
PEACE REGION (GRANDE PRAIRIE DISTRICT – NORTH)
INSTRUMENTATION MONITORING RESULTS – FALL 2022

SECTION C

SITE PH023: HWY 64:02, CLEAR RIVER EAST HILL (SITE 5 – TWIN PIPES LANDSLIDE)

Dear Mr. Szmata:

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 Peace Region Grande Prairie District – North (CON0022165).

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

Five slope inclinometers (SI20-1, SI20-4, SI20-5, SI20-7 and SI20-8), and thirteen pneumatic piezometers (PN20-1A, 1B, 2A, 2B, 3A, 3B, 4A, 5A, 5B, 7A, 7B, 8A and 8B) were read at the Hwy 64:02 Clear River East Hill (Site 5 – Twin Pipes Landslide) site on October 1, 2022 by Mr. Niraj Regmi, G.I.T. and Mr. Kyle Crooymans, both of Thurber Engineering Ltd. Unfortunately, SI20-6, PN20-6A and PN20-6B were not read due to safety reasons because of recent bear activity in the area. SI20-4, SI20-5, and SI20-8 were found to have been sheared off at 7.9 m, 11.6 m, and 36.2 m below the respective top of instrument casings since the spring of 2022 readings.

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

2. DATA PRESENTATION

2.1 General

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

Slope inclinometer and piezometer reading summary tables are provided below.

2.2 Zones of Movement

Since the last set of readings in the spring of 2022, no new zones of movement were observed.

Zones of movements are summarized in Table PH023-1 below. Table PH023-1 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 PH023-1
FALL 2022 – HWY 64:02, CLEAR RIVER EAST HILL (SITE 5 – TWIN PIPES LANDSLIDE)
SLOPE INCLINOMETER INSTRUMENTATION READING SUMMARY

Date Monitored: October 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-9	*May 8, 1996*	*126.0 mm over 3.6 m to 7.9 m depth in 284° direction*	*159.3 mm/yr in October 2020*	*Sheared at 5.5 m below top of casing*	*October 18, 2021*	*N/A*	*N/A*	*N/A*
		36.2 mm over 9.7 m to 11.6 m depth in 116° direction	*43.0 mm/yr. in October 2020*			*N/A*	*N/A*	*N/A*
		16.9 mm over 11.6 m to 13.4 m depth in 116° direction	*14.7 mm/yr. in October 2020*			*N/A*	*N/A*	*N/A*
SI20-1	October 11, 2020	73.1 mm over 3.7 m to 5.6 m depth in 7° direction	49.6 mm/yr in October 2022	Operational	June 20, 2022	14.0	49.6	10.4
		8.6 mm over 50.1 m to 54.3 m depth in 7° direction	5.0 mm/yr in June 2022			1.2	4.2	-0.8
SI20-2	*October 11, 2020*	*39.5 mm over 31.8 m to 34.2 m depth in 193° direction*	*59.6 mm/yr in July 2021*	*Sheared at 33.2 m below top of casing*	*October 18, 2021*	*N/A*	*N/A*	*N/A*
		4.2 mm over 42.1 m to 43.4 m depth in 213° direction	*7.1 mm/yr in October 2020*			*N/A*	*N/A*	*N/A*
SI20-3	*October 11, 2020*	*48.0 mm over 19.6 m to 21.4 m depth in 213° direction*	*75.1 mm/yr in July 2021*	*Sheared at 21.0 m below top of casing*	*October 18, 2021*	*N/A*	*N/A*	*N/A*

Drawing 32123-PH023 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site

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TABLE PH023-1 – CONTINUED…
FALL 2022 – HWY 64:02, CLEAR RIVER EAST HILL (SITE 5 – TWIN PIPES LANDSLIDE)
SLOPE INCLINOMETER INSTRUMENTATION READING SUMMARY

Date Monitored: October 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)
SI20-4	*October 11, 2020*	*49.8 mm over 6.2 m to 8.0 m depth in 197° direction*	*42.1 mm/yr in June 2022*	*Sheared at 7.6 m below top of casing*	*June 20, 2022*	*N/A*	*N/A*	*N/A*
		6.1 mm over 60.4 m to 62.3 m depth in 187° direction	*8.5 mm/yr in October 2020*			*N/A*	*N/A*	*N/A*
SI20-5	*October 11, 2020*	*70.9 mm over 9.4 m to 11.8 m depth in 200° direction*	*82.3 mm/yr in July 2021*	*Sheared at 11.6 m below top of casing*	*June 20, 2022*	*N/A*	*N/A*	*N/A*
		74.7 mm over 31.3 m to 35.6 m depth in 200° direction	*64.3 mm/yr in June 2022*			*N/A*	*N/A*	*N/A*
SI20-6	October 11, 2020	33.9 mm over 18.3 m to 20.1 m depth in 230° direction	73.1 mm/yr in July 2021	Operational, not read in 2022 due to bears	Oct. 18, 2021	N/A	N/A	N/A
		36.8 mm over 28.1 m to 31.1 m depth in 230° direction	62.6 mm/yr in July 2021			N/A	N/A	N/A
SI20-7	October 11, 2020	28.1 mm over 17.8 m to 19.6 m depth in 195° direction	52.3 mm/yr in October 2022	Operational	June 20, 2022	14.8	52.3	35.0
		9.5 mm over 31.8 m to 33.6 m depth in 204° direction	6.5 mm/yr in June 2022			1.8	6.4	~Same

Drawing 32123-PH023 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site

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TABLE PH023-1 – CONTINUED…
FALL 2022 – HWY 64:02, CLEAR RIVER EAST HILL (SITE 5 – TWIN PIPES LANDSLIDE)
SLOPE INCLINOMETER INSTRUMENTATION READING SUMMARY

Date Monitored: October 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)
SI20-8	*October 11, 2020*	*48.4 mm over 34.1 m to 36.6 m depth in 194° direction*	*53.0 mm/yr in June 2022*	*Sheared at 36.2 m below top of casing*	*October 18, 2021*	*N/A*	*N/A*	*N/A*

Drawing 32123-PH023 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site

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TABLE PH023-2
FALL 2022 – HWY 64:02, CLEAR RIVER EAST HILL (SITE 5 – TWIN PIPES LANDSLIDE)
PNEUMATIC PIEZOMETER INSTRUMENTATION READING SUMMARY

Date Monitored: October 1, 2022

INSTRUMENT #	DATE INITIALIZED	TIP DEPTH (m)	GROUND ELEV. (m)	CURRENT STATUS	HIGHEST MEASURED GROUNDWATER ELEVATION (m)	MEASURED PORE PRESSURE (kPa)	CURRENT GROUNDWATER ELEVATION (m)	PREVIOUS GROUNDWATER ELEVATION (m)	CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)
PN20-1A (38006)	October 11, 2020	27.43	515.79	Operational	506.29 on November 26, 2020	175.1	506.22	505.16	1.06
PN20-1B (38581)	October 11, 2020	57.91	515.79	Operational	492.82 on October 11, 2020	312.3	489.73	490.50	-0.77
PN20-2A (38240)	October 11, 2020	5.79	506.27	Operational	506.46 on June 20, 2022	51.0	505.69	506.46	-0.77
PN20-2B (37405)	October 11, 2020	36.58	506.27	Operational	497.81 on October 11, 2020	263.4	496.55	496.90	-0.35
PN20-3A (38242)	October 11, 2020	15.24	497.13	Operational	491.73 on October 18, 2021	93.1	491.38	491.45	-0.07
PN20-3B (37402)	October 11, 2020	30.48	497.13	Operational	491.89 on February 18, 2021	242.7	491.40	478.95	12.45
PN20-4A (38241)	October 11, 2020	6.40	517.15	Operational	511.10 on November 26, 2020	0.7	510.82	510.89	-0.07
PN20-4B (38580)	*October 11, 2020*	*51.82*	*517.15*	*Non-operational*	*469.06 on November 26, 2020*	*N/A*	*N/A*	*469.06 (Nov. 26, 2020)*	*N/A*

