ALBERTA TRANSPORTATION AND ECONOMIC CORRIDORS GRMP
PEACE REGION – (PEACE RIVER DISTRICT)
INSTRUMENTATION MONITORING - SPRING 2025

Site Number	Location	Name	Hwy	km
PH009-3	Hwy 684:02 km 30.99, Town of Peace River	Shaftesbury Trail - Shop Slide	684:02	30.9-31.1
			Old 2:02	0.0-0.4
Legal Description:		**UTM Co-ordinates**		
4-31-83-21 W5		11V E 480321	N 6232126	

Current Monitoring:	8-June-2025	**Previous Monitoring**	19 & 20-Sep-2024
Instruments Read By:	Mr. Niraj Regmi, G.I.T., and Mr. Godfred Etiendem, of Thurber		

Instruments Read During This Site Visit			
Slope Inclinometers (SIs): SI05-1, SI09-3, SI09-4, SI11-1, and SI19-5	**Pneumatic Piezometers (PN):** PN19-5A and PN19-5B	**Vibrating Wire Piezometers (VW):** VW09-3 and VW09-4	**Standpipe Piezometers (SP):** SP11-06, SP05-1, SP05-4, SP05-5, SP09-8 to SP09-10 and SP19 3
Load Cell (LC): Load Cells A19, A34, A51, A67, A77	**Strain Gauges:** Pile P34, P77 and P113 strain Gauges	**SAAs:** SAA-P34, SAA-P77, and SAA-P113	**Others:** N/A

Readout Equipment Used			
Slope Inclinometers: RST Digital Inclinometer probe with 2 ft wheelbases and RST pocket readout.	**Pneumatic Piezometers:** RST C108 pneumatic piezometer readout	**Vibrating Wire Piezometers:** GEOKON GK-404 vibrating wire readout	**Standpipe Piezometers:** DGSi Dipmeter
Load Cell: Downloaded from datalogger	**Strain Gauges:** Downloaded from datalogger	**SAAs:** Downloaded from datalogger	**Others:**

Note: There were errors in the data downloaded from the datalogger for the strain gauges. The majority of the strain gauges had no usable readings since the previous readings in Fall 2024, and some were only working on certain dates, so the most recent readings available were used. During a visit to Peace River, the cabinet was opened to look for potential causes. Multiple animal nests and signs of rodents were visible in the cabinet that had likely entered before the conduits were repaired. Additionally, signs of corrosion were visible on one of the multiplexers.

The datalogger readings were interrupted between March 7, 2024 and November 23, 2024 due to battery theft. Manual readings were taken during this time period.

Discussion	
Zones of New Movement:	None
Interpretation of Monitoring Results:	**SLOPE INDICATORS** Slope inclinometer SI05-1 is located upslope of the highway and not within the main area of movement. It showed a rate of movement of 0.9 mm/yr over 0.0 m to 3.0 m depth since the fall of 2024 readings.

SI09-3 is located on the east side of the rail tracks. If continues to show no discernible movement.

SI09-4 is located immediately east (downslope) of the newly installed pile wall. It showed no discernible movement over 8.6 m to 10.5 m depth and a rate of movement of 0.2 mm/yr over 11.7 m to 13.5 m depth, respectively, since the fall of 2024 readings. These movement zones were first observed in 2021 during construction, and the movement rates have been gradually decreasing since.

SI11-01 is located about 7 m north of the north end of the pile wall and developed a movement zone between 13.9 m to 16.3 m depth shortly after construction started and the maximum rate of movement of 34.3 mm/yr occurred in June 14, 2022, near the end of construction. The rate of movement observed over this depth since the fall of 2024 readings was 4.6 mm/yr. This zone of movement shows no signs of slowing despite the installation of the pile wall and offloading of the slope below. There was no discernible movement over the previously perceived new movement zone between 23.0 m and 25.4 m depth, indicating that the erroneous readings likely caused it. The displacement plot for this zone is included for completeness, where it can be seen that there has not been a historically coherent pattern in this zone, and it will no longer be tracked.

SI19-5 is located in the lower central portion of the slide. It showed a rate of movement of 0.2 mm/yr over 8.2 m to 11.2 m depth and a rate of movement of 0.2 mm/yr over 17.9 m to 19.7 m depth. The overall movement in SI19-5 has slowed significantly since slope offloading and the completion of construction.

It is anticipated that the landslide movements are now constrained by the concrete pile wall and associated lower slope offloading and flattening. A new equilibrium is becoming established and movement rates have reduced with the exception of SI11-01. .

SAA

Surface accelerometer arrays (SAA) were installed in three concrete piles during construction. SAA-P34 has shown an average rate of movement of 0.4 mm/yr in the downslope direction since the fall of 2024 readings, with a current pile head deflection of 8.3 mm since datalogger readings began for this instrument on May 27, 2022. SAA-P34 shows seasonal trends of greater pile deflection through winter months and a relaxation in summer months in response to the seasonal behaviour of anchors. The maximum pile head deflection of 12.0 mm was measured in March 2025.

SAA-P77 showed a rate of movement of 0.3 mm/yr since the fall of 2024 readings. SAA-P77 has shown a total pile head movement of 3.9 mm since datalogger readings began on May 27, 2022. The maximum pile head deflection of 5.0 mm was measured in March 2025. . The seasonal movement trend at SAA-P77 is less pronounced compared to SAA-P34, which is due to the lower height of the wall at this location (roughly 3 m compared to 6 m to 7 m at P34).

SAA-P113 has shown an average rate of movement of 2.1 mm/yr in the downslope direction since the fall of 2024 readings, with a total pile head deflection of 17.4 mm since datalogger readings began on May 27, 2022. The higher observed movement in SAA-P113 can be attributed to the fact that the pile wall at this location is cantilevered rather than tied-back like the other portions of the wall. The movement rate measured in the instrument has decreased since the fall of 2024 readings by 4.3 mm/yr. SAAP-113 does not show clear seasonal movement trends as SAA-P34 or SAA-P77 since there are no anchors in this portion of the wall.

STRAIN GAUGES

The readings for the majority of the strain gauges were not usable since the fall of 2024 readings, despite working before that. Therefore, the issue is expected to be with the datalogger system or programming, not the strain gauges themselves. For the strain gauges with reported values, the most recent date on which the strain gauges data was available for each individual pile was used.

The strain profiles prior to the spring of 2025 readings along all three piles were well below the established threshold for implementation of remedial measures and show strain rate profiles consistent with anticipated trends. The functioning strain gauges for the spring 2025 readings were consistent with previous readings.

On November 29, 2024, The functioning strain gauges in P34 (Figures PH009-1 and -2) showed minor changes in strain, ranging from a increase in positive (tension) strain of 0.8 microstrain on the upslope pile face at 13.2 m depth, to an increase in positive (tension) strain of 4.6 microstrain on the upslope face at 17.2 m depth. The strains measured at 13.2 m depth are plotted against time in Figure PH009-3.

On December 2, 2024, The functioning strain gauges in P77 (Figures PH009-4 and -5) showed minor changes in strain, ranging from an increase in negative (compression) strain of 1.1 microstrain on the downslope pile face at 15.0 m depth, to an increase in negative (compression) strain of 2.5 microstrain on the downslope face at 12.9 m depth. The strains measured at 11.1 m depth and 12.9 m depth are plotted against time in Figures PH009-6 and PH009-7, respectively.

On December 27, 2024, only the strain gauges at 2.8 m depth in P113 were functioning (Figures PH009-8 and -9). The upslope strain gauge showed an increase in negative (compression) strain of 12.4 microstrain, and the downslope strain gauge showed an increase in negative (compression) strain of 6.0 microstrain.

The datalogger system should be reviewed in the fall of 2025 to re-enable readings of the strain gauges.

LOAD CELLS

The load cell readings are summarized in Table PH009-4. The anchors showed increases in measured load ranging from an increase of 10.80 kN in Anchor A34 (Load Cell VC2341) to an increase of 18.43 kN in Anchor A19 (Load Cell VC2340), compared to the fall of 2024 readings.

All of the anchors registered maximum recorded loads between March 2, 2025, and May 29, 2025.

The pattern of movements is attributed to frost pressures on the back of the wall. The load cells generally show a pattern of highest loads in the winter months, before relaxing slightly into the spring and summer months. Anchors A67(Load Cell VC2343) and A77 (Load Cell VC2344) have continued showing an overall trend of increasing load with a smaller post-winter relaxation than seen in the other anchors. Overall, the anchor loads have risen significantly since they were locked off, and Anchors A19, A34, and A77 are currently above their SLS design loads but have not exceeded the 270 kN load that would require remedial measures. The load cells will need to be closely monitored to see if the increased movement trend continues. The load cell readings are plotted on Figure PH009-10 in Appendix A.

Pile head deflections measured by the SAA are within an acceptable range (below the estimated SLS Design Values, measured since anchor lock-off: of 18 mm for SAA-P34, 7 mm for SAA-P77, and 39 mm for SAA-P113). More deflection is noted, as expected, in the cantilever section of

	the wall (SAA-P113). The additional deflection in SAA-P34 may be due to the deeper amount of cut as compared to the slope below SAA-P77. This will require additional readings and analysis to interpret and will be considered as part of the ongoing development of threshold criteria for this pile wall. **PIEZOMETERS** Standpipe piezometers SP05-1, SP05-4, SP09-10, and SP019-3 showed decreases in groundwater level of 0.17 m, 0.07 m, 1.03 m, and 0.43 m respectively, since the fall of 2024 readings. Standpipe piezometer SP05-5 showed an increase in groundwater level of 0.03 m, since the fall of 2024 readings. SP11-06, SP09 8, and SP09-9 continued to be dry (SP09-8 and SP09-9 have been dry since installation). The water levels measured in the standpipes have not demonstrated a trend. The results of the standpipe piezometers are summarized in Table PH009-5, and are plotted in Figure PH009-11 in Appendix A. Historical standpipe piezometer readings are presented in Figure PH009-12. VW09-4 showed a slight decrease in ground water level of 0.13 m since the fall of 2024 readings; the groundwater levels have been trending downward since 2012. VW09-3 has been dry since August 2009. The vibrating wire piezometer results are summarized in Table PH009-6, and are plotted in Figure PH009-13 in Appendix A. Pneumatic piezometer PN15-5A showed a decrease in groundwater level of 0.01 m since the previous reading in fall of 2024. PN19-5B showed an increase in groundwater level of 0.13 m since the fall of 2024 readings and has had a slight increasing trend overall since installation (February 2019). Pneumatic piezometer results are summarized in Table PH009-7, and are plotted in Figure PH009-14 in Appendix A.
Future Work:	The instruments should be read again in the fall of 2025. The movement rate in SI11-01 should be monitored carefully as it is beyond the north extent of the wall and has not responded to completion of the pile wall which slowed movements significantly in the other inclinometers. The instruments at the pile wall, particularly for the load cells, will need to be frequently monitored to see if the loads increase. At present, the loads, strain, and deflections are within acceptable limits based on the modeling done during detailed design of the wall.
Instrumentation Repairs:	A new long shackle lock should be purchased for the datalogger enclosure to prevent unauthorized entry to the cabinet. The interior of the datalogger, the wiring and connections with the strain gauges, and the multiplexer should be inspected to identify the source of the issue with the strain gauge readings. The multiplexer should be cleaned of corrosion to confirm if this is the cause of the issue. If not and no other issues are identified, the multiplexer may need to be replaced. A manual set of readings should also be taken, if the datalogger does not begin working before then.
Additional Comments:	

Attachments:	• Table PH009-1 Spring 2025 – Shop Slide Slope Inclinometer Instrumentation Reading Summary
	• Table PH009-1A Spring 2025 – Shop Slide Slope Inclinometer Instrumentation Reading Summary (Inactive Instruments)
	• Table PH009-2: Spring 2025 – Shop Slide Shape Accelerometer Array Instrumentation Reading Summary
	• Table PH009-3: Spring 2025 – Shop Slide Vibrating Wire Strain Gauge Instrumentation Reading Summary
	• Table PH009-4: Spring 2025 – Shop Slide Vibrating Wire Load Cell Instrumentation Reading Summary
	• Table PH009-5 Spring 2025 – Shop Slide Standpipe Piezometer Instrumentation Reading Summary
	• Table PH009-6: Spring 2025 – Shop Slide Vibrating Wire Piezometer Instrumentation Reading Summary
	• Table PH009-7: Spring 2025 – Shop Slide Pneumatic Piezometer Instrumentation Reading Summary
	• Statement Statement for Use and Interpretation of Report
	• Appendix A
	  ○ Field Inspector's report
	  ○ Site Plan Showing Approximate Instrument Locations (Drawings No. 32121-PH009-1, 32121-PH009-2, and 32121-PH009-3)
	  ○ SI Reading Plots
	  ○ SAA Reading Plots
	  ○ Figures PH009-1 through PH009-9 (Vibrating Wire Strain Gauge Readings)
	  ○ Figure PH009-10 (Vibrating Wire Load Cell Readings)
	  ○ Figure PH009-11 (Active Standpipe Piezometer Readings)
	  ○ Figure PH009-12 (Historical Standpipe Piezometer Readings)
	  ○ Figure PH009-13 (Vibrating Wire Piezometer Readings)
	  ○ Figure PH009-14 (Pneumatic Piezometer Readings)

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.
Senior Geotechnical Engineer

PROFESSIONAL ENGINEER ALBERTA
LUCAS R.M. GREEN
ID 206714
July 12, 2025

PERMIT TO PRACTICE
THURBER ENGINEERING LTD.
RM SIGNATURE: Don Proudfoot
RM APEGA ID #: 51674
DATE: July 14, 2025
PERMIT NUMBER: P005186
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

Lucas Green, P.Eng.
Geotechnical Engineer

Table PH009-1A: Spring 2025 – Old Hwy 2:02 Shop Slide Slope Inclinometer Instrumentation Reading Summary

Date Monitored: June 8, 2025

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	CURRENT RATE OF MOVEMENT (mm/yr)	CHANGE IN RATE OF MOVEMENT SINCE PREVIOUS READING (mm/yr)
SI05-1	Jun. 6, 2005	31. 9 over 0.0 m to 3.0 m depth in 56° direction	21.0 between Sept. 2010 and May 2011	Operational	September 19, 2024	0.7	0.9	14.0
SI09-3	August 20, 2009	No discernible movement	N/A	Operational	September 20, 2024	N/A	N/A	N/A
SI09-4	June 13, 2020 (Reinitialized)	6.3 over 8.6 m to 10.5 m depth in 54° direction	6.9 in October 2021	Operational	September 20, 2024	No Discernible Movement	N/A	-0.6
		4.2 over 11.7 m to 13.5 m depth in 54° direction	13.0 in October 2021			0.1	0.2	-0.6
SI11-01	May 21, 2015	20.7 over 13.9 m to 16.3 m depth in 81° direction	34.3 in June 14, 2022	Operational	September 20, 2024	3.3	4.6	7.1

Drawings 32121-PH009-1 through 32121-PH009-3 in Appendix A provide a sketch of the approximate location of the monitoring instrumentation for this site

Table PH009-1A: Continued… Spring 2025 – Old Hwy 2:02 Shop Slide Slope Inclinometer Instrumentation Reading Summary

Date Monitored: June 8, 2025

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	CURRENT RATE OF MOVEMENT (mm/yr)	CHANGE IN RATE OF MOVEMENT SINCE PREVIOUS READING (mm/yr)
SI19-5	June 25, 2019	8.8 over 8.2 m to 11.2 m depth in 111° direction	8.8 in September 2023	Operational	September 19, 2024	0.1	0.2	-0.9
		9.9 over 17.9 m to 19.7 m depth in 111° direction	12.4 in July 2021			0.1	0.2	-0.2

Table PH009-1A: Spring 2025 – Old Hwy 2:02 Shop Slide Slope Inclinometer Instrumentation Reading Summary (Inactive Instruments)

Date Monitored: Not monitored

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	CURRENT RATE OF MOVEMENT (mm/yr)	CHANGE IN RATE OF MOVEMENT SINCE PREVIOUS READING (mm/yr)
SI05-2	*Jun. 6, 2005*	*70.6 mm over 0.2 m to 11.8 m depth in 20° direction*	*33.9 mm/yr between Oct. 2007 and May 2008*	*Sheared at 10.7 m depth*	*May 27, 2009*	*N/A*	*N/A*	*N/A*
		73.0 mm over 8.7 m to 11.8 m depth in 20° direction	*36.4 mm/yr between May and Oct. 2007*			*N/A*	*N/A*	*N/A*
SI05-3	*Jun. 6, 2005*	*3.8 mm over 0.2 m to 2 m depth in 15° direction*	*9.2 mm/yr between May 2009 and Sept. 2009*	*Sheared at 17.5 m depth*	*September 23, 2009*	*N/A*	*N/A*	*N/A*
		8.0 mm over 8.1m to 10 m depth in 15° direction	*6.1 mm/yr between May and Oct. 2007*			*N/A*	*N/A*	*N/A*
		11.2 mm over 11.8 m to 14.2 m depth in 15° direction	*9.1 mm/yr between May and Oct. 2007*			*N/A*	*N/A*	*N/A*
		23.8 mm over 15.5 m to 17.9 m depth in 15° direction	*11.6 mm/yr between May and Oct. 2007*			*N/A*	*N/A*	*N/A*
		4.2 mm over 19.7 m to 22.2 m depth in 15° direction	*2.7 mm/yr between Jun. and Aug. 2005*			*N/A*	*N/A*	*N/A*

Drawings 32121-PH009-1 through 32121-PH009-3 in Appendix A provide a sketch of the approximate location of the monitoring instrumentation for this site

Table PH009-1A – Continued… Spring 2025 – Old Hwy 2:02 Shop Slide Slope Inclinometer Instrumentation Reading Summary (Inactive Instruments)

Date Monitored: Not monitored

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	CURRENT RATE OF MOVEMENT (mm/yr)	CHANGE IN RATE OF MOVEMENT SINCE PREVIOUS READING (mm/yr)
SI05-4	*Jun. 6, 2005*	*53.8 mm over 5.2 m to 8.3 m depth in 47° direction*	*21 mm/yr between May and Oct. 2007*	*Sheared at 6.7 m depth*	*June 9, 2012*	*N/A*	*N/A*	*N/A*
SI09-1	*August 20, 2009*	*152.1 mm over 0.3 m to 2.2 m depth in 50° direction*	*215.6 mm/yr in May 2011*	*Sheared at 1.8 m depth*	*June 1, 2011*	*N/A*	*N/A*	*N/A*
		3.4 mm over 7.1 m to 8.3 m depth in 50° direction	*5.8 mm/yr in September 2009*			*N/A*	*N/A*	*N/A*
		10.6 mm over 11.9 m to 13.8 m depth in 50° direction	*29.0 mm/yr in September 2009*			*N/A*	*N/A*	*N/A*
SI09-2	*August 20, 2009*	*156.4 mm over 0.1 m to 3.8 m depth in 25° direction*	*270.4 mm between May 2009 and September 2010*	*Destroyed*	*September 21, 2010*	*N/A*	*N/A*	*N/A*

Drawings 32121-PH009-1 through 32121-PH009-3 in Appendix A provide a sketch of the approximate location of the monitoring instrumentation for this site

Table PH009-2: Spring 2025 – Old Hwy 2:02 Shop Slide Shape Accelerometer Array Instrumentation Reading Summary

Date Monitored: June 8, 2025

INSTRUMENT #	DATE INITIALIZED	TOTAL CUMULATIVE RESULTANT MOVEMENT AT NOTED DEPTH SINCE INITIAL READING (mm)	CURRENT STATUS	DATE OF PREVIOUS READING	INCREMENTAL MOVEMENT SINCE PREVIOUS READING (mm)	AVERAGE RATE OF MOVEMENT (1, 2) (mm/yr)	CHANGE IN AVERAGE RATE OF MOVEMENT SINCE PREVIOUS READING (mm/yr)
Manual Readings November 24, 2021 – April 13, 2022(1)							
SAA-P34	November 24, 2021	13.0 over 1.8 m to 20.8 m depth	Operational	April 13, 2022	N/A	33.8	N/A
SAA-P77	November 24, 2021	18.4 over 1.8 m to 20.8 m depth	Operational	January 19, 2022(2)	N/A	119.7	N/A
SAA-P113	February 2, 2022	3.9 over 1.4 m to 25.9 m depth	Operational	April 13, 2022	N/A	20.1	N/A
Datalogger Readings May 27, 2022 - Current(2)							
SAA-P34	May 27, 2022	8.3 over 1.8 m to 20.8 m depth	Operational	May 27, 2024	0.4	2.7	-1.6
SAA-P77	May 27, 2022	3.9 over 1.8 m to 20.8 m depth	Operational	May 27 2024	0.3	1.3	-3.0
SAA-P113	May 27, 2022	17.4 over 1.4 m to 25.9 m depth	Operational	May 27, 2024	2.1	25.7	-4.3

Drawings 32121-PH009-1 through 32121-PH009-3 in Appendix A provide a sketch of the approximate location of the monitoring instrumentation for this site

Notes:

1) Average rate of movement for manual readings is the average movement rate for entire monitoring period from November 24, 2021 to April 13, 2022.
2) The average movement rate for the data logger readings is the average movement rate between May 27, 2022, and June 8, 2025.

THURBER

Table PH009-3: Spring 2025 – Old Hwy 2:02 Shop Slide Vibrating Wire Strain Gauge Instrumentation Reading Summary

Date Monitored: June 8, 2025

DEPTH FROM TOP OF PILE (m)	GAUGE #	TOTAL MICROSTRAIN (NOVEMBER 29, 2024) (με)	CHANGE IN MICROSTRAIN SINCE PREVIOUS READINGS* (με)	MEASURED TEMPERATURE (°C)	GAUGE #	TOTAL MICROSTRAIN (NOVEMBER 29, 2024) (με)	CHANGE IN MICROSTRAIN SINCE PREVIOUS READINGS* (με)	MEASURED TEMPERATURE (°C)
PILE P34								
UPSLOPE PILE FACE					**DOWNSLOPE PILE FACE**			
1.2	SR1854	N/A	N/A	N/A	SR1853	N/A	N/A	N/A
2.0	SE1017 (2 Tapes)**	N/A	N/A	N/A	SE1017 (3 Tapes)**	N/A	N/A	N/A
3.3	SR1851	N/A	N/A	N/A	SR1849	N/A	N/A	N/A
4.1	SE1017 (0 Tapes)**	N/A	N/A	N/A	SE1017 (1 Tape)**	N/A	N/A	N/A
5.1	SR1846	N/A	N/A	N/A	SR1845	N/A	N/A	N/A
7.2	SR1843	N/A	N/A	N/A	SR1842	N/A	N/A	N/A
9.3	SR1841	N/A	N/A	N/A	SR1840	N/A	N/A	N/A
11.1	SR1839	N/A	N/A	N/A	SR1838	N/A	N/A	N/A
13.2	SR1837	60.8	0.8	6.7	SR1835	-60.2	3.7	9.2
15.0	SR1834	24.7	4.8	9.3	SR1832	-36.9	3.7	9.3
17.2	SR1831	11.0	4.6	9.3	SR1829	-2.8	4.5	7.3

Drawings 32121-PH009-1 through 32121-PH009-3 in Appendix A provide a sketch of the approximate locations of the monitoring instrumentation for this site.

* Previous readings on September 20, 2024

**Tapes were used to identify separate strain gauges with same serial number

Table PH009-3 – Continued… Spring 2025 – Old Hwy 2:02 Shop Slide Vibrating Wire Strain Gauge Instrumentation Reading Summary

Date Monitored: June 8, 2025

DEPTH FROM TOP OF PILE (m)	GAUGE #	TOTAL MICROSTRAIN (DECEMBER 2, 2024) (με)	CHANGE IN MICROSTRAIN SINCE PREVIOUS READINGS* (με)	MEASURED TEMPERATURE (°C)	GAUGE #	TOTAL MICROSTRAIN (DECEMBER 2, 2024) (με)	CHANGE IN MICROSTRAIN SINCE PREVIOUS READINGS* (με)	MEASURED TEMPERATURE (°C)
PILE P77								
UPSLOPE PILE FACE					DOWNSLOPE PILE FACE			
1.00	SR1865	N/A	N/A	N/A	SR1861	N/A	N/A	N/A
2.85	SR1857	N/A	N/A	N/A	SR1856	N/A	N/A	N/A
5.00	SR1855	N/A	N/A	N/A	SR1852	N/A	N/A	N/A
7.10	SR1850	N/A	N/A	N/A	SR1848	N/A	N/A	N/A
8.95	SR1847	N/A	N/A	N/A	SR1844	N/A	N/A	N/A
11.05	SR1836	-17.2	-1.8	6.3	SR1833	-109.3	-1.9	6.4
12.90	SR1830	-31.6	-1.9	6.4	SR1828	-87.4	-2.5	6.4
15.00	SR1827	-22.0	-1.5	6.4	SR1826	-52.9	-1.1	6.8
17.10	SR1825	-29.2	-1.5	6.3	SR1824	-44.4	-1.3	6.5

Drawings 32121-PH009-1 through 32121-PH009-3 in Appendix A provide a sketch of the approximate locations of the monitoring instrumentation for this site.

***** Previous readings on May 22, 2024

Table PH009-3 – Continued… Spring 2025 – Old Hwy 2:02 Shop Slide Vibrating Wire Strain Gauge Instrumentation Reading Summary

Date Monitored: June 8, 2025

DEPTH FROM TOP OF PILE (m)	GAUGE #	TOTAL MICROSTRAIN (DECEMBER 27, 2025) (με)	CHANGE IN MICROSTRAIN SINCE PREVIOUS READINGS* (με)	MEASURED TEMPERATURE (°c)	GAUGE #	TOTAL MICROSTRAIN (DECEMBER 27, 2025) (με)	CHANGE IN MICROSTRAIN SINCE PREVIOUS READINGS* (με)	MEASURED TEMPERATURE (°c)
PILE P113								
UPSLOPE PILE FACE					**DOWNSLOPE PILE FACE**			
1.0	SR1820	*Not functioning*	*N/A*	*N/A*	SR1821	N/A	N/A	N/A
2.8	SR1822	-13.4	-12.4	6.8	SR1823	-82.9	-6.0	6.8
4.9	SR1806	N/A	N/A	N/A	SR1807	N/A	N/A	N/A
6.9	SR1808	N/A	N/A	N/A	SR1809	N/A	N/A	N/A
9.0	SR1810	N/A	N/A	N/A	SR1811	*Not functioning*	*N/A*	*N/A*
11.2	SR1812	N/A	N/A	N/A	SR1813	N/A	N/A	N/A
13.3	SR1814	N/A	N/A	N/A	SR1815	N/A	N/A	N/A
15.3	SR1816	N/A	N/A	N/A	SR1817	N/A	N/A	N/A
17.0	SR1818	N/A	N/A	N/A	SR1819	N/A	N/A	N/A
19.0	SR1858	N/A	N/A	N/A	SR1859	N/A	N/A	N/A
21.2	SR1860	N/A	N/A	N/A	SR1862	N/A	N/A	N/A
23.2	SR1863	N/A	N/A	N/A	SR1864	N/A	N/A	N/A

Drawings 32121-PH009-1 through 32121-PH009-3 in Appendix A provide a sketch of the approximate locations of the monitoring instrumentation for this site.

***** Previous readings on May 22, 2024

Table PH009-4: Spring 2025 – Old Hwy 2:02 Shop Slide Vibrating Wire Load Cell Instrumentation Reading Summary

Date Monitored: June 8, 2025

ANCHOR NUMBER	LOAD CELL SERIAL #	WALL SECTION	SLS DESIGN LOAD / LOCK-OFF LOAD (kN)	MAXIMUM RECORDED LOAD (kN)	RECORDED LOAD (Jun. 8, 2025) (kN)	PREVIOUS RECORDED LOAD (Sep. 20, 2024) (kN)	CHANGE IN LOAD SINCE PREVIOUS READING (kN)
A19	VC2340	1	202/100	251.30 on May 29, 2025	249.36	230.93	18.43
A34	VC2341	1	202/100	246.15 on March 25, 2025	222.54	211.74	10.80
A51	VC2342	1	202/100	232.69 on March 2, 2025	191.85	172.99	18.86
A67	VC2343	2	160/100	144.53 on May 29, 2025	141.89	128.81	13.08
A77	VC2344	2	160/100	243.92 on May 29, 2025	242.25	231.20	11.05

Drawings 32121-PH009-1 through 32121-PH009-3 in Appendix A provide a sketch of the approximate locations of the monitoring instrumentation for this site.

