



**Tutela Heights Slope Monitoring  
Inclinometer and Survey Data  
Brantford, Ontario  
August 26, 2020**

**Project No. IDG 180462**

Prepared for:  
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## 1. Introduction

In-Depth Geotechnical Inc. was retained by the City of Brantford to monitor slope conditions at the Tutela Heights site, along portions of the Grand River southern bank. The monitoring program consists of *a)* acquiring field survey data on a quarterly basis; *b)* evaluating the observed movements; and *c)* summarizing the findings in this report.

Specifically, this Monitoring Report provides an update on monitoring data from *a)* inclinometers and *b)* survey points, collected up to July 17, 2020, and April 3, 2020, respectively.

Inclinometer data was collected by In-Depth Geotechnical, while movements of survey points were measured/surveyed by J.C. Cohoon Engineering Ltd.

## 2. Field Monitoring Procedures

### 2.1 Inclinometers

Three inclinometer casings were installed on the subject area between September 28 and October 8, 2015. Approximate inclinometer locations are illustrated in Appendix One (Page 1).

Depths of installation below ground surface were as follows:

BH-01: 25.76 m;  
BH-02: 24.99 m; and  
BH-03: 32.49 m.

Inclinometer casing has two orthogonal sets of grooves. During installation, the primary orientation of grooves (A-A) were set pointing to the face of the slope, while the secondary orientation (B-B) were aligned parallel to the face of the slope.

Initial baseline readings for the three inclinometer casings was completed on October 15, 2015. Subsequent monitoring readings were completed on the following dates:

1. November 6, 2015;
2. December 18, 2015;
3. January 15, 2016;
4. April 12, 2016;
5. May 16, 2016;
6. August 27, 2018;
7. October 4, 2018;
8. November 2, 2018;
9. January 10, 2019;
10. February 4, 2019;
11. May 10, 2019;
12. September 18, 2019;
13. October 23, 2019;
14. March 5, 2020; and
15. July 17, 2020

The summarized inclinometer data is attached into Appendix One. The data is provided in tables and plot formats. These data values refer to recorded displacements versus depth, along the A-A and B-B orientations. Displacements from base line readings are reported in *mm*. Depths, in meters, are referred from the ground surface to the center of probe at the time of the recording.

## **2.2 Survey Points**

Nineteen survey points were installed by JC Cohoon Engineering with their locations illustrated in Appendix Two (Page 1). Installation date was January 13, 2015.

Baseline readings were recorded on January 15, 2015, with subsequent readings completed on the following dates:

April 24, 2015;  
November 5, 2015;  
May 8, 2018;  
December 11, 2018;  
May 8, 2019;  
November 11, 2019; and  
April 3, 2020 (latest records).

Survey readings consist of elevations and horizontal displacements measured with respect of the original or baseline readings. Summarized survey point data is attached into Appendix Two in tabular format. The last two sets of survey measurements are displayed into E-W and N-S alignments. This decomposition of total movements allows for interpretation of observed displacements in terms of field orientation.

## 3. Monitoring data – Summary

Based on the updated data the following observations can be made:

### 3.1 Inclinometers

1. At *Inclinometer BH01* location, maximum rate of ground displacement is less than 0.0011 mm/day, or less than 0.411 mm/years. This corresponds to displacements perpendicular to the face of slope. It is noted that this maximum rate of displacement corresponds to readings taken on April 12, 2016.
2. At *Inclinometer BH02* location, maximum rate of ground displacement is less than 0.0012 mm/day, or less than 0.455 mm/years. The ground mass at this location exhibits a small counter-clockwise rotation above the 8 m depth elevation. This is consistent with visual observations of ground surface, which exhibits a step-down type of localized slope failure. Below the 8 m depth, the soil mass is not showing significant movements. This trend is being confirmed with all readings recorded after July 17, 2020.
3. At *Inclinometer BH03* location, maximum rate of ground displacement is less than 0.0009 mm/day, or less than 0.317 mm/years. This corresponds to displacements perpendicular to the face of slope (towards the Grand River), and to the latest set of readings.
4. In relation to *inclinometer data*, recorded readings display small amounts of fluctuations (back and forth); these fluctuations can be associated in part a) to small ground motion due to temperature/weather-related changes through the seasons; and b) to intrinsic small variations of the inclinometer probe. Overall, inclinometer readings exhibit a satisfactory level of consistency, suggesting that they working as required and/or expected.
5. Details of the actual rate of lateral displacements from inclinometer locations can be appreciated in the tables and depth-plots attached in Appendix One.

### 3.2 Survey Iron Bars (SIB)

1. Details of the actual rate of displacements/settlements can be appreciated in the tables attached into Appendix Two, as well as the summary Table 1, included below.
2. The Iron Bar corresponding to MP 01-14 was found to be damaged/bent.
3. *SIB Nos. 07-; 08-; 09-; 11-; 12-; and 14-14* exhibited the rate of *horizontal displacements*, above the 30 mm/yr. All other survey points registered considerably lower values of rate displacements, i.e., less than 30 mm/yr. The latest data set from April 3, 2020 confirms the trend from previous data sets. In addition to the previous listed SIBs, SIB No. 9-14 is also showing a rate of near 30 mm/yr. movements.
4. *Survey Point No. 11-14* exhibited the highest rate of *settlements*, still remains at 43.48 mm/yr.

5. It is noted that reverse movements were observed at:  
 SIB No. 06-14 reversed the direction from upward movements to downward.  
 Whether these rate of movement reversals are real or spurious, we will be observing the trends during the next round of monitoring data collection.
6. In relation to survey points, the rate of displacement values listed above corresponds to the *latest set* of readings, April 3, 2020.
7. It is considered that future monitoring readings will reinforce actual trends of ground mass displacements/settlements while filtering out spurious displacements correlated to weather- or operator-related errors.
- 8.

**Table No. 1**

MP	Rate of Displacements <sup>(1)</sup>					
	Last Reading: April 3, 2020					
	Vertical orientation		N-S Orientation		E-W Orientation	
<b>01-14</b>	n/a	n/a	n/a	n/a	n/a	n/a
<b>02-14</b>	13.40	down	9.57	North	11.18	East
<b>03-14</b>	11.48	down	13.40	North	13.40	East
<b>04-14</b>	22.97	down	9.57	North	5.74	East
<b>05-14</b>	11.48	down	24.88	North	11.48	East
<b>06-14</b>	12.42	down	12.42	North	8.28	East
<b>07-14</b>	11.48	down	66.99	North	3.83	East
<b>08-14</b>	24.84	down	113.87	North	28.99	West
<b>09-14</b>	21.05	down	28.71	North	5.74	East
<b>10-14</b>	5.74	down	5.74	North	0.00	-
<b>11-14</b>	43.48	down	78.67	North	97.31	West
<b>12-14</b>	11.48	down	24.88	North	22.97	West
<b>13-14</b>	-3.83	up	7.66	North	0.00	-
<b>14-14</b>	13.40	down	62.25	North	1.91	West
<b>15-14</b>	11.48	down	3.83	South	7.66	East
<b>16-14</b>	24.88	down	17.23	North	5.74	East
<b>17-14</b>	11.48	down	3.83	North	3.83	East
<b>18-14</b>	7.66	down	1.91	South	1.91	West
<b>19-14</b>	9.57	down	1.91	South	3.83	East

<sup>(1)</sup> Rate of Displacements are in *mm/year*, and correspond to the latest set of survey reading, namely, from April 3, 2020.

## 4. Closure

We trust that the present quarterly update report fulfills your present requirements. Should you have any question, please feel free to contact the undersigned.