Drawing 32123-PH023 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site

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TABLE PH023-2 – CONTINUED…
FALL 2022 – HWY 64:02, CLEAR RIVER EAST HILL (SITE 5 – TWIN PIPES LANDSLIDE)
PNEUMATIC PIEZOMETER INSTRUMENTATION READING SUMMARY

Date Monitored: October 1, 2022

INSTRUMENT #	DATE INITIALIZED	TIP DEPTH (m)	GROUND ELEV. (m)	CURRENT STATUS	HIGHEST MEASURED GROUNDWATER ELEVATION (m)	MEASURED PORE PRESSURE (kPa)	CURRENT GROUNDWATER ELEVATION (m)	PREVIOUS GROUNDWATER ELEVATION (m)	CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)
PN20-5A (37853)	October 19, 2020	7.62	490.91	Operational	486.45 on June 20, 2022	26.9	486.03	485.56	0.47
PN20-5B (37403)	*October 19, 2020*	*49.99*	*490.91*	*Damaged*	*450.62 on October 19, 2020*	*0.7*	*N/A*	*440.99 (June 20, 2022)*	*N/A*
PN20-6A (38005)	October 11, 2020	15.24	489.15	Operational, not read in 2022	484.11 on July 15, 2021	N/A	N/A	484.11 (July 15, 2021)	N/A
PN20-6B (37404)	October 11, 2020	38.40	489.15	Operational, not read in 2022	468.82 on October 11, 2020	N/A	N/A	462.00 (October 18, 2021)	N/A
PN20-7A (38007)	October 11, 2020	13.41	492.55	Operational	484.56 on June 20, 2022	53.8	484.63	484.56	0.07
PN20-7B (38528)	October 11, 2020	53.34	492.55	Operational	450.81 on October 11, 2020	89.6	448.35	448.63	-0.28
PN20-8A (38239)	October 11, 2020	27.43	488.99	Operational	475.41 on October 1, 2022	135.8	475.41	475.27	0.14
PN20-8B (38583)	October 11, 2020	44.20	488.99	Operational	469.75 on October 24, 2020	224.1	467.64	469.19	-1.55

Drawing 32123-PH023 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site

3. INTERPRETATION OF MONITORING RESULTS

Overall, the SIs showed accelerated rates of movement compared to the previous readings in the spring of 2022.

SI20-1 showed current movement rates of 49.6 mm/yr and 4.2 mm/yr over 3.7 m to 5.6 m depth and 50.1 m to 54.3 m depth, respectively. SI20-7 showed rates of movement of 52.3 mm/yr and 6.4 mm/yr over 17.8 m to 19.6 m and 31.8 m to 33.6 m depth, respectively. The current rates of movement in SI20-1 (upper zone), and SI20-7 (upper zone) are the highest recorded since these instruments were initialized.

The groundwater levels in pneumatic piezometers PN20-1A, PN20-3B, PN20-5A, and PN20-8A showed increases in water levels of 1.06 m, 12.45 m, 0.47 m, and 0.14 m, respectively, since the spring of 2022 readings. This large rise in PN20-3B is bringing it back to historical levels. PN20-8A showed the highest recorded water level measured in the instrument since it was initialized. The groundwater levels in pneumatic piezometers PN20-1B, PN20-2A, PN20-2B, PN20-3A, PN20-4A, PN20-7B and PN20-8B showed decreases in water levels 0.77 m, 0.77 m, 0.35 m, 0.07 m, 0.07 m, 0.28 m, and 1.55 m, respectively, since the spring of 2022 readings. The pneumatic piezometer readings are summarized in Table PH023-2 and are plotted in Figure PH023-1 (by elevation) and Figure PH023-2 (by depth) in Appendix A.

4. RECOMMENDATIONS

4.1 Future Work

The instruments should be read again in the spring of 2023. The reading of PN20-3B should be checked to confirm if this instrument is functioning properly. A third party wildlife escort should be considered to read SI20-6, PN20-6A and PN20-6B due to the presence of a bear den near the instrument location.

4.2 Instrumentation Repairs

No instrument repairs are required at this time.

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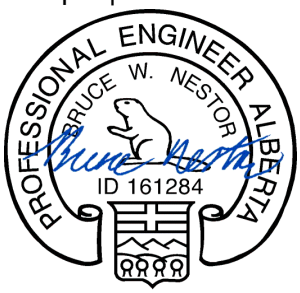
5. CLOSURE

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



November 22, 2022

PERMIT TO PRACTICE
THURBER ENGINEERING LTD.
RM SIGNATURE: Don Proudfoot
RM APEGA ID #: 51674
DATE: November 23, 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. 32123-PH023)
  - SI Reading Plots
  - Figure PH023-1 (Piezometric Elevations)
  - Figure PH023-2 (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 (CON0022165)
PEACE REGION (GRANDE PRAIRIE DISTRICT – NORTH)
INSTRUMENTATION MONITORING RESULTS

FALL 2022

APPENDIX A
DATA PRESENTATION

SITE PH023: HWY 64:02, CLEAR RIVER EAST HILL (SITE 5 – TWIN PIPES LANDSLIDE)

ALBERTA TRANSPORTATION
PEACE REGION (GRANDE PRAIRIE - NORTH DISTRICT)
INSTRUMENTATION MONITORING FIELD SUMMARY (PH023)
FALL 2022

Location:	Clear River East Hill - Site 5 (HWY 64:02 C1 24.101)	**Readout:**	RST PN C108 Unit 1
File Number:	32123	**Casing Size:**	2.75
Probe:	RST SI Set 8R	**Temp:**	6
Cable:	RST SI Set 8R	**Read by:**	KTC/NKR

SLOPE INCLINOMETER (SI) READINGS

SI#	GPS Location (UTM 11)		Date	Stickup (m)	Depth from top of casing (ft)	Azimuth of A+ Groove	Current Bottom Depth Readings				Probe/ Reel #	Remarks
	Easting (m)	Northing (m)					A+	A-	B+	B-		
SI20-1	335453	6244315	01-Oct-22	0.83	196 to 2	340	-121	137	-27	40	8R/8R	
SI20-4	335200	6244260	01-Oct-22	0.84	218 to 2	215	71	-56	-48	56	8R/8R	Sheared off at 26ft
SI20-5	335235	6244111	01-Oct-22	0.66	166 to 2	168	288	-274	-343	299	8R/8R	Sheared off at 38ft
SI20-6	335332	6244073	Not read	0.9	128 to 2	144	79	-61	-436	443	8R/8R	did not read
SI20-7	334956	6244086	01-Oct-22	0.82	178 to 2	180	-70	90	92	-74	5R/5R	
SI20-8	332430	5933825	01-Oct-22	0.93	148 to 2	202	43	-26	-340	351	8R/8R	See remarks

PNEUMATIC PIEZOMETER (PN) READINGS

PN#	GPS Location (UTM 11)		Date	Reading Psi	Identification Number
	Easting (m)	Northing (m)			
PN20-1A	335453	6244315	01-Oct-22	25.4	38006
PN20-1B	335453	6244315	01-Oct-22	45.3	38581
PN20-2A	335476	6244253	01-Oct-22	7.4	38240
PN20-2B	335476	6244253	01-Oct-22	38.2	37405
PN20-3A	335579	6244143	01-Oct-22	13.5	38242
PN20-3B	335579	6244143	01-Oct-22	35.2**	37402
PN20-4A	335200	6244260	01-Oct-22	0.1	38241
PN20-5A	335235	6244111	01-Oct-22	3.9	37853
PN20-5B	335235	6244111	01-Oct-22	***	37403
PN20-6A	335332	6244073	Not read	Not read	38005
PN20-6B	335332	6244073	Not read	Not read	37404
PN20-7A	334956	6244086	01-Oct-22	7.8	38007
PN20-7B	334956	6244086	01-Oct-22	13	38582
PN20-8A	332430	5933825	01-Oct-22	19.7	38239
PN20-8B	332430	5933825	01-Oct-22	32.5	38583