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Table PH009-5: Spring 2025 – Old Hwy 2:02 Shop Slide Standpipe Piezometer Instrumentation Reading Summary

Date Monitored: June 8, 2025

INSTRUMENT #	DATE INITIALIZED	TIP DEPTH (m)	GROUND ELEV. (m)	CURRENT STATUS	HIGHEST MEASURED WATER LEVEL BGS (m)	MEASURED WATER LEVEL BGS (m)	PREVIOUS READING (MAY 22, 2024) BGS (m)	CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)
SP11-06	May 21, 2015	12.98	-	Active	8.31 on June 15, 2018	DRY	DRY	N/A
SP05-1	Jun. 6, 2005	9.91	N/A	Active	1.56 on June 9, 2012	8.40	8.23	-0.17
SP05-4	Jun. 6, 2005	9.91	N/A	Active	4.80 on May 18, 2008	6.48	6.41	-0.07
SP05-5	Jun. 6, 2005	12.04	N/A	Active	2.55 on May 18, 2007	3.60	3.63	0.03
SP09-8	August 20, 2009	23.77	393.778	Active	N/A	DRY	DRY	N/A
SP09-9	August 20, 2009	11.28	361.294	Active	N/A	DRY	DRY	N/A
SP09-10	August 17, 2009	21.03	379.506	Active	7.05 on June 15, 2018	9.32	8.29	-1.03
SP19-3	February 7, 2019	9.25	393.650	Active	3.44 on June 13, 2020	4.12	3.69	-0.43

Drawings 32121-PH009-1 through 32121-PH009-3 in Appendix A provide a sketch of the approximate location of the monitoring instrumentation for this site

Table PH009-6: Spring 2025 – Old Hwy 2:02 Shop Slide Vibrating Wire Piezometer Instrumentation Reading Summary

Date Monitored: June 8, 2025

INSTRUMENT	DATE INITIALIZED	TIP ELEV. (m)	GROUND ELEV. (m)	CURRENT STATUS	HIGHEST MEASURED WATER LEVEL ELEVATION (DEPTH, mBGS)	CURRENT GROUNDWATER ELEVATION (m) (DEPTH, mBGS)	PREVIOUS (MAY 22, 2024) GROUNDWATER ELEVATION (m) (DEPTH, mBGS)	CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)
VW09-3 (10022)	August 18, 2009	356.40	361.73	Operational	356.18 m on June 1, 2011 (5.55)	DRY	DRY	N/A
VW09-4 (10021)	August 17, 2009	361.19	379.58	Operational	373.29 m on August 17, 2009 (7.26)	365.41 (14.17)	365.54 (14.04)	-0.13

Drawings 32121-PH009-1 through 32121-PH009-3 in Appendix A provide a sketch of the approximate location of the monitoring instrumentation for this site

Note: BGS = Below Ground Surface

Table PH009-7: Spring 2025 – Old Hwy 2:02 Shop Slide Pneumatic Piezometer Instrumentation Reading Summary

Date Monitored: June 8, 2025

INSTRUMENT #	DATE INITIALIZED	TIP DEPTH (m)	GROUND ELEV. (m)	CURRENT STATUS	HIGHEST MEASURED WATER LEVEL BGS (m)	MEASURED PORE PRESSURE (kPa)	CURRENT GROUNDWATER ELEVATION (m) (DEPTH, mBGS)	PREVIOUS (MAY 22, 2024) GROUNDWATER ELEVATION (m) (DEPTH, mBGS)	CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)
PN19-5A	February 14, 2019	9.30	372.11	Repaired	365.55 on February 14, 2019	0.5	362.86 (9.25)	362.87 (9.24)	-0.01
PN19-5B	February 14, 2019	19.25	372.11	Active	367.41 on August 18, 2021	138.8	367.01 (5.10)	366.88 (5.23)	0.13

Drawings 32121-PH009-1 through 32121-PH009-3 in Appendix A provide a sketch of the approximate location of the monitoring instrumentation for this site

* PN19-5A not functioning during 2023

Note: BGS = Below Ground Surface

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STATEMENT FOR USE AND INTERPRETATION OF REPORT

1. STANDARD OF CARE

This Report has been prepared in a manner consistent with that degree of care and skill ordinarily exercised by members of the same profession currently practicing under similar circumstances at the same time and in the same or similar locality and in compliance with all applicable laws.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment, including this Statement For Use and Interpretation of Report, 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, AS DESCRIBED ABOVE. THURBER IS NOT RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TOTHE WHOLE OF THE 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 for the development, design objectives, and/or purposes described to Thurber by the Client. **NO OTHER PARTY MAY USE OR RELY ON THE REPORT OR ANY PORTION THEREOF FOR OTHER THAN THE CLIENT'S BENEFIT IN CONNECTION WITH THE PURPOSES DESCRIBED IN THE REPORT**. Any use which a third party makes of the Report is the sole responsibility of such third party and is always subject to this Statement for Use and Interpretation of Report. Thurber accepts no liability or responsibility for damages suffered by any third party resulting from use of the Report for purposes outside the reasonable contemplation of Thurber at the time it was prepared or in any manner unintended by Thurber.

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 is inherently judgement-based. 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 parties making use of such documents or records with or without our express written consent need to 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 parties. Some conditions are subject to change over time and those making use of the Report need to be aware of this possibility and understand that the Report only presents the interpreted conditions at the sampled points at the time of sampling. If special concerns exist, or the Client has special considerations or requirements, the Client must 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 based on conditions in evidence at the time of site inspections and based on 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 resulting from misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other parties 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 is recommended to 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 need to 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 to confirm and document that the site conditions do not materially differ from those 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. 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 other parties 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, unless such decisions expressly form part of the stated purpose of the Report as described in Paragraph 3.

THURBER

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

SPRING 2025

APPENDIX A
DATA PRESENTATION

SITE PH009: OLD HWY 2:02 SHOP SLIDE

ALBERTA TRANSPORTATION AND ECONOMIC CORRIDORS
PEACE REGION (PEACE RIVER DISTRICT)
INSTRUMENTATION MONITORING FIELD SUMMARY (PH009)
SPRING 2025

Location:	Shop Slide (Old Hwy 2:02 km 0.000 to 0.365)	**Readout:**	RST PN C108,Unit 8, DGSI Dipmeter/ GK404 SN 364
File Number:	32121	**Casing size:**	3.34/2.75
Probe:	RST SET 8R	**Temp degree C:**	20
Cable:	RST SET 8R	**Read by:**	NKR/GE

SLOPE INCLINOMETER (SI) READINGS

SI#	GPS Location (UTM 11)		Date	Stickup (m)	Depth from top of Casing (ft)	Azimuth of A+ Groove (Mag N)	Current Bottom Depth Readings				Probe/ Reel #	Size (")	Remarks
	Easting (m)	Northing (m)					A+	A-	B+	B-			
SI05-1	480320.97	6232126.34	08-Jun-25	0.65	69 to 3	20°	-274	254	379	-371	8R/8R	2.75	
SI09-3	480391.11	6232279.95	08-Jun-25	1.1	53 to 3	355°	-483	495	196	-190	8R/8R	2.75	
SI09-4	480373.71	6232136.12	08-Jun-25	0.2	72 to 2	23°	-922	933	236	-240	8R/8R		Casing size 2.27" inside 3.34"
SI11-1	480200.11	6232265.25	08-Jun-25	1.08	102 to 2	75°	-359	374	109	-109	8R/8R	2.75	
SI19-5	480323.02	6232243.91	08-Jun-25	0.68	82 to 2	75°	358	-348	-583	579	8R/8R		

STANDPIPE PIEZOMETER (SP) READINGS

SP#	GPS Location (UTM 11)		Date	Stick-up (m)	Reading below top of casing (m)	Bottom Pipe Depth (below top of casing (m))
	Easting (m)	Northing (m)				
SP11-06	480372.32	6232387.56	08-Jun-25	1.02	Dry	13.05
SP05-1	480320.97	6232126.34	08-Jun-25	0.94	9.34	11.05
SP05-4	480345.06	6232200.36	08-Jun-25	0.97	7.45	9.70
SP05-5	480425.01	6232237.5	08-Jun-25	0.81	4.41	12.94
SP09-8	480224.19	6232191.23	08-Jun-25	0.96	Dry	24.73
SP09-9	480375.12	6232308.07	08-Jun-25	0.83	Dry	12.11
SP09-10	480402.11	6232110.94	08-Jun-25	1.13	10.45	21.78
SP19-3	480211	6232232	08-Jun-25	0.89	5.01	10.14

PNEUMATIC PIEZOMETER (PN) READINGS

PN#	GPS Location (UTM 11)		Date	Reading (kPa)	Identification Number
	Easting (m)	Northing (m)			
PN19-5A	Attached to SI19-5		08-Jun-25	0.5	38168
PN19-5B	Attached to SI19-5		08-Jun-25	138.8	38157

VIBRATING WIRE PIEZOMETER (VW) READINGS

VW #	GPS Location (UTM 11)		Date	Reading (Dg/^{0}C)	Identification
	Easting (m)	Northing (m)			
VW09-3	480391.11	6232279.95	08-Jun-25	9006.3/4.2	10022
VW09-4	480373.71	6232136.12	08-Jun-25	8794.0/6.4	10021

Conduit Repaired see Photos

ALBERTA TRANSPORTATION AND ECONOMIC CORRIDORS
PEACE REGION (PEACE RIVER DISTRICT)
INSTRUMENTATION MONITORING FIELD SUMMARY (PH009)
SPRING 2025

Location:	Shop Slide (Old Hwy 2:02 km 0.000 to 0.365)	**Readout:**	
File Number:	32121	**Casing size:**	3.34/2.75
Probe:		**Temp degree C:**	20
Cable:		**Read by:**	NKR/GE

SHAPE ACCELEROMETER ARRAY (SAA) READINGS

SAA#	GPS Location (UTM 11)		Date	Download Reading from Datalogger	Identification Number
	Easting (m)	Northing (m)			
SAA-P34	Attached to Pile P34				401460
SAA-P77	Attached to Pile P77				401455
SAA-P113	Attached to Pile P113		08-Jun-25		401452

VIBRATING WIRE STRAIN GAUGE READINGS

PILE#	GPS Location (UTM 11)		Date	Download Reading from Datalogger	Strain Gauges
	Easting (m)	Northing (m)			
Pile P34	Attached to Pile P34				11 Upslope Face, 11 Downslope Face
Pile P77	Attached to Pile P77				9 Upslope Face, 9 Downslope Face
Pile 113*	Attached to Pile P113		08-Jun-25		12 Upslope Face, 12 Downslope Face*

VIBRATING WIRE LOAD CELL READINGS

Anchor #	GPS Location (UTM 11)		Date	Download Reading from Datalogger	Load Cells
	Easting (m)	Northing (m)			
A19	Attached to Pile P19				VC2340
A34	Attached to Pile P34				VC2341
A51	Attached to Pile P51		08-Jun-25		VC2342
A67	Attached to Pile P67				VC2343
A77	Attached to Pile P77				VC2344

* Vibrating Wire Strain Gauge SR1820 (Upslope) and SR1811 (Downslope) not functioning

*Download readings from Datalogger cabinet, requires key

Conduit Repaired See Photos

G:\32000\32121 AT GRMP Peace River District 2021-2025\CAD\2025 Instrument\32121-PH009-1.dwg - 1N - Jul. 03, 2025

OLD HWY 2 R/W
SI05-1
TH05-1
SP09-8
REMOVED AND REINSTATED SIGN POST
800 mm Ø CSP
SP19-3
300 mm DIA 1/2 CULVERT
TH19-4
INSTALLED W-BEAM TERMINAL AS PER RDG-BI-5
REPLACED ASPHALT PAVEMENT
CONSTRUCTED CONCRETE DRAIN TROUGH
INSTALLED SALVAGED AND NEW W BEAM GUARDRAIL
SP19-2 (DAMAGED)
SP19-1
HIGHWAY 2 OFFRAMP
SEWER MAIN
WATERMAIN
OLD HWY 2
DATALOGGER
SAA-P113
SI11-01
W-BEAM GUARDRAIL
(DAMAGED) BH13/SP09-11
SP09-10
SI09-4/VW09-4
SI05-3 (SHEARED)
SP05-3
SP05-2/SI05-2 (SHEARED)
VC2344 SAA-P77
VC2343
VC2342
VC2341 SAA-P34
VC2340 SP09-7 (DAMAGED)
INSTALLED 14 m LONG 600 mm Ø CSP UNDER PATH
CONCRETE SWALE
SI09-2/VW09-2 (DESTROYED)
≈21%
≈26%
≈25%
OLD HWY 2 R/W
S.W. 1/4 SEC. 31-83-21-5
TRM
CLASS 1M RIPRAP
SP09-6 (DAMAGED)
CLASS 1M RIPRAP
INSTALLED NEW PATH ALIGNMENT (SEE SHEET 22 FOR DETAILS)
CONSTRUCTED DRAINAGE SWALE
TRM
RIPRAP LINED DISSIPATION BOWL
SI19-5/PN19-5A/B
SI09-1/VW09-1 (SHEARED)
SP05-4/SI05-4
SP09-5
INSTALLED 150 mm DIA PERFORATED SUBDRAINS (SURROUNDED BY FILTER MATERIAL ENVELOPED IN NON-WOVEN GEOTEXTILE) TO DRAIN GRAVEL LAYER INTO DRAINAGE CHANNEL. SHOWN LOCATION IS APPROXIMATE AND TO BE FIELD FIT TO PLACE DRAINS IN AREA OF HIGHEST SEEPAGE AS DIRECTED BY THE CONSULTANT
CNR R/W
ECSB TYPE B (TYP)
DRAINAGE CHANNEL
CLASS 1 RIPRAP
600 mm Ø CSP
800 mm Ø CSP
SP05-5
SI09-3/VW09-3
760 STEEL CASING (1979)
600 STEEL CASING (1979)
SP09-9
SI8

LEGEND

- ASPHALT CEMENT PAVEMENT
- ASPHALT CEMENT SLOPE PROTECTION (40 mm THICK)
- EROSION CONTROL SOIL COVERING (TYPE B)
- PERMANENT RECP (TRM TYPE B, COMPLETE WITH SYNTHETIC PERMEABLE DITCH BARRIERS AT 15 m INTERVALS ALONG SWALE)
- CLASS 1M RIPRAP (0.4 m THICK)
- CLASS 1 RIPRAP (0.8 m THICK)
- FIBRE ROLL
- GUARDRAIL
- TELUS LINE (BURIED)
- GAS LINE
- POWER LINE AND POWER POLE
- GUY WIRE
- RAIL LINE
- ROW BOUNDARY
- SIGN POST
- TELUS UNDERGROUND VAULT
- DATALOGGER ENCLOSURE
- INSTRUMENT LOCATION
- NON-OPERATIONAL
- SI SLOPE INCLINOMETER
- VW VIBRATING WIRE PIEZOMETER
- SP STANDPIPE PIEZOMETER
- PN PNEUMATIC PIEZOMETER

0 10 20 30 40 50 60m
SCALE 1:500

Alberta Transportation

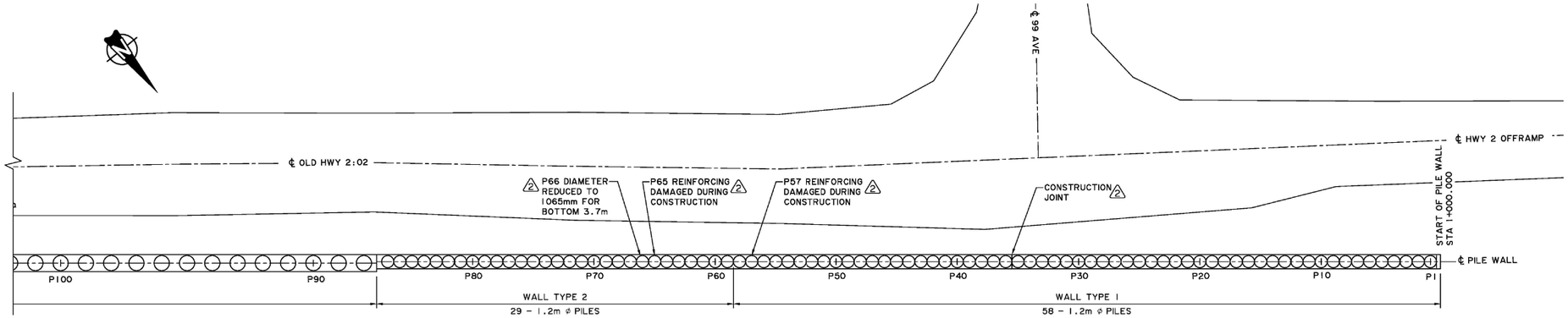
PEACE REGION (PEACE RIVER DISTRICT)

PH009: OLD HWY 2:02 SHOP SLIDE
SITE PLAN SHOWING INSTRUMENT LOCATIONS

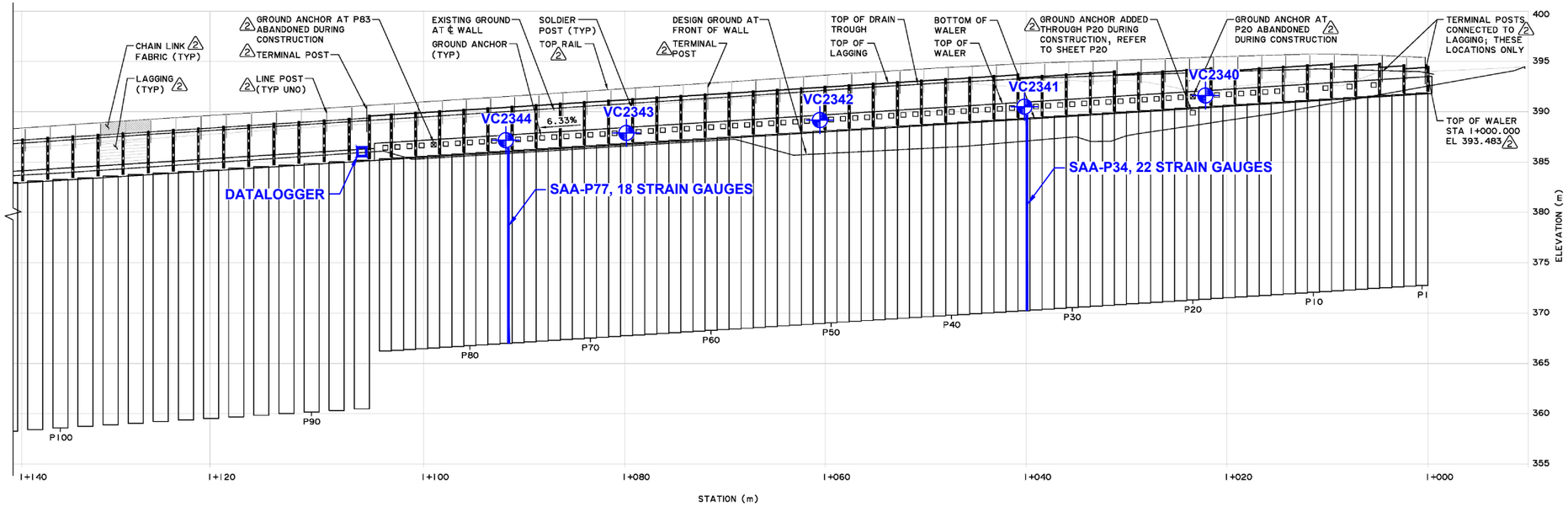
DWG No. 32121-PH009-1

DRAWN BY	ML
DESIGNED BY	BWN
APPROVED BY	DWP
SCALE	1:1500
DATE	JULY 2025
FILE No.	32121

THURBER



SITE PLAN
1:200



ELEVATION – PILE WALL

LEGEND

- INSTRUMENT LOCATION
- DATALOGGER ENCLOSURE

0 5 10 15 20 25 30m
SCALE 1:500

Alberta Transportation

PEACE REGION (PEACE RIVER DISTRICT)

PH009: OLD HWY 2:02 SHOP SLIDE
PILE WALL GENERAL LAYOUT 2

DWG No. 32121-PH009-2

DRAWN BY	ML
DESIGNED BY	BWN
APPROVED BY	DWP
SCALE	1:500
DATE	JULY 2025
FILE No.	32121

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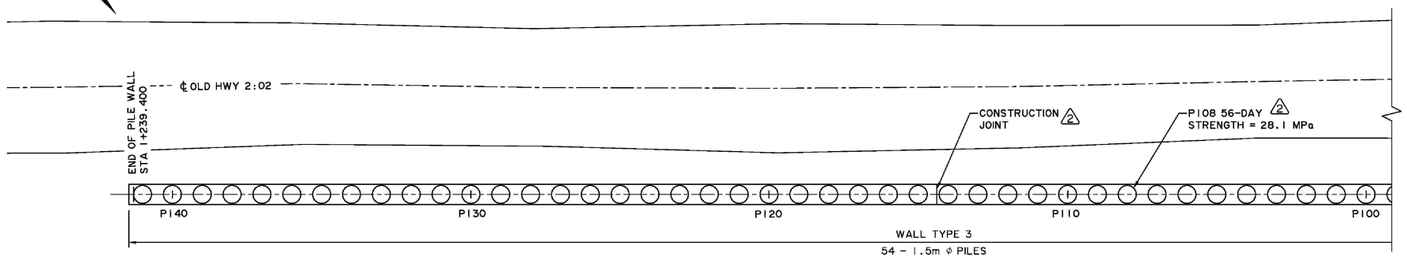
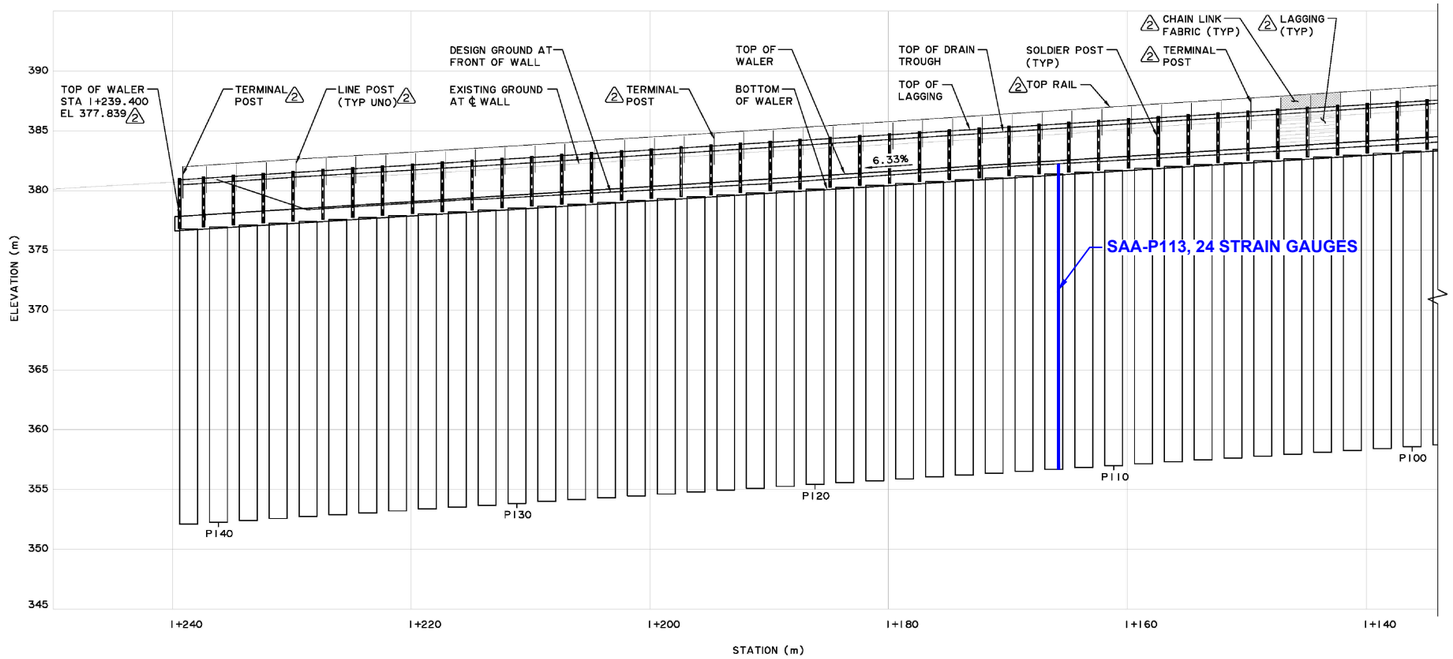


SITE PLAN
1:200



ELEVATION – PILE WALL

0 5 10 15 20 25 30m
SCALE 1:500

Alberta Transportation

PEACE REGION (PEACE RIVER DISTRICT)

PH009: OLD HWY 2:02 SHOP SLIDE
PILE WALL GENERAL LAYOUT 1

DWG No. 32121-PH009-3

DRAWN BY	ML
DESIGNED BY	BWN
APPROVED BY	DWP
SCALE	1:500
DATE	JULY 2025
FILE No.	32121

THURBER

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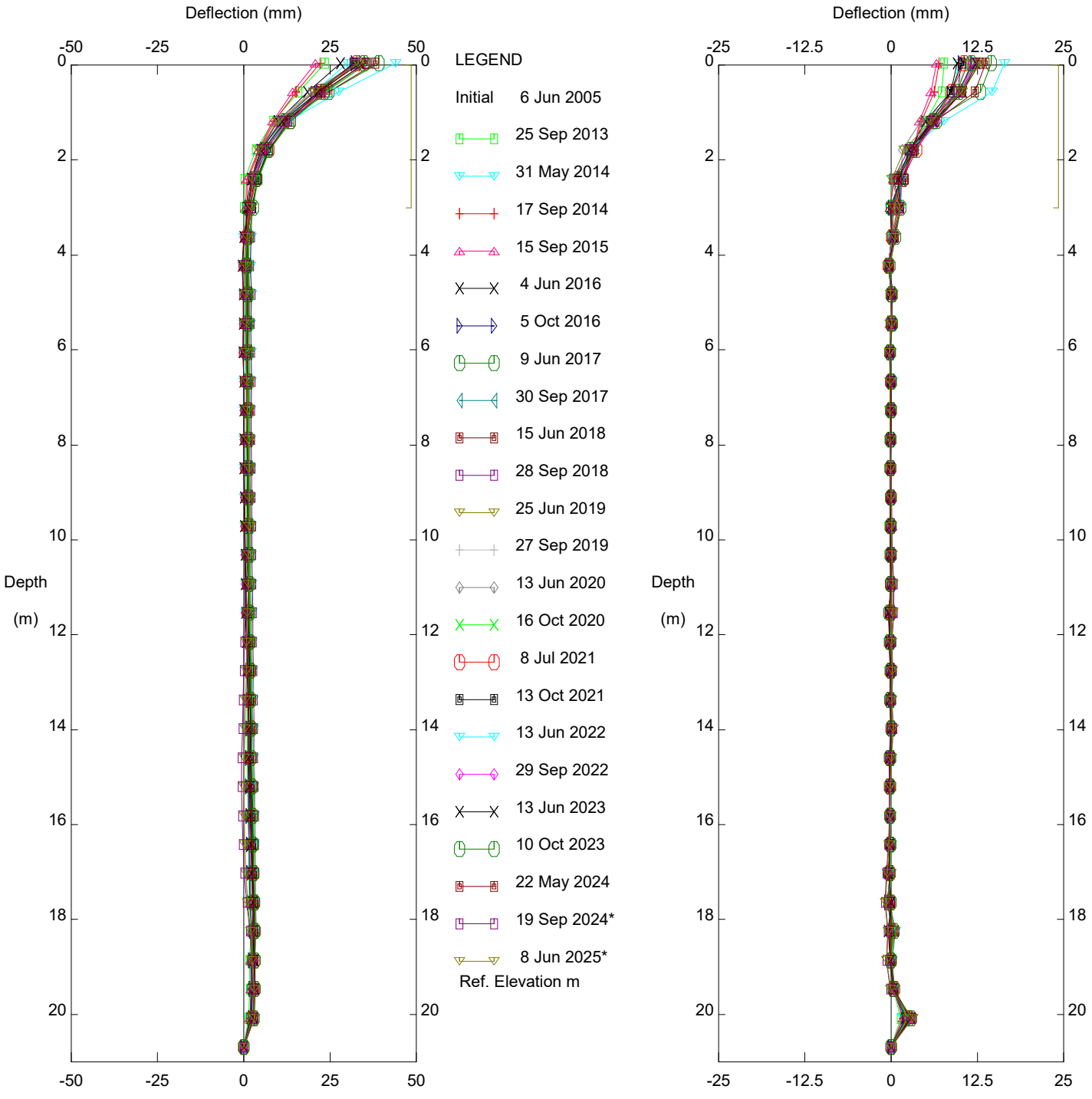

Cumulative Deflection

Direction A

Incremental Deflection

Direction A

PH009 Old Hwy 2:02 Shop Slide, Inclinometer SI05-1

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

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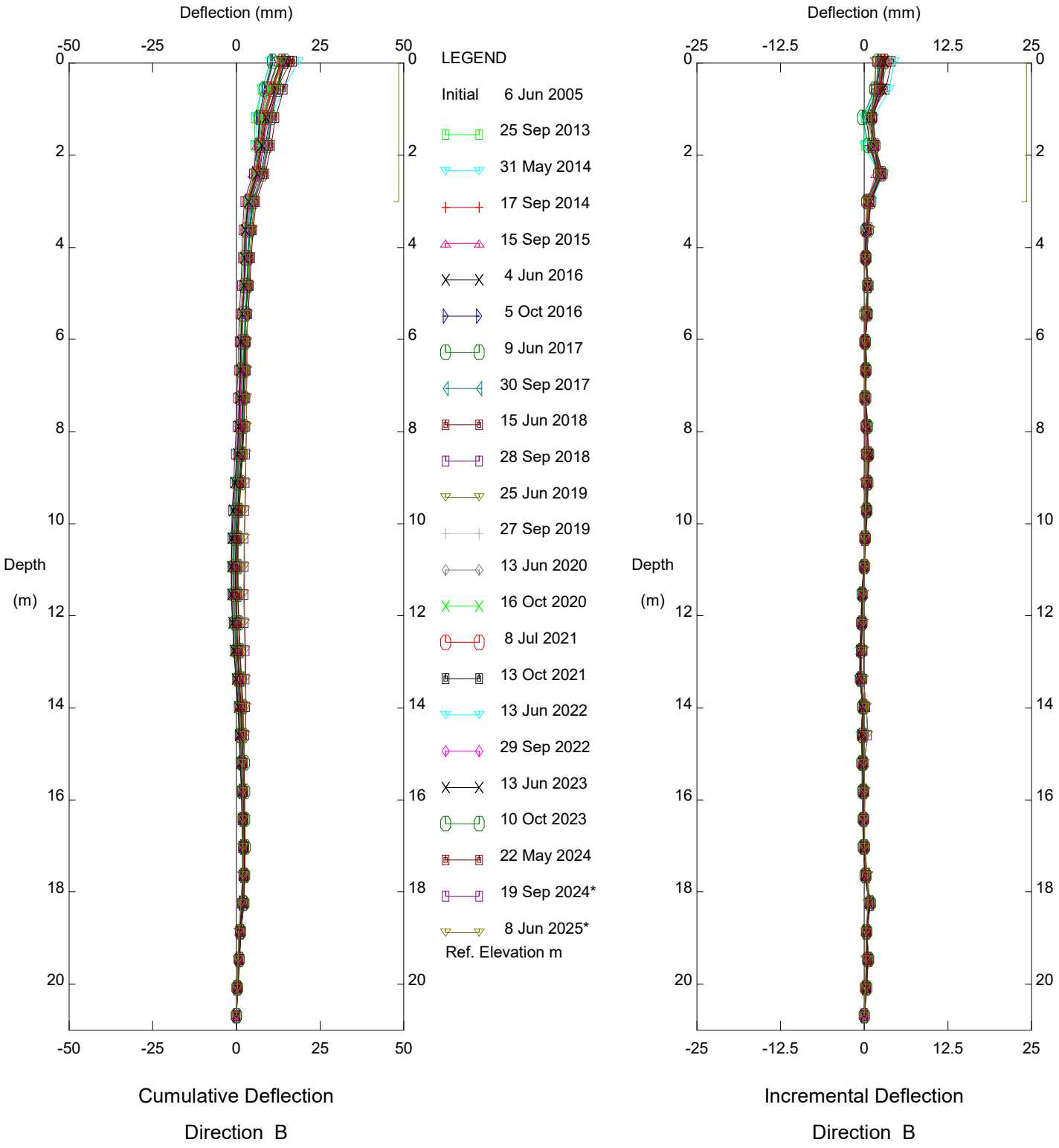