Sincerely,

**In-Depth Geotechnical Inc.**



Gabriel Sedran, P.Eng., Ph.D.  
President

# Appendix One

## Inclinometer Data

Updated with inclinometer data from fieldwork completed on October 23, 2019

Inclinometer Locations

Appendix One - Page 1

### ***Inclinometer BH 01***

Table for *A-A* Alignment and profile

Appendix One - Pages 2 to 4

Table for *B-B* Alignment and profile

Appendix One - Pages 5 to 7

### ***Inclinometer BH 02***

Table for *A-A* Alignment and profile

Appendix One - Pages 8 to 10

Table for *B-B* Alignment and profile

Appendix One - Pages 11 to 13

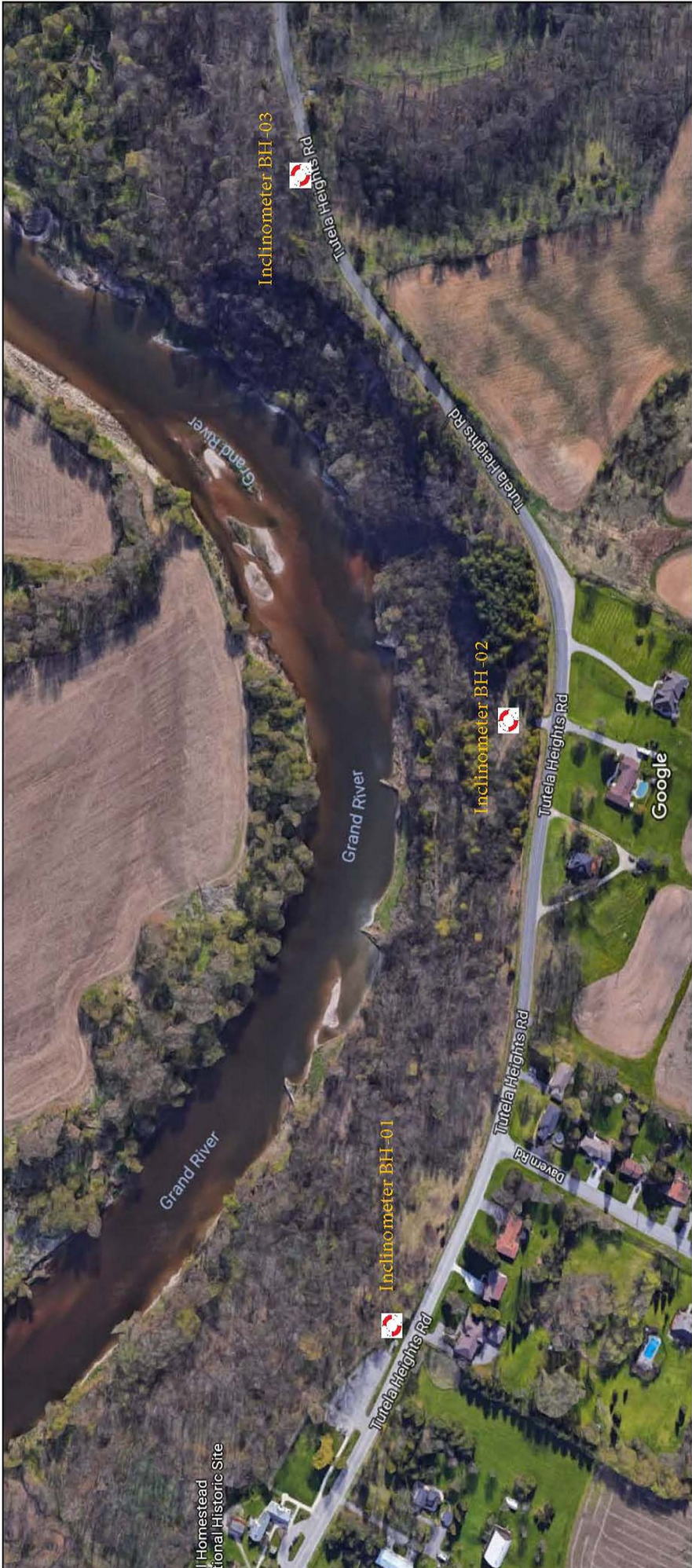
### ***Inclinometer BH 03***

Table for *A-A* Alignment and profile

Appendix One - Pages 14 to 16

Table for *B-B* Alignment and profile

Appendix One - Pages 17 to 19



Imagery ©2018 Google, Map data ©2018 Google 50 m

## Inclinometer BH01 A-A Alignment

*Displacements along plane perpendicular to the face of slope*

continues on next page

Profile Change in mm

	0	1	2	3	4	5	6	7	8	9	10	11
Depth m	October 10, 2015	November 6, 2015	December 18, 2015	January 15, 2016	April 12, 2016	May 16, 2016	August 27, 2018	October 4, 2018	November 2, 2018	January 10, 2019	February 4, 2019	May 10, 2019
0.21	0.00	0.37	0.76	1.05	1.96	1.08	1.36	1.17	1.60	1.80	1.92	1.92
0.82	0.00	0.21	0.51	1.06	1.55	0.86	1.58	1.15	1.48	1.64	1.84	1.84
1.43	0.00	0.22	0.48	0.88	1.31	0.59	1.02	0.62	0.94	1.04	1.17	1.16
2.04	0.00	0.17	0.40	0.80	1.20	0.51	0.84	0.49	0.80	0.87	1.01	1.01
2.65	0.00	0.15	0.40	0.80	1.19	0.50	0.67	0.30	0.49	0.69	0.81	0.81
3.26	0.00	0.13	0.38	0.76	1.13	0.45	0.55	0.18	0.35	0.51	0.62	0.61
3.87	0.00	0.13	0.35	0.75	1.11	0.44	0.64	0.29	0.45	0.59	0.70	0.41
4.48	0.00	0.13	0.34	0.73	1.11	0.45	0.67	0.32	0.47	0.61	0.72	0.43
5.09	0.00	0.13	0.35	0.73	1.11	0.46	0.64	0.29	0.45	0.60	0.70	0.41
5.70	0.00	0.15	0.35	0.76	1.11	0.48	0.67	0.32	0.51	0.67	0.73	0.47
6.31	0.00	0.14	0.34	0.74	1.06	0.46	0.63	0.28	0.47	0.63	0.68	0.43
6.92	0.00	0.17	0.35	0.76	1.07	0.50	0.75	0.42	0.60	0.73	0.80	0.53
7.52	0.00	0.16	0.34	0.74	1.04	0.47	0.67	0.35	0.51	0.65	0.71	0.45
8.13	0.00	0.18	0.35	0.70	0.99	0.47	0.68	0.35	0.50	0.63	0.67	0.42
8.74	0.00	0.18	0.32	0.66	0.93	0.42	0.60	0.28	0.41	0.54	0.57	0.33
9.35	0.00	0.14	0.29	0.65	0.87	0.38	0.49	0.17	0.33	0.48	0.46	0.30
9.96	0.00	0.14	0.29	0.65	0.85	0.38	0.44	0.13	0.29	0.45	0.44	0.29
10.57	0.00	0.12	0.30	0.67	0.85	0.40	0.50	0.22	0.40	0.59	0.59	0.47
11.18	0.00	0.14	0.33	0.70	0.87	0.46	0.62	0.37	0.55	0.72	0.73	0.62
11.79	0.00	0.12	0.30	0.67	0.81	0.43	0.57	0.30	0.48	0.66	0.67	0.56
12.40	0.00	0.14	0.33	0.69	0.84	0.46	0.64	0.35	0.53	0.71	0.72	0.63
13.01	0.00	0.12	0.28	0.65	0.80	0.41	0.60	0.33	0.50	0.64	0.67	0.54
13.62	0.00	0.12	0.26	0.64	0.77	0.41	0.59	0.31	0.48	0.58	0.61	0.47
14.23	0.00	0.13	0.23	0.57	0.71	0.38	0.55	0.26	0.41	0.46	0.46	0.30
14.84	0.00	0.14	0.20	0.52	0.66	0.35	0.52	0.21	0.36	0.37	0.38	0.22
15.45	0.00	0.15	0.18	0.48	0.64	0.33	0.50	0.18	0.33	0.30	0.33	0.19
16.06	0.00	0.15	0.16	0.47	0.61	0.32	0.49	0.18	0.30	0.22	0.25	0.09
16.67	0.00	0.12	0.14	0.44	0.56	0.29	0.43	0.13	0.26	0.18	0.20	0.07
17.28	0.00	0.14	0.18	0.44	0.53	0.28	0.40	0.14	0.24	0.19	0.22	0.08
17.89	0.00	0.19	0.19	0.45	0.52	0.31	0.45	0.26	0.29	0.24	0.27	0.13
18.50	0.00	0.19	0.22	0.43	0.50	0.30	0.43	0.24	0.27	0.20	0.24	0.09
19.11	0.00	0.17	0.20	0.40	0.45	0.29	0.39	0.21	0.23	0.21	0.26	0.10
19.72	0.00	0.17	0.22	0.39	0.43	0.32	0.40	0.23	0.24	0.19	0.24	0.06
20.33	0.00	0.14	0.19	0.35	0.38	0.29	0.37	0.24	0.24	0.18	0.25	0.11
20.94	0.00	0.13	0.15	0.31	0.33	0.27	0.34	0.24	0.27	0.22	0.28	0.19
21.55	0.00	0.11	0.11	0.21	0.31	0.20	0.26	0.14	0.19	0.16	0.16	0.06
22.16	0.00	0.10	0.09	0.15	0.25	0.16	0.19	0.07	0.09	0.01	0.02	-0.11
22.76	0.00	0.10	0.08	0.13	0.23	0.15	0.20	0.10	0.13	0.02	0.05	-0.05
23.37	0.00	0.08	0.05	0.09	0.18	0.14	0.17	0.07	0.12	0.03	0.04	-0.04
23.98	0.00	0.02	0.00	0.03	0.09	0.07	0.08	0.01	0.05	0.03	0.01	-0.05
24.59	0.00	0.02	0.03	0.04	0.09	0.09	0.12	0.06	0.11	0.09	0.09	0.06
25.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

## Inclinometer BH01 A-A Alignment

*Displacements along plane perpendicular to the face of slope*

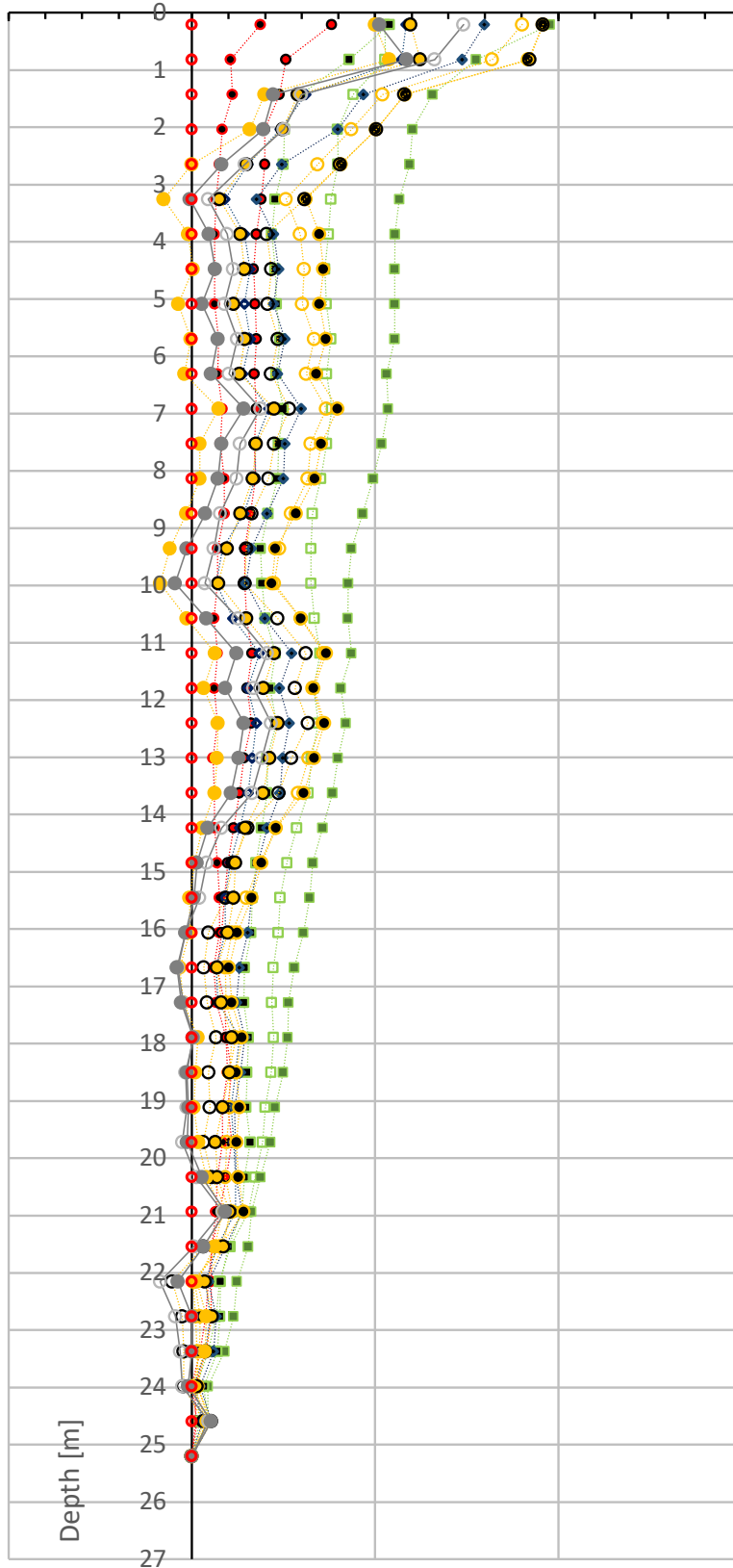
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Profile Change in mm

Depth m	0	12	13	14	15							
	October 10, 2015	September 18, 2019	October 23, 2019	March 5, 2020	July 17, 2020							
0.21	0.00	1.19	1.00	1.48	1.02							
0.82	0.00	1.25	1.08	1.33	1.17							
1.43	0.00	0.58	0.40	0.60	0.44							
2.04	0.00	0.50	0.32	0.50	0.39							
2.65	0.00	0.30	0.00	0.29	0.16							
3.26	0.00	0.15	-0.15	0.09	-0.01							
3.87	0.00	0.27	-0.02	0.19	0.09							
4.48	0.00	0.29	0.01	0.23	0.13							
5.09	0.00	0.23	-0.07	0.18	0.06							
5.70	0.00	0.29	-0.01	0.25	0.14							
6.31	0.00	0.26	-0.04	0.20	0.10							
6.92	0.00	0.45	0.15	0.38	0.28							
7.52	0.00	0.35	0.04	0.26	0.16							
8.13	0.00	0.33	0.04	0.24	0.14							
8.74	0.00	0.27	-0.03	0.15	0.07							
9.35	0.00	0.19	-0.12	0.12	-0.03							
9.96	0.00	0.14	-0.17	0.07	-0.09							
10.57	0.00	0.30	-0.03	0.25	0.08							
11.18	0.00	0.45	0.13	0.41	0.24							
11.79	0.00	0.39	0.07	0.34	0.18							
12.40	0.00	0.47	0.14	0.43	0.28							
13.01	0.00	0.42	0.14	0.38	0.26							
13.62	0.00	0.39	0.12	0.33	0.21							
14.23	0.00	0.29	0.06	0.16	0.09							
14.84	0.00	0.24	0.02	0.08	0.03							
15.45	0.00	0.23	-0.01	0.04	0.01							
16.06	0.00	0.20	-0.01	-0.03	-0.03							
16.67	0.00	0.14	-0.07	-0.08	-0.08							
17.28	0.00	0.16	-0.05	-0.05	-0.06							
17.89	0.00	0.22	0.03	0.01	0.01							
18.50	0.00	0.21	0.02	-0.03	-0.03							
19.11	0.00	0.17	0.01	-0.03	-0.02							
19.72	0.00	0.13	0.04	-0.05	-0.03							
20.33	0.00	0.14	0.08	0.03	0.06							
20.94	0.00	0.21	0.17	0.17	0.18							
21.55	0.00	0.17	0.12	0.01	0.06							
22.16	0.00	0.07	0.03	-0.17	-0.08							
22.76	0.00	0.11	0.08	-0.09	0.00							
23.37	0.00	0.08	0.07	-0.06	0.00							
23.98	0.00	0.03	0.00	-0.05	-0.02							
24.59	0.00	0.11	0.08	0.09	0.10							
25.20	0.00	0.00	0.00	0.00	0.00							

BH 01 A-A Displacements [mm]

-1.0 0.0 1.0 2.0 3.0



- October 10, 2015
- November 6, 2015
- December 18, 2015
- January 15, 2016
- April 12, 2016
- May 16, 2016
- ◇ October 4, 2018
- ◇ November 2, 2018
- January 10, 2019
- February 4, 2019
- May 10, 2019
- Sept. 18, 2019
- October 23, 2019
- March 5, 2020
- July 17, 2020