INSPECTOR REPORT

* Reading fluctuates before closing the bypass, does not stablize - Damaged
SI 20-8 probe does not go past 119ft, read SI from 118ft. Sheared off at 119 ft.
** Took reading twice
*** Pressure continues to climb when bypass is open up to 200 PSI plus still climbing. Possibly damaged.
SI 20-6 needs bear scare, deep into bush, fresh bear track on the way to SI 20-6

H:\32000\32123 AT GRMP Grande Prairie District North 2021-2025\CAD\2022 INSTRUMENTS\32123-PH023 NOVEMBER 1, 2022.dwg - 1n - Nov. 21, 2022

SW33 84-11-6
SE33 84-11-6
SW34 84-11-6
SE34 84-11-6
NW28 84-11-6
NW27 84-11-6
NE28 84-11-6
NE27 84-11-6
SW28 84-11-6
SE28 84-11-6
SW27 84-11-6
SE27 84-11-6

4143 PIPELINE(S)

SI20-1, PN20-1A/B
SI20-4, PN20-4A/B (SHEARED)
SI20-2, PN20-2A/B (SHEARED)
SI20-5, PN20-5A/B (DAMAGED)
SI20-3, PN20-3A/B (SHEARED)
SI-09 (SHEARED)
SI20-7, PN20-7A/B
SI20-6, PN20-6A/B
SI20-8, PN20-8A/B (SHEARED)

CLEAR RIVER

902 1503

N
W E
S

LEGEND

- APPROXIMATE INSTRUMENT LOCATION
- PISCES TRANSECT 4.5 LOCATION (NAD83 ZN11 COORDINATES = 335041E 6243896N)
- APPROXIMATE TRIBUTARY CENTERLINE

0 100 200 300 400 500 600m

SCALE 1:10000

BASE PLAN PROVIDED BY WSP (LIDAR UAV FLOWN SEPT 29/30, 2020)

Alberta

PEACE REGION
(GRANDE PRAIRIE DISTRICT NORTH)

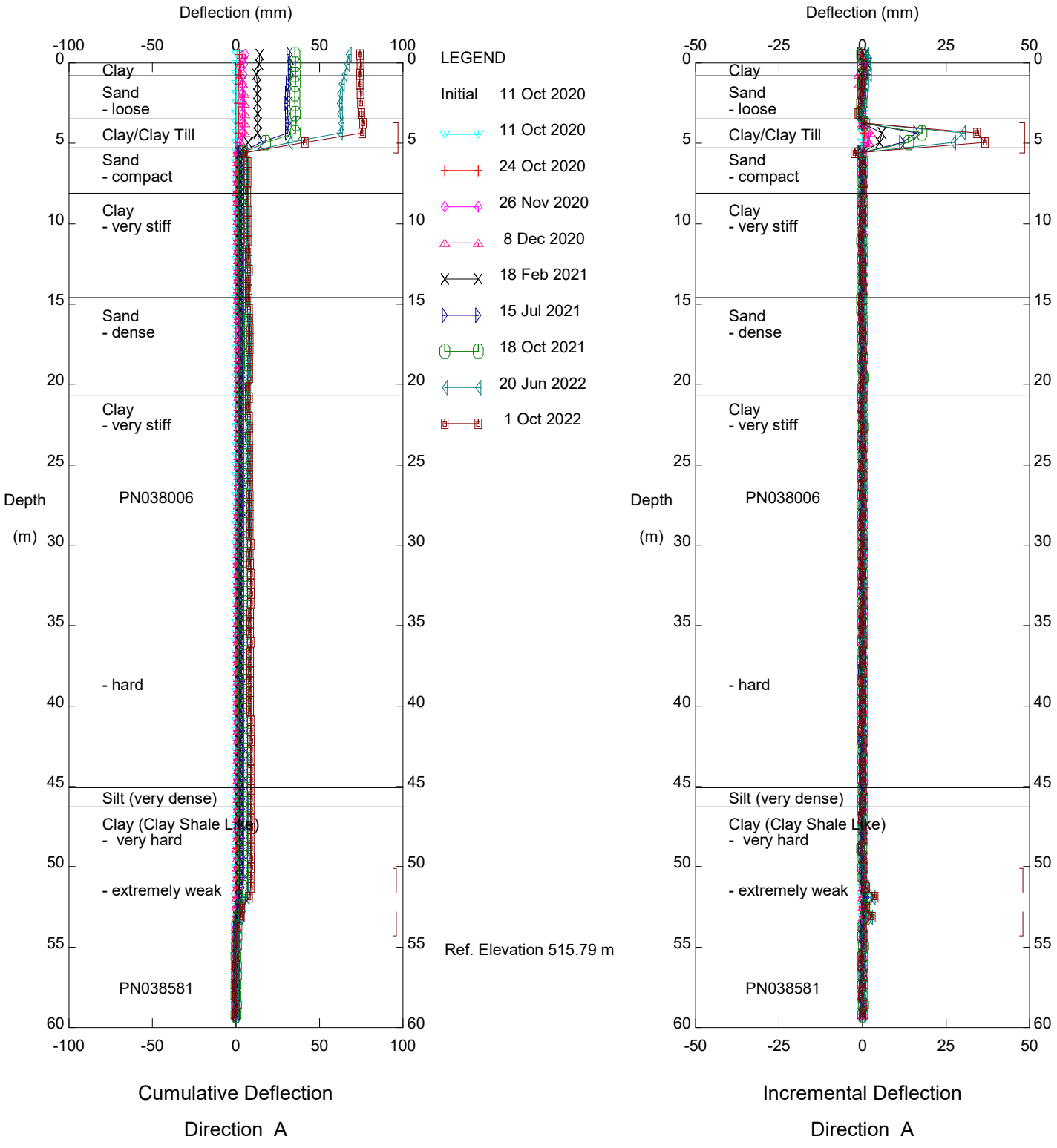
PH023: HWY 64:02 - CLEAR RIVER EAST HILL
SITE PLAN SHOWING APPROXIMATE INSTRUMENT LOCATIONS

DWG No. 32123-PH023

DRAWN BY	ML
DESIGNED BY	BNW
APPROVED BY	DWP
SCALE	1:10000
DATE	NOVEMBER 2022
FILE No.	32123

THURBER ENGINEERING LTD.

Thurber Engineering Ltd.