Cumulative Deflection

Direction B

Incremental Deflection

Direction B

PH009 Old Hwy 2:02 Shop Slide, Inclinometer SI05-1

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

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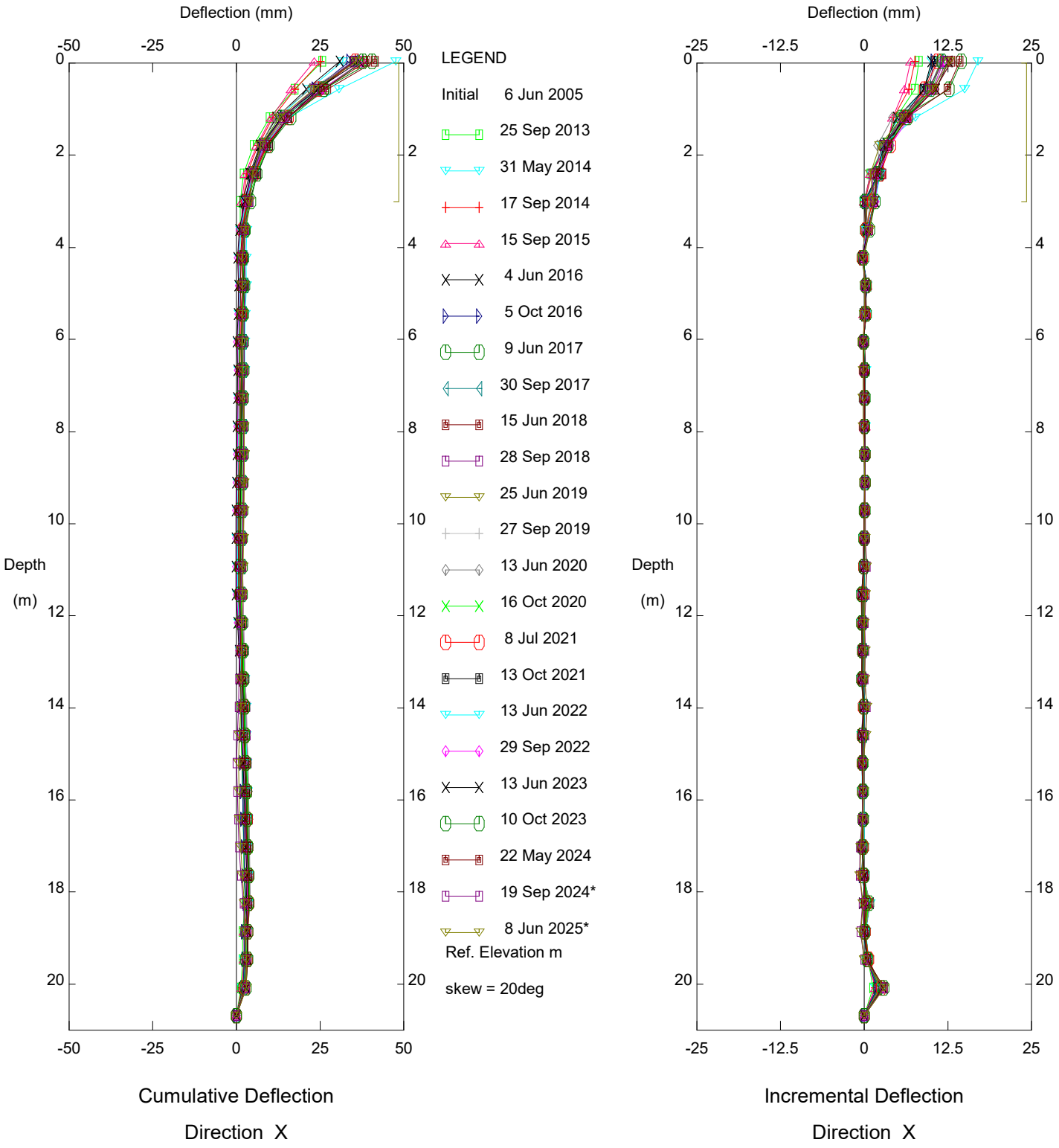

Cumulative Deflection

Direction X

Incremental Deflection

Direction X

PH009 Old Hwy 2:02 Shop Slide, Inclinometer SI05-1

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

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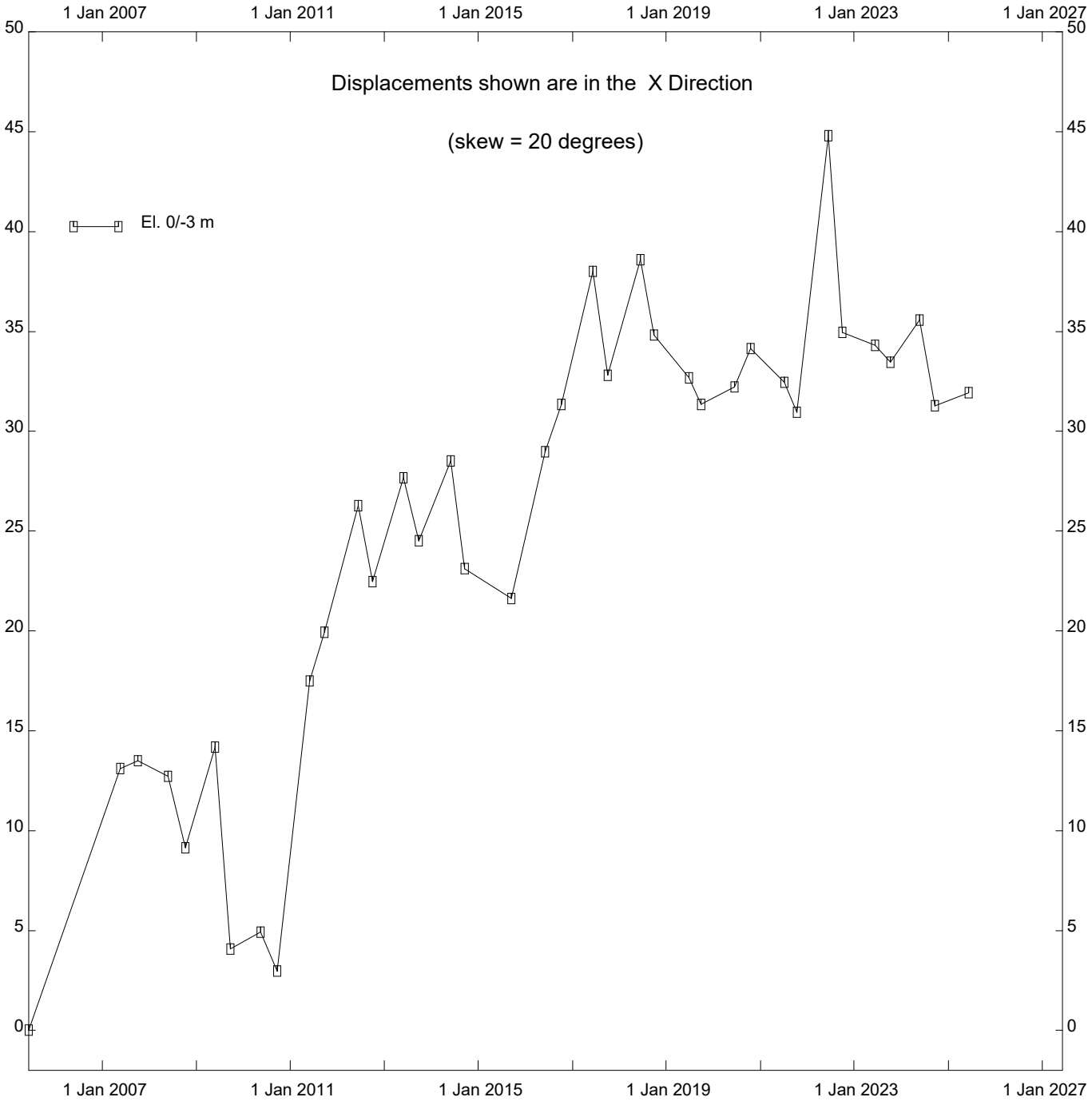
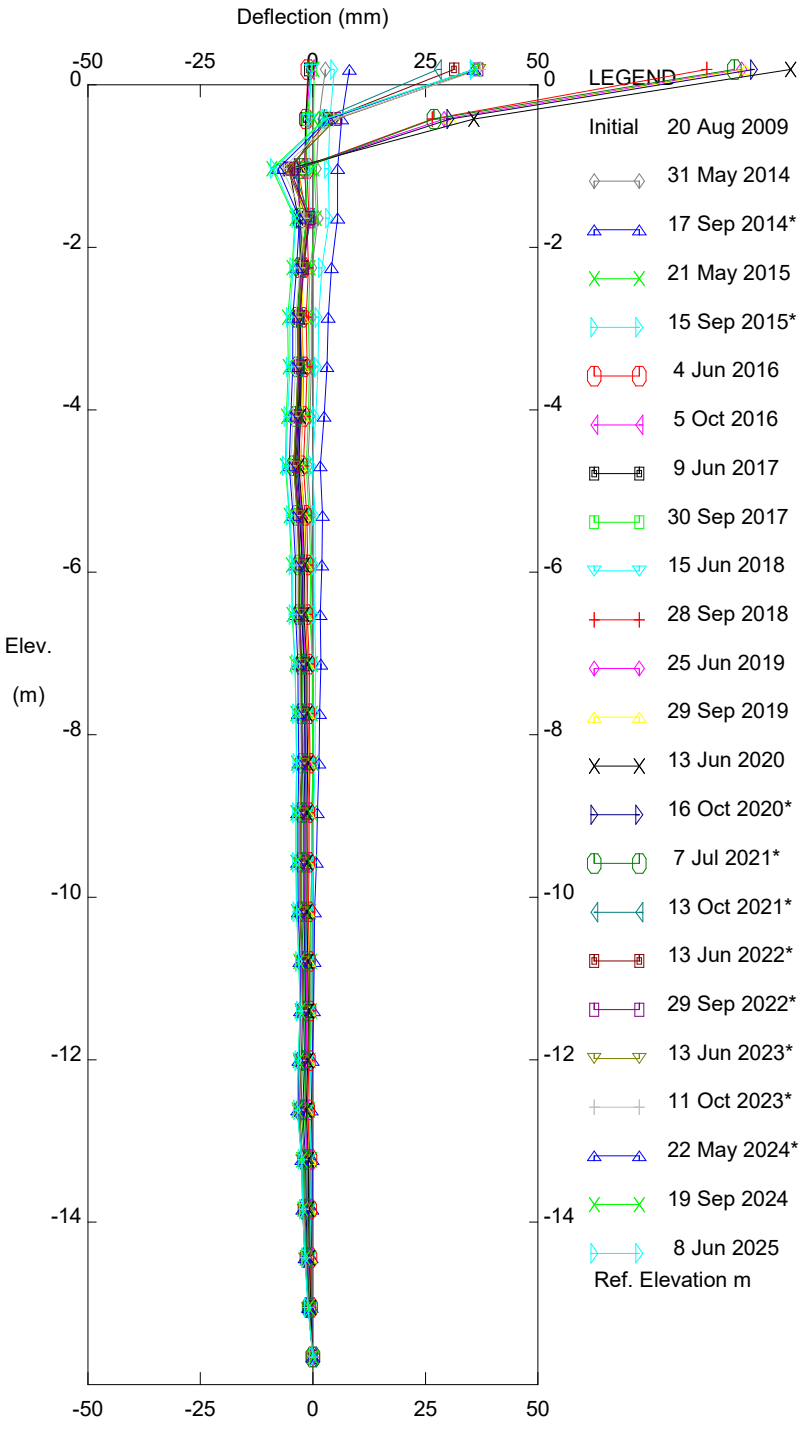


PH009 Old Hwy 2:02 Shop Slide, Inclinometer SI05-1

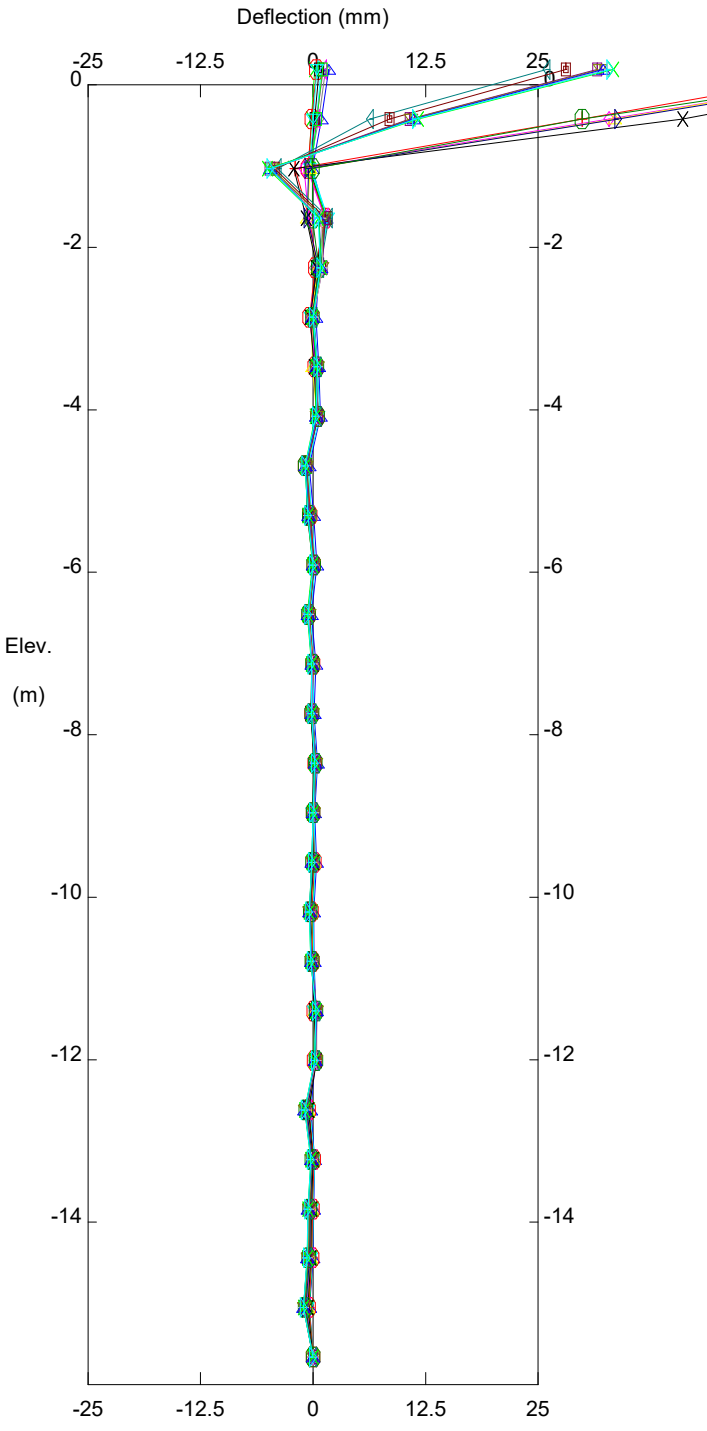
Alberta Transportation

Thurber Engineering Ltd.



Cumulative Deflection

Direction A



Incremental Deflection

Direction A

PH009 Old Hwy 2:02 Shop Slide, Inclinometer SI09-3

Alberta Transportation

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

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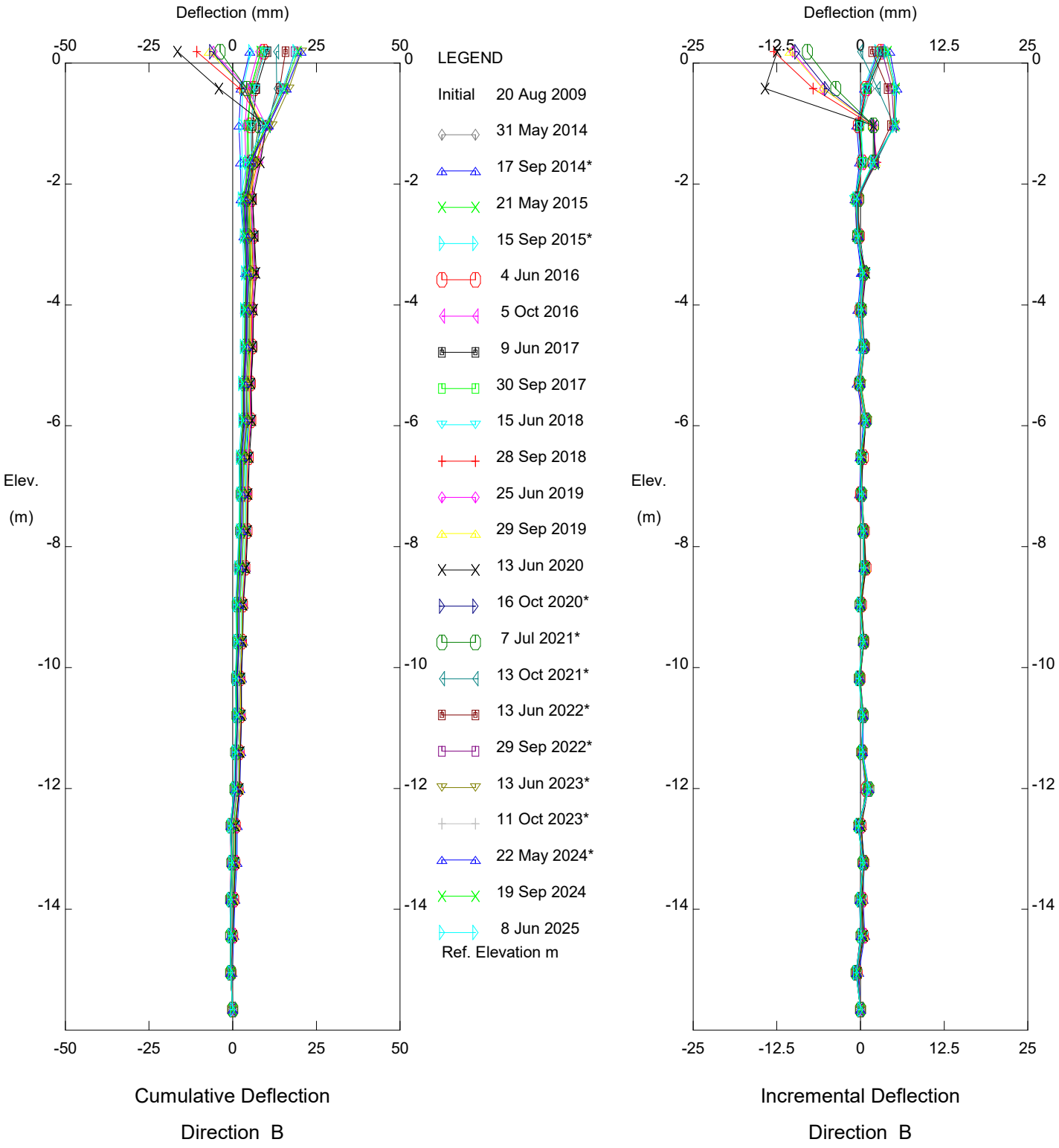
Thurber Engineering Ltd.



Cumulative Deflection

Direction B

Incremental Deflection

Direction B

PH009 Old Hwy 2:02 Shop Slide, Inclinometer SI09-3

Alberta Transportation

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

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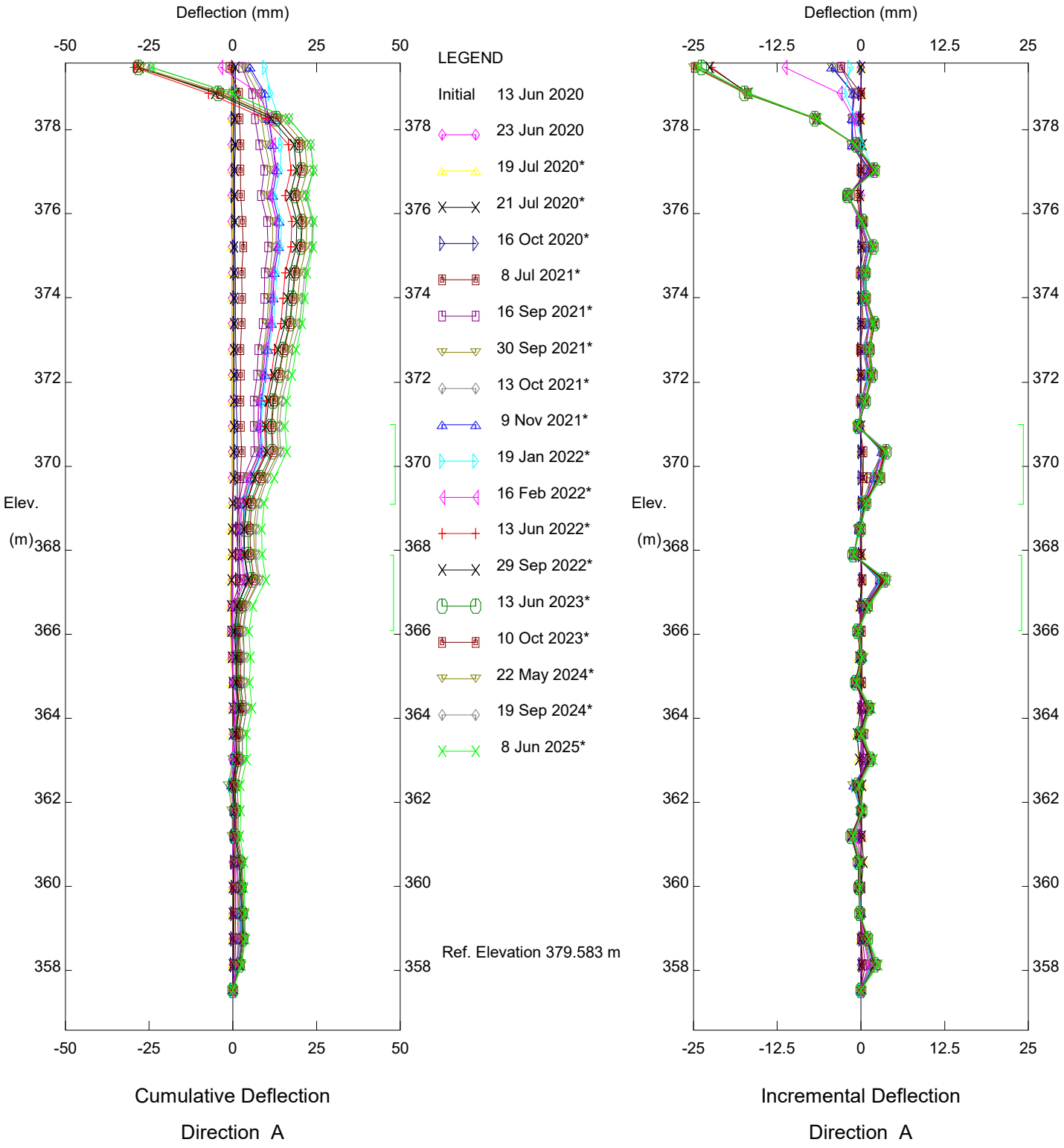
Thurber Engineering Ltd.



Cumulative Deflection

Direction A

Incremental Deflection

Direction A

PH009 Old Hwy 2:02 Shop Slide, Inclinometer SI09-4

Alberta Transportation

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

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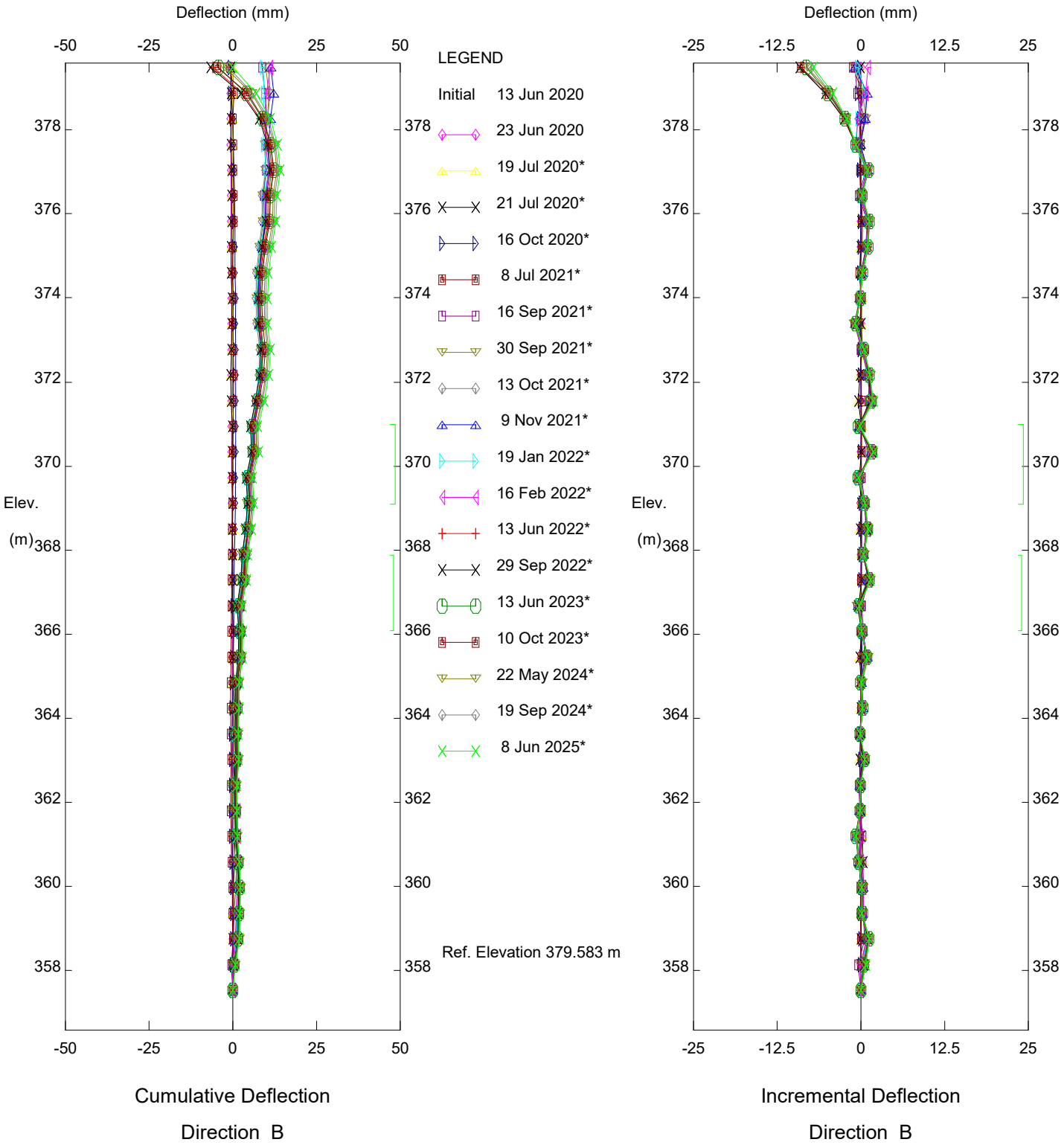
Thurber Engineering Ltd.



Cumulative Deflection

Direction B

Incremental Deflection

Direction B

PH009 Old Hwy 2:02 Shop Slide, Inclinometer SI09-4

Alberta Transportation

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

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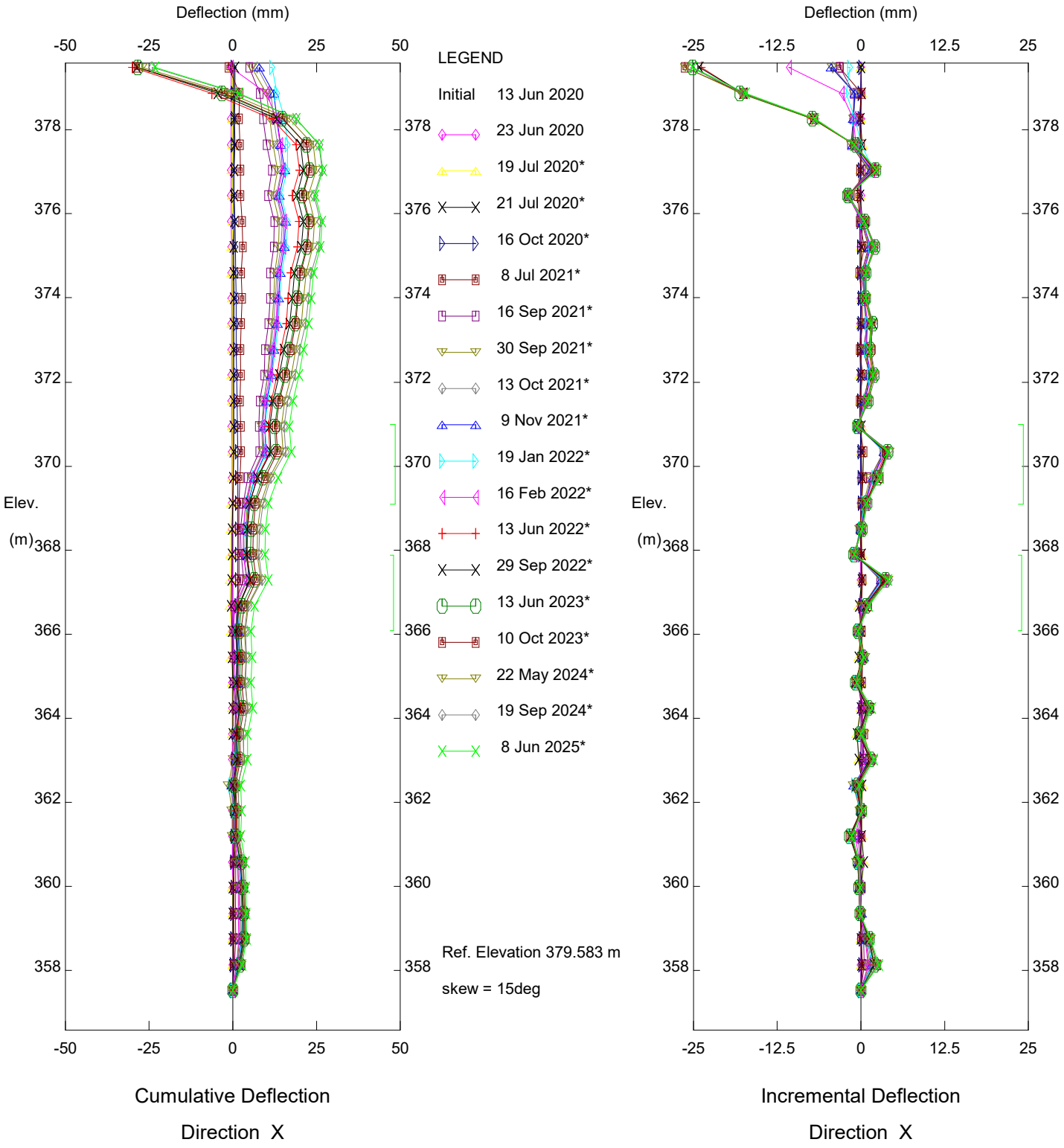
Thurber Engineering Ltd.