## Inclinometer BH01 B-B Alignment

*Displacements along plane parallel to the face of slope*

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Profile Change in mm

	0	1	2	3	4	5	6	7	8	9	10	11
Depth m	October 10, 2015	November 6, 2015	December 18, 2015	January 15, 2016	April 12, 2016	May 16, 2016	August 27, 2018	October 4, 2018	November 2, 2018	January 10, 2019	February 4, 2019	May 10, 2019
0.21	0.00	0.24	1.23	1.30	1.69	0.95	0.34	1.69	2.17	3.23	2.63	3.19
0.82	0.00	0.35	1.20	1.08	1.43	0.65	-0.04	1.22	1.63	2.59	2.27	2.61
1.43	0.00	-0.11	0.54	0.33	0.52	-0.29	-1.19	0.15	0.68	1.42	1.06	1.25
2.04	0.00	-0.53	0.12	-0.01	0.08	-0.63	-2.29	-1.03	-0.59	0.40	-0.07	0.21
2.65	0.00	0.20	1.01	0.90	1.08	0.45	-0.90	0.35	0.82	1.85	1.38	1.66
3.26	0.00	0.10	0.90	0.84	1.01	0.41	-0.86	0.36	0.85	1.71	1.37	1.59
3.87	0.00	0.08	0.84	0.77	0.91	0.32	-0.95	0.26	0.77	1.57	1.21	1.42
4.48	0.00	0.16	0.87	0.75	0.89	0.36	-0.86	0.31	0.82	1.62	1.30	1.44
5.09	0.00	0.15	0.82	0.71	0.84	0.31	-0.91	0.23	0.73	1.48	1.19	1.31
5.70	0.00	0.15	0.83	0.74	0.88	0.37	-0.80	0.35	0.87	1.65	1.31	1.47
6.31	0.00	0.10	0.77	0.68	0.80	0.31	-0.86	0.23	0.75	1.53	1.16	1.31
6.92	0.00	0.09	0.74	0.66	0.70	0.23	-1.05	0.13	0.53	1.28	0.91	1.08
7.52	0.00	0.09	0.72	0.64	0.69	0.21	-1.05	0.10	0.50	1.26	0.89	1.08
8.13	0.00	0.02	0.73	0.64	0.69	0.22	-1.01	0.11	0.53	1.21	0.87	1.04
8.74	0.00	0.21	0.67	0.56	0.61	0.15	-1.05	0.19	0.43	1.08	0.71	0.85
9.35	0.00	0.33	0.61	0.44	0.55	0.08	-1.13	0.12	0.24	0.78	0.59	0.52
9.96	0.00	0.33	0.61	0.41	0.54	0.09	-1.06	0.12	0.23	0.76	0.58	0.47
10.57	0.00	0.27	0.58	0.37	0.50	0.08	-1.15	0.06	0.23	0.77	0.62	0.53
11.18	0.00	0.22	0.54	0.36	0.45	0.04	-1.21	0.10	0.27	0.83	0.72	0.70
11.79	0.00	0.18	0.51	0.34	0.41	0.01	-1.24	0.06	0.26	0.84	0.71	0.66
12.40	0.00	0.18	0.50	0.33	0.39	0.00	-1.12	0.08	0.26	0.87	0.72	0.70
13.01	0.00	0.20	0.53	0.32	0.42	0.05	-1.04	0.17	0.31	0.96	0.71	0.77
13.62	0.00	0.18	0.49	0.26	0.37	0.01	-1.01	0.10	0.31	0.90	0.65	0.68
14.23	0.00	0.17	0.47	0.27	0.36	0.02	-0.95	0.10	0.35	0.90	0.69	0.77
14.84	0.00	0.09	0.41	0.20	0.29	-0.03	-1.01	0.03	0.26	0.77	0.55	0.60
15.45	0.00	0.03	0.38	0.19	0.28	-0.04	-0.88	0.06	0.10	0.73	0.51	0.47
16.06	0.00	0.06	0.35	0.15	0.28	-0.06	-0.85	0.04	0.07	0.67	0.39	0.37
16.67	0.00	0.05	0.35	0.15	0.26	-0.01	-0.77	0.03	0.06	0.59	0.42	0.36
17.28	0.00	0.02	0.31	0.13	0.23	-0.01	-0.72	-0.01	0.04	0.55	0.40	0.30
17.89	0.00	-0.03	0.23	0.10	0.19	-0.03	-0.78	-0.13	-0.01	0.46	0.26	0.17
18.50	0.00	-0.04	0.11	0.06	0.16	-0.03	-0.78	-0.19	-0.06	0.36	0.13	0.04
19.11	0.00	-0.06	0.05	0.03	0.13	-0.09	-0.75	-0.26	-0.09	0.18	-0.04	-0.19
19.72	0.00	-0.02	0.03	0.01	0.11	-0.10	-0.72	-0.27	-0.11	0.08	-0.11	-0.30
20.33	0.00	0.02	0.05	0.01	0.13	-0.08	-0.63	-0.18	-0.10	0.08	-0.09	-0.25
20.94	0.00	0.08	0.03	-0.03	0.06	-0.08	-0.60	-0.21	-0.10	0.06	-0.11	-0.24
21.55	0.00	0.02	0.09	0.04	0.05	-0.02	-0.46	-0.10	-0.04	0.01	-0.09	-0.20
22.16	0.00	0.00	0.07	0.03	0.02	-0.03	-0.41	-0.12	-0.09	-0.02	-0.11	-0.22
22.76	0.00	-0.05	0.05	0.02	0.00	-0.02	-0.32	-0.08	-0.07	-0.02	-0.09	-0.19
23.37	0.00	-0.03	0.06	0.04	0.00	0.01	-0.24	-0.01	-0.08	0.04	-0.03	-0.10
23.98	0.00	-0.10	-0.06	-0.09	-0.09	-0.08	-0.30	-0.12	-0.18	-0.13	-0.16	-0.23
24.59	0.00	-0.06	-0.03	-0.07	-0.06	-0.05	-0.20	-0.08	-0.13	-0.14	-0.14	-0.22
25.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

## Inclinometer BH01 B-B Alignment

*Displacements along plane parallel to the face of slope*

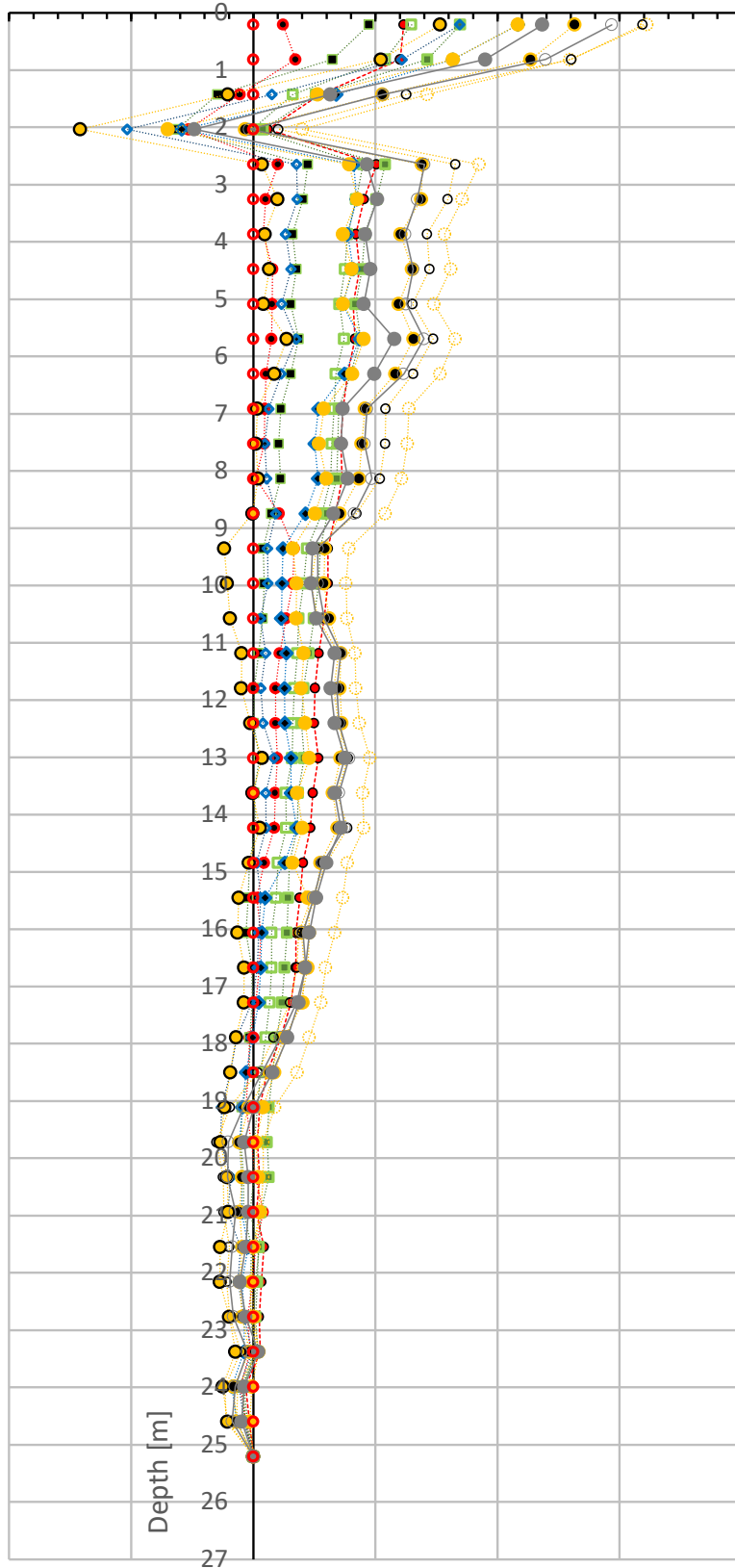
continued from previous page

Profile Change in mm

Depth m	0	12	13	14	15							
	October 10, 2015	September 18, 2019	October 23, 2019	March 5, 2020	July 17, 2020							
0.21	0.00	1.53	2.17	2.94	2.37							
0.82	0.00	1.05	1.64	2.40	1.90							
1.43	0.00	-0.21	0.53	1.06	0.63							
2.04	0.00	-1.42	-0.70	-0.03	-0.48							
2.65	0.00	0.07	0.79	1.40	0.93							
3.26	0.00	0.20	0.85	1.34	1.02							
3.87	0.00	0.10	0.74	1.24	0.92							
4.48	0.00	0.13	0.81	1.31	0.96							
5.09	0.00	0.08	0.73	1.25	0.90							
5.70	0.00	0.27	0.90	1.40	1.16							
6.31	0.00	0.17	0.81	1.23	0.99							
6.92	0.00	0.03	0.58	0.93	0.73							
7.52	0.00	0.02	0.54	0.91	0.72							
8.13	0.00	0.04	0.60	0.97	0.77							
8.74	0.00	-0.01	0.51	0.83	0.66							
9.35	0.00	-0.24	0.33	0.53	0.49							
9.96	0.00	-0.21	0.35	0.53	0.47							
10.57	0.00	-0.19	0.35	0.58	0.52							
11.18	0.00	-0.10	0.41	0.72	0.67							
11.79	0.00	-0.10	0.39	0.68	0.64							
12.40	0.00	-0.03	0.42	0.70	0.67							
13.01	0.00	0.07	0.46	0.79	0.75							
13.62	0.00	-0.01	0.36	0.70	0.67							
14.23	0.00	0.05	0.40	0.75	0.72							
14.84	0.00	-0.04	0.32	0.57	0.60							
15.45	0.00	-0.12	0.45	0.49	0.52							
16.06	0.00	-0.13	0.46	0.41	0.46							
16.67	0.00	-0.07	0.45	0.43	0.42							
17.28	0.00	-0.08	0.39	0.35	0.37							
17.89	0.00	-0.14	0.27	0.22	0.28							
18.50	0.00	-0.19	0.17	0.07	0.16							
19.11	0.00	-0.24	0.08	-0.08	0.00							
19.72	0.00	-0.27	0.02	-0.20	-0.07							
20.33	0.00	-0.21	0.04	-0.21	-0.04							
20.94	0.00	-0.21	0.05	-0.15	-0.04							
21.55	0.00	-0.27	0.00	-0.17	-0.06							
22.16	0.00	-0.27	-0.01	-0.19	-0.11							
22.76	0.00	-0.20	0.01	-0.16	-0.06							
23.37	0.00	-0.14	0.04	-0.05	0.04							
23.98	0.00	-0.25	-0.01	-0.15	-0.07							
24.59	0.00	-0.21	-0.03	-0.17	-0.10							
25.20	0.00	0.00	0.00	0.00	0.00							

**BH 01 B-B Displacements [mm]**

-2.0 -1.0 0.0 1.0 2.0 3.0 4.0



- October 10, 2015
- November 6, 2015
- December 18, 2015
- January 15, 2016
- April 12, 2016
- May 16, 2016
- ◆ October 4, 2018
- ◆ November 2, 2018
- January 10, 2019
- February 4, 2019
- May 10, 2019
- Sept. 18, 2019
- October 23, 2019
- March 5, 2020
- July 17, 2020