Cumulative Deflection

Direction A

Incremental Deflection

Direction A

Hwy 64:02 Twin Pipes Landslide (PH023), Inclinometer SI20-1

Alberta Transportation

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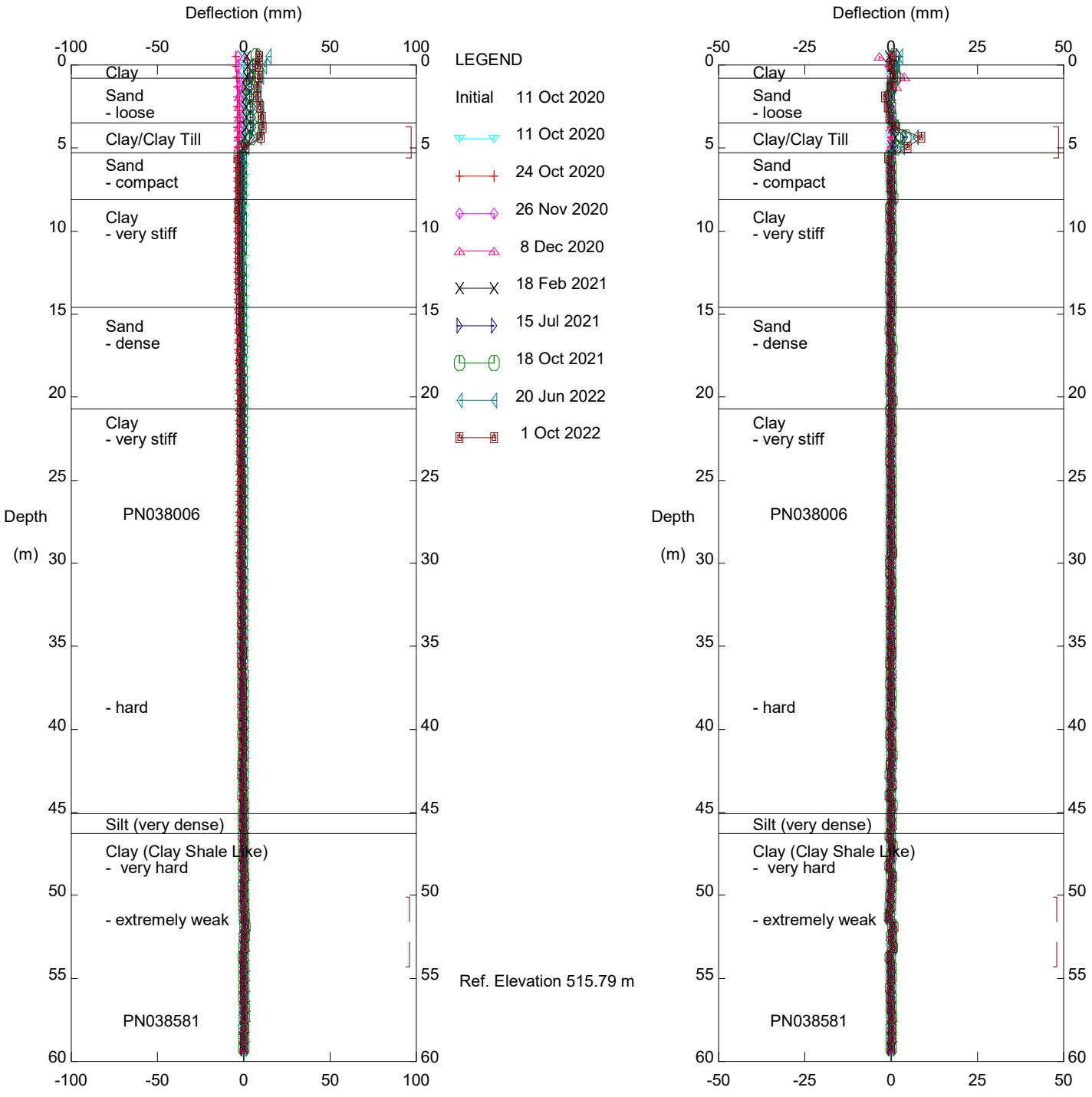

Cumulative Deflection

Direction B

Incremental Deflection

Direction B

Hwy 64:02 Twin Pipes Landslide (PH023), Inclinometer SI20-1

Alberta Transportation

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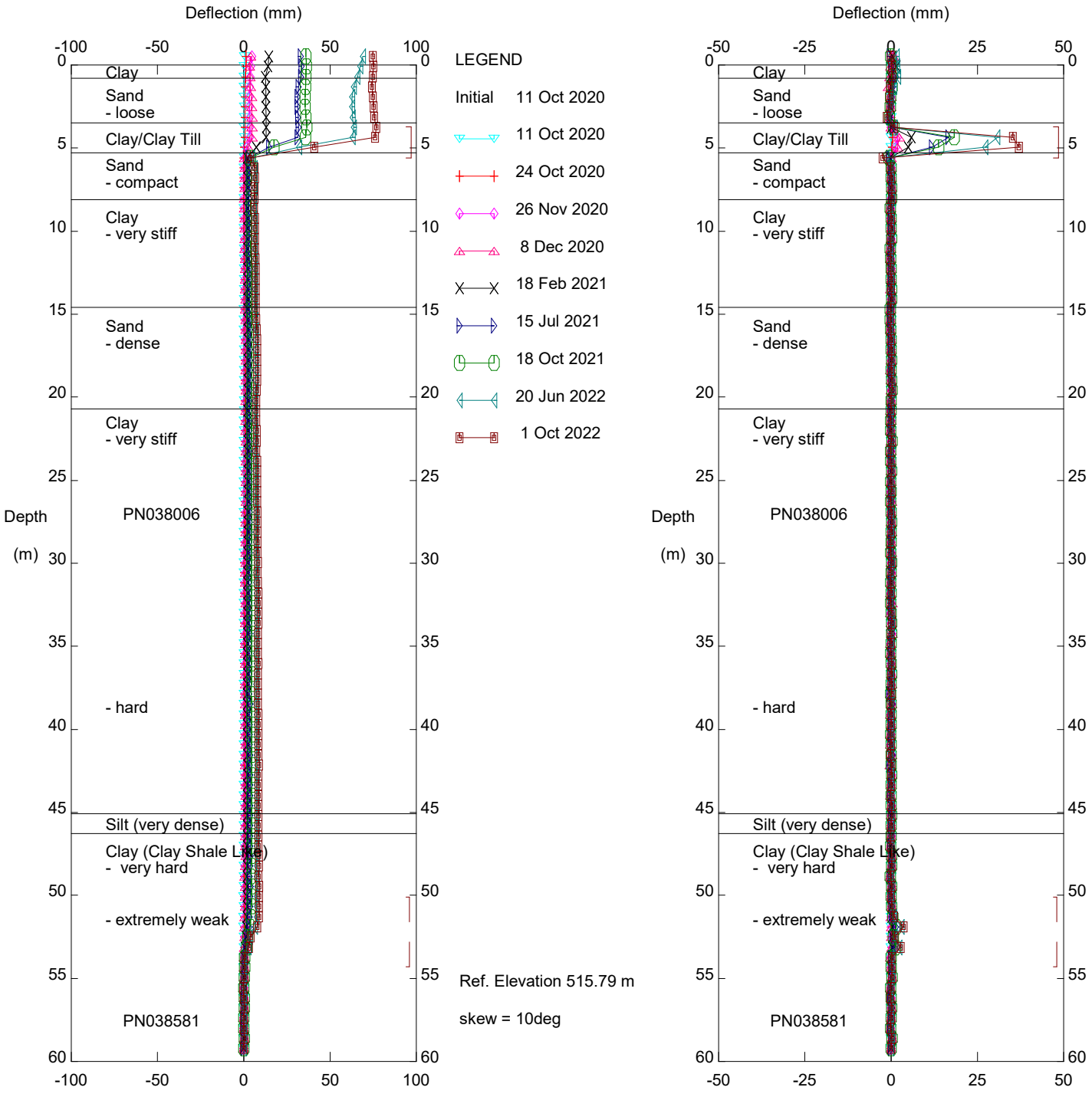