Cumulative Deflection

Direction X

Incremental Deflection

Direction X

PH009 Old Hwy 2:02 Shop Slide, Inclinometer SI09-4

Alberta Transportation

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

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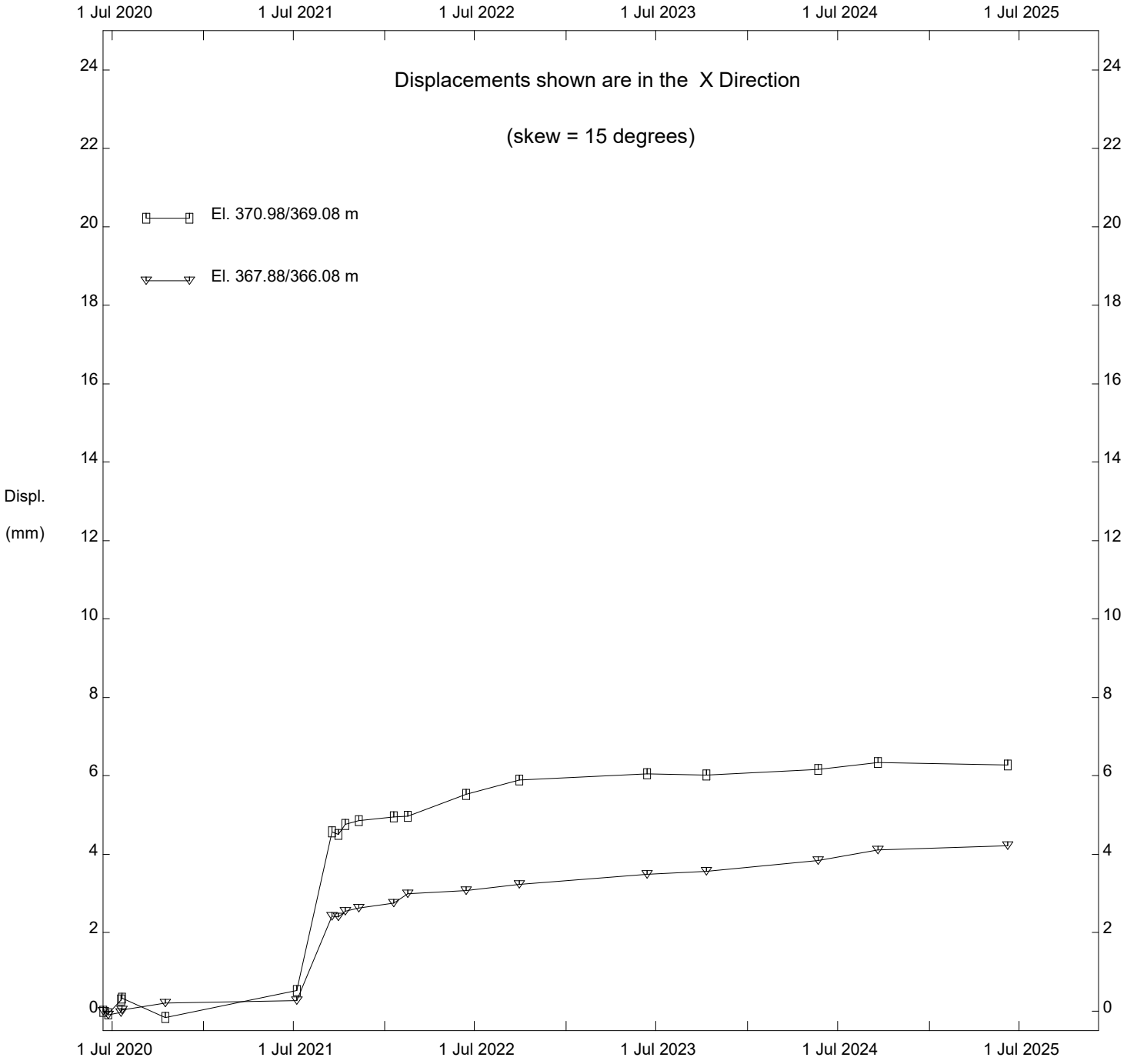
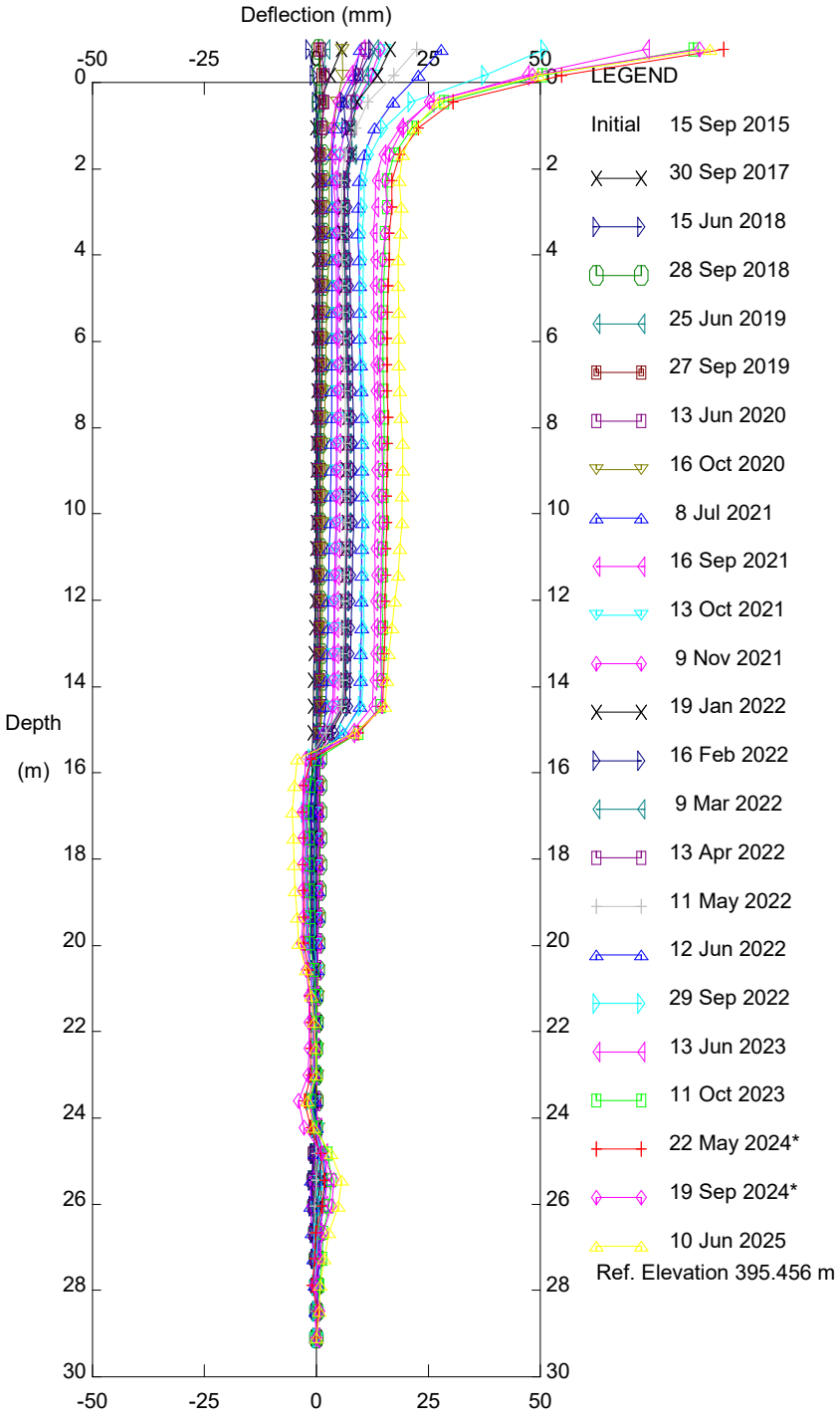
Thurber Engineering Ltd.



PH009 Old Hwy 2:02 Shop Slide, Inclinometer SI09-4

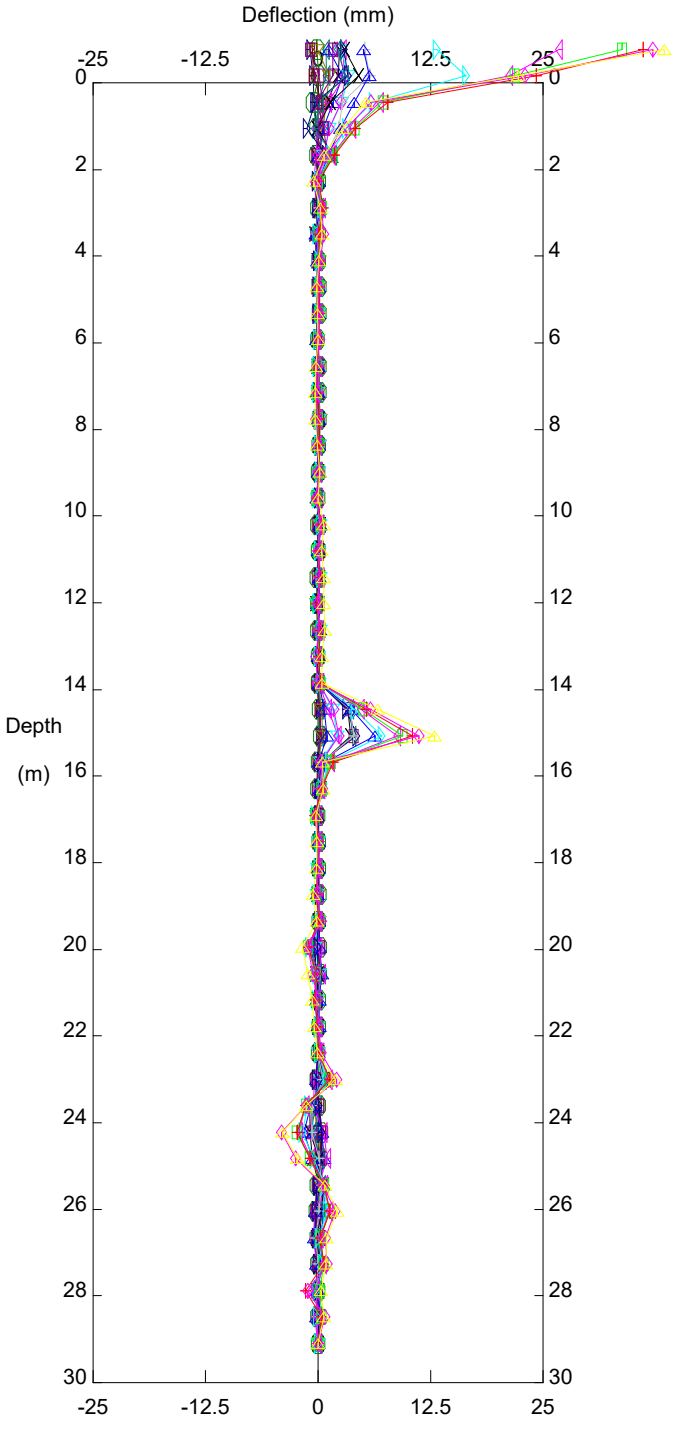
Alberta Transportation

Thurber Engineering Ltd.



Cumulative Deflection

Direction A



Incremental Deflection

Direction A

PH009 Old Hwy 2:02 Shop Slide, Inclinometer SI11-01

Alberta Transportation

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

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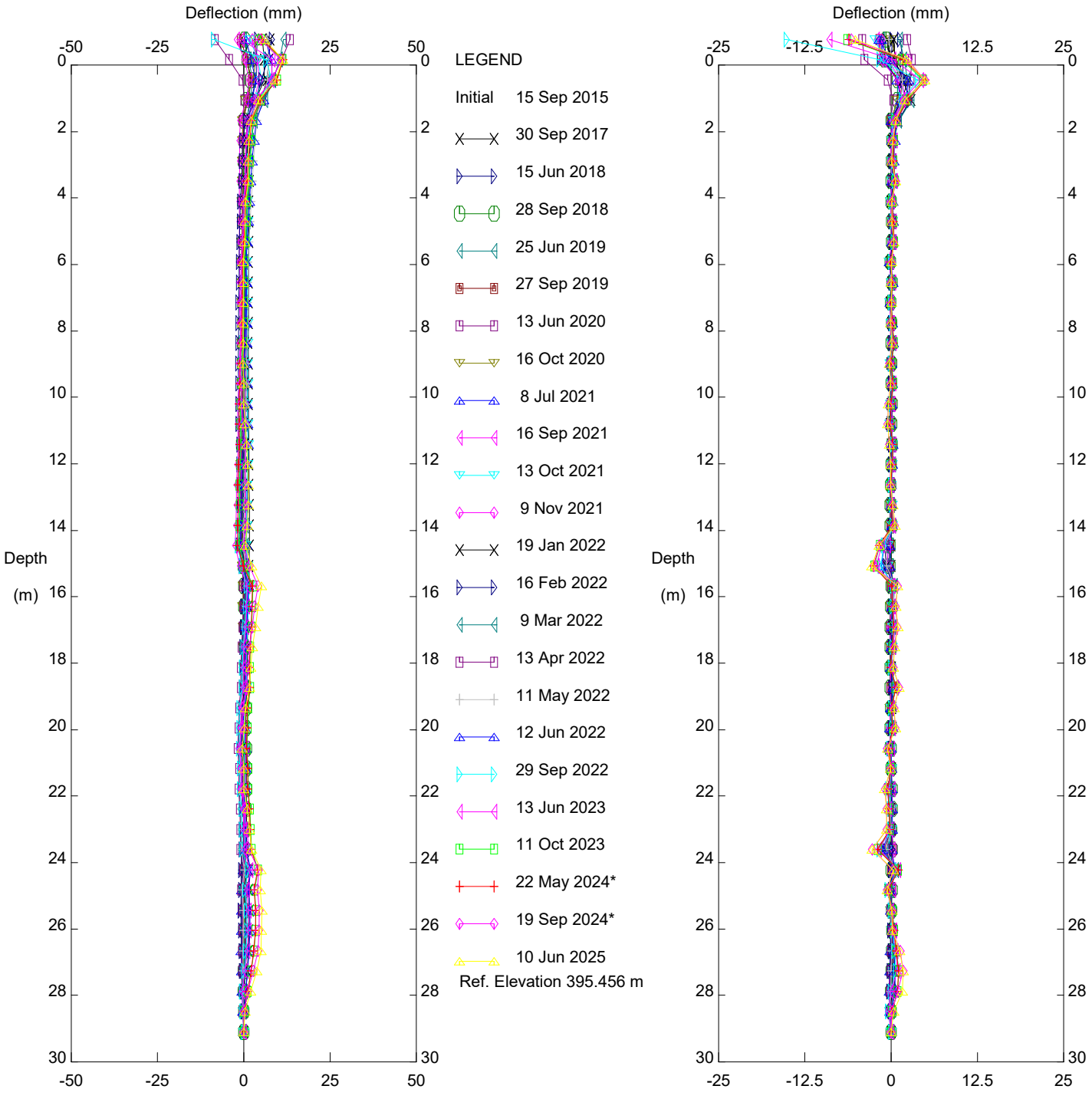
Thurber Engineering Ltd.



Cumulative Deflection

Direction B

Incremental Deflection

Direction B

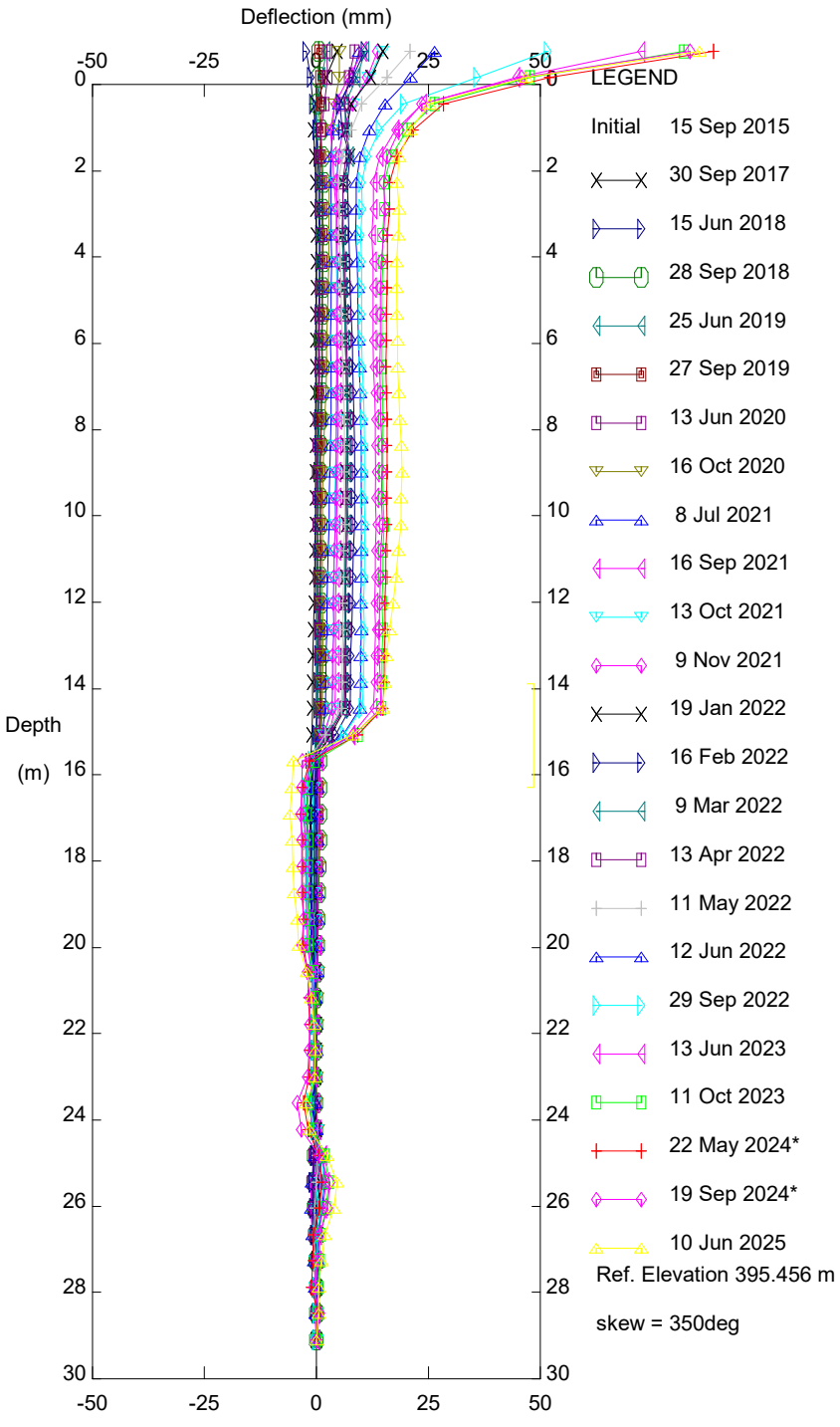
PH009 Old Hwy 2:02 Shop Slide, Inclinometer SI11-01

Alberta Transportation

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

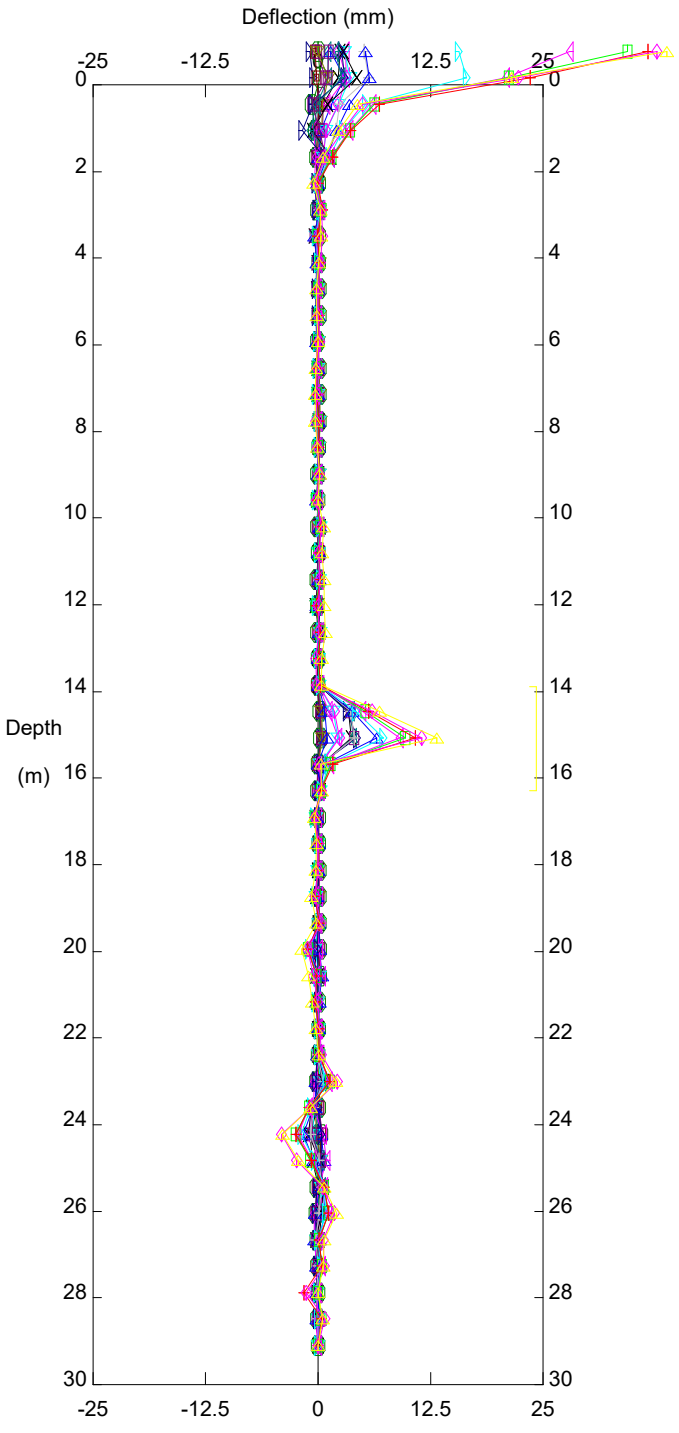
G:\32000\32121 AT GRMP Peace River District 2021-2025\Section C\2025A-Spring\SI Readings\PH009\SI11-01.gtl

Thurber Engineering Ltd.



Cumulative Deflection

Direction X



Incremental Deflection

Direction X

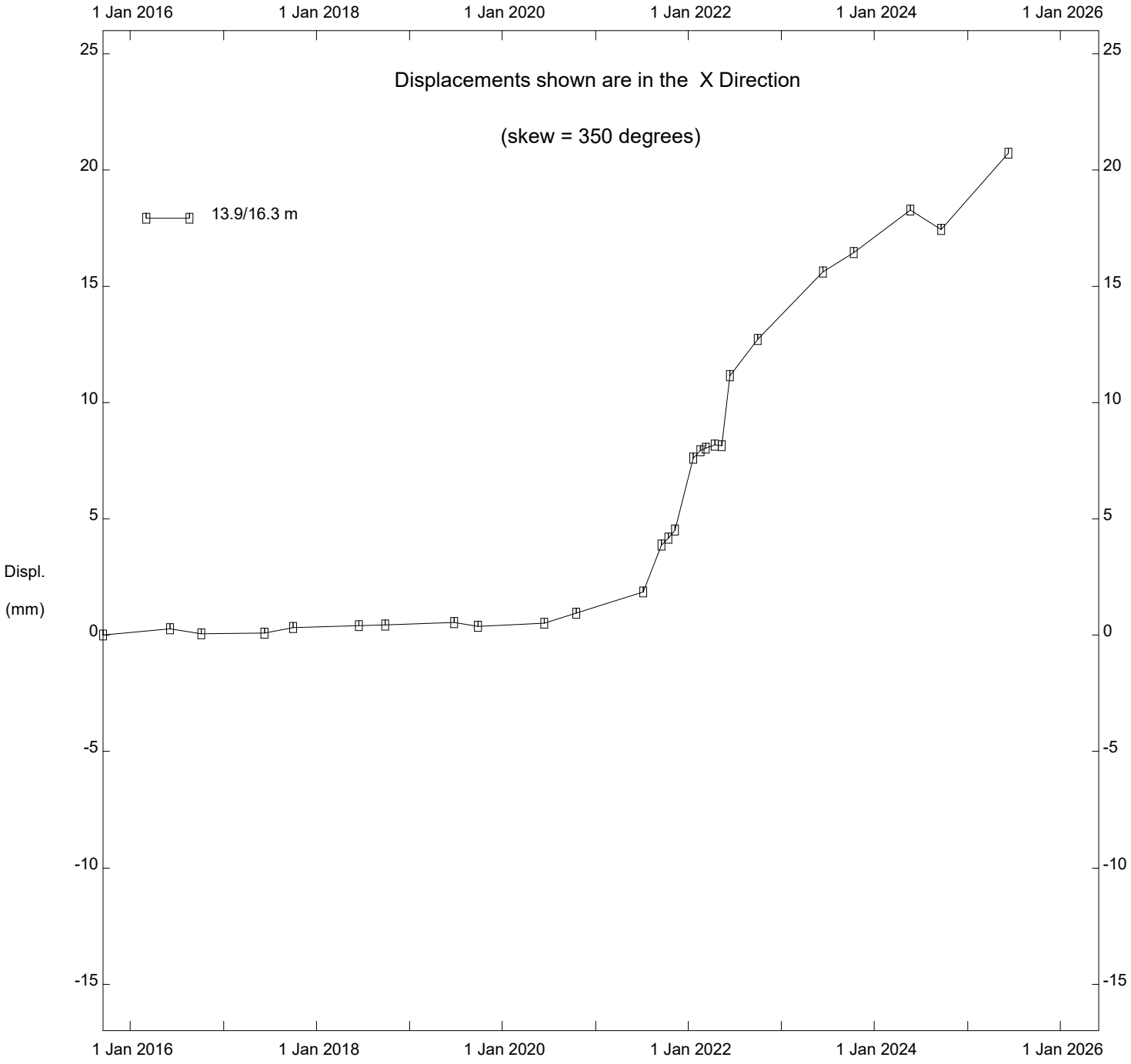
PH009 Old Hwy 2:02 Shop Slide, Inclinometer SI11-01

Alberta Transportation

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

G:\32000\32121 AT GRMP Peace River District 2021-2025\Section C\2025A-Spring\SI Readings\PH009\SI11-01.gtl

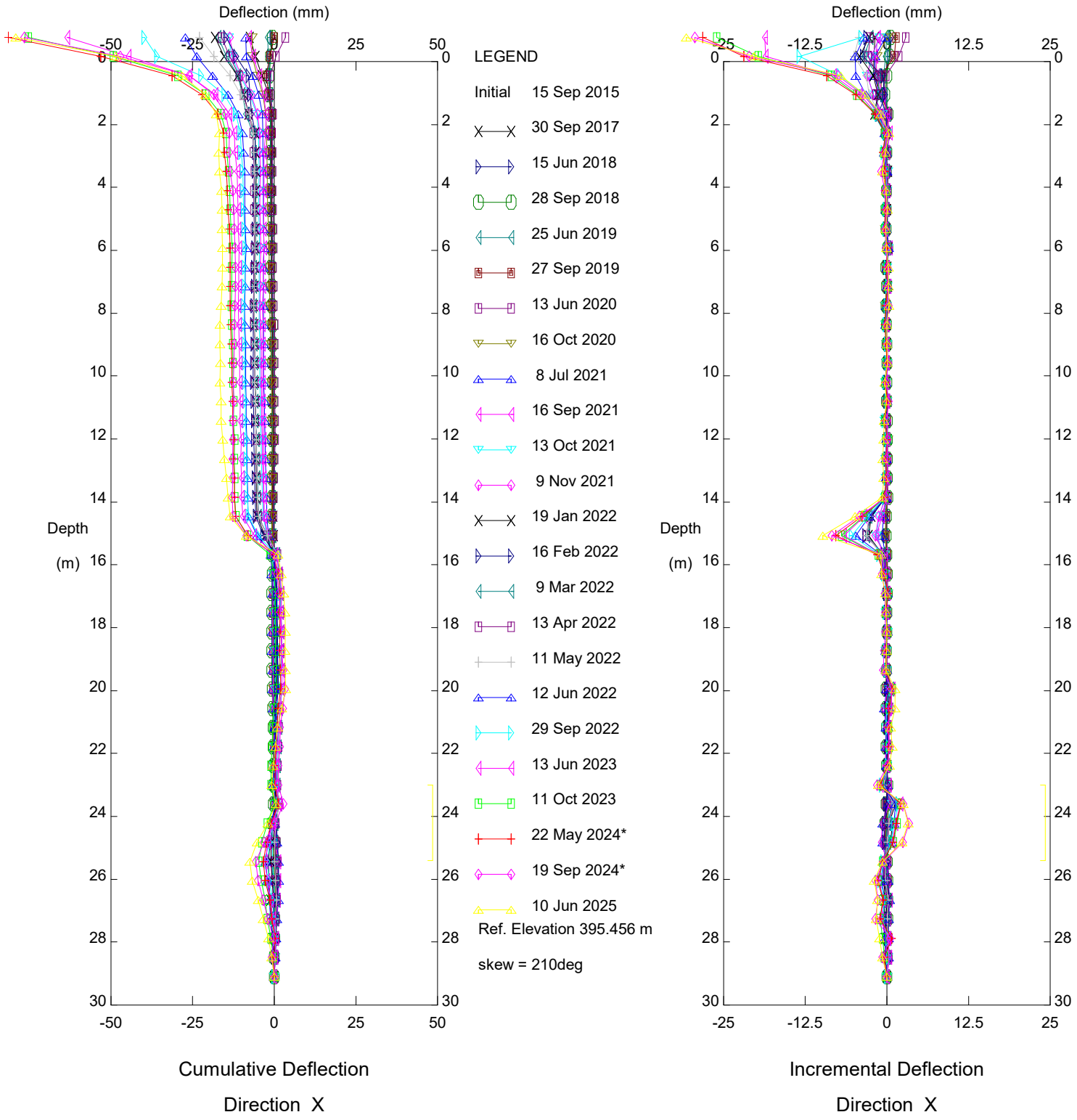
Thurber Engineering Ltd.