## Inclinometer BH02 A-A Alignment

*Displacements along plane perpendicular to the face of slope*

*continues on next page*

*Profile Change in mm*

	0	1	2	3	4	5	6	7	8	9	10	11
Depth m	October 10, 2015	November 6, 2015	December 18, 2015	January 15, 2016	April 12, 2016	May 16, 2016	August 27, 2018	October 4, 2018	November 2, 2018	January 10, 2019	February 4, 2019	May 10, 2019
0.31	0.00	-0.12	-0.70	-1.89	-1.30	-1.70	1.38	1.48	0.08	-0.07	-0.08	0.19
0.92	0.00	0.03	-0.25	-0.72	-0.16	-0.49	0.37	0.44	-0.46	-0.33	-0.50	-0.12
1.53	0.00	0.05	0.03	0.02	0.70	0.42	0.09	0.13	-0.45	-0.15	-0.30	0.08
2.14	0.00	0.21	0.09	-0.25	0.22	-0.03	0.10	0.03	-0.27	-0.09	-0.07	0.27
2.75	0.00	0.34	0.12	-0.34	-0.15	-0.40	-0.33	-0.43	-0.36	-0.35	-0.27	0.05
3.36	0.00	0.20	-0.09	-0.67	-0.55	-0.79	-1.06	-1.17	-0.92	-1.07	-0.97	-0.70
3.97	0.00	0.17	-0.04	-0.60	-0.52	-0.75	-1.01	-1.13	-0.95	-1.23	-1.12	-0.88
4.58	0.00	0.07	-0.14	-0.43	-0.49	-0.70	-0.73	-0.82	-0.62	-1.07	-0.93	-0.72
5.19	0.00	0.02	-0.23	-0.21	-0.10	-0.30	0.14	0.08	0.22	-0.19	-0.04	0.14
5.80	0.00	0.05	-0.11	0.70	0.87	0.71	1.37	1.29	1.40	1.22	1.42	1.61
6.41	0.00	0.07	-0.11	0.64	0.72	0.56	0.85	0.73	0.80	1.22	0.98	1.20
7.02	0.00	0.06	-0.05	0.28	0.43	0.27	0.42	0.29	0.37	0.71	0.44	0.64
7.62	0.00	0.14	0.01	-0.01	0.14	-0.09	0.17	0.08	0.17	0.41	0.14	0.33
8.23	0.00	0.24	0.15	0.05	0.20	-0.06	0.26	0.17	0.23	0.46	0.21	0.36
8.84	0.00	0.21	0.06	-0.02	0.14	-0.10	0.04	-0.08	0.01	0.25	0.03	0.19
9.45	0.00	0.19	0.03	-0.01	0.13	-0.06	0.06	-0.03	0.05	0.19	0.01	0.14
10.06	0.00	0.16	-0.01	-0.02	0.13	-0.04	0.09	-0.03	0.05	0.25	0.07	0.20
10.67	0.00	0.16	-0.01	-0.03	0.12	-0.03	0.11	-0.03	0.05	0.24	0.10	0.22
11.28	0.00	0.19	0.03	-0.05	0.12	-0.04	0.15	0.05	0.09	0.29	0.14	0.27
11.89	0.00	0.20	0.05	-0.04	0.14	-0.03	0.19	0.09	0.15	0.33	0.19	0.31
12.50	0.00	0.23	0.08	-0.04	0.12	-0.05	0.12	0.02	0.07	0.24	0.09	0.20
13.11	0.00	0.23	0.08	-0.04	0.09	-0.06	0.14	0.04	0.09	0.23	0.10	0.20
13.72	0.00	0.20	0.07	-0.05	0.07	-0.09	0.23	0.13	0.21	0.32	0.23	0.30
14.33	0.00	0.19	0.05	-0.08	0.01	-0.13	0.00	-0.12	-0.01	0.06	-0.02	0.06
14.94	0.00	0.20	0.07	-0.04	0.08	-0.05	0.18	0.09	0.18	0.24	0.15	0.24
15.55	0.00	0.21	0.07	-0.09	0.03	-0.11	0.10	0.06	0.08	0.15	0.08	0.16
16.16	0.00	0.20	0.08	-0.08	0.03	-0.09	0.09	0.07	0.09	0.15	0.12	0.20
16.77	0.00	0.14	0.06	-0.04	0.04	-0.06	0.07	0.04	0.09	0.16	0.11	0.21
17.38	0.00	0.05	-0.14	-0.21	-0.22	-0.30	-0.47	-0.54	-0.45	-0.46	-0.48	-0.42
17.99	0.00	-0.10	-0.23	-0.27	-0.24	-0.30	-0.34	-0.41	-0.32	-0.29	-0.31	-0.24
18.60	0.00	0.01	-0.10	-0.17	-0.12	-0.17	-0.10	-0.16	-0.10	-0.07	-0.09	-0.03
19.21	0.00	0.06	-0.09	-0.22	-0.23	-0.26	-0.17	-0.22	-0.20	-0.15	-0.18	-0.13
19.82	0.00	0.35	0.20	-0.01	0.01	-0.06	0.15	0.15	0.11	0.21	0.13	0.20
20.43	0.00	0.27	0.19	0.03	0.08	0.01	0.19	0.21	0.17	0.24	0.19	0.25
21.04	0.00	0.20	0.14	-0.01	0.03	-0.03	0.13	0.15	0.12	0.20	0.13	0.19
21.65	0.00	0.13	0.11	0.04	0.10	0.08	0.18	0.18	0.17	0.21	0.18	0.22
22.26	0.00	-0.04	-0.06	-0.06	0.12	0.12	0.19	0.19	0.19	0.21	0.20	0.22
22.86	0.00	-0.11	-0.10	-0.09	0.01	0.04	0.07	0.08	0.09	0.09	0.10	0.10
23.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

## Inclinometer BH02 A-A Alignment

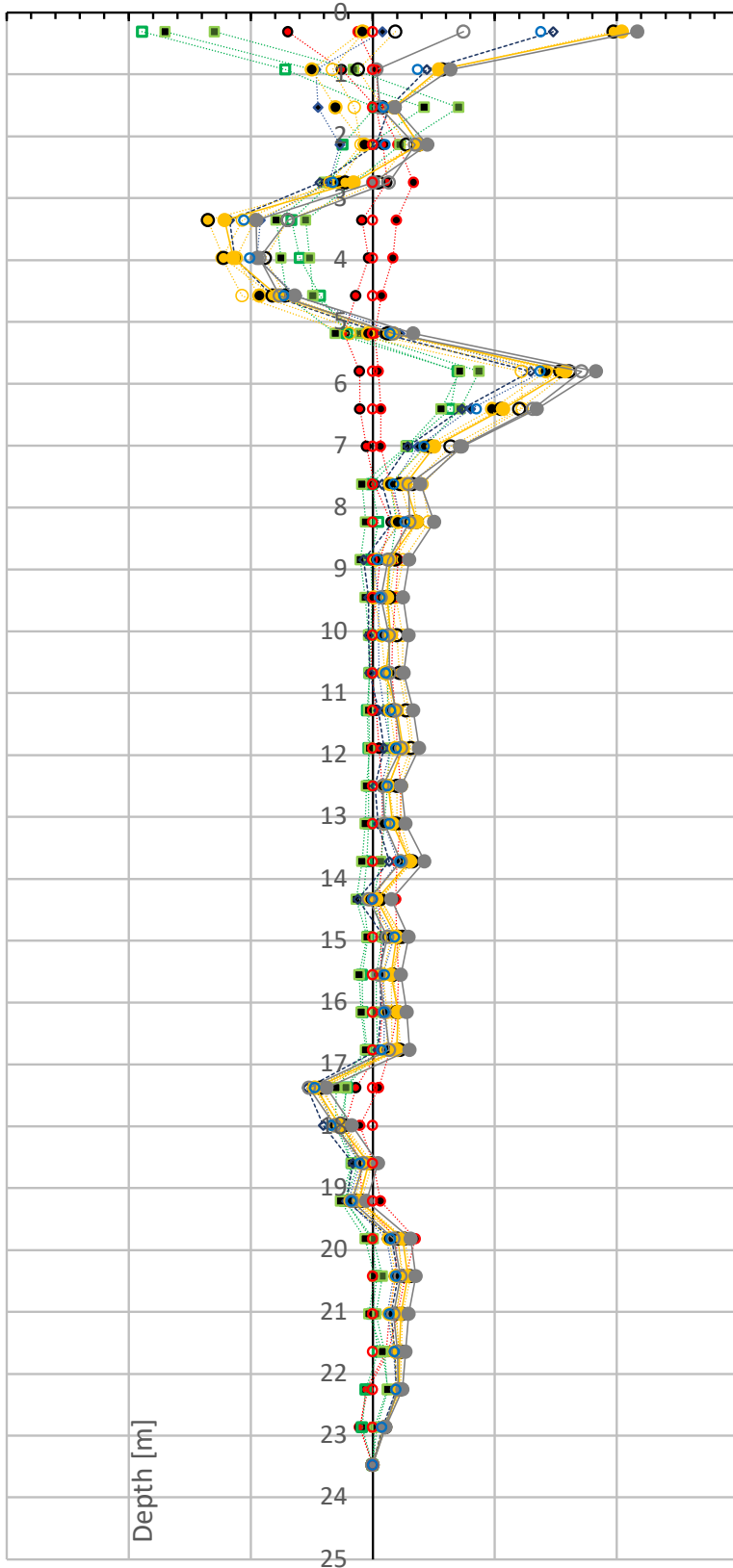
*Displacements along plane perpendicular to the face of slope  
Profile Change in mm*

continued from previous page

Depth m	0	12	13	14	15							
	October 10, 2015	September 18, 2019	October 23, 2019	March 5, 2020	July 17, 2020							
0.31	0.00	1.97	2.04	0.74	2.17							
0.92	0.00	0.57	0.54	0.03	0.64							
1.53	0.00	0.18	0.17	0.06	0.18							
2.14	0.00	0.38	0.38	0.35	0.45							
2.75	0.00	-0.23	-0.16	0.13	0.01							
3.36	0.00	-1.35	-1.21	-0.70	-0.96							
3.97	0.00	-1.22	-1.14	-0.93	-0.95							
4.58	0.00	-0.82	-0.78	-0.76	-0.64							
5.19	0.00	0.12	0.17	0.17	0.33							
5.80	0.00	1.54	1.58	1.71	1.83							
6.41	0.00	1.05	1.07	1.31	1.34							
7.02	0.00	0.48	0.51	0.72	0.73							
7.62	0.00	0.22	0.27	0.29	0.39							
8.23	0.00	0.32	0.36	0.30	0.51							
8.84	0.00	0.14	0.14	0.12	0.30							
9.45	0.00	0.10	0.12	0.07	0.25							
10.06	0.00	0.14	0.15	0.13	0.29							
10.67	0.00	0.11	0.11	0.14	0.25							
11.28	0.00	0.17	0.20	0.19	0.33							
11.89	0.00	0.24	0.25	0.23	0.38							
12.50	0.00	0.13	0.13	0.08	0.23							
13.11	0.00	0.18	0.16	0.10	0.27							
13.72	0.00	0.33	0.30	0.23	0.42							
14.33	0.00	0.05	0.03	-0.04	0.15							
14.94	0.00	0.22	0.20	0.12	0.29							
15.55	0.00	0.17	0.15	0.05	0.23							
16.16	0.00	0.21	0.21	0.10	0.28							
16.77	0.00	0.22	0.20	0.13	0.30							
17.38	0.00	-0.43	-0.47	-0.52	-0.38							
17.99	0.00	-0.23	-0.27	-0.31	-0.17							
18.60	0.00	-0.01	-0.03	-0.08	0.04							
19.21	0.00	-0.09	-0.11	-0.17	-0.05							
19.82	0.00	0.26	0.25	0.17	0.31							
20.43	0.00	0.31	0.29	0.23	0.35							
21.04	0.00	0.24	0.23	0.17	0.29							
21.65	0.00	0.23	0.22	0.20	0.27							
22.26	0.00	0.23	0.22	0.21	0.24							
22.86	0.00	0.10	0.09	0.10	0.11							
23.47	0.00	0.00	0.00	0.00	0.00							

# BH 02 A-A Displacements [mm]

-3.0 -2.0 -1.0 0.0 1.0 2.0 3.0



- October 10, 2015
- November 6, 2015
- December 18, 2015
- January 15, 2016
- April 12, 2016
- May 16, 2016
- August 27, 2018
- October 4, 2018
- November 2, 2018
- January 10, 2019
- February 4, 2019
- May 10, 2019
- Sept. 18, 2019
- October 23, 2019
- March 5, 2020
- July 17, 2020