Cumulative Deflection

Direction X

Incremental Deflection

Direction X

Hwy 64:02 Twin Pipes Landslide (PH023), Inclinometer SI20-1

Alberta Transportation

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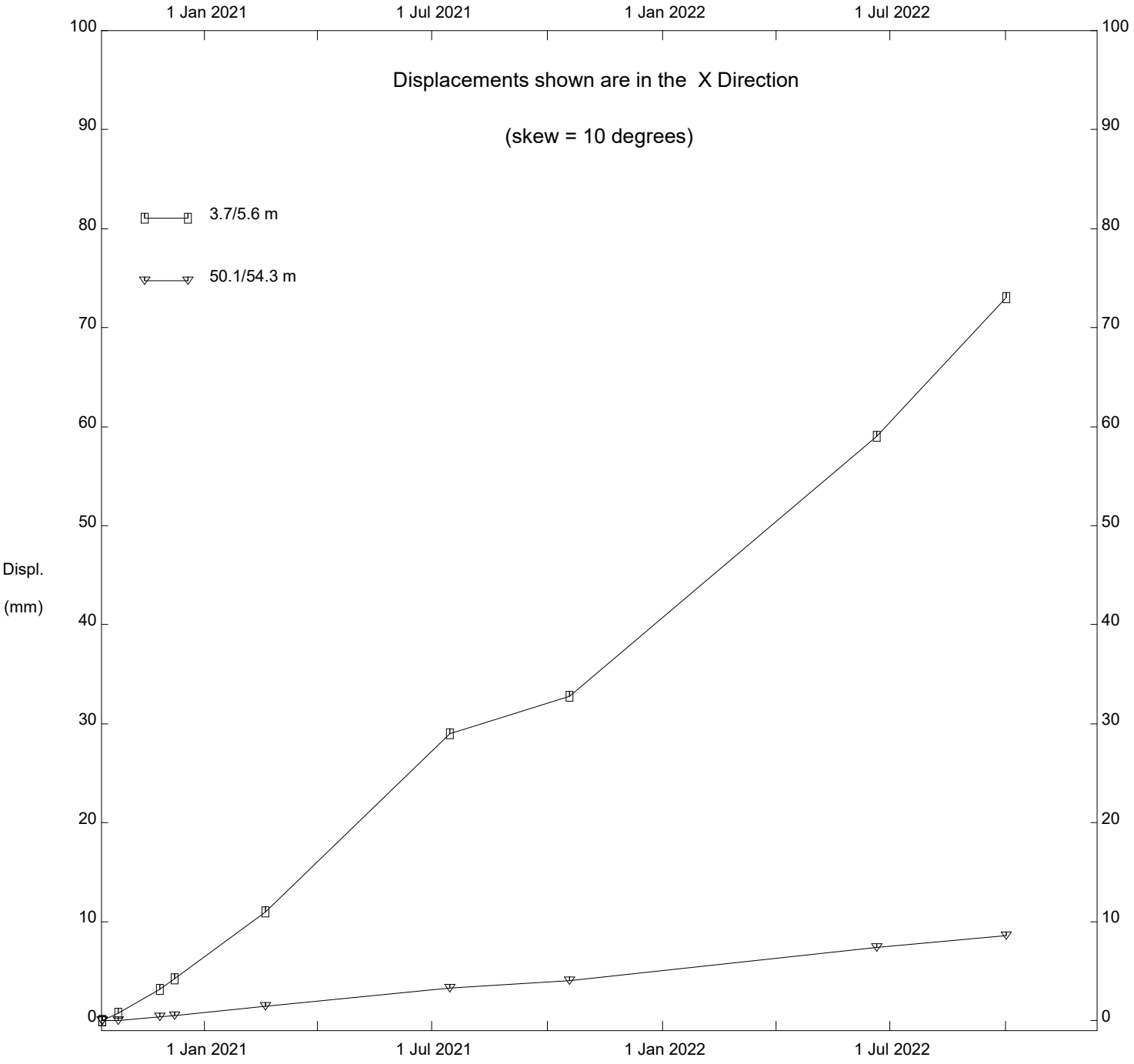
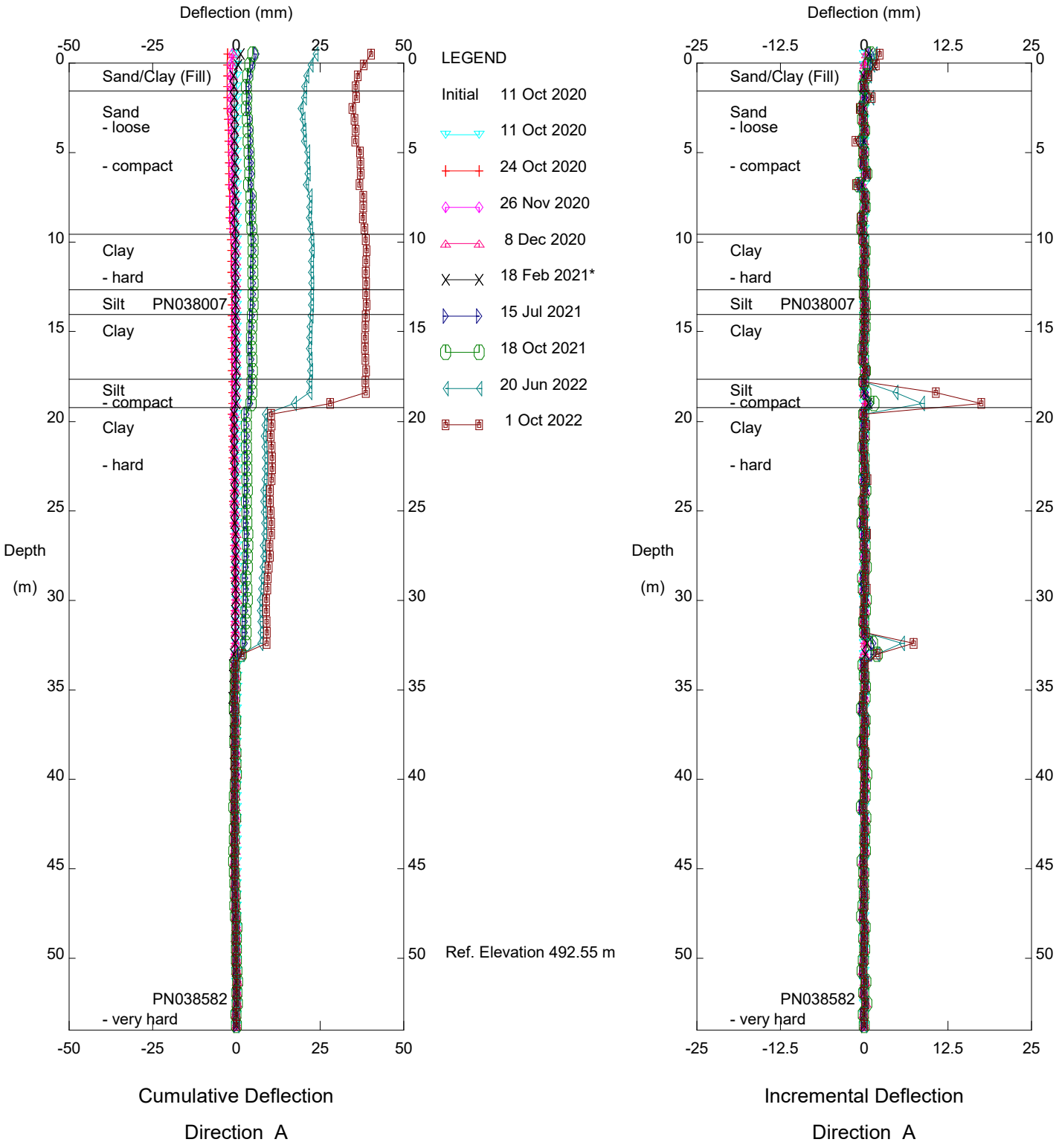


Hwy 64:02 Twin Pipes Landslide (PH023), Inclinometer SI20-1

Alberta Transportation

Thurber Engineering Ltd.