PH009 Old Hwy 2:02 Shop Slide, Inclinometer SI11-01

Alberta Transportation

Thurber Engineering Ltd.



Cumulative Deflection

Direction X

Incremental Deflection

Direction X

PH009 Old Hwy 2:02 Shop Slide, Inclinometer SI11-01

Alberta Transportation

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

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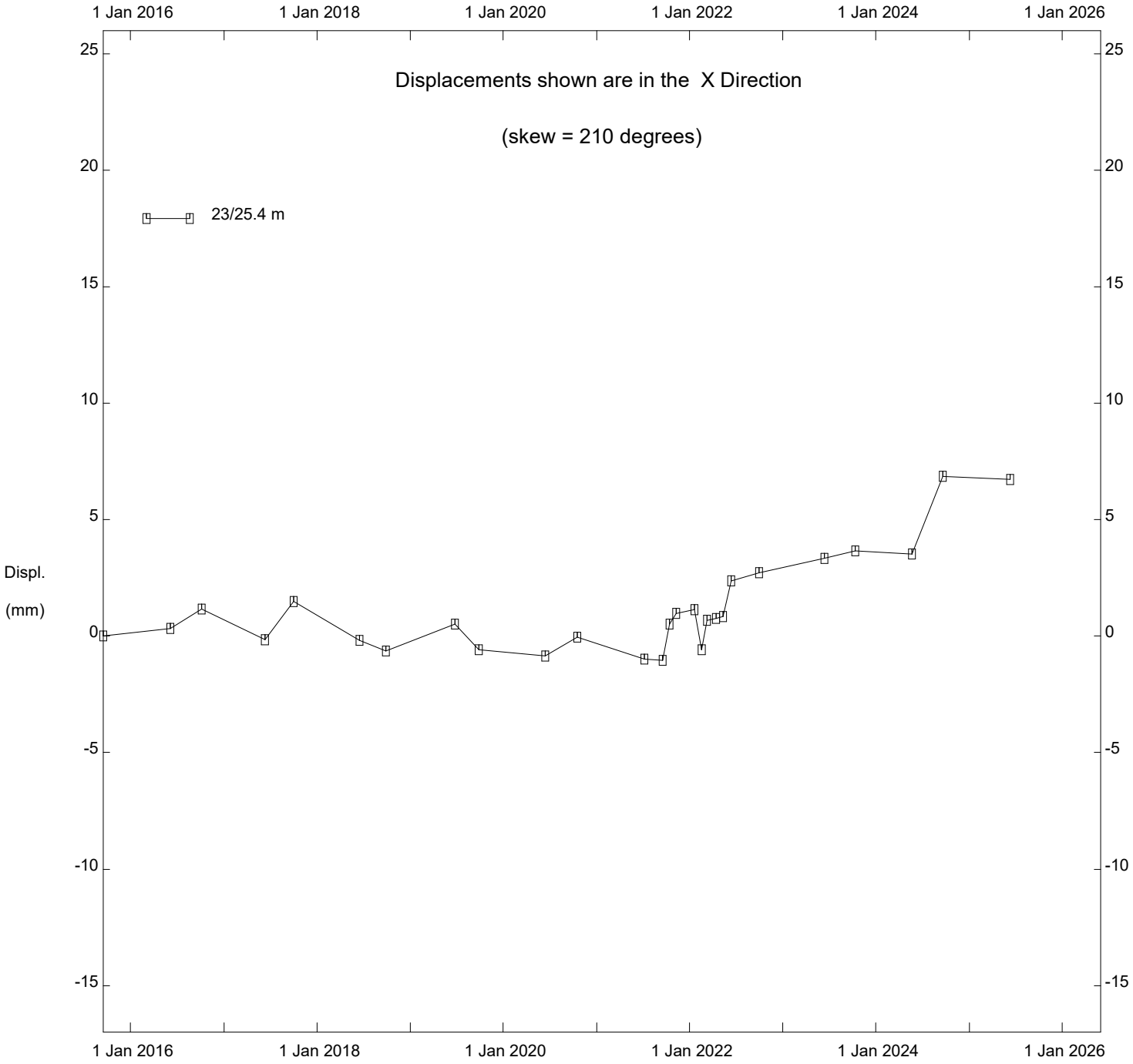
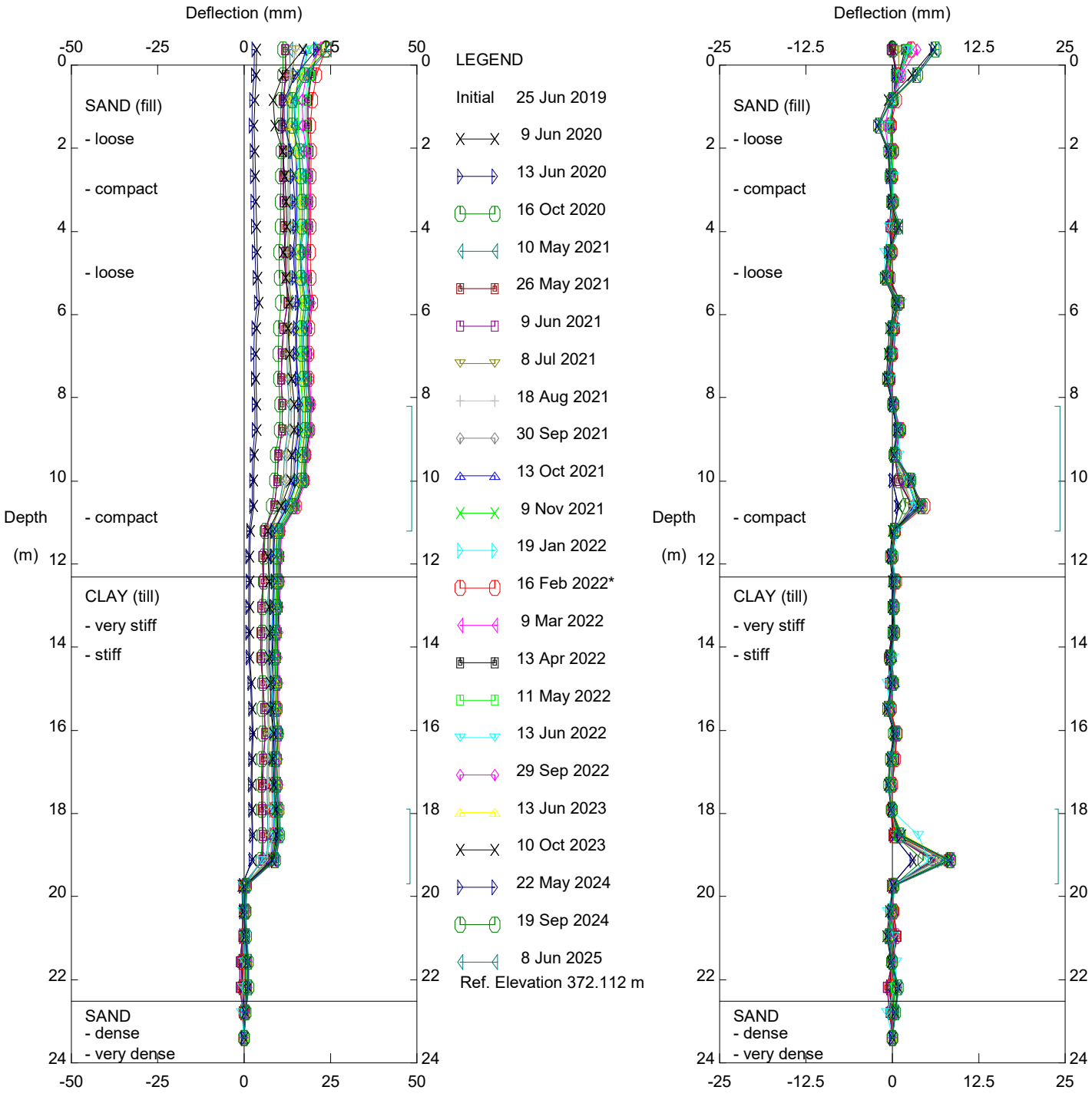


PH009 Old Hwy 2:02 Shop Slide, Inclinometer SI11-01

Alberta Transportation

Thurber Engineering Ltd.



Cumulative Deflection

Direction A

Incremental Deflection

Direction A

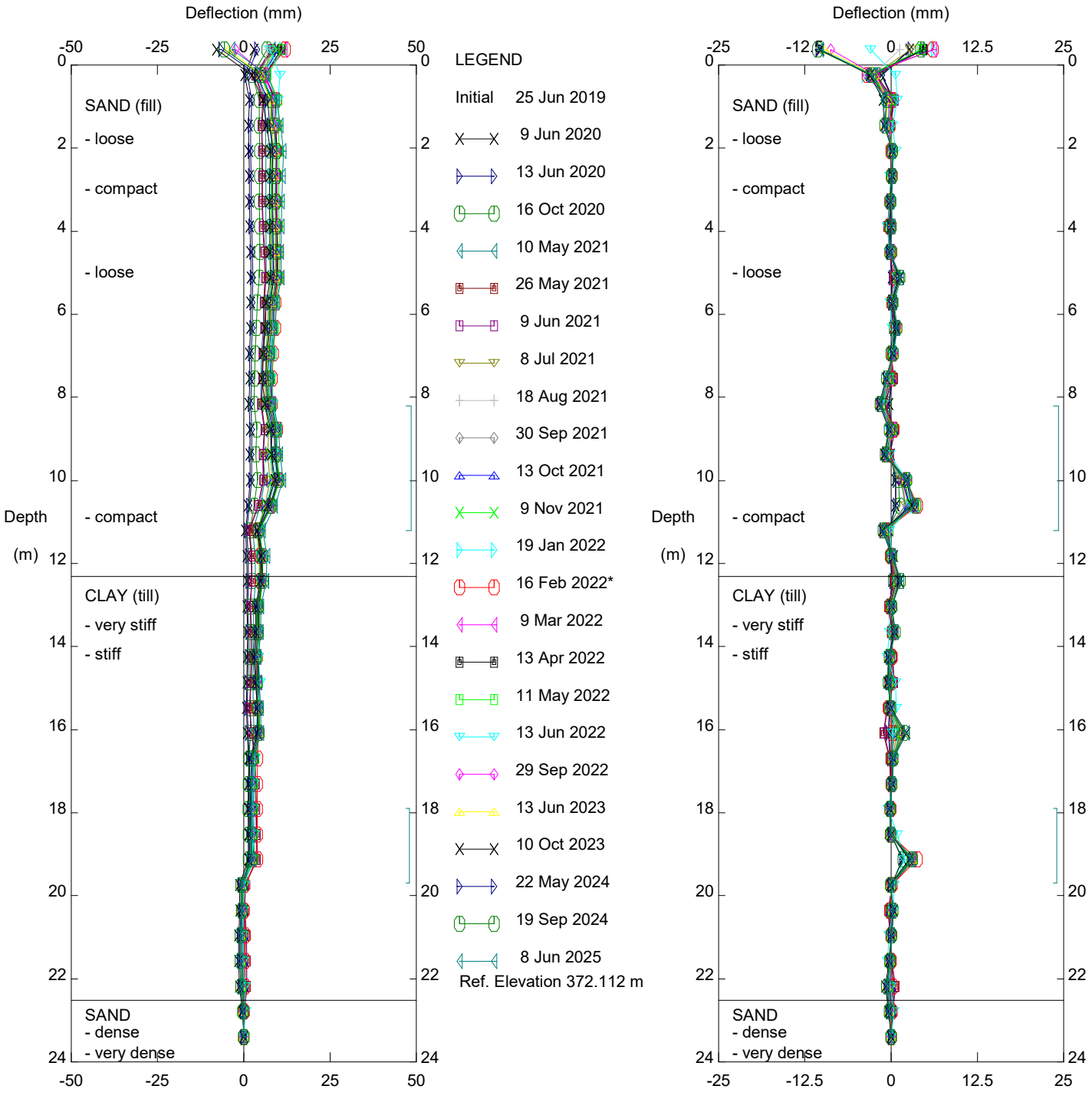
PH009 Old Hwy 2:02 Shop Slide, Inclinometer SI19-5

Alberta Transportation

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

G:\32000\32121 AT GRMP Peace River District 2021-2025\Section C\2025A-Spring\SI Readings\PH009\SI19-5_48 mm casing_shortened 4'.gtl

Thurber Engineering Ltd.



Cumulative Deflection

Direction B

Incremental Deflection

Direction B

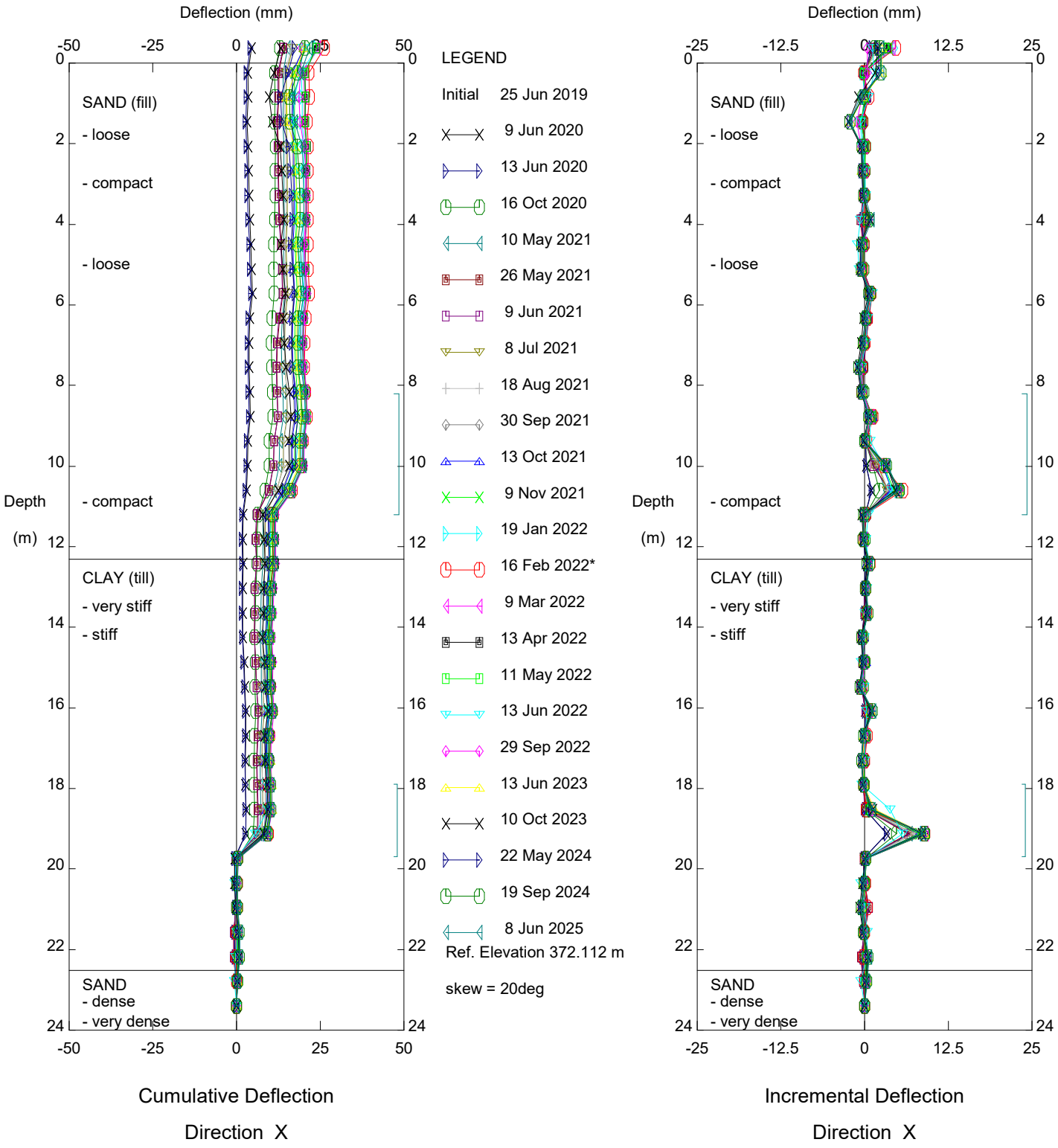
PH009 Old Hwy 2:02 Shop Slide, Inclinometer SI19-5

Alberta Transportation

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

G:\32000\32121 AT GRMP Peace River District 2021-2025\Section C\2025A-Spring\SI Readings\PH009\SI19-5_48 mm casing_shortened 4'.gtl

Thurber Engineering Ltd.



Cumulative Deflection

Direction X

Incremental Deflection

Direction X

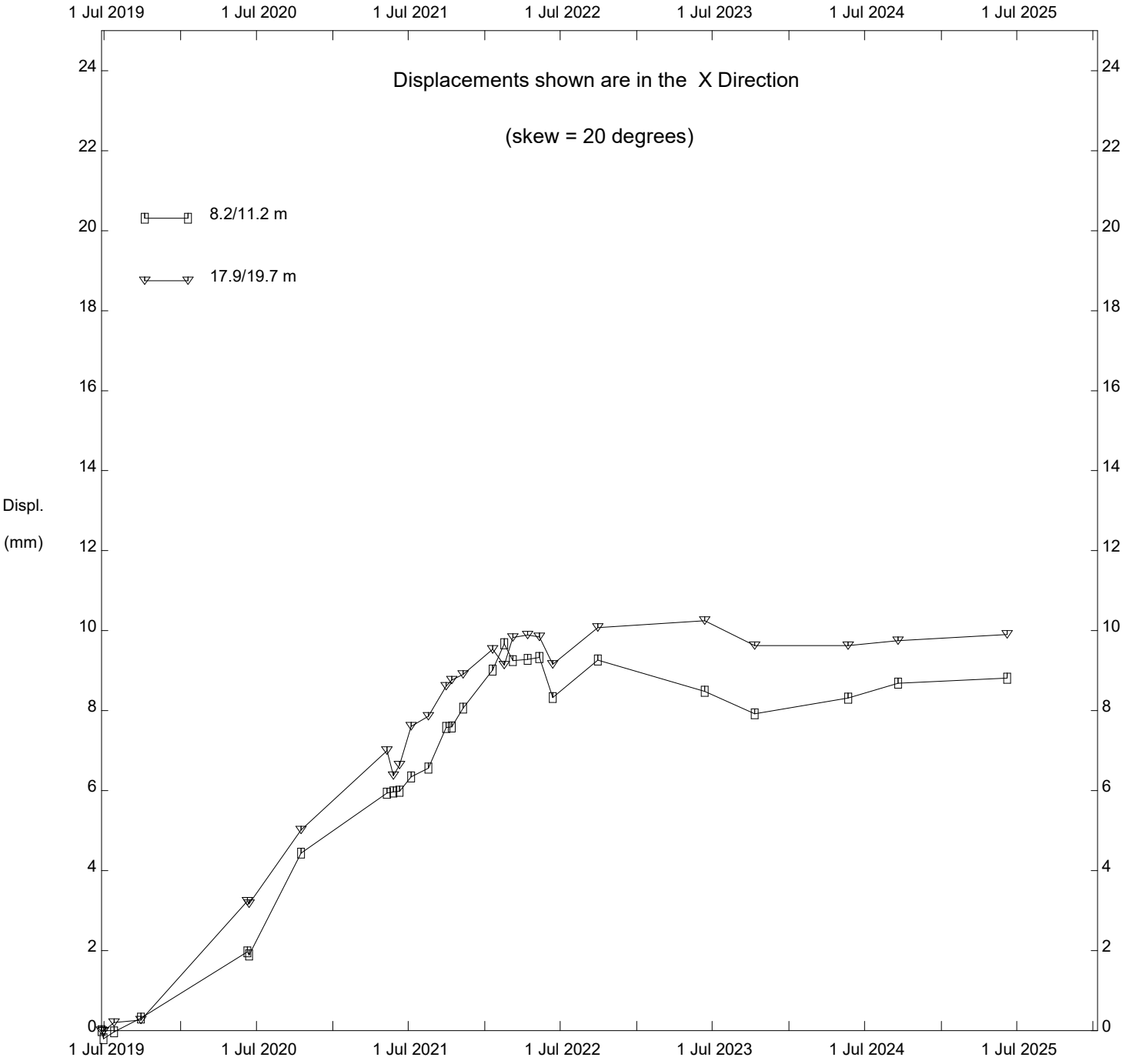
PH009 Old Hwy 2:02 Shop Slide, Inclinometer SI19-5

Alberta Transportation

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

G:\32000\32121 AT GRMP Peace River District 2021-2025\Section C\2025A-Spring\SI Readings\PH009\SI19-5_48 mm casing_shortened 4'.gtl

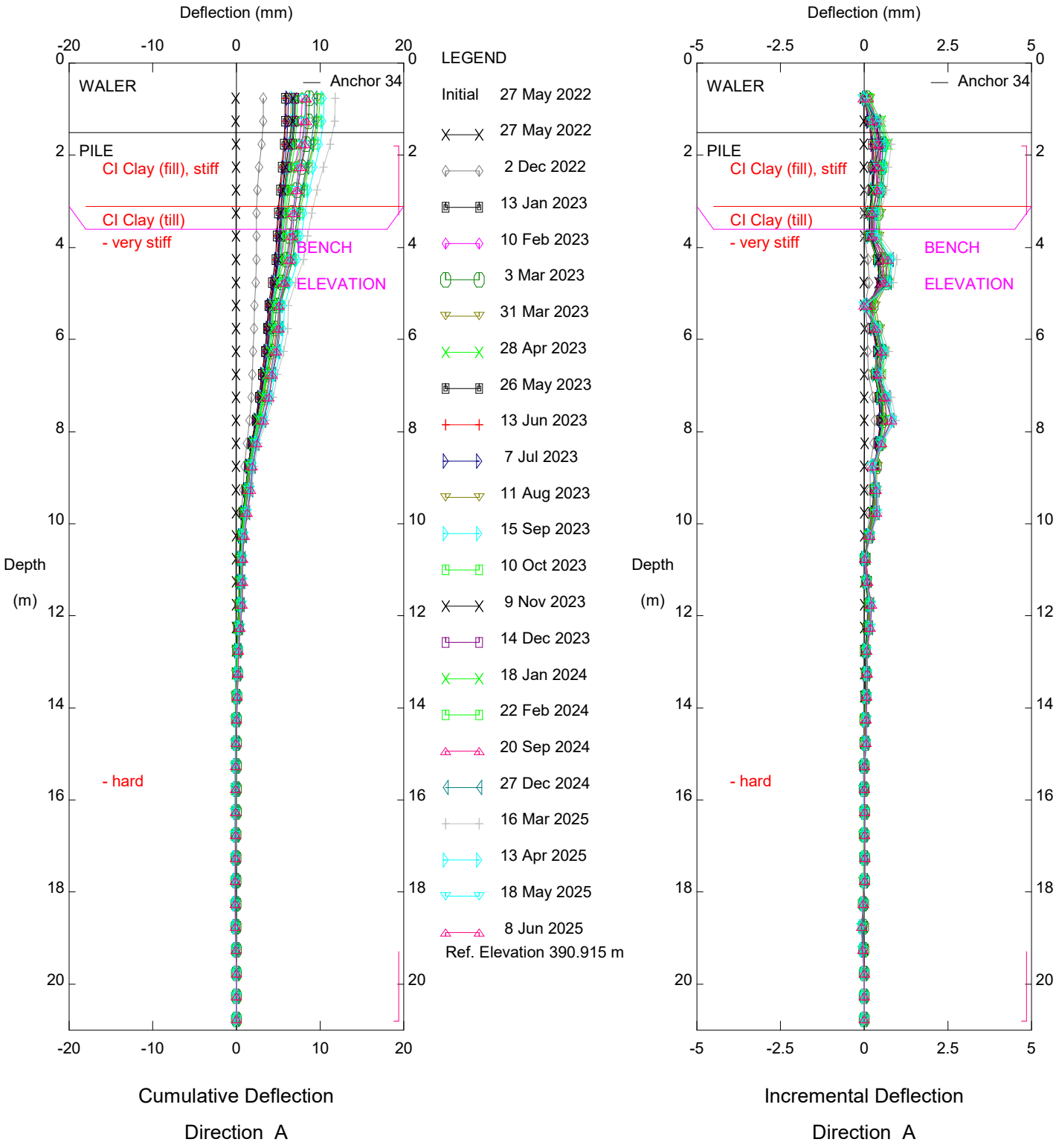
Thurber Engineering Ltd.



PH009 Old Hwy 2:02 Shop Slide, Inclinometer SI19-5

Alberta Transportation

Thurber Engineering Ltd.



Cumulative Deflection

Direction A

Incremental Deflection

Direction A

Shop Slide Type 1 Wall Section, Inclinometer SAA-P34

Alberta Transportation

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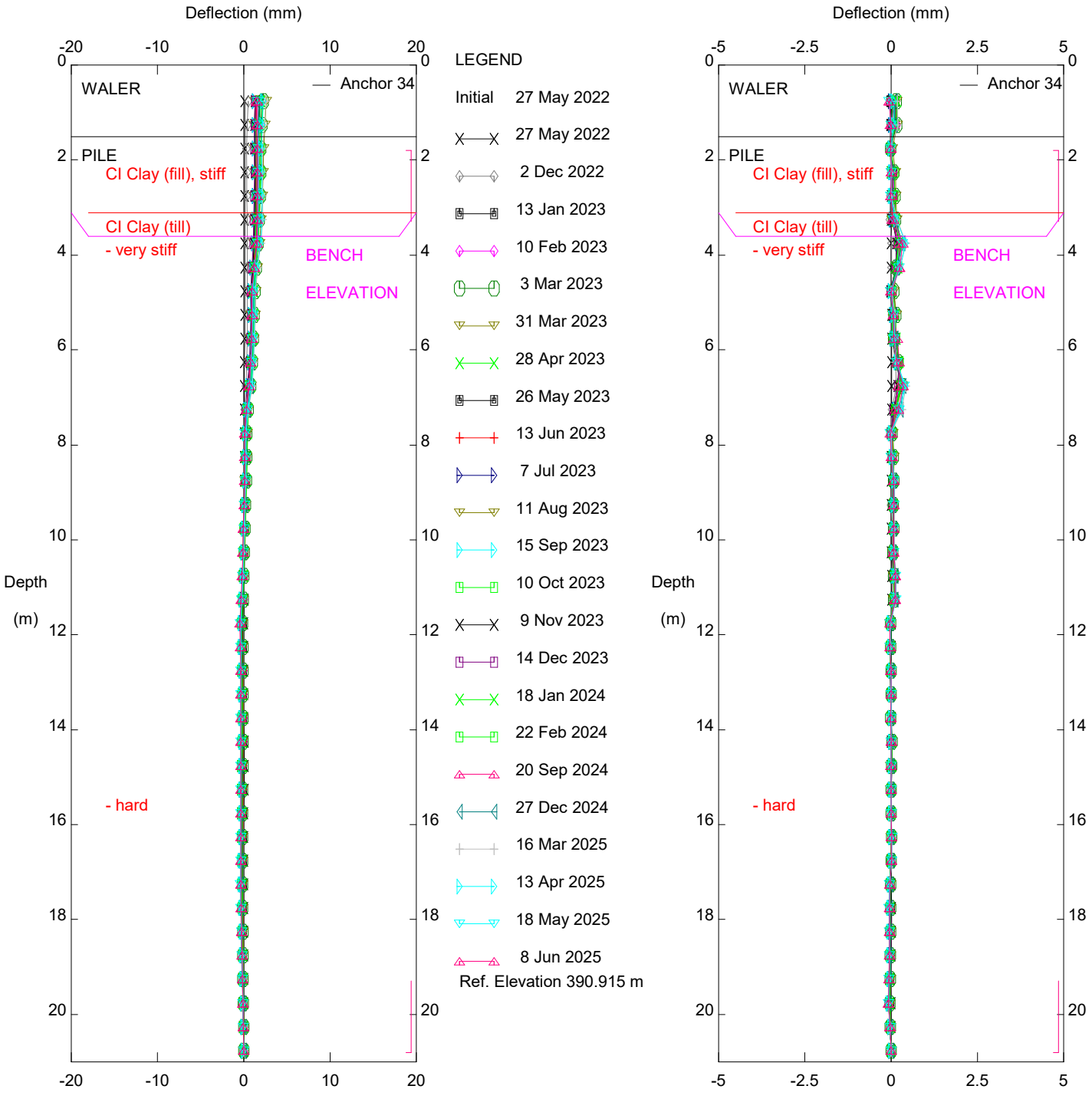
Thurber Engineering Ltd.