## Inclinometer BH02 B-B Alignment

*Displacements along plane parallel to the face of slope*

*continues on next page*

*Profile Change in mm*

	0	1	2	3	4	5	6	7	8	9	10	11
Depth m	October 10, 2015	November 6, 2015	December 18, 2015	January 15, 2016	April 12, 2016	May 16, 2016	August 27, 2018	October 4, 2018	November 2, 2018	January 10, 2019	February 4, 2019	May 10, 2019
0.31	0.00	0.65	0.17	0.57	-0.07	0.40	1.56	1.84	1.11	1.31	1.42	0.45
0.92	0.00	0.76	0.40	0.79	-0.11	0.24	1.40	1.65	1.08	1.17	1.46	0.49
1.53	0.00	0.57	0.15	0.90	-0.19	0.29	0.96	1.06	0.87	0.75	1.12	0.28
2.14	0.00	0.42	0.12	1.09	0.20	0.69	0.74	0.61	0.72	0.93	1.27	0.50
2.75	0.00	0.60	0.31	0.97	0.18	0.58	1.15	1.07	1.18	1.44	1.70	0.92
3.36	0.00	0.66	0.72	1.74	0.81	1.12	2.14	1.95	2.08	2.48	2.67	2.00
3.97	0.00	0.82	0.84	1.86	1.07	1.35	1.96	1.84	1.98	2.47	2.56	1.88
4.58	0.00	0.89	1.07	1.75	1.00	1.28	0.90	0.86	1.14	1.48	1.55	0.90
5.19	0.00	0.90	1.05	1.35	0.60	0.82	-0.01	0.02	0.36	0.44	0.52	-0.24
5.80	0.00	0.77	0.90	1.19	0.39	0.63	0.00	0.05	0.46	0.35	0.53	-0.21
6.41	0.00	0.73	0.85	1.45	0.64	0.90	0.52	0.56	0.93	0.90	1.17	0.44
7.02	0.00	0.80	0.89	1.29	0.65	0.96	0.68	0.76	1.00	0.96	1.15	0.56
7.62	0.00	0.82	0.94	1.44	0.79	1.08	0.68	0.74	1.04	1.04	1.32	0.73
8.23	0.00	0.83	0.95	1.41	0.80	1.04	0.69	0.76	1.02	0.96	1.22	0.65
8.84	0.00	0.83	0.95	1.39	0.82	1.04	0.71	0.72	0.96	0.96	1.20	0.65
9.45	0.00	0.90	0.99	1.40	0.81	1.01	0.79	0.75	0.99	0.95	1.21	0.69
10.06	0.00	0.90	0.99	1.41	0.81	0.99	0.86	0.85	1.08	0.99	1.24	0.72
10.67	0.00	0.84	1.02	1.44	0.83	1.01	0.99	1.00	1.17	1.10	1.32	0.84
11.28	0.00	0.80	1.00	1.38	0.80	0.98	0.91	0.93	1.10	0.99	1.23	0.75
11.89	0.00	0.79	0.95	1.42	0.80	1.03	0.93	0.94	1.17	1.01	1.27	0.83
12.50	0.00	0.68	0.86	1.44	0.81	1.08	0.88	0.86	1.13	0.92	1.21	0.74
13.11	0.00	0.55	0.85	1.34	0.72	1.07	0.98	0.87	1.04	0.81	1.32	0.59
13.72	0.00	0.47	0.86	1.30	0.69	1.07	0.88	0.74	0.96	0.68	1.23	0.52
14.33	0.00	0.43	0.85	1.31	0.72	1.13	0.65	0.68	0.93	0.57	1.12	0.41
14.94	0.00	0.34	0.72	1.25	0.65	1.10	0.53	0.61	0.84	0.45	1.03	0.32
15.55	0.00	0.22	0.60	1.16	0.56	1.07	0.54	0.65	0.85	0.45	1.04	0.29
16.16	0.00	0.25	0.66	1.15	0.56	1.04	0.46	0.67	0.85	0.46	0.94	0.33
16.77	0.00	0.26	0.74	1.08	0.50	0.88	0.38	0.66	0.67	0.62	0.82	0.49
17.38	0.00	0.40	0.95	0.99	0.71	1.03	0.55	0.89	0.80	0.79	0.86	0.67
17.99	0.00	0.65	0.92	0.88	0.67	0.81	0.67	1.04	0.95	0.91	0.91	0.93
18.60	0.00	0.85	1.31	1.29	1.21	1.34	1.41	1.83	1.73	1.72	1.67	1.71
19.21	0.00	0.63	0.76	0.81	0.80	0.65	0.94	1.23	1.22	1.26	1.13	1.26
19.82	0.00	0.57	0.64	0.58	0.56	0.38	0.69	0.94	0.93	1.02	0.81	0.97
20.43	0.00	0.63	0.77	0.55	0.58	0.36	0.70	0.93	0.85	0.88	0.77	0.94
21.04	0.00	0.69	0.85	0.82	0.84	0.73	1.00	1.10	1.10	1.02	1.04	1.14
21.65	0.00	0.26	0.47	0.38	0.51	0.51	0.63	0.59	0.64	0.54	0.61	0.61
22.26	0.00	-0.15	-0.03	-0.06	0.00	0.00	0.10	0.07	0.06	0.01	0.09	0.09
22.86	0.00	-0.24	-0.24	-0.25	-0.19	-0.20	-0.17	-0.16	-0.19	-0.20	-0.15	-0.16
23.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

## Inclinometer BH02 B-B Alignment

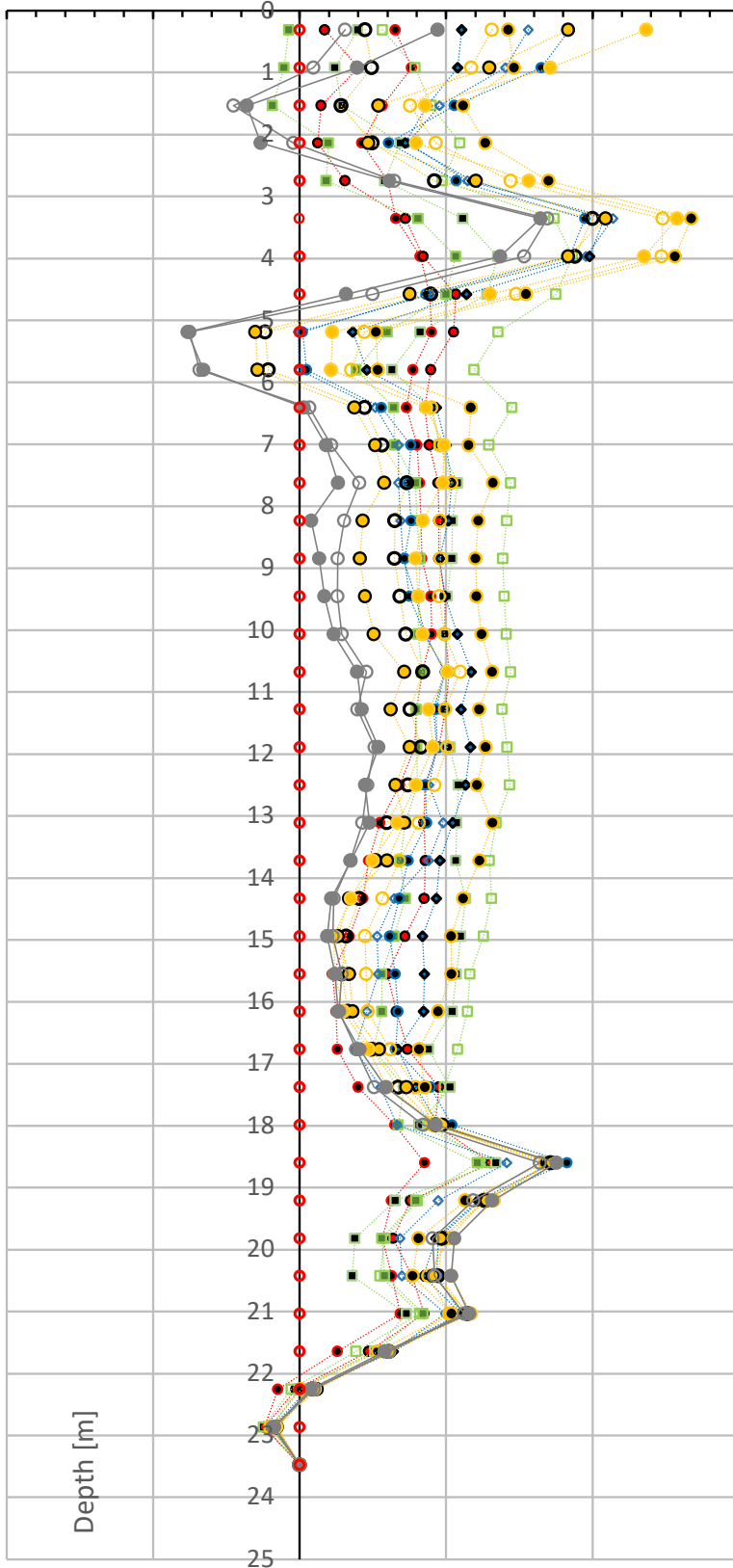
*Displacements along plane parallel to the face of slope  
Profile Change in mm*

continued from previous page

Depth m	0	12	13	14	15						
	October 10, 2015	September 18, 2019	October 23, 2019	March 5, 2020	July 17, 2020						
0.31	0.00	1.83	2.37	0.31	0.94						
0.92	0.00	1.30	1.71	0.09	0.39						
1.53	0.00	0.54	0.86	-0.45	-0.36						
2.14	0.00	0.47	0.80	-0.04	-0.26						
2.75	0.00	1.20	1.56	0.65	0.61						
3.36	0.00	2.09	2.58	1.69	1.65						
3.97	0.00	1.83	2.35	1.53	1.37						
4.58	0.00	0.75	1.30	0.50	0.32						
5.19	0.00	-0.30	0.22	-0.75	-0.76						
5.80	0.00	-0.29	0.21	-0.68	-0.66						
6.41	0.00	0.38	0.86	0.07	0.03						
7.02	0.00	0.52	0.99	0.22	0.18						
7.62	0.00	0.58	0.98	0.41	0.26						
8.23	0.00	0.43	0.84	0.30	0.08						
8.84	0.00	0.41	0.79	0.26	0.13						
9.45	0.00	0.45	0.81	0.26	0.17						
10.06	0.00	0.51	0.84	0.29	0.23						
10.67	0.00	0.71	1.01	0.46	0.39						
11.28	0.00	0.62	0.88	0.39	0.42						
11.89	0.00	0.75	0.91	0.51	0.54						
12.50	0.00	0.66	0.80	0.46	0.45						
13.11	0.00	0.71	0.67	0.43	0.48						
13.72	0.00	0.60	0.50	0.35	0.35						
14.33	0.00	0.34	0.35	0.23	0.22						
14.94	0.00	0.26	0.23	0.23	0.19						
15.55	0.00	0.34	0.24	0.29	0.24						
16.16	0.00	0.36	0.30	0.27	0.26						
16.77	0.00	0.54	0.47	0.39	0.41						
17.38	0.00	0.73	0.59	0.51	0.59						
17.99	0.00	0.98	0.94	0.84	0.93						
18.60	0.00	1.72	1.76	1.64	1.76						
19.21	0.00	1.28	1.33	1.19	1.32						
19.82	0.00	0.96	1.05	0.91	1.06						
20.43	0.00	0.91	1.04	0.92	1.03						
21.04	0.00	1.16	1.17	1.13	1.16						
21.65	0.00	0.61	0.61	0.61	0.58						
22.26	0.00	0.12	0.10	0.10	0.07						
22.86	0.00	-0.17	-0.16	-0.18	-0.17						
23.47	0.00	0.00	0.00	0.00	0.00						

BH 02 B-B Displacements [mm]

-2.0 -1.0 0.0 1.0 2.0 3.0



- October 10, 2015
- November 6, 2015
- December 18, 2015
- January 15, 2016
- April 12, 2016
- May 16, 2016
- ◇ August 27, 2018
- October 4, 2018
- ◆ November 2, 2018
- January 10, 2019
- February 4, 2019
- May 10, 2019
- Sept. 18, 2019
- October 23, 2019
- March 5, 2020
- July 17, 2020

## Inclinometer BH03 A-A Alignment

*Displacements along plane perpendicular to the face of slope*  
*Profile Change in mm*