Cumulative Deflection

Direction A

Incremental Deflection

Direction A

Hwy 64:02 Twin Pipes Landslide (PH023), Inclinometer SI20-7

Alberta Transportation

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

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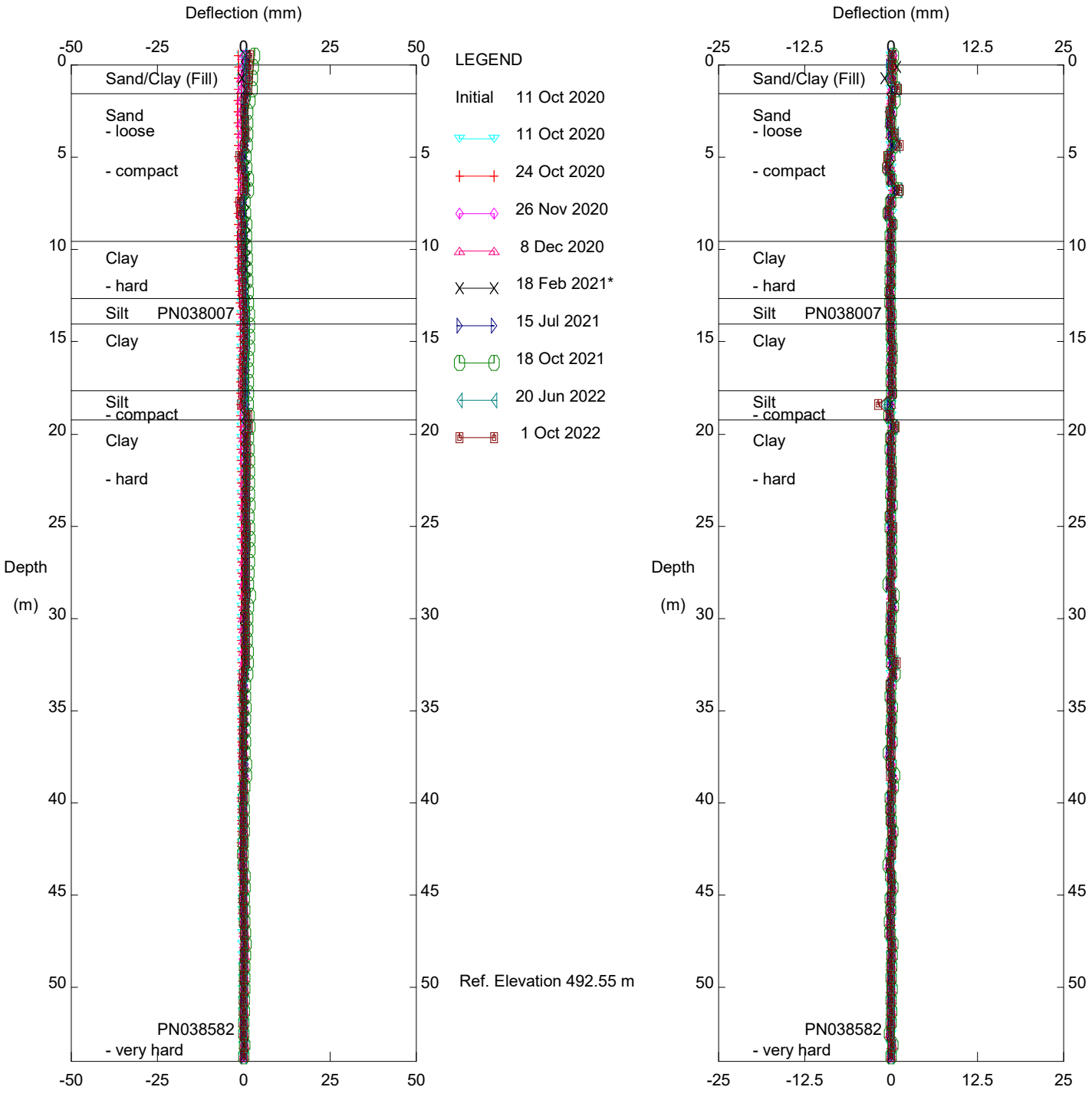

Cumulative Deflection

Direction B

Incremental Deflection

Direction B

Hwy 64:02 Twin Pipes Landslide (PH023), Inclinometer SI20-7

Alberta Transportation

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

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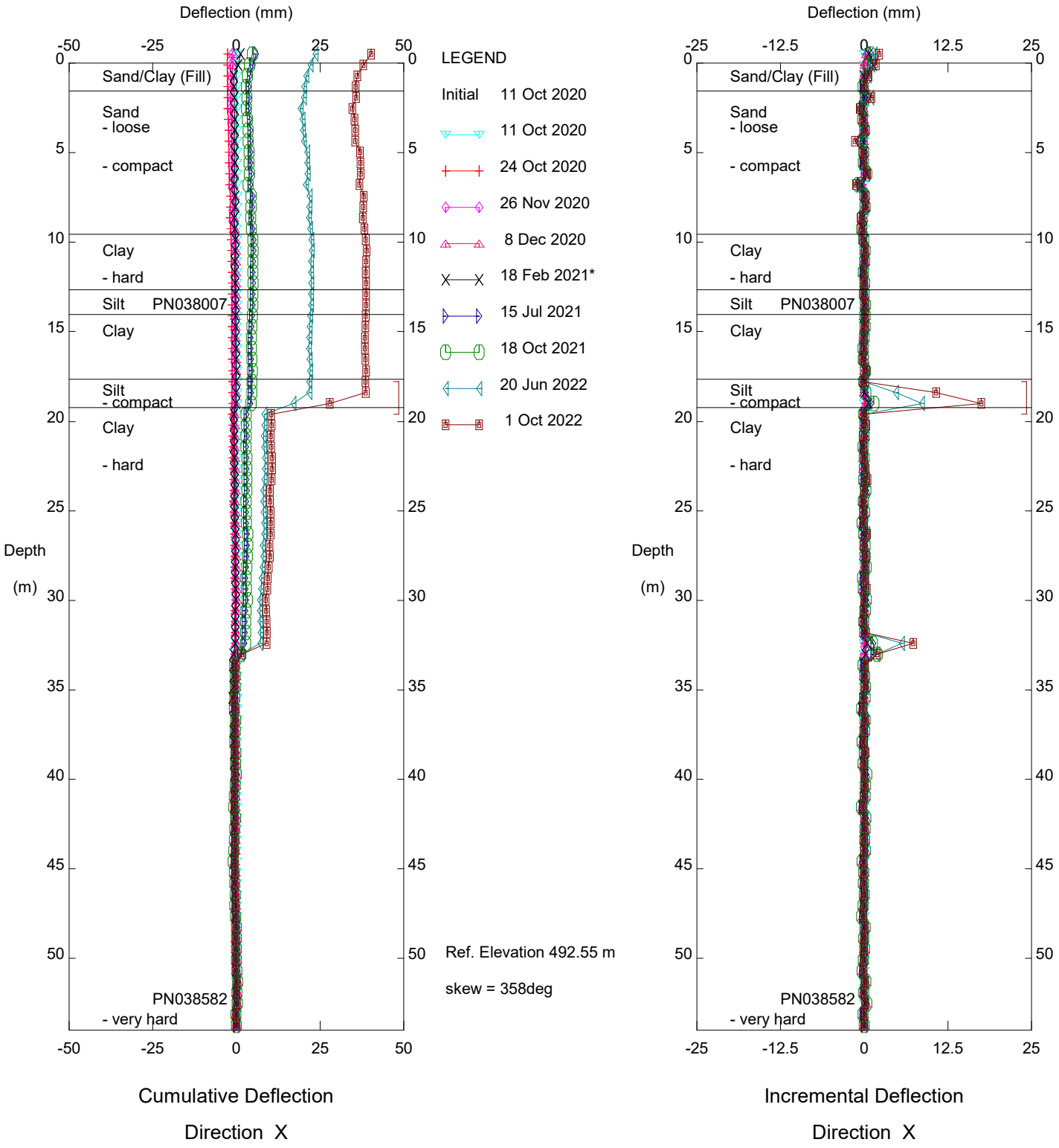