Cumulative Deflection

Direction B

Incremental Deflection

Direction B

Shop Slide Type 1 Wall Section, Inclinometer SAA-P34

Alberta Transportation

G:\32000\32121 AT GRMP Peace River District 2021-2025\Section C\2025A-Spring\SAA'S\2025 PH009 Spring SAA Readings\SAA-P34.gtl

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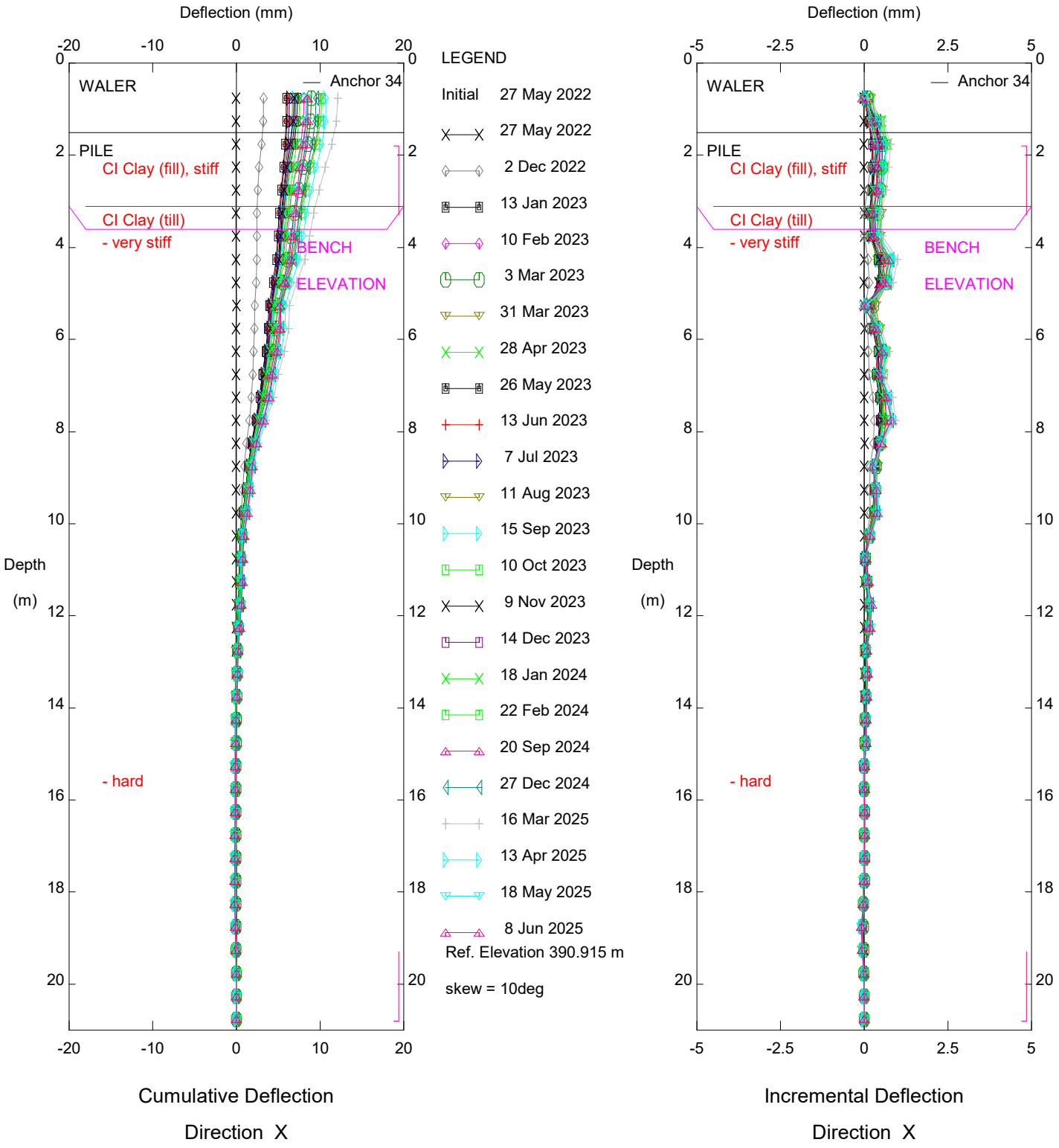


Cumulative Deflection

Direction X

Incremental Deflection

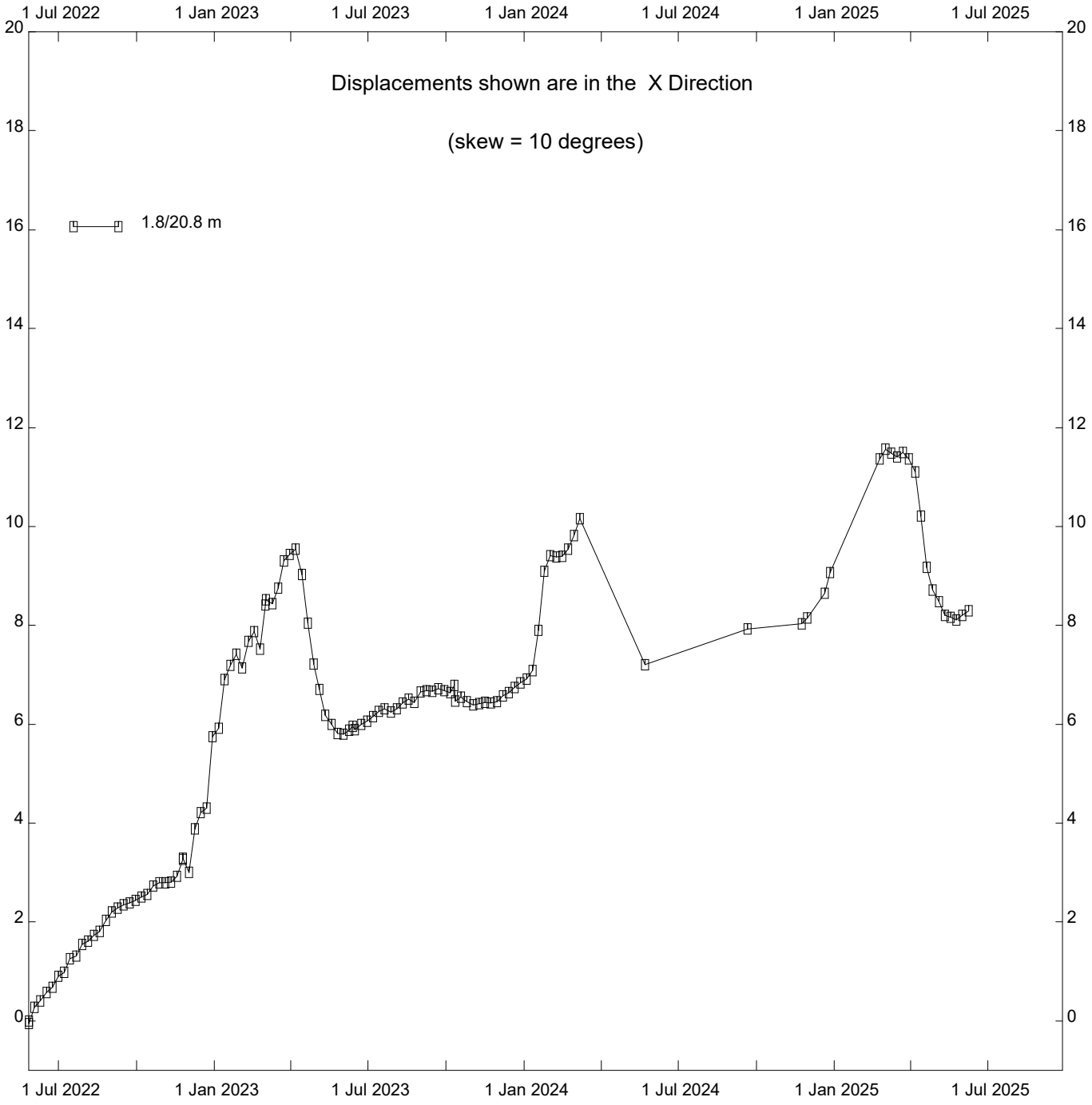
Direction X

Shop Slide Type 1 Wall Section, Inclinometer SAA-P34

Alberta Transportation

G:\32000\32121 AT GRMP Peace River District 2021-2025\Section C\2025A-Spring\SAA'S\2025 PH009 Spring SAA Readings\SAA-P34.gtl

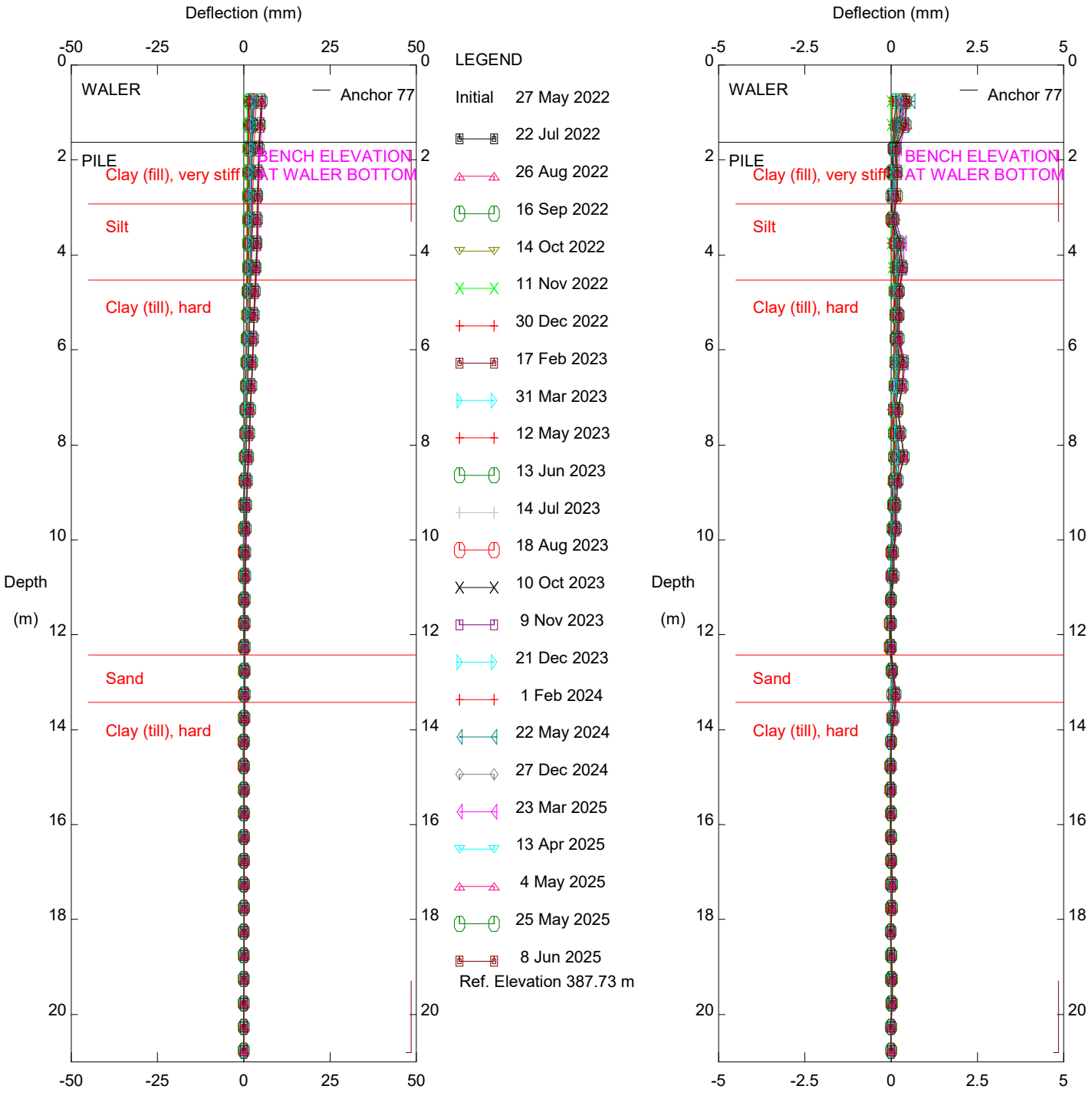
Thurber Engineering Ltd.



Shop Slide Type 1 Wall Section, Inclinometer SAA-P34

Alberta Transportation

Thurber Engineering Ltd.



Cumulative Deflection

Direction A

Incremental Deflection

Direction A

Dates of Note:

July 15, 2021 - P77 poured, SAA installed
February 8-April 1, 2022 - wall backfilled to top of waler
April 1, 2022 - Anchor A77 locked off
April 1-May 31, 2022 - wall backfilled to top of lagging and road level
May 3-June 27, 2022 - Grading downslope of pile wall

Shop Slide Wall Type 2 Section, Inclinometer SAA-P77

Alberta Transportation

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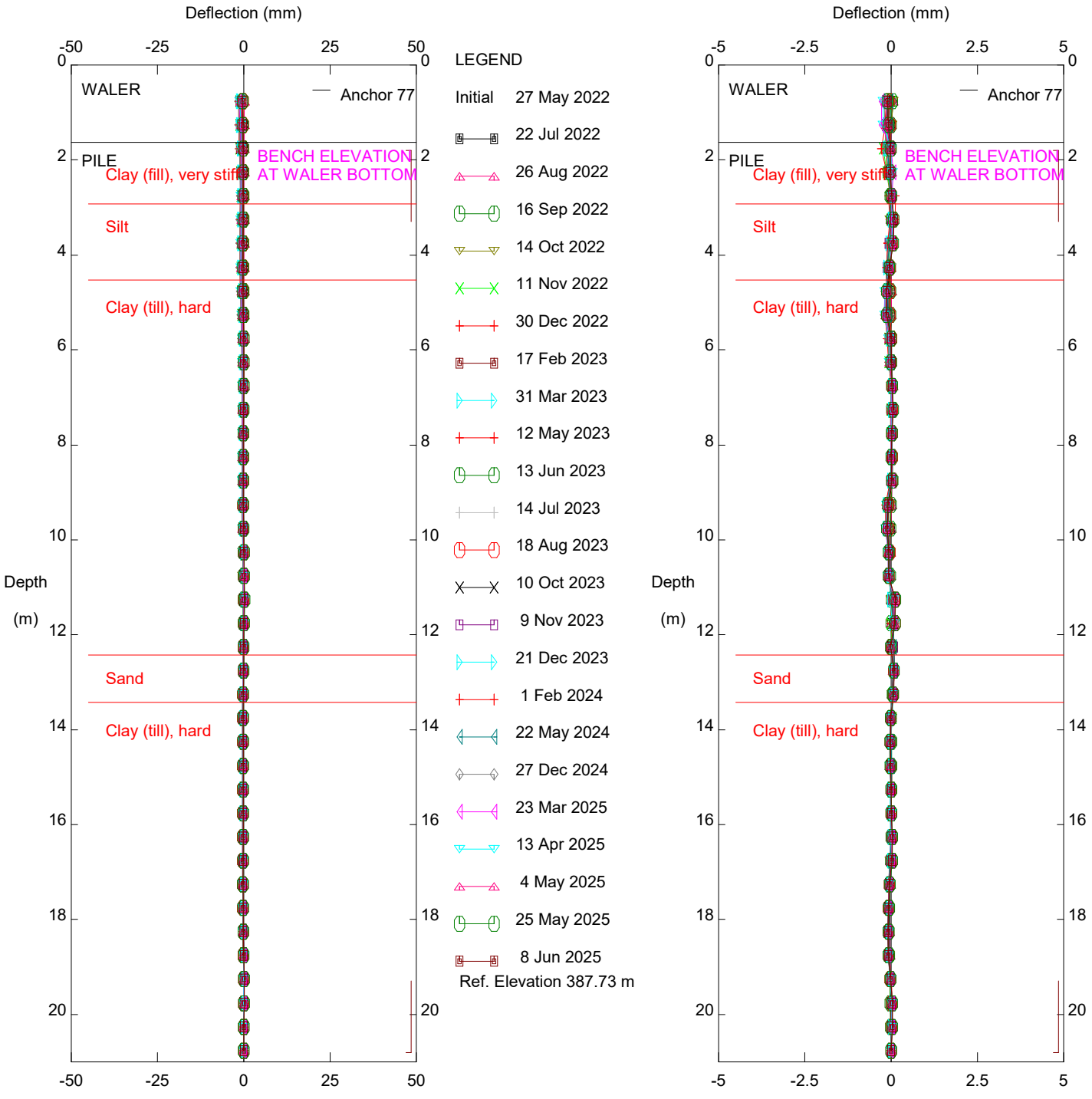
Thurber Engineering Ltd.



Cumulative Deflection

Direction B

Incremental Deflection

Direction B

Dates of Note:

July 15, 2021 - P77 poured, SAA installed
February 8-April 1, 2022 - wall backfilled to top of waler
April 1, 2022 - Anchor A77 locked off
April 1-May 31, 2022 - wall backfilled to top of lagging and road level
May 3-June 27, 2022 - Grading downslope of pile wall

Shop Slide Wall Type 2 Section, Inclinometer SAA-P77

Alberta Transportation

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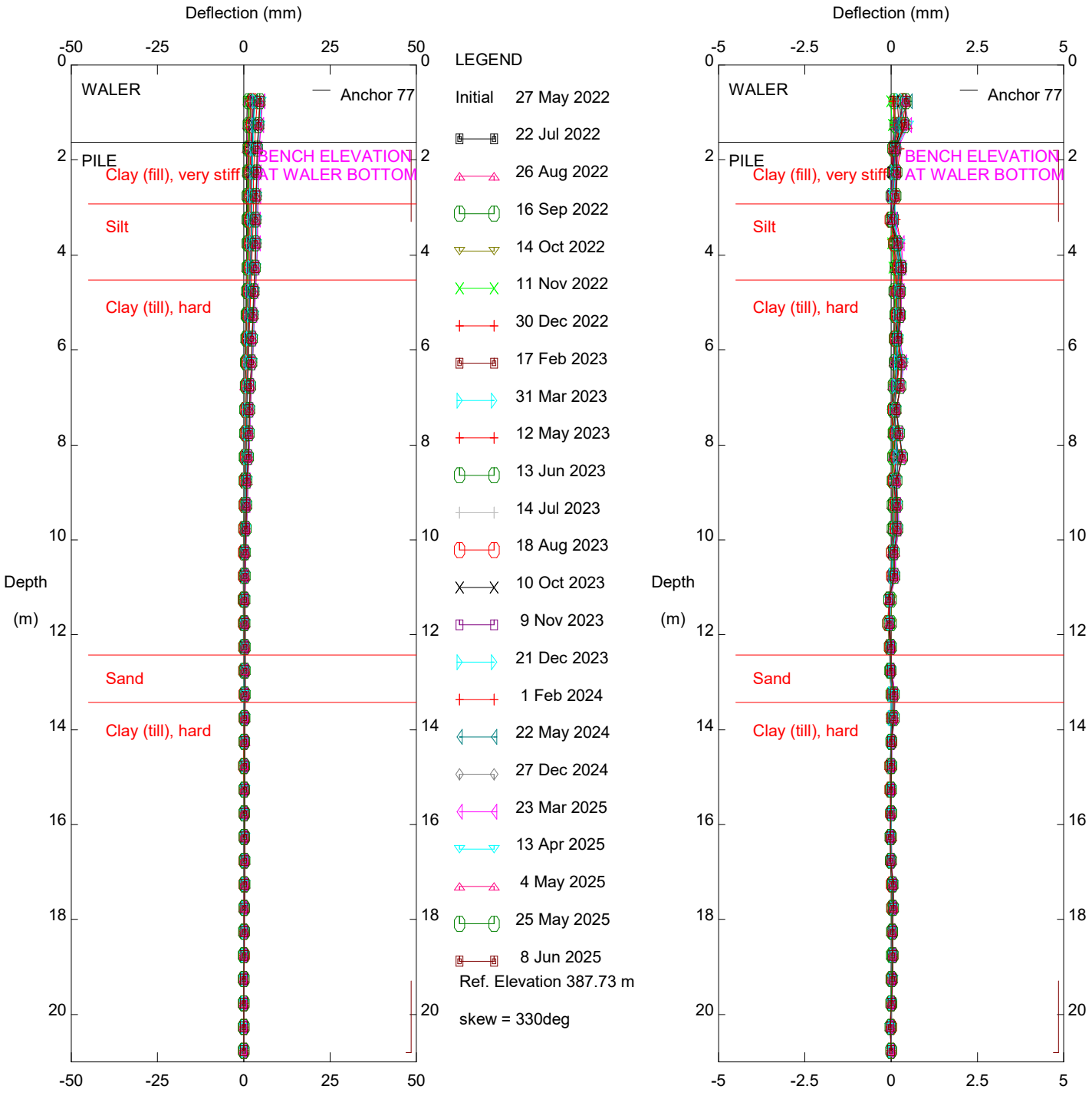


Cumulative Deflection

Direction X

Incremental Deflection

Direction X

Dates of Note:

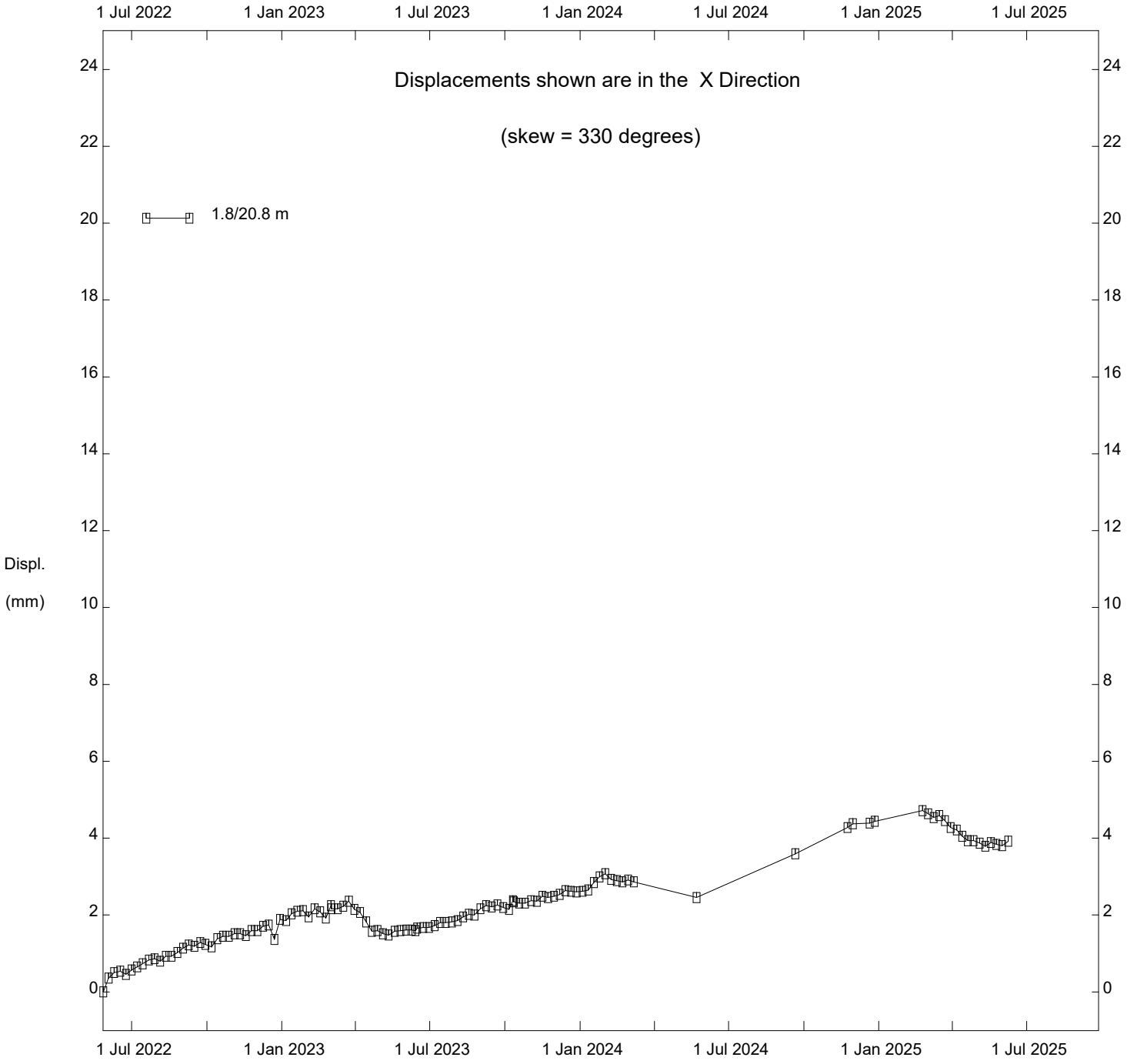
July 15, 2021 - P77 poured, SAA installed
February 8-April 1, 2022 - wall backfilled to top of waler
April 1, 2022 - Anchor A77 locked off
April 1-May 31, 2022 - wall backfilled to top of lagging and road level
May 3-June 27, 2022 - Grading downslope of pile wall

Shop Slide Wall Type 2 Section, Inclinometer SAA-P77

Alberta Transportation

G:\32000\32121 AT GRMP Peace River District 2021-2025\Section C\2025A-Spring\SAA'S\2025 PH009 Spring SAA Readings\SAA-P77.gtl

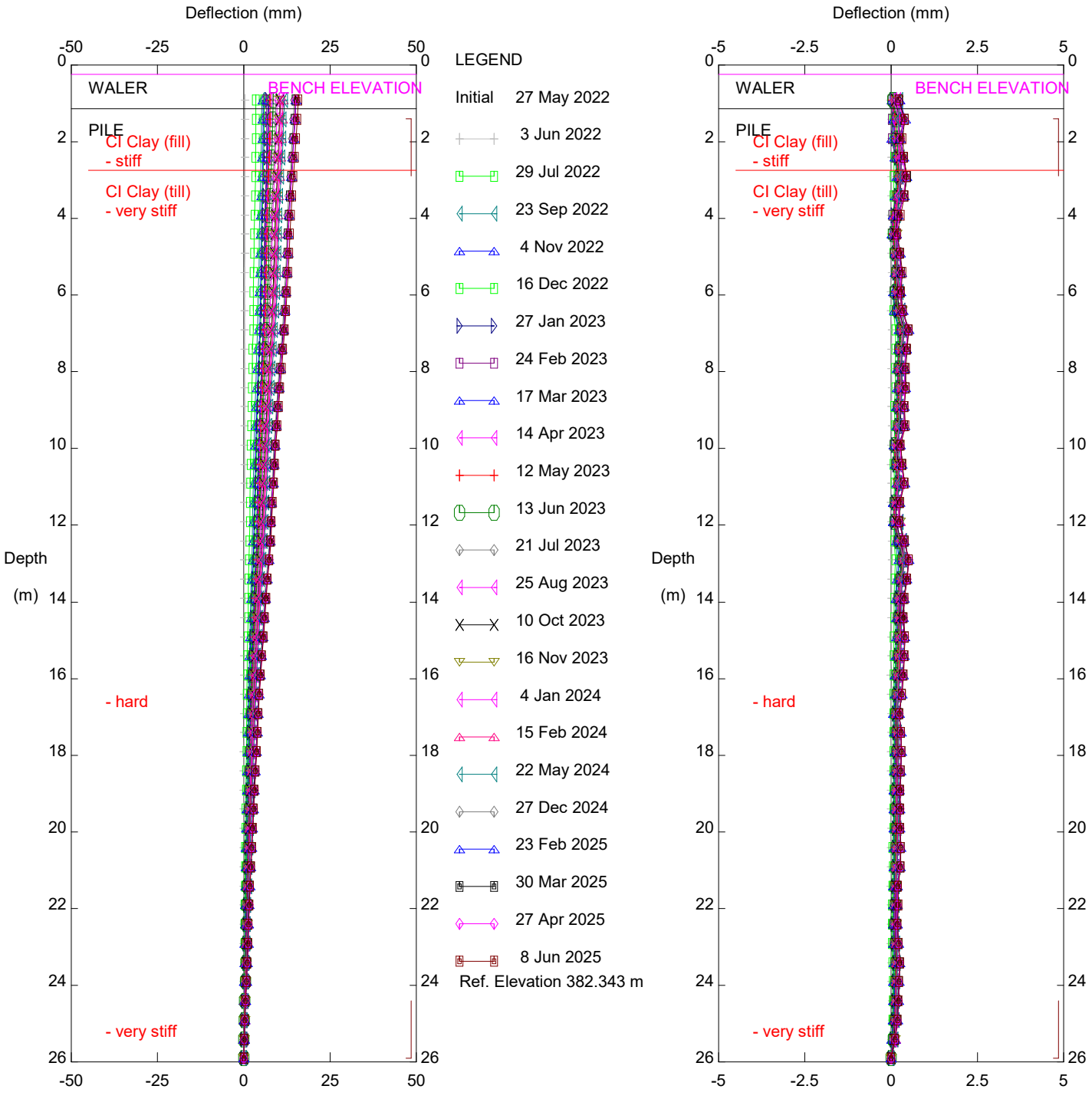
Thurber Engineering Ltd.



Shop Slide Wall Type 2 Section, Inclinometer SAA-P77

Alberta Transportation

Thurber Engineering Ltd.