continues on next page

	0	1	2	3	4	5	6	7	8	9	10	11
Depth m	October 10, 2015	November 6, 2015	December 18, 2015	January 15, 2016	April 12, 2016	May 16, 2016	August 27, 2018	October 4, 2018	November 2, 2018	January 10, 2019	February 4, 2019	May 10, 2019
0.61	0.00	0.15	0.76	1.07	0.68	0.72	-1.80	-2.67	-1.80	-1.17	-0.96	-0.44
1.22	0.00	0.21	0.73	0.99	0.44	0.47	-0.86	-1.37	-0.94	-0.64	-0.41	0.01
1.83	0.00	0.15	0.58	0.76	0.10	0.15	-0.17	-0.45	-0.35	-0.17	-0.01	0.33
2.44	0.00	0.33	0.80	0.96	0.29	0.35	0.35	0.19	0.29	0.38	0.56	0.86
3.05	0.00	0.31	0.79	0.88	0.13	0.19	0.40	0.29	0.48	0.52	0.72	1.00
3.66	0.00	0.22	0.69	0.90	0.21	0.29	0.63	0.50	0.80	0.83	1.04	1.31
4.27	0.00	0.20	0.67	0.94	0.29	0.37	0.60	0.49	0.75	0.80	1.01	1.27
4.88	0.00	0.15	0.62	0.91	0.22	0.30	0.54	0.41	0.74	0.78	0.96	1.18
5.49	0.00	0.15	0.63	0.93	0.23	0.31	0.55	0.44	0.80	0.85	1.02	1.24
6.10	0.00	0.18	0.65	0.92	0.19	0.25	0.42	0.32	0.66	0.70	0.87	1.06
6.71	0.00	0.19	0.65	0.91	0.19	0.23	0.57	0.49	0.78	0.85	1.00	1.17
7.32	0.00	0.16	0.49	0.85	0.13	0.18	0.54	0.46	0.79	0.77	0.94	1.14
7.92	0.00	0.12	0.43	0.84	0.10	0.15	0.30	0.21	0.62	0.61	0.80	0.98
8.53	0.00	0.12	0.44	0.86	0.12	0.18	-0.03	-0.10	0.31	0.30	0.48	0.66
9.14	0.00	0.18	0.50	0.93	0.20	0.27	0.24	0.18	0.59	0.60	0.76	0.96
9.75	0.00	0.17	0.49	0.88	0.20	0.26	0.45	0.41	0.83	0.85	1.00	1.20
10.36	0.00	0.19	0.51	0.92	0.23	0.29	0.47	0.43	0.85	0.91	1.04	1.23
10.97	0.00	0.23	0.56	0.98	0.31	0.29	0.60	0.61	1.06	1.10	1.26	1.47
11.58	0.00	0.19	0.51	0.94	0.28	0.23	0.50	0.51	0.96	1.01	1.17	1.35
12.19	0.00	0.20	0.49	0.94	0.29	0.25	0.50	0.50	0.97	1.02	1.17	1.37
12.80	0.00	0.23	0.50	0.87	0.30	0.23	0.52	0.49	0.89	0.91	1.05	1.23
13.41	0.00	0.25	0.50	0.84	0.33	0.24	0.54	0.50	0.88	0.89	1.03	1.18
14.02	0.00	0.26	0.53	0.93	0.39	0.34	0.67	0.66	1.11	1.17	1.32	1.51
14.63	0.00	0.28	0.54	0.91	0.41	0.35	0.58	0.56	0.99	1.05	1.20	1.36
15.24	0.00	0.28	0.54	0.91	0.39	0.34	0.56	0.55	0.98	1.04	1.21	1.38
15.85	0.00	0.31	0.57	0.95	0.43	0.38	0.65	0.64	1.07	1.15	1.31	1.51
16.46	0.00	0.28	0.53	0.93	0.39	0.34	0.60	0.58	1.04	1.12	1.30	1.52
17.07	0.00	0.29	0.52	0.90	0.41	0.34	0.58	0.55	0.96	1.06	1.21	1.41
17.68	0.00	0.39	0.63	0.96	0.54	0.45	0.78	0.73	1.08	1.19	1.32	1.49
18.29	0.00	0.44	0.67	0.97	0.61	0.51	0.82	0.75	1.06	1.17	1.28	1.40
18.90	0.00	0.58	0.81	1.07	0.76	0.66	0.87	0.79	1.05	1.16	1.27	1.36
19.51	0.00	0.34	0.51	0.73	0.44	0.32	0.49	0.37	0.60	0.71	0.81	0.88
20.12	0.00	0.16	0.27	0.51	0.19	0.09	0.13	0.03	0.31	0.41	0.53	0.65
20.73	0.00	0.19	0.30	0.55	0.23	0.15	0.23	0.11	0.41	0.52	0.64	0.77
21.34	0.00	0.20	0.30	0.55	0.24	0.17	0.18	0.08	0.38	0.52	0.65	0.78
21.95	0.00	0.29	0.41	0.63	0.36	0.30	0.37	0.28	0.53	0.69	0.80	0.93
22.56	0.00	0.09	0.15	0.38	0.06	-0.02	-0.10	-0.19	0.12	0.27	0.41	0.57
23.16	0.00	0.18	0.28	0.49	0.23	0.15	0.23	0.12	0.39	0.54	0.66	0.80
23.77	0.00	0.30	0.43	0.57	0.39	0.30	0.44	0.31	0.53	0.67	0.75	0.86
24.38	0.00	0.30	0.42	0.53	0.38	0.29	0.29	0.12	0.31	0.45	0.51	0.59
24.99	0.00	0.44	0.53	0.74	0.48	0.45	0.58	0.47	0.73	0.87	0.99	1.12
25.60	0.00	0.51	0.59	0.81	0.55	0.56	0.72	0.61	0.92	1.07	1.21	1.37
26.21	0.00	0.73	0.86	1.04	0.89	0.86	1.08	0.93	1.19	1.33	1.45	1.57
26.82	0.00	0.55	0.66	0.80	0.67	0.64	0.84	0.67	0.89	1.02	1.13	1.22
27.43	0.00	0.74	0.85	0.99	0.87	0.84	1.03	0.86	1.06	1.19	1.30	1.39
28.04	0.00	0.11	0.19	0.29	0.20	0.16	0.28	0.10	0.29	0.42	0.52	0.59
28.65	0.00	-0.11	-0.11	-0.02	-0.15	-0.17	-0.11	-0.28	-0.08	0.06	0.17	0.25
29.26	0.00	0.09	0.06	0.15	0.03	0.04	0.07	-0.10	0.10	0.26	0.36	0.46
29.87	0.00	0.05	0.05	0.14	0.06	0.08	0.15	-0.03	0.15	0.30	0.40	0.47
30.48	0.00	0.18	0.18	0.24	0.17	0.19	0.26	0.07	0.22	0.38	0.44	0.52
31.09	0.00	-0.02	-0.03	0.02	-0.02	-0.02	0.02	-0.19	-0.07	0.08	0.10	0.13
31.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

## Inclinometer BH03 A-A Alignment

*Displacements along plane perpendicular to the face of slope*

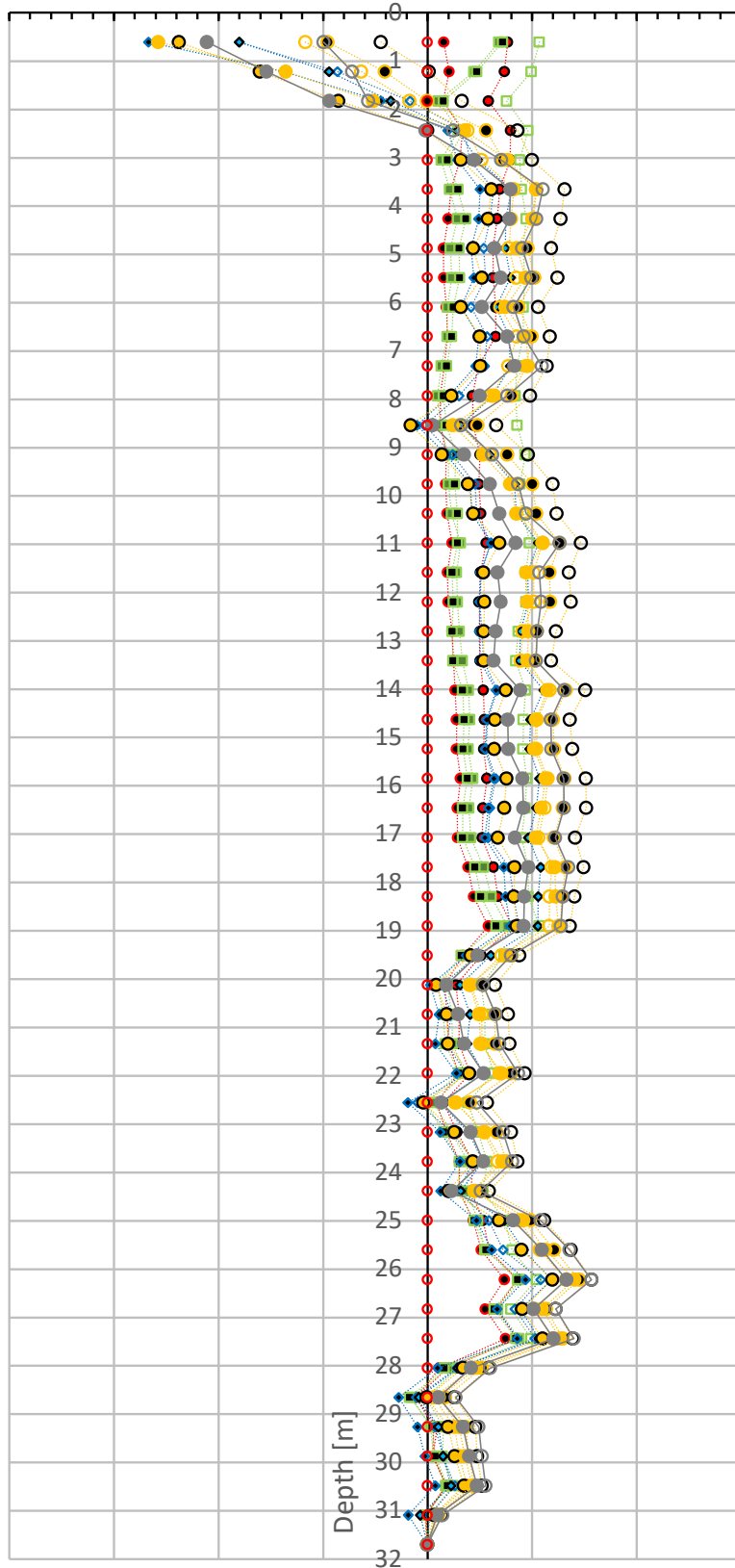
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*Profile Change in mm*

Depth m	0	12	13	14	15							
	October 10, 2015	September 18, 2019	October 23, 2019	March 5, 2020	July 17, 2020							
0.61	0.00	-2.38	-2.58	0.99	2.11							
1.22	0.00	-1.60	-1.36	0.72	1.54							
1.83	0.00	-0.85	-0.52	0.57	0.94							
2.44	0.00	0.00	0.35	-0.24	0.02							
3.05	0.00	0.32	0.76	-0.70	-0.45							
3.66	0.00	0.61	1.04	-1.10	-0.80							
4.27	0.00	0.58	1.00	-1.04	-0.78							
4.88	0.00	0.44	0.85	-0.90	-0.64							
5.49	0.00	0.52	0.93	-0.99	-0.70							
6.10	0.00	0.32	0.74	-0.82	-0.52							
6.71	0.00	0.50	0.94	-0.92	-0.76							
7.32	0.00	0.51	0.96	-1.09	-0.83							
7.92	0.00	0.23	0.64	-0.76	-0.50							
8.53	0.00	-0.16	0.24	-0.32	-0.05							
9.14	0.00	0.14	0.53	-0.62	-0.35							
9.75	0.00	0.39	0.79	-0.87	-0.59							
10.36	0.00	0.44	0.85	-0.94	-0.69							
10.97	0.00	0.69	1.10	-1.26	-0.84							
11.58	0.00	0.53	0.94	-1.07	-0.67							
12.19	0.00	0.54	0.96	-1.09	-0.70							
12.80	0.00	0.54	0.96	-1.05	-0.65							
13.41	0.00	0.54	0.96	-1.04	-0.63							
14.02	0.00	0.75	1.14	-1.31	-0.89							
14.63	0.00	0.65	1.04	-1.18	-0.77							
15.24	0.00	0.64	1.02	-1.18	-0.77							
15.85	0.00	0.76	1.13	-1.30	-0.91							
16.46	0.00	0.73	1.09	-1.31	-0.91							
17.07	0.00	0.67	1.03	-1.22	-0.84							
17.68	0.00	0.83	1.22	-1.35	-0.97							
18.29	0.00	0.83	1.22	-1.30	-0.93							
18.90	0.00	0.85	1.25	-1.28	-0.92							
19.51	0.00	0.41	0.75	-0.80	-0.48							
20.12	0.00	0.08	0.40	-0.53	-0.18							
20.73	0.00	0.18	0.49	-0.65	-0.29							
21.34	0.00	0.20	0.51	-0.69	-0.35							
21.95	0.00	0.40	0.71	-0.87	-0.54							
22.56	0.00	-0.04	0.26	-0.47	-0.13							
23.16	0.00	0.25	0.55	-0.72	-0.41							
23.77	0.00	0.43	0.72	-0.81	-0.53							
24.38	0.00	0.20	0.45	-0.51	-0.23							
24.99	0.00	0.68	0.91	-1.08	-0.82							
25.60	0.00	0.90	1.13	-1.36	-1.09							
26.21	0.00	1.19	1.40	-1.57	-1.33							
26.82	0.00	0.90	1.10	-1.22	-1.01							
27.43	0.00	1.10	1.26	-1.40	-1.20							
28.04	0.00	0.34	0.47	-0.60	-0.42							
28.65	0.00	-0.01	0.11	-0.27	-0.10							
29.26	0.00	0.20	0.30	-0.49	-0.34							
29.87	0.00	0.26	0.36	-0.52	-0.40							
30.48	0.00	0.35	0.43	-0.55	-0.47							
31.09	0.00	0.06	0.10	-0.14	-0.09							
31.70	0.00	0.00	0.00	0.00	0.00							

### BH 03 A-A Displacements [mm]

-4.0 -3.0 -2.0 -1.0 0.0 1.0 2.0 3.0



- October 10, 2015
- November 6, 2015
- December 18, 2015
- January 15, 2016
- April 12, 2016
- May 16, 2016
- ◇ August 27, 2018
- ◇ October 4, 2018
- ◇ November 2, 2018
- January 10, 2019
- February 4, 2019
- May 10, 2019
- Sept. 18, 2019
- October 23, 2019
- March 5, 2020
- July 17, 2020