Cumulative Deflection

Direction X

Incremental Deflection

Direction X

Hwy 64:02 Twin Pipes Landslide (PH023), Inclinometer SI20-7

Alberta Transportation

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

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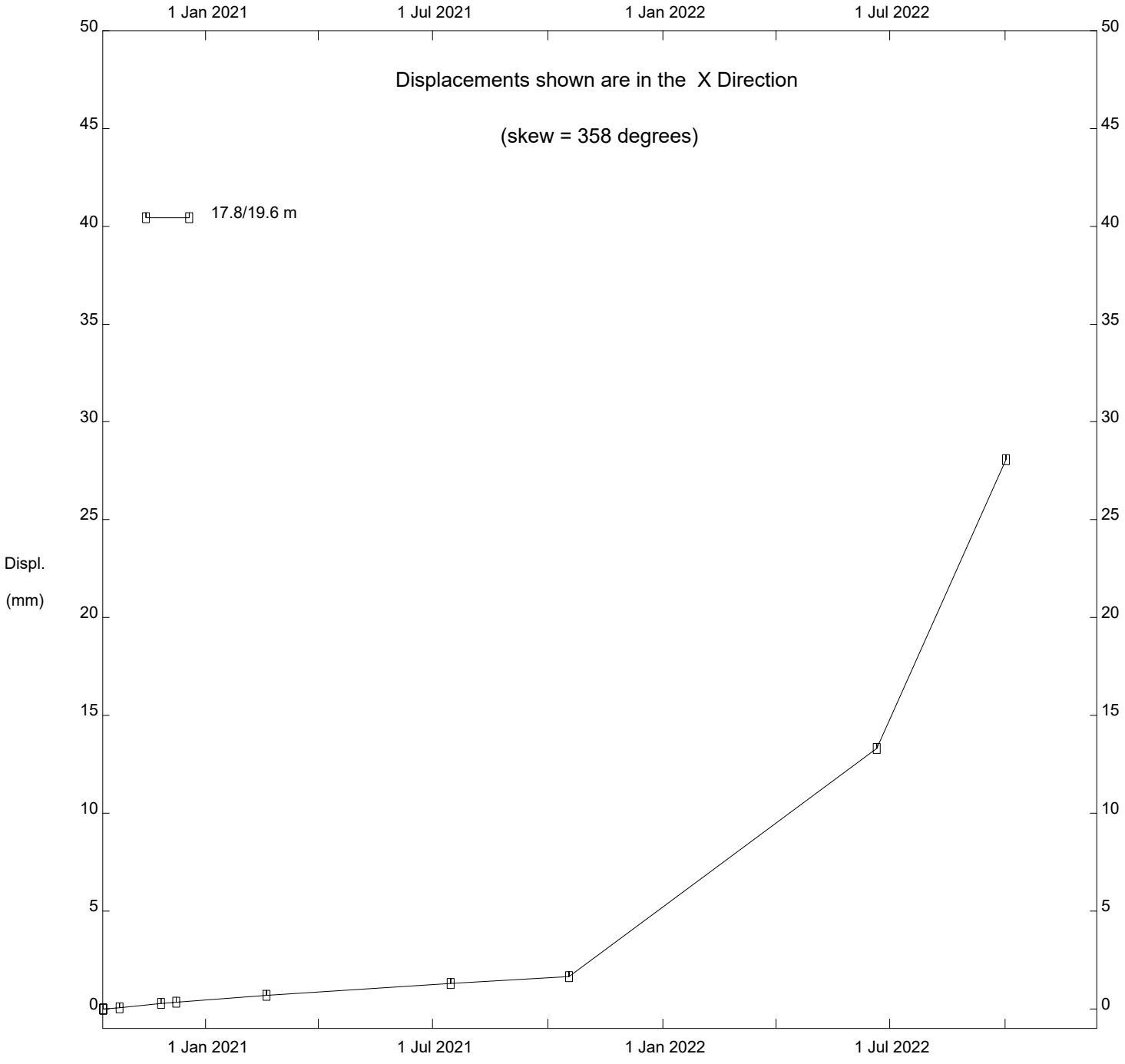
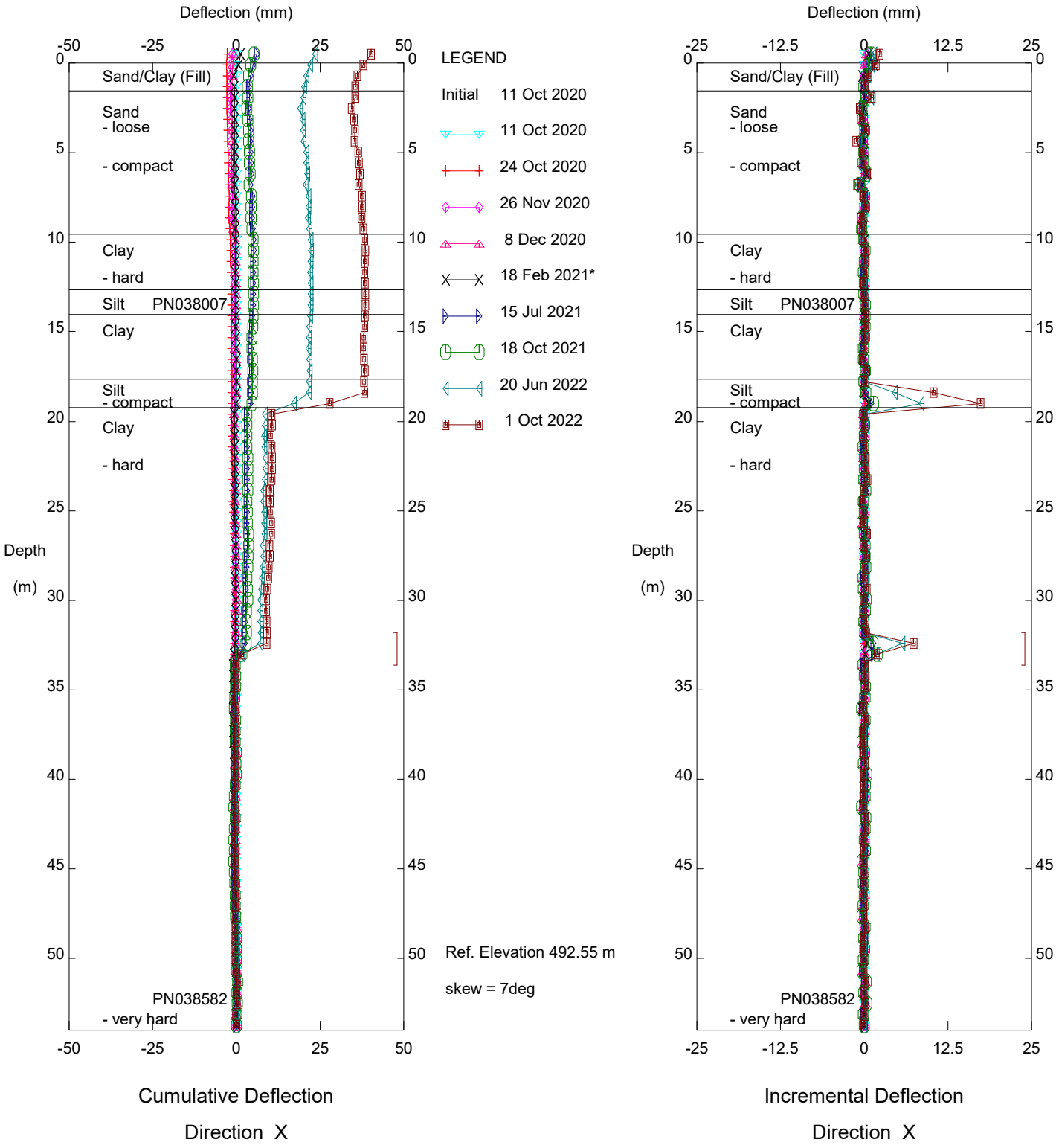


Hwy 64:02 Twin Pipes Landslide (PH023), Inclinometer SI20-7

Alberta Transportation

Thurber Engineering Ltd.