Cumulative Deflection

Direction A

Incremental Deflection

Direction A

Dates of Note:
Sep. 23, 2022 - P113 poured, SAA installed
February 8-May 31, 2022 - backfill completed above waler
May 3-June 27, 2022 - grading downslope of pile wall

Shop Slide Wall Type 3, Inclinometer SAA-P113

Alberta Transportation

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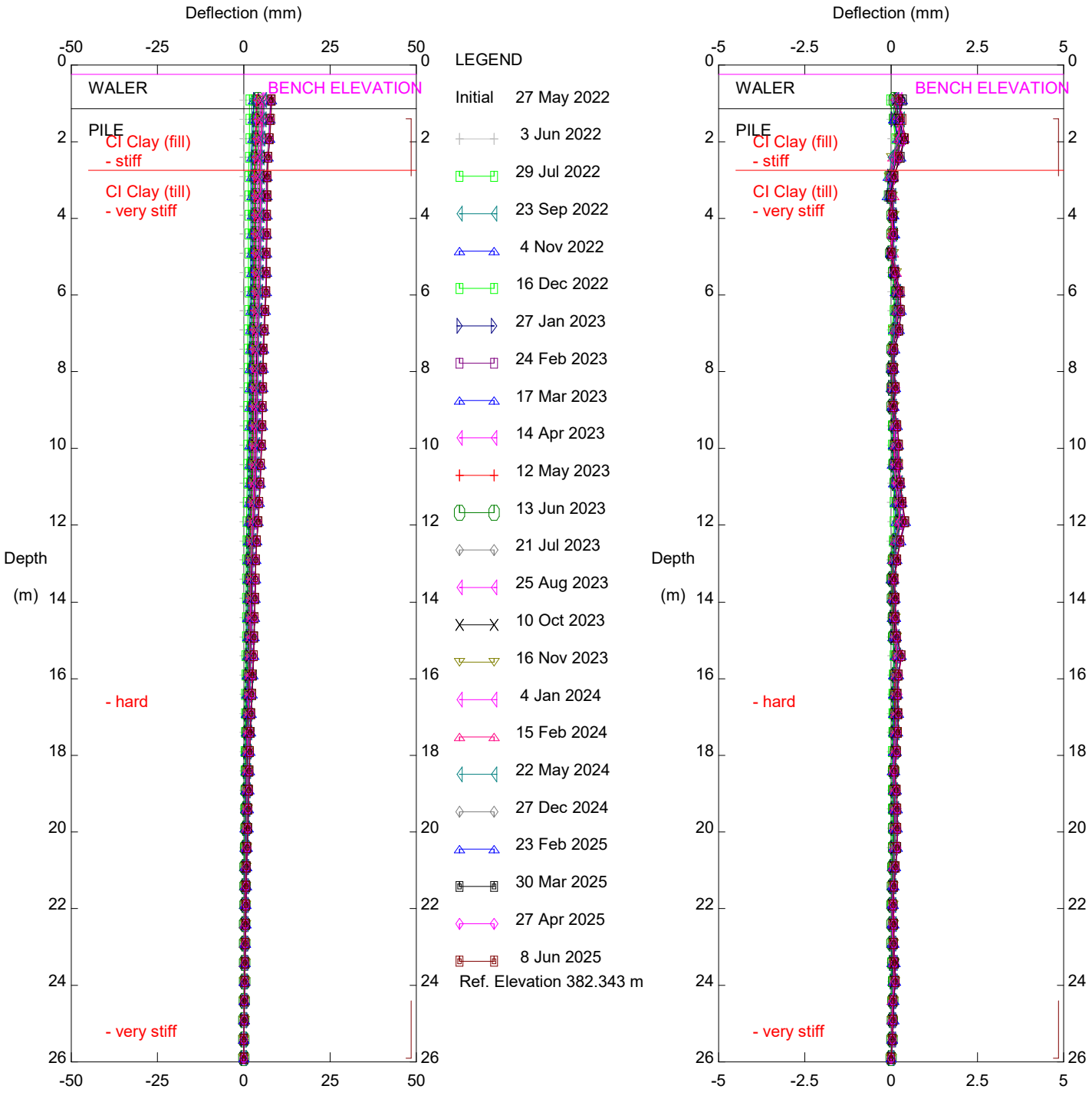

Cumulative Deflection

Direction B

Incremental Deflection

Direction B

Dates of Note:
Sep. 23, 2022 - P113 poured, SAA installed
February 8-May 31, 2022 - backfill completed above waler
May 3-June 27, 2022 - grading downslope of pile wall

Shop Slide Wall Type 3, Inclinometer SAA-P113

Alberta Transportation

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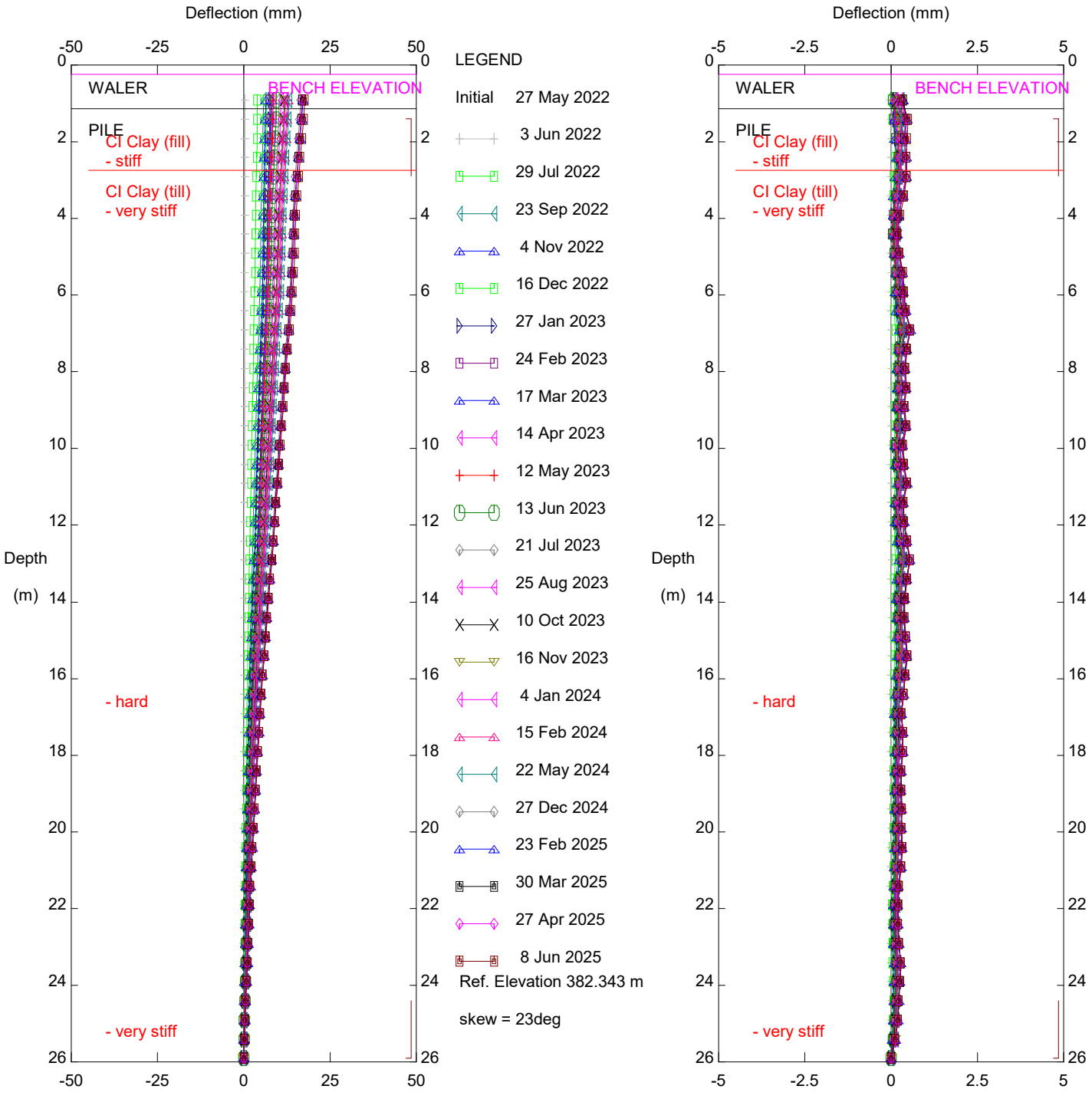
Thurber Engineering Ltd.



Cumulative Deflection

Direction X

Incremental Deflection

Direction X

Dates of Note:
Sep. 23, 2022 - P113 poured, SAA installed
February 8-May 31, 2022 - backfill completed above waler
May 3-June 27, 2022 - grading downslope of pile wall

Shop Slide Wall Type 3, Inclinometer SAA-P113

Alberta Transportation

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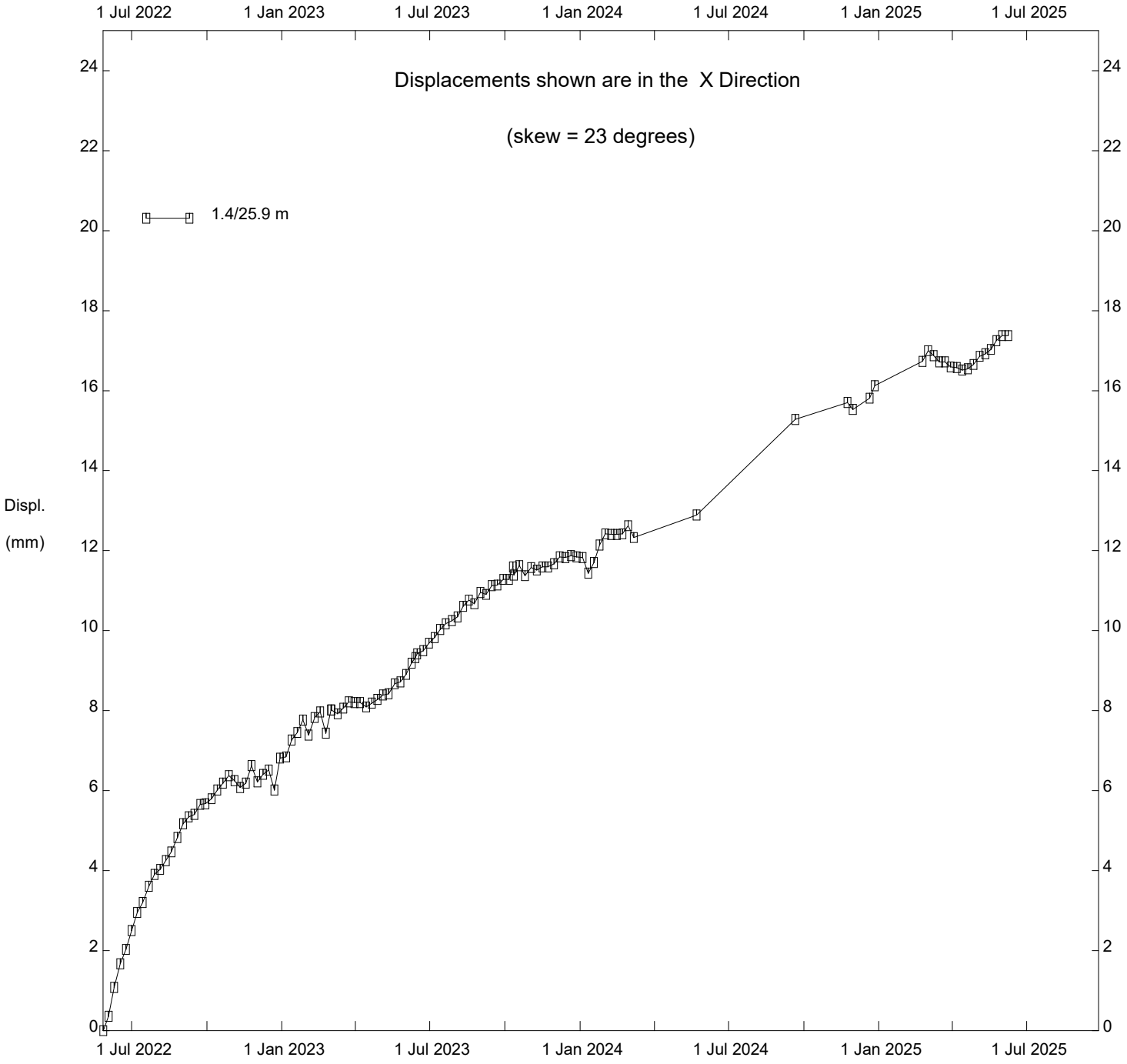
Thurber Engineering Ltd.



Shop Slide Wall Type 3, Inclinometer SAA-P113

Alberta Transportation

FIGURE PH009-1: PEACE RIVER SHOP SLIDE
P34 UPSLOPE SIDE STRAIN GAUGE VALUES VS DEPTH

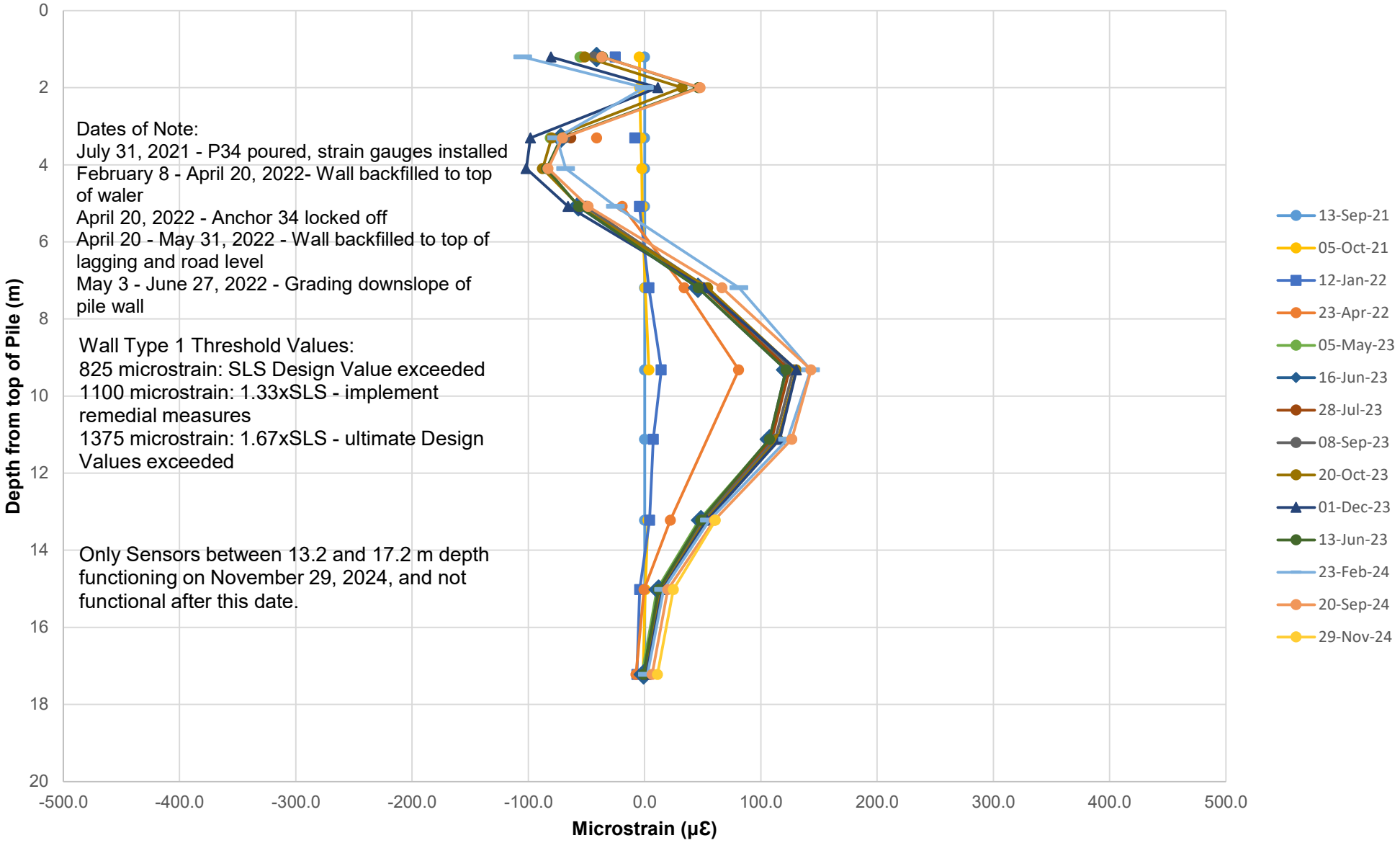


FIGURE PH009-2: PEACE RIVER SHOP SLIDE
P34 DOWNSLOPE SIDE STRAIN GAUGE VALUES VS DEPTH

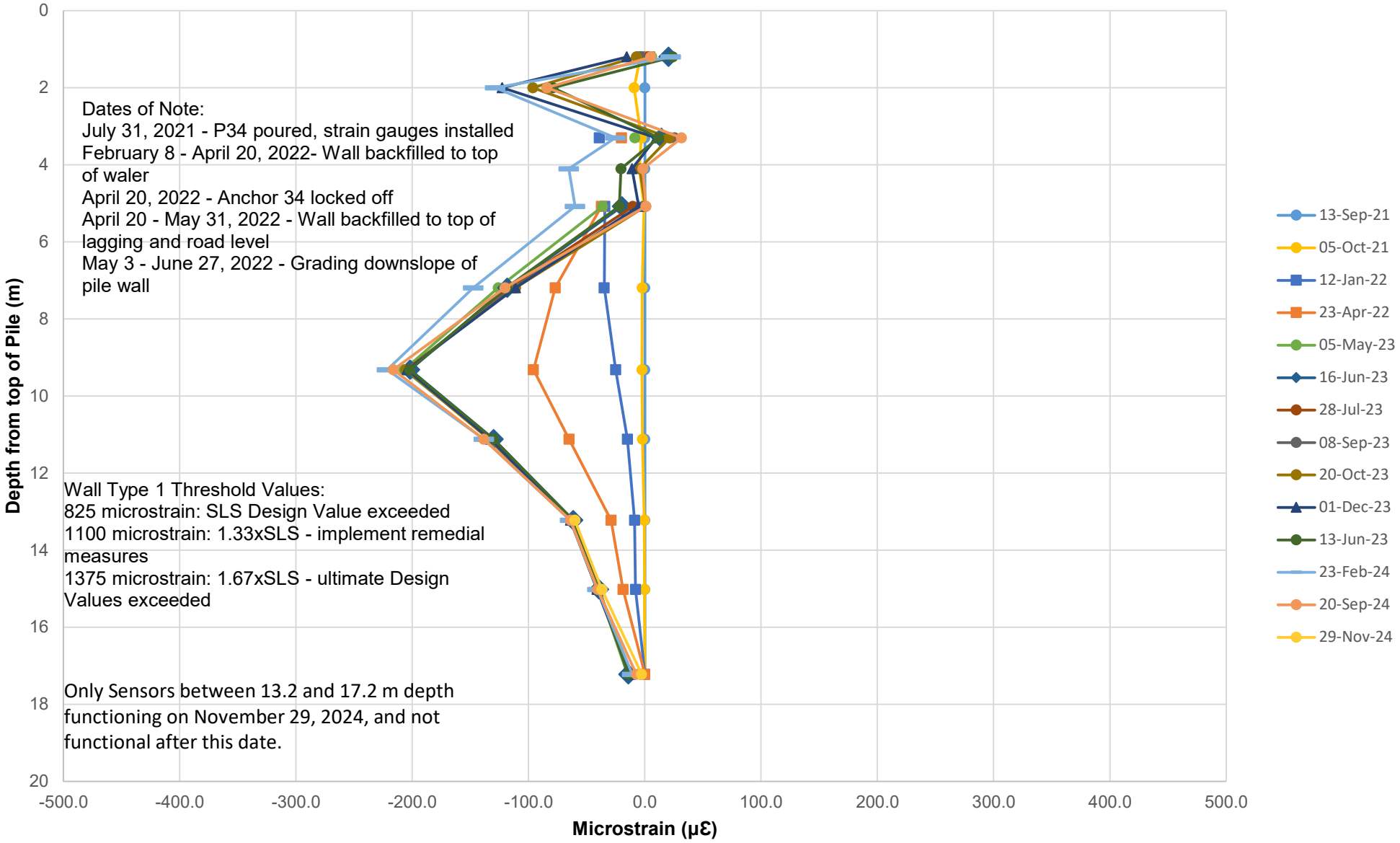


FIGURE PH009-3: PEACE RIVER SHOP SLIDE
P34 MAXIMUM STRAIN VS TIME (13.2m DEPTH)

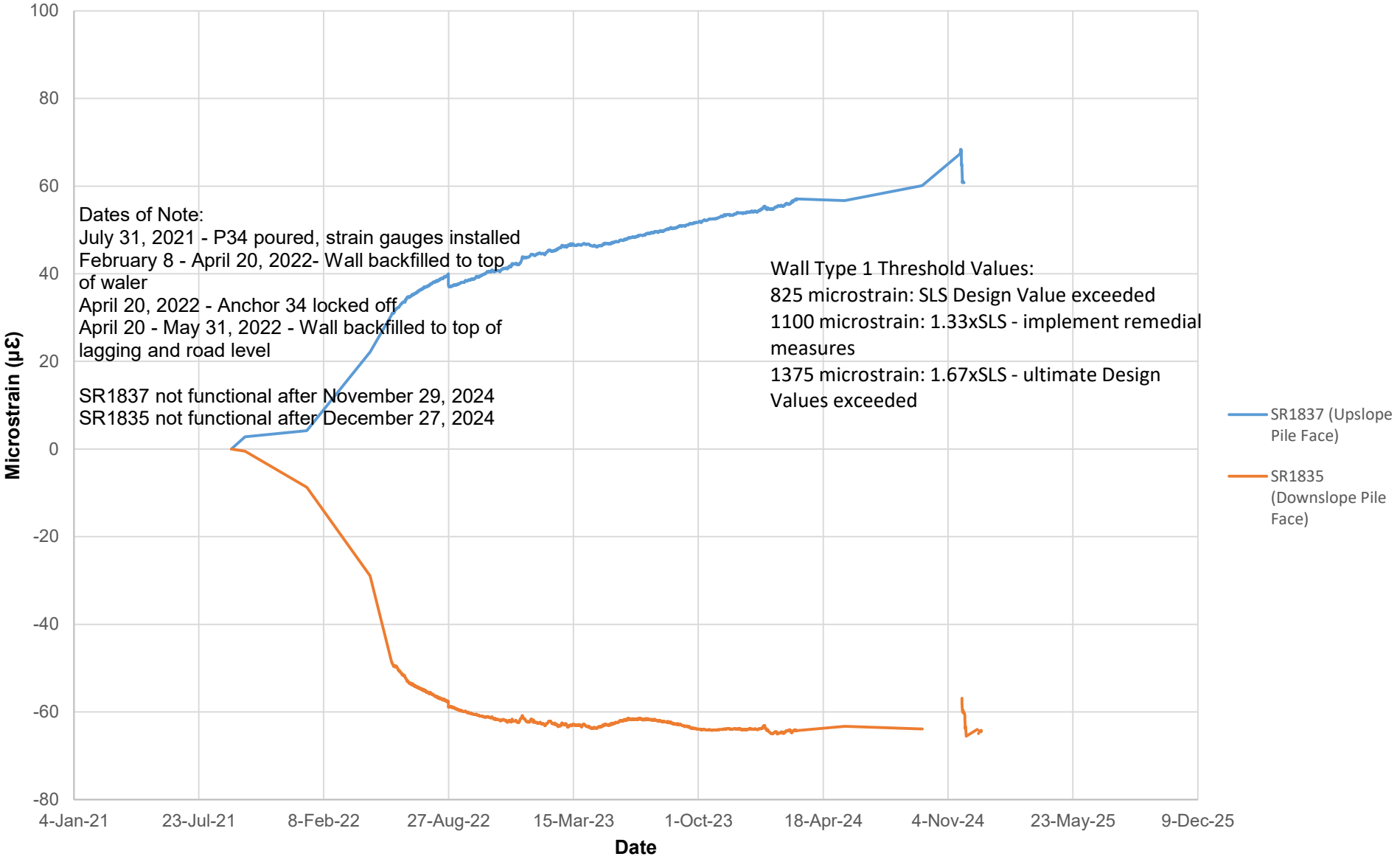


FIGURE PH009-4: PEACE RIVER SHOP SLIDE
P77 UPSLOPE SIDE STRAIN GAUGE VALUES VS DEPTH

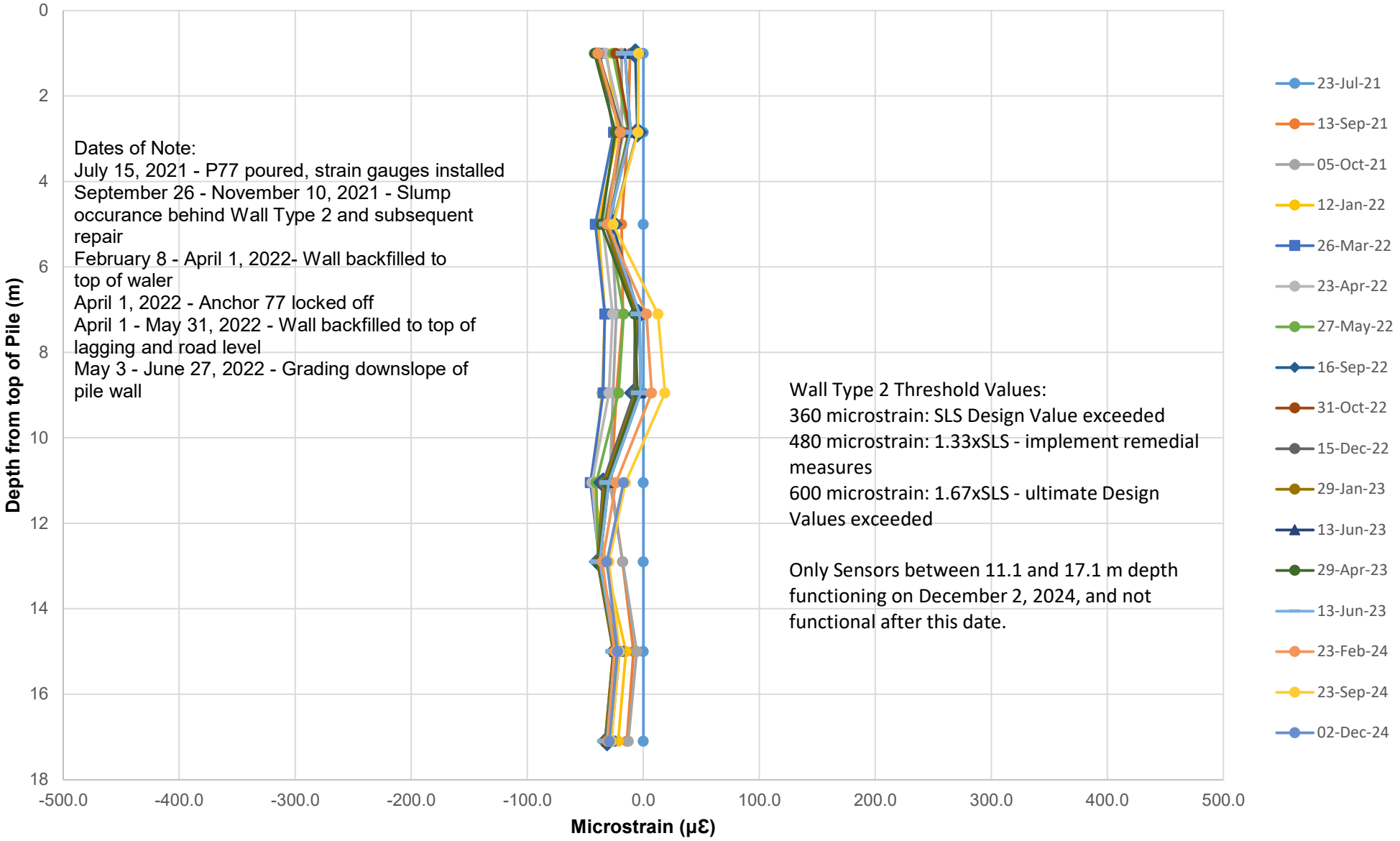


FIGURE PH009-5: PEACE RIVER SHOP SLIDE
P77 DOWNSLOPE SIDE STRAIN GAUGE VALUES VS DEPTH

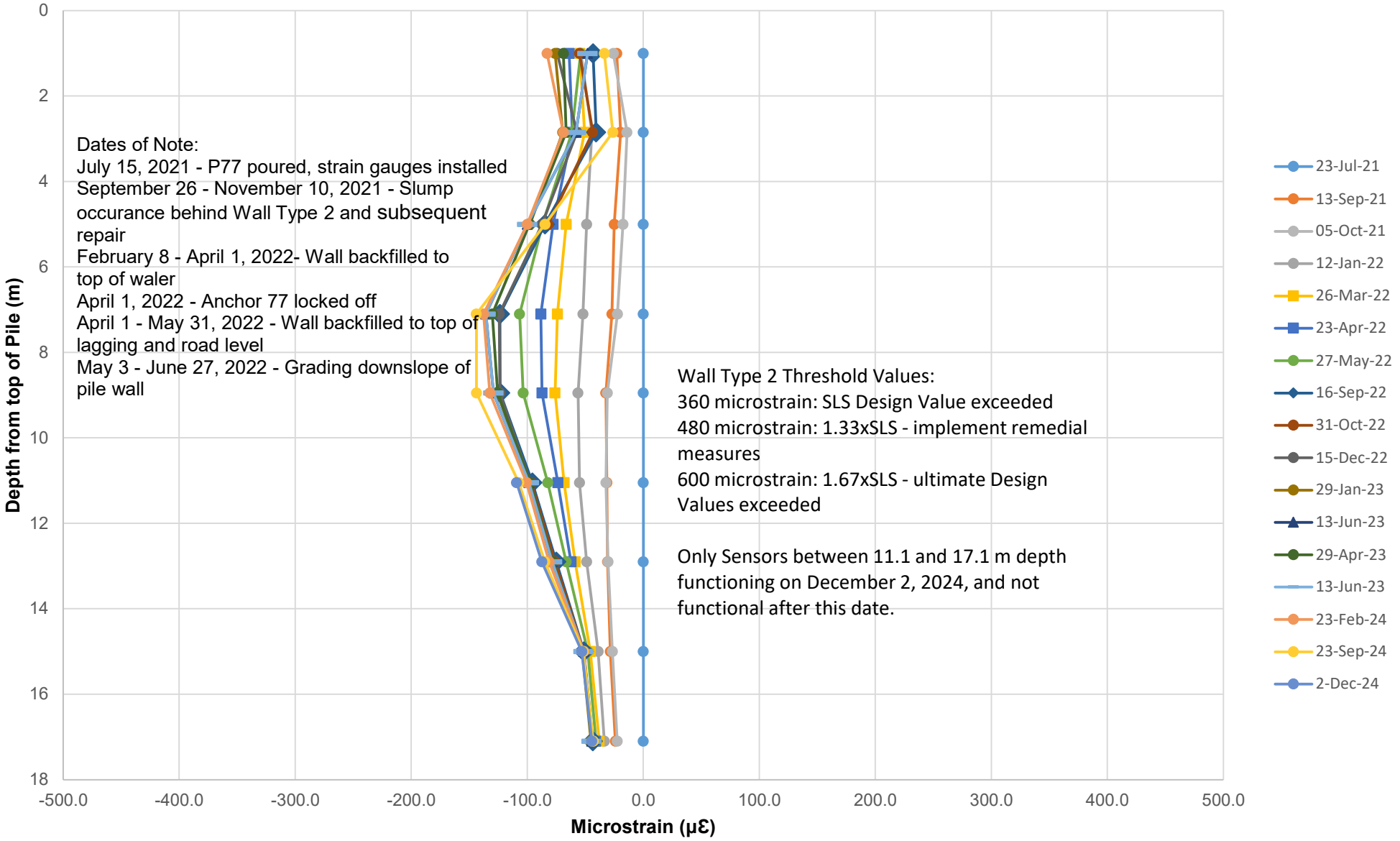


FIGURE PH009-6: PEACE RIVER SHOP SLIDE
P77 MAXIMUM STRAIN VS TIME (11.1 m DEPTH)