## Inclinometer BH03 B-B Alignment

Displacements along plane parallel to the face of slope  
Profile Change in mm

continues on next page

	0	1	2	3	4	5	6	7	8	9	10	11
Depth m	October 10, 2015	November 6, 2015	December 18, 2015	January 15, 2016	April 12, 2016	May 16, 2016	August 27, 2018	October 4, 2018	November 2, 2018	January 10, 2019	February 4, 2019	May 10, 2019
0.61	0.00	0.80	1.02	0.67	0.64	0.39	1.45	2.25	1.29	0.95	0.68	0.47
1.22	0.00	0.90	1.14	0.84	0.83	0.56	1.53	2.36	1.57	1.26	1.00	0.85
1.83	0.00	0.76	0.97	0.73	0.72	0.43	1.31	1.97	1.27	0.97	0.73	0.60
2.44	0.00	0.63	0.82	0.63	0.49	0.18	0.85	1.39	0.73	0.40	0.17	0.15
3.05	0.00	0.65	0.86	0.74	0.58	0.28	0.89	1.41	0.77	0.46	0.23	0.21
3.66	0.00	0.55	0.76	0.71	0.58	0.31	0.91	1.40	0.75	0.45	0.19	0.18
4.27	0.00	0.49	0.73	0.72	0.78	0.51	1.49	1.97	1.42	1.14	0.94	0.92
4.88	0.00	0.53	0.68	0.65	0.49	0.20	0.96	1.44	0.78	0.51	0.27	0.26
5.49	0.00	0.53	0.67	0.61	0.38	0.08	0.61	1.10	0.42	0.14	-0.10	-0.09
6.10	0.00	0.47	0.64	0.60	0.45	0.18	0.62	1.24	0.55	0.29	-0.01	0.01
6.71	0.00	0.41	0.61	0.61	0.44	0.20	0.78	1.48	0.78	0.52	0.27	0.29
7.32	0.00	0.38	0.67	0.64	0.46	0.26	0.77	1.41	0.71	0.57	0.33	0.34
7.92	0.00	0.41	0.71	0.72	0.53	0.31	0.76	1.37	0.72	0.54	0.36	0.39
8.53	0.00	0.49	0.77	0.77	0.63	0.40	1.17	1.77	1.09	0.90	0.75	0.76
9.14	0.00	0.52	0.76	0.78	0.64	0.40	1.19	1.73	1.10	0.93	0.76	0.77
9.75	0.00	0.44	0.68	0.68	0.53	0.29	0.84	1.37	0.71	0.54	0.37	0.37
10.36	0.00	0.52	0.78	0.73	0.63	0.39	0.96	1.44	0.83	0.61	0.51	0.52
10.97	0.00	0.43	0.69	0.67	0.50	0.37	0.79	1.29	0.62	0.41	0.30	0.31
11.58	0.00	0.44	0.72	0.72	0.56	0.42	0.86	1.37	0.65	0.50	0.35	0.35
12.19	0.00	0.42	0.69	0.69	0.52	0.36	0.79	1.29	0.53	0.40	0.26	0.21
12.80	0.00	0.41	0.69	0.68	0.51	0.31	0.70	1.14	0.39	0.25	0.12	0.02
13.41	0.00	0.38	0.68	0.73	0.52	0.35	0.75	1.21	0.54	0.41	0.33	0.23
14.02	0.00	0.36	0.67	0.71	0.47	0.33	0.72	1.18	0.55	0.43	0.34	0.26
14.63	0.00	0.42	0.70	0.77	0.50	0.36	0.63	1.01	0.34	0.21	0.10	-0.01
15.24	0.00	0.41	0.69	0.74	0.50	0.35	0.68	1.06	0.36	0.21	0.10	-0.01
15.85	0.00	0.43	0.69	0.71	0.52	0.35	0.73	1.10	0.32	0.22	0.09	-0.10
16.46	0.00	0.47	0.72	0.73	0.55	0.40	0.81	1.10	0.33	0.20	0.04	-0.17
17.07	0.00	0.51	0.70	0.73	0.61	0.40	0.84	1.15	0.40	0.26	0.11	-0.04
17.68	0.00	0.47	0.68	0.70	0.57	0.39	0.84	1.21	0.47	0.34	0.22	0.08
18.29	0.00	0.34	0.56	0.56	0.46	0.27	0.64	1.02	0.32	0.14	0.06	-0.11
18.90	0.00	0.29	0.52	0.50	0.38	0.25	0.64	1.05	0.42	0.25	0.18	0.06
19.51	0.00	0.26	0.47	0.44	0.32	0.17	0.36	0.76	0.12	-0.09	-0.10	-0.21
20.12	0.00	0.25	0.47	0.46	0.32	0.21	0.37	0.81	0.22	0.02	0.06	0.01
20.73	0.00	0.22	0.43	0.42	0.28	0.20	0.41	0.77	0.24	0.01	0.08	-0.01
21.34	0.00	0.32	0.57	0.58	0.48	0.39	0.64	1.01	0.53	0.30	0.40	0.33
21.95	0.00	0.39	0.65	0.64	0.57	0.47	0.84	1.23	0.76	0.53	0.60	0.54
22.56	0.00	0.45	0.73	0.72	0.69	0.56	1.03	1.45	0.99	0.72	0.81	0.75
23.16	0.00	0.59	0.89	0.89	0.82	0.74	1.18	1.62	1.25	0.97	1.12	1.09
23.77	0.00	0.64	0.94	0.91	0.85	0.77	1.22	1.62	1.26	0.99	1.11	1.08
24.38	0.00	0.34	0.58	0.52	0.45	0.37	0.73	1.11	0.75	0.45	0.57	0.54
24.99	0.00	0.47	0.65	0.64	0.56	0.52	0.88	1.33	1.02	0.71	0.84	0.83
25.60	0.00	0.35	0.51	0.56	0.42	0.42	0.57	1.06	0.74	0.40	0.56	0.59
26.21	0.00	-0.23	-0.13	-0.07	-0.24	-0.21	-0.14	0.36	0.07	-0.25	-0.07	-0.04
26.82	0.00	-0.26	-0.13	-0.08	-0.23	-0.19	-0.12	0.37	0.06	-0.17	-0.09	-0.08
27.43	0.00	-0.62	-0.52	-0.51	-0.60	-0.60	-0.58	-0.11	-0.46	-0.69	-0.63	-0.66
28.04	0.00	-0.84	-0.80	-0.78	-0.87	-0.89	-0.89	-0.38	-0.72	-0.93	-0.85	-0.87
28.65	0.00	-0.45	-0.44	-0.41	-0.49	-0.49	-0.52	0.02	-0.29	-0.52	-0.45	-0.46
29.26	0.00	-0.19	-0.15	-0.19	-0.25	-0.23	-0.29	0.24	-0.11	-0.32	-0.31	-0.34
29.87	0.00	-0.23	-0.13	-0.20	-0.19	-0.18	-0.25	0.29	-0.10	-0.30	-0.34	-0.38
30.48	0.00	-0.20	-0.12	-0.23	-0.17	-0.20	-0.27	0.27	-0.13	-0.34	-0.40	-0.45
31.09	0.00	0.26	0.33	0.23	0.32	0.27	0.25	0.82	0.36	0.15	0.08	-0.01
31.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

## Inclinometer BH03 B-B Alignment

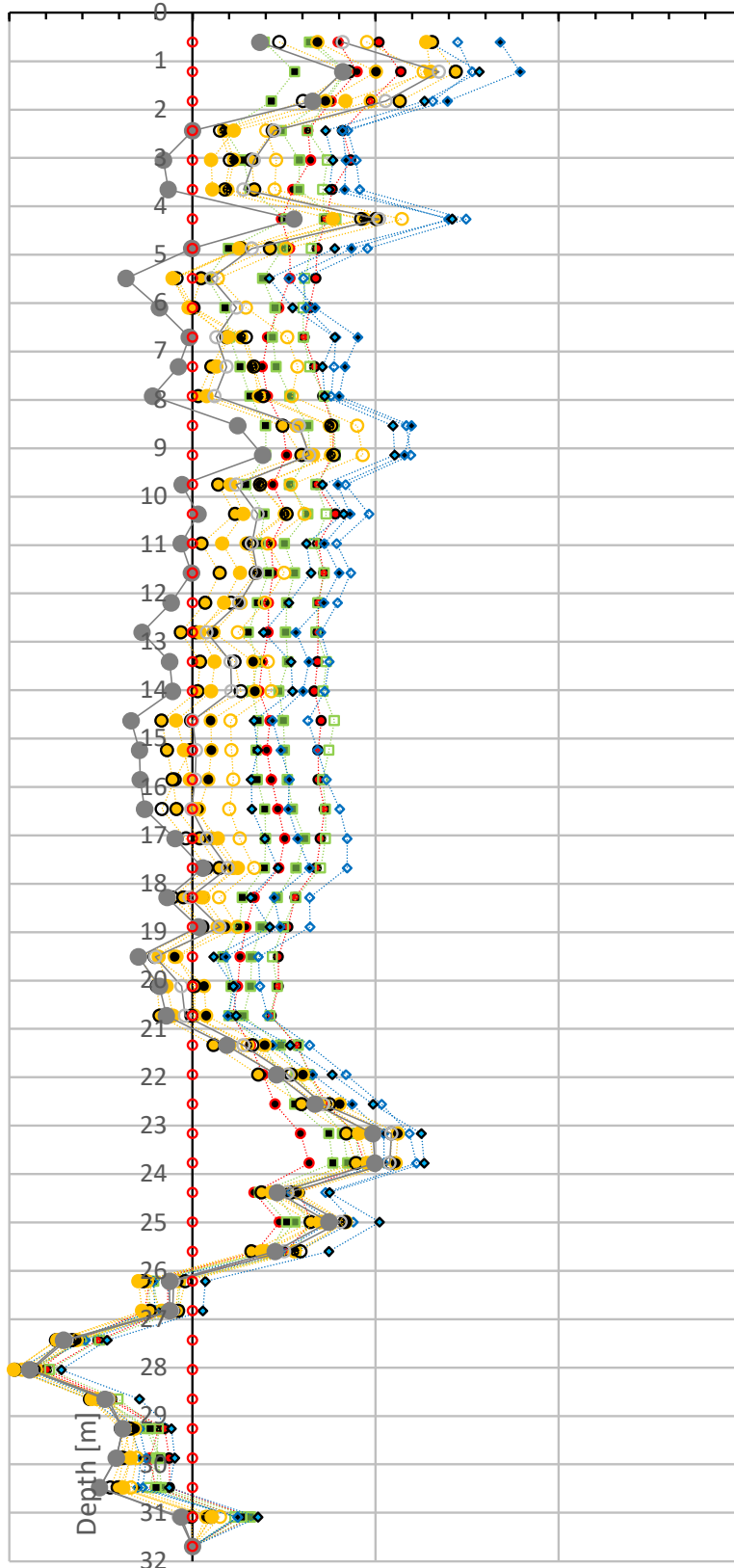
*Displacements along plane parallel to the face of slope*  
*Profile Change in mm*

continued from previous page

Depth m	0	12	13	14	15							
	October 10, 2015	November 6, 2015	December 18, 2015	March 5, 2020	July 17, 2020							
0.61	0.00	1.31	1.28	0.82	0.37							
1.22	0.00	1.44	1.30	1.35	0.82							
1.83	0.00	1.13	0.84	1.05	0.66							
2.44	0.00	0.44	0.23	0.45	0.00							
3.05	0.00	0.32	0.10	0.34	-0.16							
3.66	0.00	0.34	0.11	0.28	-0.13							
4.27	0.00	1.00	0.77	1.02	0.55							
4.88	0.00	0.42	0.25	0.33	0.00							
5.49	0.00	0.05	-0.11	0.10	-0.36							
6.10	0.00	-0.01	-0.02	0.24	-0.18							
6.71	0.00	0.19	0.19	0.13	-0.02							
7.32	0.00	0.10	0.13	0.19	-0.08							
7.92	0.00	0.03	0.08	0.12	-0.22							
8.53	0.00	0.49	0.57	0.58	0.25							
9.14	0.00	0.60	0.66	0.64	0.38							
9.75	0.00	0.14	0.21	0.24	-0.06							
10.36	0.00	0.23	0.28	0.36	0.03							
10.97	0.00	0.05	0.16	0.33	-0.06							
11.58	0.00	0.15	0.26	0.35	-0.01							
12.19	0.00	0.07	0.17	0.25	-0.12							
12.80	0.00	-0.06	0.04	0.08	-0.27							
13.41	0.00	0.04	0.12	0.21	-0.12							
14.02	0.00	0.03	0.10	0.21	-0.11							
14.63	0.00	-0.17	-0.09	0.00	-0.34							
15.24	0.00	-0.14	-0.05	0.02	-0.29							
15.85	0.00	-0.11	-0.01	0.02	-0.28							
16.46	0.00	-0.09	0.01	-0.01	-0.26							
17.07	0.00	0.04	0.14	0.08	-0.09							
17.68	0.00	0.15	0.25	0.19	0.06							
18.29	0.00	-0.05	0.05	-0.02	-0.14							
18.90	0.00	0.05	0.14	0.15	0.03							
19.51	0.00	-0.29	-0.18	-0.20	-0.29							
20.12	0.00	-0.19	-0.14	-0.06	-0.18							
20.73	0.00	-0.18	-0.10	-0.04	-0.14							
21.34	0.00	0.12	0.20	0.28	0.19							
21.95	0.00	0.36	0.46	0.52	0.46							
22.56	0.00	0.60	0.69	0.71	0.67							
23.16	0.00	0.84	0.91	1.09	0.99							
23.77	0.00	0.89	0.96	1.08	1.00							
24.38	0.00	0.38	0.43	0.52	0.46							
24.99	0.00	0.65	0.70	0.81	0.74							
25.60	0.00	0.32	0.38	0.50	0.45							
26.21	0.00	-0.27	-0.29	-0.10	-0.12							
26.82	0.00	-0.23	-0.27	-0.11	-0.12							
27.43	0.00	-0.74	-0.74	-0.69	-0.70							
28.04	0.00	-0.97	-0.97	-0.88	-0.89							
28.65	0.00	-0.56	-0.55	-0.46	-0.48							
29.26	0.00	-0.39	-0.37	-0.38	-0.38							
29.87	0.00	-0.38	-0.34	-0.42	-0.42							
30.48	0.00	-0.41	-0.38	-0.51	-0.51							
31.09	0.00	0.10	0.11	-0.07	-0.06							
31.70	0.00	0.00	0.00	0.00	0.00							

### BH 03 B-B Displacements [mm]

-1.0      0.0      1.0      2.0      3.0



- October 10, 2015
- November 6, 2015
- December 18, 2015
- January 15, 2016
- April 12, 2016
- May 16, 2016
- ◇ August 27, 2018
- ◇ October 4, 2018
- ◇ November 2, 2018
- January 10, 2019
- February 4, 2019
- May 10, 2019
- Sept. 18, 2019
- October 23, 2019
- March 5, 2019
- July 17, 2020

## **Appendix Two**

### **Survey Data**

Updated with surface survey provided by J.H. Cohoon Engineering Ltd.  
Survey Update completed on April 3, 2020.