Cumulative Deflection

Direction X

Incremental Deflection

Direction X

Hwy 64:02 Twin Pipes Landslide (PH023), Inclinometer SI20-7

Alberta Transportation

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

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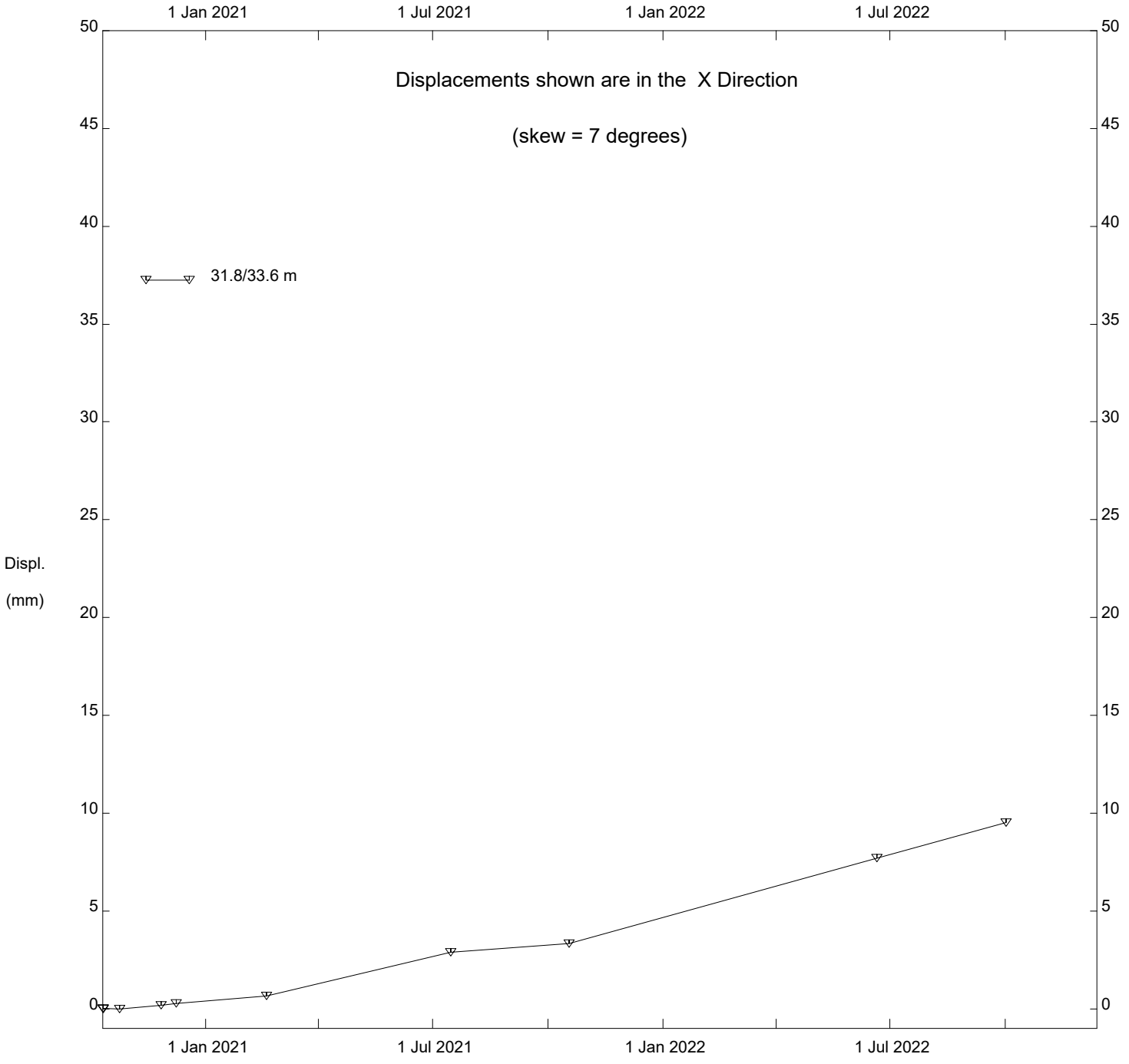

Hwy 64:02 Twin Pipes Landslide (PH023), Inclinometer SI20-7

Alberta Transportation

FIGURE PH023-1
HWY 64:02 - CLEAR RIVER EAST HILL - (SITE #5)
PIEZOMETRIC ELEVATIONS

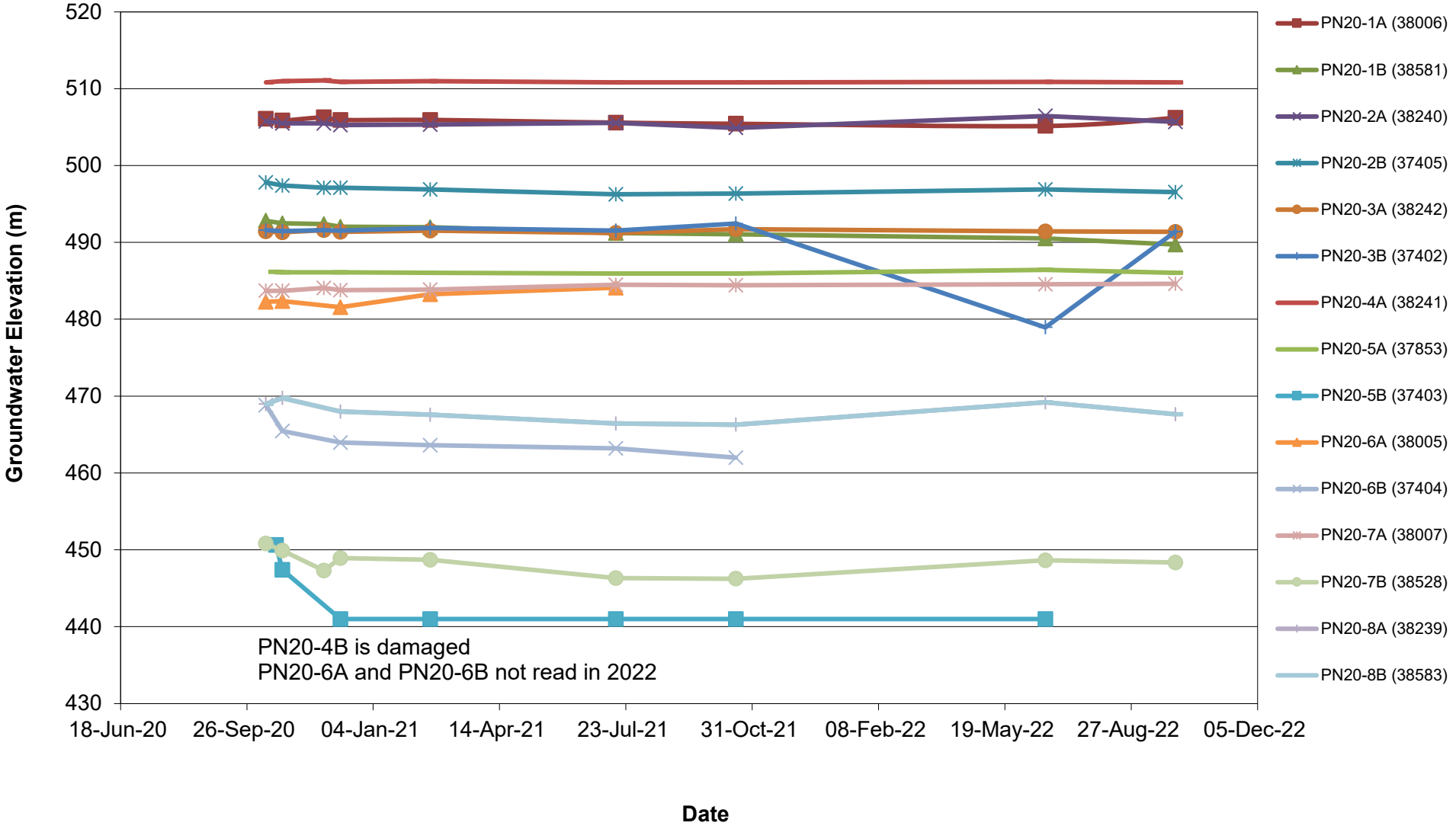

FIGURE PH023-2
HWY 64:02 - CLEAR RIVER EAST HILL - (SITE #5)
PIEZOMETRIC DEPTHS