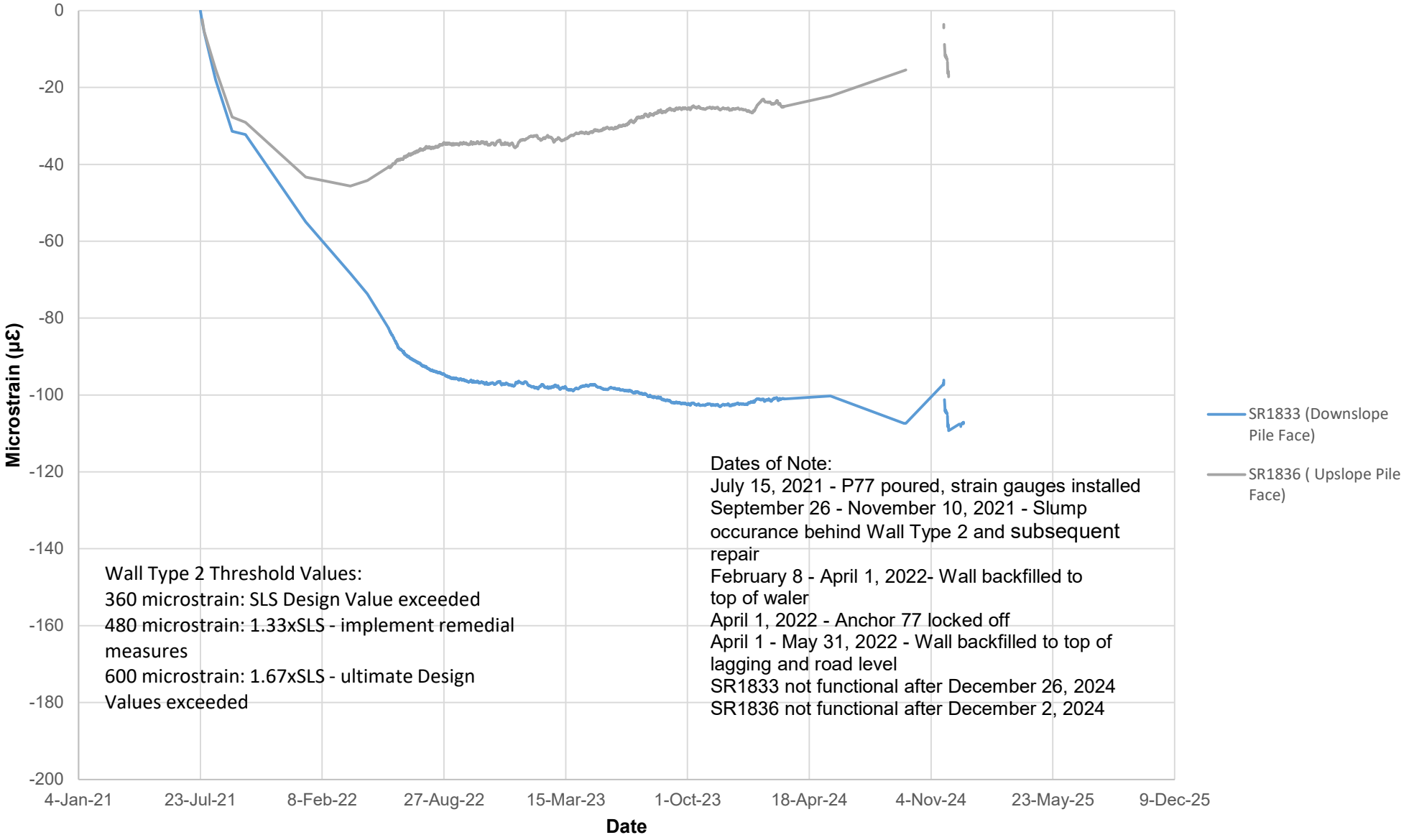


FIGURE PH009-7: PEACE RIVER SHOP SLIDE
P77 MAXIMUM STRAIN VS TIME (12.9 m DEPTH)

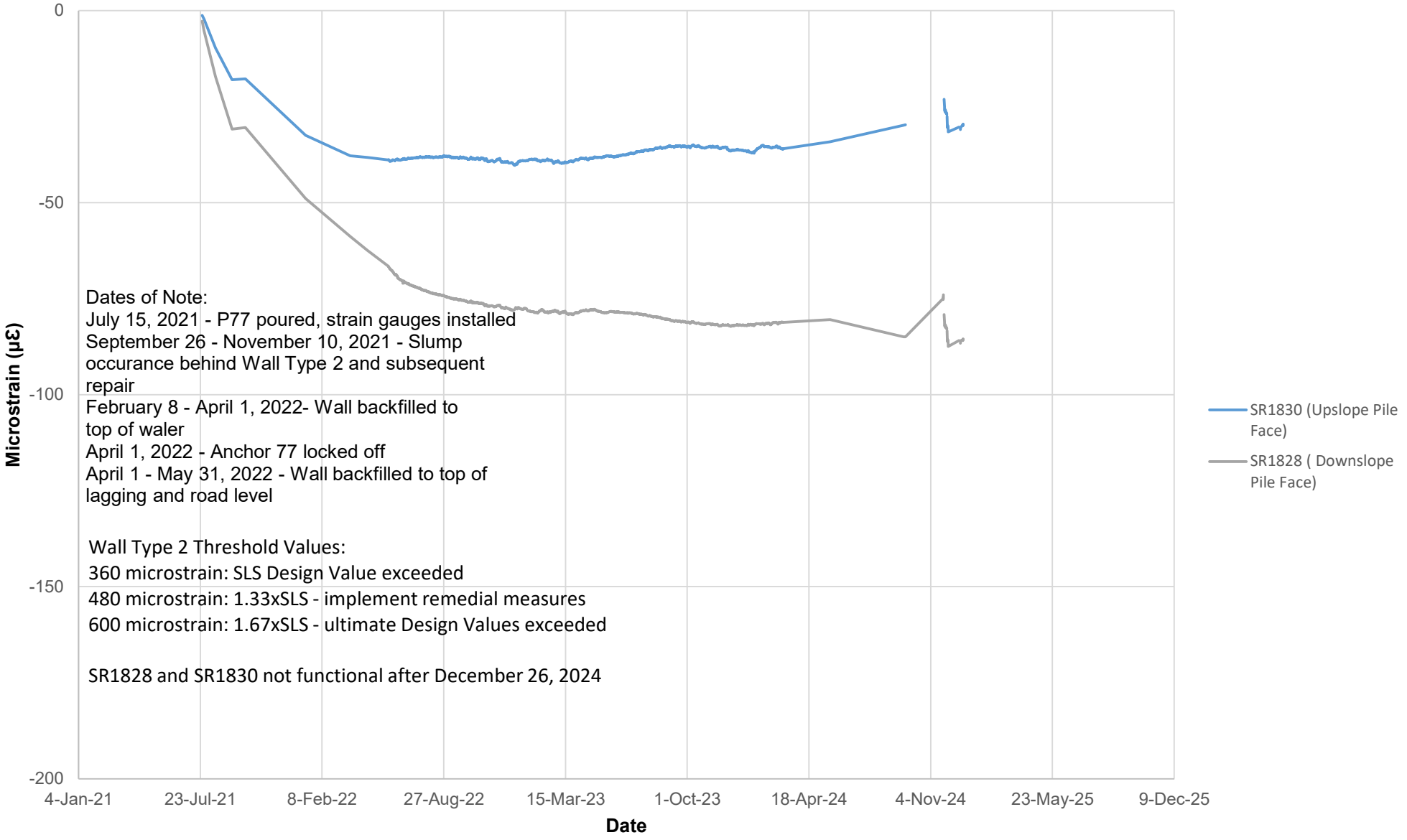


FIGURE PH009-8: PEACE RIVER SHOP SLIDE
P113 UPSLOPE SIDE STRAIN GAUGE VALUES VS DEPTH

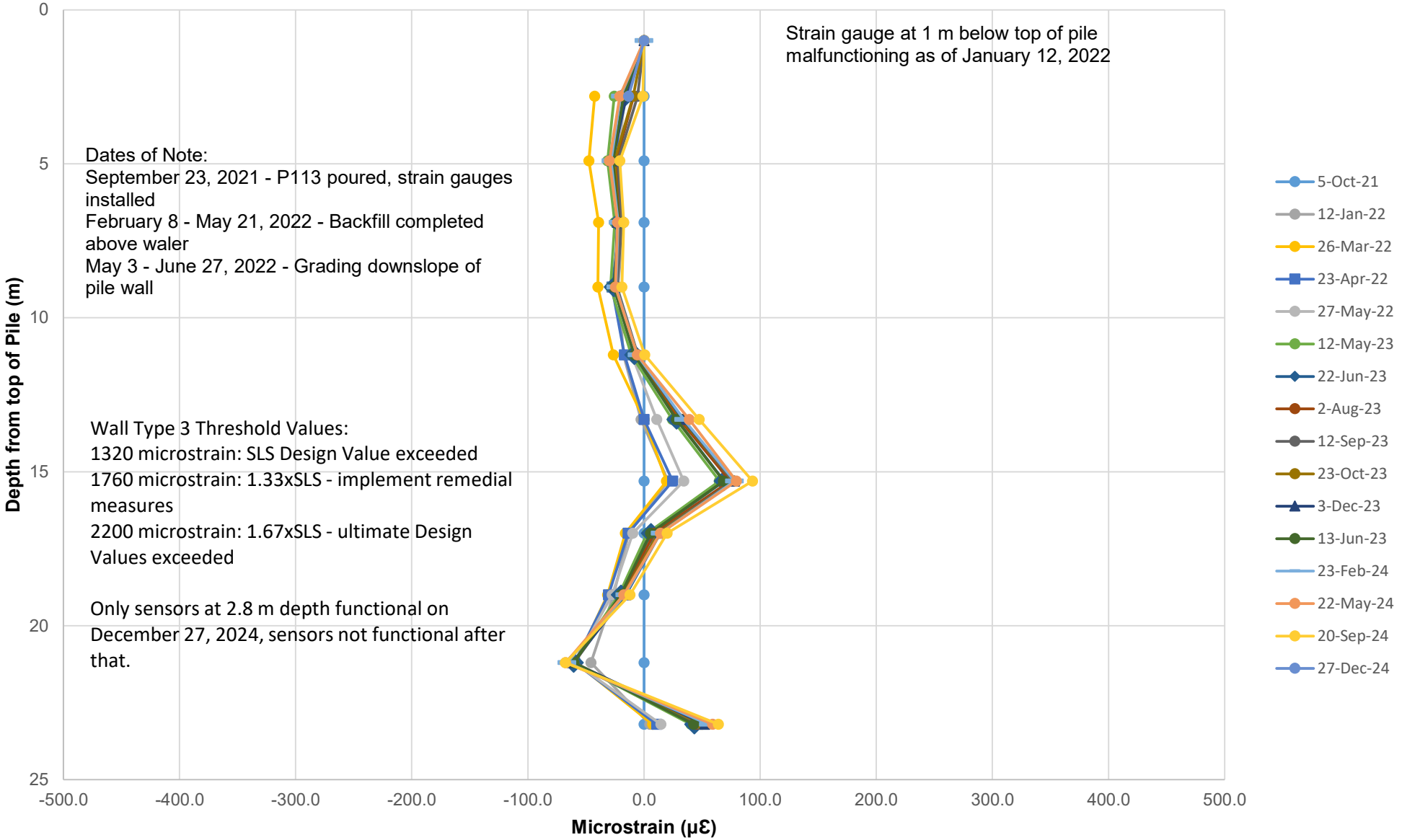


FIGURE PH009-9: PEACE RIVER SHOP SLIDE
P113 DOWNSLOPE SIDE STRAIN GAUGE VALUES VS DEPTH

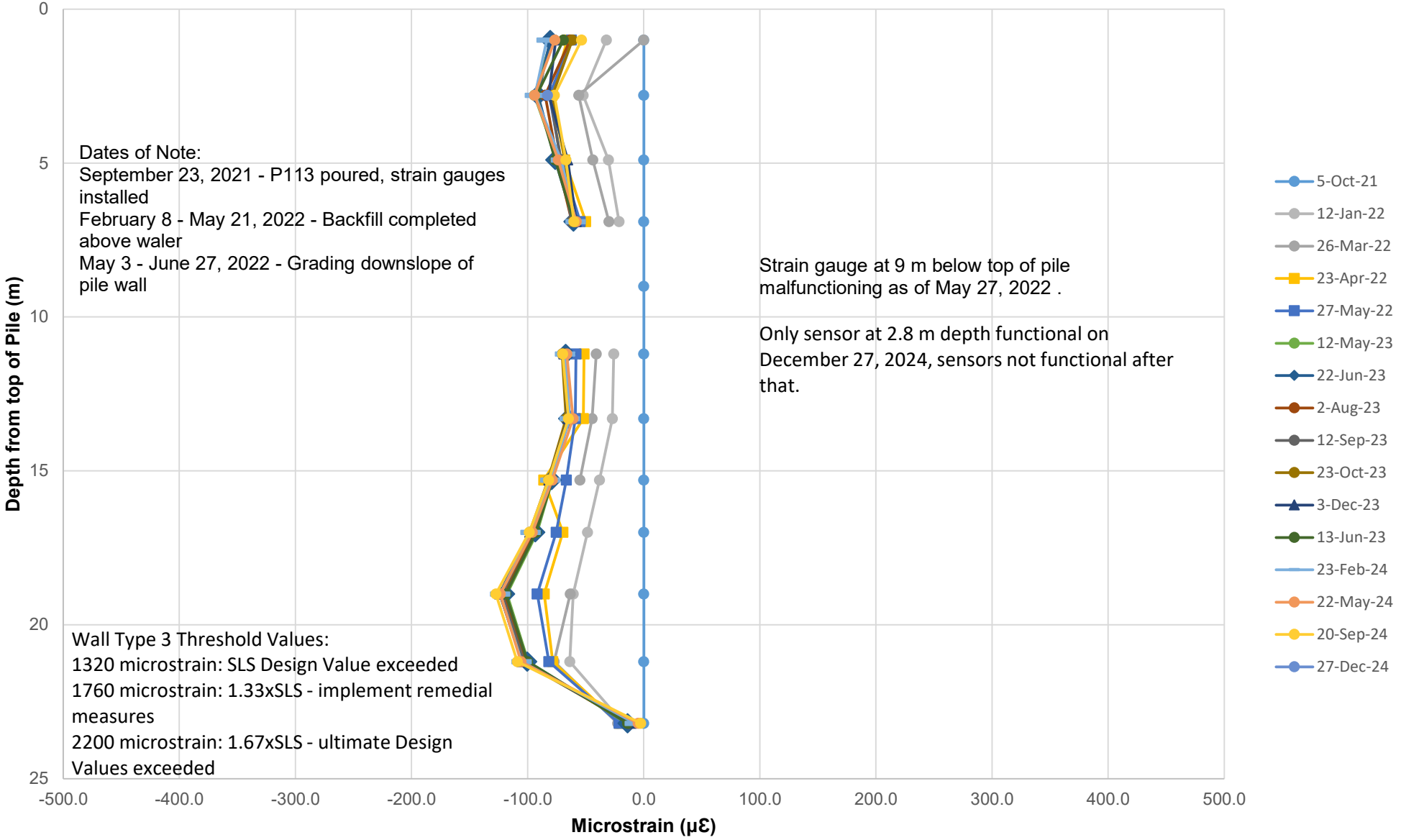


FIGURE PH009-10
OLD HWY 2:02 SHOP SLIDE LOAD CELL READINGS

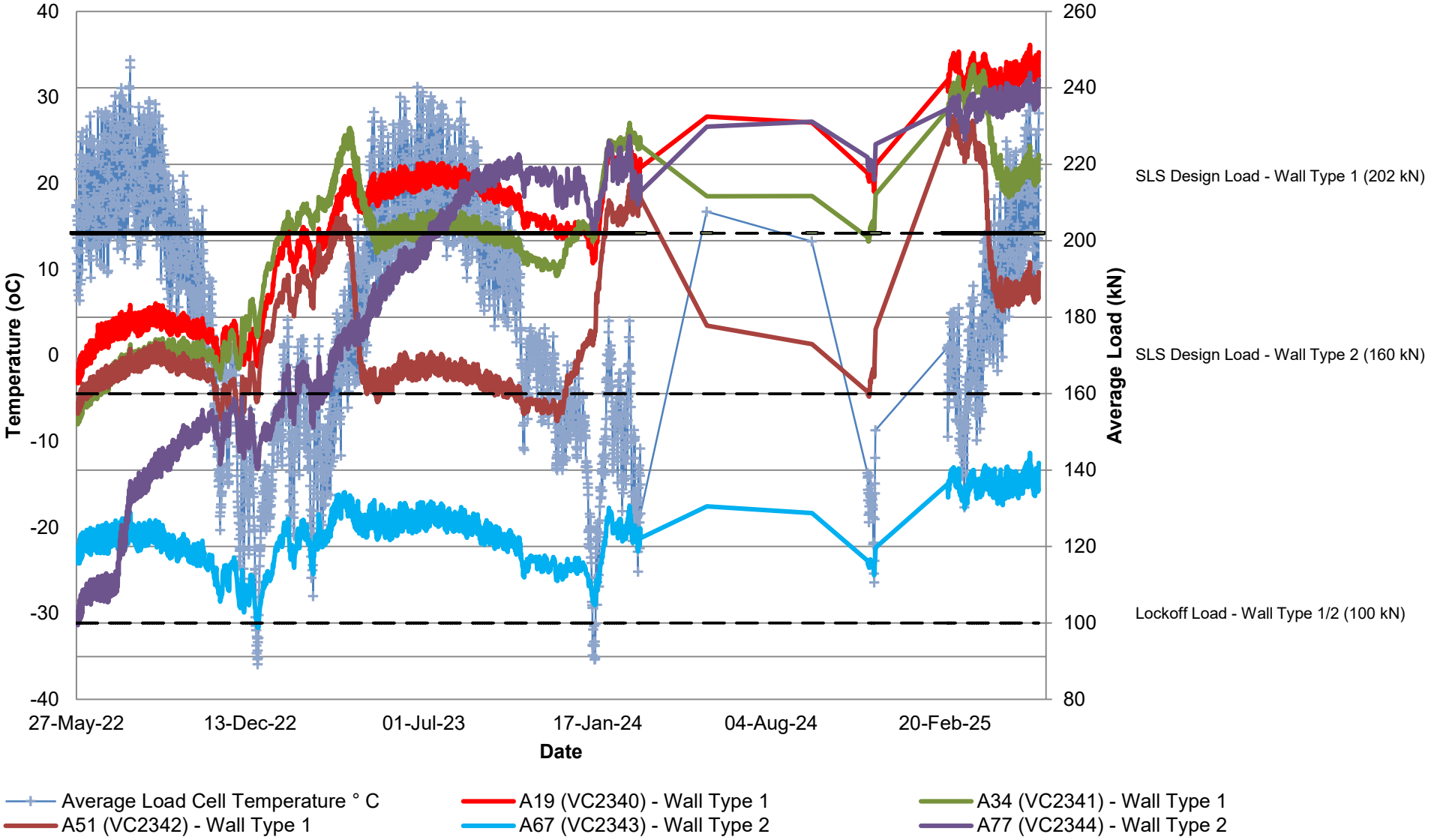


FIGURE PH009-11
ACTIVE STANDPIPE PIEZOMETER READINGS:
SHOP SLIDE

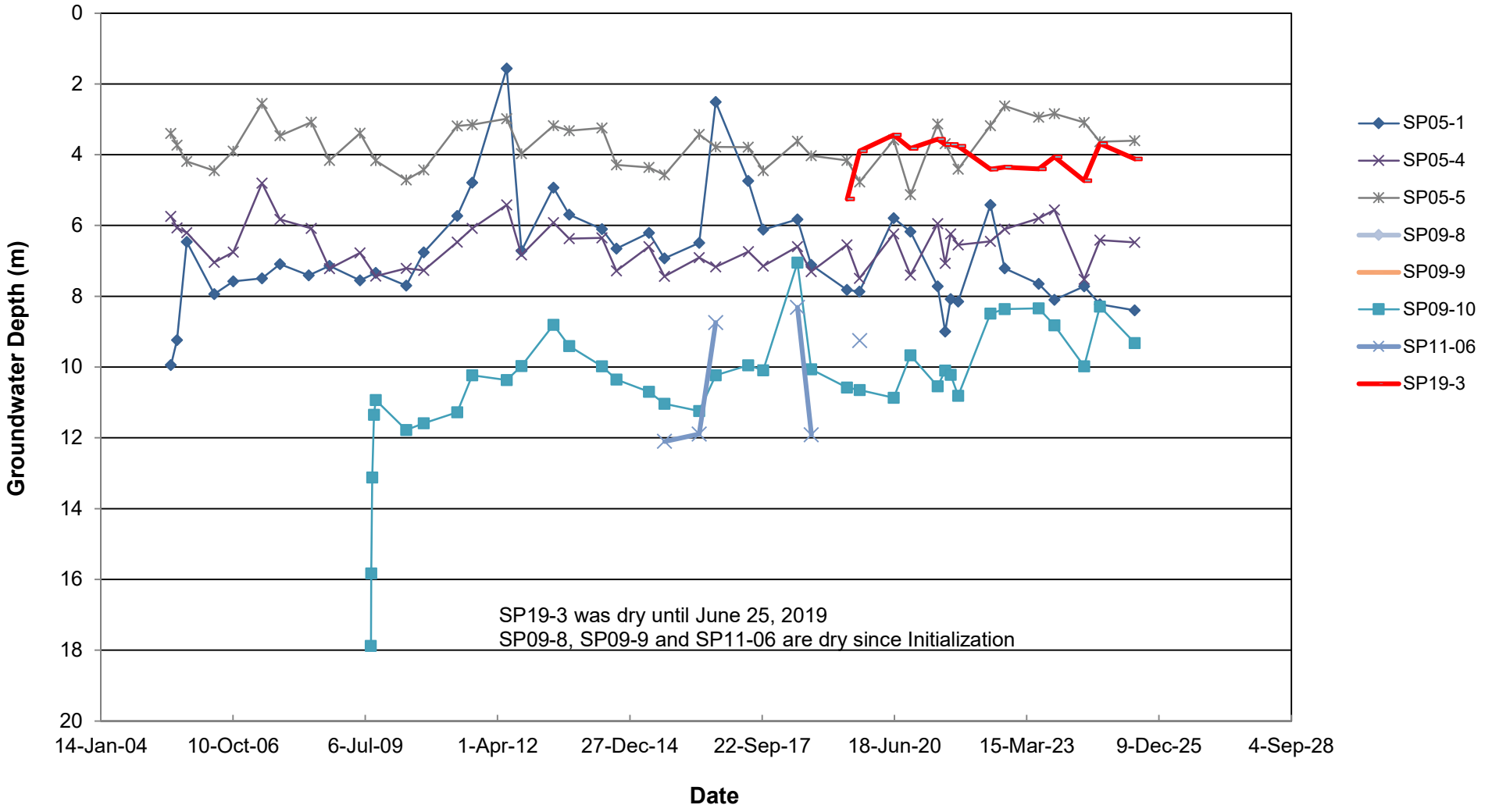


FIGURE PH009-12
HISTORICAL STANDPIPE PIEZOMETER READINGS:
SHOP SLIDE

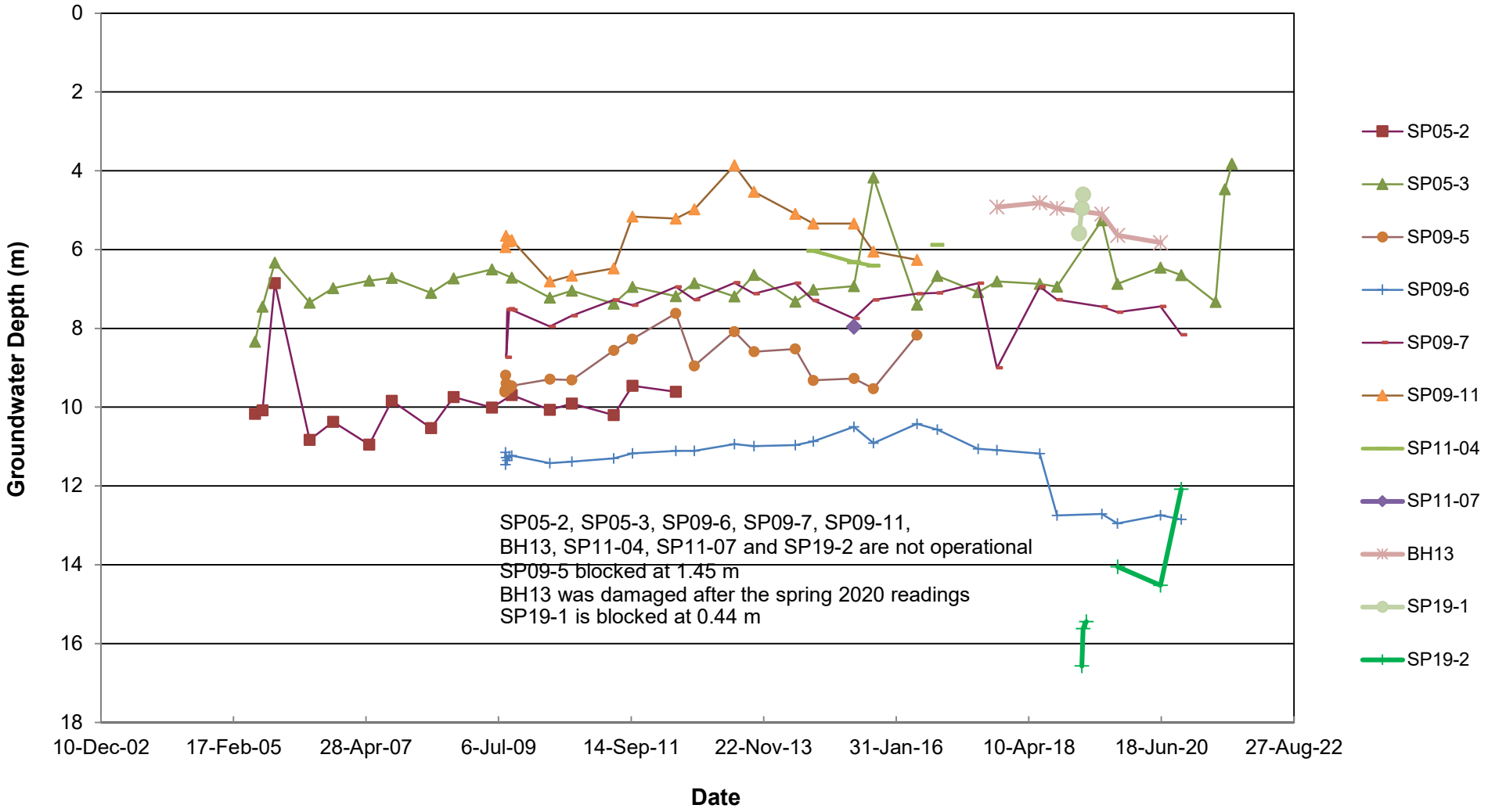


FIGURE PH009-13
VIBRATING WIRE PIEZOMETER DATA
SHOP SLIDE

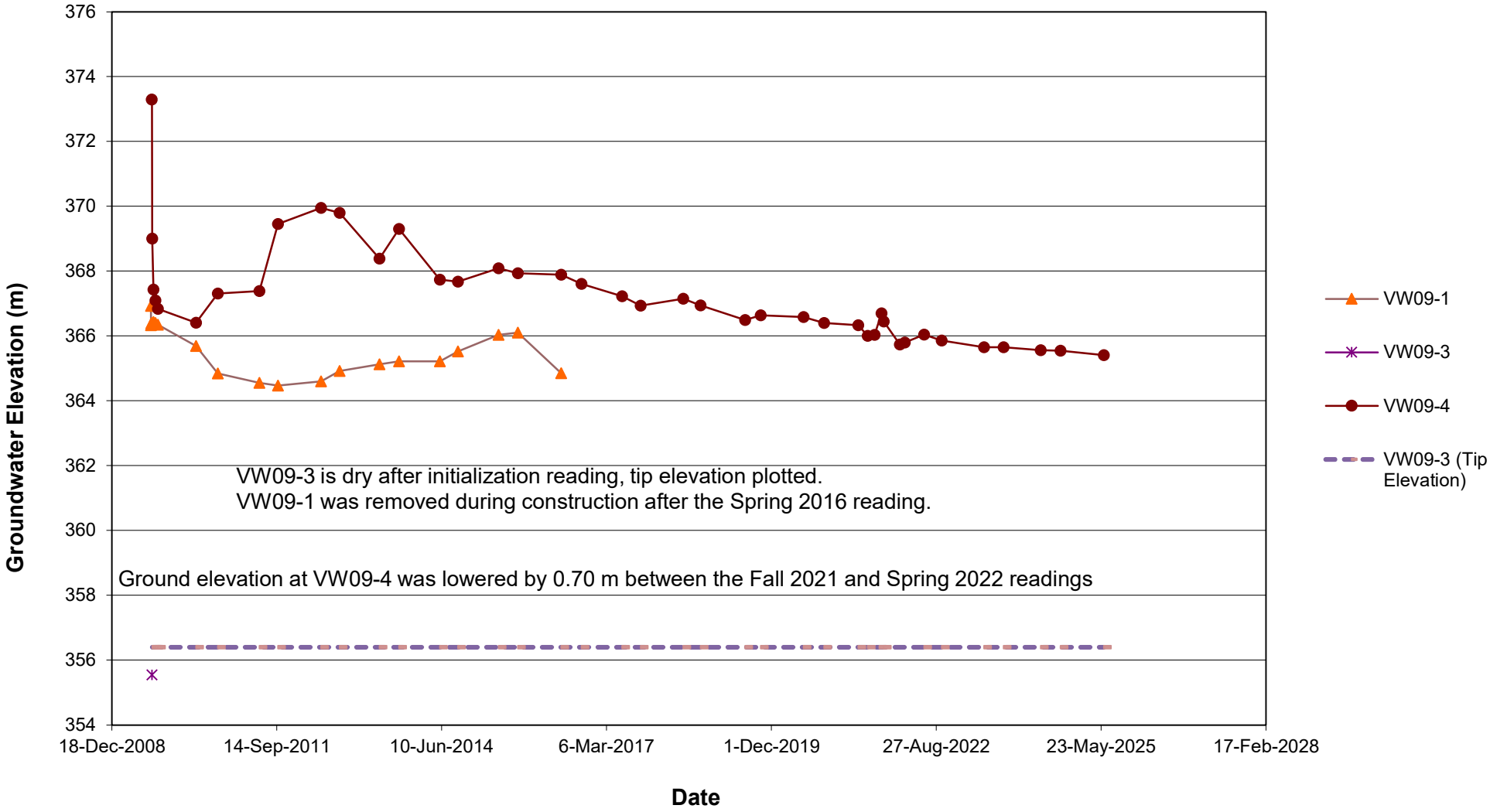


FIGURE PH009-14
PNEUMATIC PIEZOMETER READINGS: SHOP SLIDE