		MP-01-14		MP-02-14		MP-03-14		MP-04-14		MP-05-14		MP-06-14		MP-07-14		MP-08-14		MP-09-14		MP-10-14		MP-11-14		MP-12-14		MP-13-14		MP-14-14		MP-15-14		MP-16-14		MP-17-14		MP-18-14		MP-19-14																				
		ELEV.	HORZ. CHANGE	N.S.E.W. CHANGE	ELEV.	HORZ. CHANGE	N.S.E.W. CHANGE	ELEV.	HORZ. CHANGE	N.S.E.W. CHANGE	ELEV.	HORZ. CHANGE	N.S.E.W. CHANGE	ELEV.	HORZ. CHANGE	N.S.E.W. CHANGE	ELEV.	HORZ. CHANGE	N.S.E.W. CHANGE	ELEV.	HORZ. CHANGE	N.S.E.W. CHANGE	ELEV.	HORZ. CHANGE	N.S.E.W. CHANGE	ELEV.	HORZ. CHANGE	N.S.E.W. CHANGE	ELEV.	HORZ. CHANGE	N.S.E.W. CHANGE	ELEV.	HORZ. CHANGE	N.S.E.W. CHANGE	ELEV.	HORZ. CHANGE	N.S.E.W. CHANGE	ELEV.	HORZ. CHANGE	N.S.E.W. CHANGE																		
JAN. 13/2015		225.99	--		224.16	--		216.41	--		205.93	--		199.24	--		203.01	--		198.54	--		202.13	--		198.52	--		200.05	--		207.59	--		204.28	--		202.96	--		212.07	--		223.24	--		204.28	--		210.25	--		218.75	--		221.72	--	
APR. 24/2015		225.99	0.02m		224.17	0.02m		216.39	0.02m		205.95	0.02m		199.16	0.01m		203.00	0.05m		198.54	0.04m		202.11	0.04m		198.52	0.03m		200.08	0.02m		207.60	0.01m		204.22	0.04m		202.98	0.01m		212.07	0.05m		223.24	0.04m		204.27	0.02m		210.25	0.01m		218.73	0.03m		221.71	0.04m	
NOV. 5/2015		225.99	0.02m		224.15	0.02m		216.43	0.03m		205.91	0.05m		199.23	0.02m		203.00	0.02m		198.55	0.02m		202.10	0.02m		198.50	0.00m		200.01	0.04m		207.60	0.04m		204.27	0.02m		202.96	0.01m		212.04	0.05m		223.21	0.01m		204.28	0.01m		210.26	0.01m		218.74	0.02m		221.71	0.01m	
MAY 8/2018		225.95	0.16m (DISTURBED)		224.13	0.04m		216.37	0.03m		205.88	0.05m		199.16	0.05m		202.94	0.02m		198.52	0.07m		202.06	0.31m		198.48	0.05m		200.00	0.04m		207.57	0.21m		204.27	0.02m		202.95	0.06m		212.03	0.27m		223.16	0.04m		204.21	0.05m		210.24	0.03m		218.73	0.03m		221.69	0.03m	
DEC. 11/2018		225.94	0.14m	S 0.12m W 0.07m	224.12	0.03m	N 0.03m E 0.02m	216.37	0.04m	N 0.04m E 0.01m	205.85	0.04m	N 0.04m E 0.02m	199.15	0.07m	N 0.07m E 0.02m	202.96	0.05m	N 0.05m E 0.02m	198.50	0.07m	N 0.07m W 0.01m	202.09	0.37m	N 0.35m W 0.11m	198.46	0.04m	N 0.04m E 0.02m	200.03	0.03m	N 0.03m W 0.01m	207.53	0.23m	N 0.15m W 0.18m	204.21	0.04m	N 0.04m W 0.01m	202.99	0.05m	N 0.05m E 0.00m	212.02	0.27m	N 0.27m E 0.01m	223.22	0.01m	S 0.01m E 0.01m	204.21	0.04m	N 0.03m E 0.02m	210.24	0.03m	S 0.01m E 0.03m	218.72	0.02m	N 0.02m E 0.01m	221.70	0.02m	N 0.01m E 0.02m
MAY 8/2019		225.93	0.16m	S 0.14m W 0.07m	224.10	0.05m	N 0.03m E 0.04m	216.37	0.05m	N 0.04m E 0.02m	205.84	0.01m	N 0.01m E 0.01m	199.15	0.07m	N 0.07m E 0.00m	203.11	0.04m	S 0.01m E 0.04m	198.52	0.08m	N 0.08m E 0.01m	201.97	0.46m	N 0.45m W 0.12m	198.45	0.08m	N 0.07m E 0.04m	200.04	0.05m	N 0.05m E 0.01m	207.47	0.49m	N 0.31m W 0.38m	204.24	0.10m	N 0.08m W 0.06m	202.98	0.06m	N 0.04m E 0.04m	212.01	0.29m	N 0.29m E 0.03m	223.22	0.04m	N 0.02m E 0.04m	204.16	0.06m	N 0.04m E 0.04m	210.25	0.05m	N 0.01m E 0.04m	218.74	0.01m	N 0.00m E 0.01m	221.71	0.03m	S 0.01m E 0.03m
NOV. 11/2019		225.94	0.16m	S 0.04m W 0.15m	224.10	0.08m	N 0.07m E 0.04m	216.37	0.09m	N 0.08m E 0.04m	205.85	0.06m	N 0.06m E 0.02m	199.18	0.11m	N 0.11m E 0.03m	202.95	0.06m	N 0.06m E 0.01m	198.67	0.35m	N 0.35m W 0.04m	201.99	0.53m	N 0.51m W 0.14m	198.44	0.13m	N 0.13m E 0.01m	200.01	0.04m	N 0.04m W 0.01m	207.38	0.60m	N 0.38m W 0.47m	204.25	0.17m	N 0.12m W 0.12m	202.90	0.05m	N 0.05m E 0.00m	212.04	0.32m	N 0.32m E 0.00m	223.20	0.03m	S 0.01m E 0.03m	204.16	0.09m	N 0.08m E 0.04m	210.32	0.03m	N 0.01m E 0.02m	218.72	0.00m	N 0.00m E 0.00m	221.72	0.01m	N 0.01m E 0.01m
APR. 3/2020	BENT	BENT	BENT	224.09	0.08m	N 0.05m E 0.06m	216.35	0.10m	N 0.07m E 0.07m	205.81	0.06m	N 0.05m E 0.03m	199.18	0.14m	N 0.13m E 0.06m	202.96	0.07m	N 0.06m E 0.04m	198.48	0.35m	N 0.35m W 0.02m	202.01	0.57m	N 0.55m W 0.14m	198.41	0.15m	N 0.15m E 0.03m	200.02	0.03m	N 0.03m W 0.00m	207.40	0.63m	N 0.40m W 0.49m	204.22	0.18m	N 0.15m W 0.12m	202.98	0.04m	N 0.04m E 0.00m	212.00	0.32m	N 0.32m W 0.01m	223.18	0.04m	S 0.02m E 0.04m	204.15	0.09m	N 0.09m E 0.03m	210.19	0.03m	N 0.02m E 0.02m	218.71	0.01m	S 0.01m W 0.01m	221.67	0.02m	N 0.01m E 0.02m	

NOTE:  
 1. MONITORING POINTS IN THIS CHART PLANTED ON JAN. 13/2015.  
 2. DISTANCE CHANGE IS FROM THE JAN. 13/2015 LOCATIONS.  
 3. NORTH/SOUTH/EAST/WEST (N.S.E.W.) CHANGE IS FROM THE JAN. 13/2015 LOCATIONS.  
 4. STARTING APRIL 3 2020 MEASUREMENTS TAKEN BY CITY OF BRANTFORD SURVEY DEPARTMENT. ELEVATIONS ARE REFERRED TO COVD 1928.78 ADJUSTMENT



**LEGEND:**

- EXISTING ELEVATIONS
- GENERAL DIRECTION OF MOVEMENT
- EXISTING TOP OF SLOPE (JAN. 15, 2015)
- EXISTING TOP OF SLOPE (APR. 24, 2015)

**NOTES:**

- ALL ELEVATIONS & DISTANCES SHOWN ARE METRIC.
- MONITORING POINTS PLANTED ON JAN. 13/2015.
- HORIZONTAL MEASUREMENTS ACCURATE TO ±0.02m

NO.	REVISION	DATE (MM/DD/YY)	BY
7	ADDED APR 3/2020 SURVEY	08/06/20	CITY
6	ADDED NOV 11/2019 SURVEY	11/11/19	K.P.B.
5	ADDED MAY 8/2019 SURVEY	05/08/19	K.P.B.
4	ADDED DEC. 11/2018 SURVEY	12/11/18	K.P.B.
3	ADDED MAY 8/2018 SURVEY	05/08/18	K.P.B.
2	ADDED NOV. 5/2015 SURVEY	11/05/15	K.P.B.
1	ADDED APR. 24/2015 SURVEY	04/24/15	K.P.B.

**J.H. COHOON ENGINEERING LIMITED**  
 CONSULTING ENGINEERS  
 440 HARDY ROAD, UNIT #1, BRANTFORD - ONTARIO, N3T 5L8  
 TEL. (519) 753-2656 FAX. (519) 753-4263 www.cohooneg.com

PROJECT:  
 TUTELA HEIGHTS ROAD SLOPE STABILITY  
 CITY OF BRANTFORD

CLIENT:  
 ENGLOBE CORP

SITE PLAN

DESIGN:	SCALE: 1:1000
DRAWN: K.P.B.	JOB No: 11051
CHECKED: J.H.C.	
SHEET: 1 of 1	DWG. No: 11051-M1
DATE: FEB. 19/15	

<b>MP-01-14</b>		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>
Reading Number	Date	Elevation			Partial Displacement [cm]	Horizontal Displacement		
		Actual Elevation [m]	Partial Settlement [cm]	Accumulated Settlement [cm]		Total cm	Alignment N cm	Alignment S cm
1	January 13, 2015	225.99	0	0	0	0	n/a	n/a
2	April 24, 2015	225.99	0	0	2	2	n/a	n/a
3	November 5, 2015	225.99	0	0	0	2	n/a	n/a
4	May 8, 2018	225.95	-4	-4	14	16	n/a	n/a
5	December 11, 2018	225.94	-1	-5	-2.1	13.9	12	7
6	May 8, 2019	225.93	-1	-6	1.8	15.7	14	7
7	November 11, 2019	225.94	1	-5	-0.1	15.5	4	15
8	April 3, 2020	n/a	n/a	n/a	n/a	n/a	n/a	n/a

**NOTES:**

- I. Actual elevation: corresponds to elevation recorded at the date of reading.
- II. Partial settlement: corresponds to change of elevation since previous reading date.
- III. Accumulated settlement: corresponds to change of elevation since date of installation, i.e., January 13, 2015.
- IV. Resolution of displacements is  $\pm 1$  cm
- V. As per Survey Drawing Notes, this iron bar has been bent and is no longer available for monitoring.

<b>Interpretation</b>	
Time interval	Rate of settlement (accumulated)
days	n/a
years	n/a
	Rate of horizontal displacement
	Total
	N-S
	E-W
	n/a
	n/a
	mm/day
	mm/year
	down
	n/a
	n/a
	mm/day
	mm/year

<b>MP-02-14</b>		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>		
		<b>Elevation</b>			<b>Horizontal Displacement</b>					
Reading Number	Date	Actual Elevation [m]	Partial Settlement [cm]	Accumulated Settlement [cm]	Partial Displacement [cm]	Total cm	Alignment N cm	Alignment S cm	Alignment E cm	Alignment W cm
1	January 13, 2015	224.16	0	0	0	0	n/a	n/a	n/a	n/a
2	April 24, 2015	224.17	1	1	2	2	n/a	n/a	n/a	n/a
3	November 5, 2015	224.15	-2	-1	0	2	n/a	n/a	n/a	n/a
4	May 8, 2018	224.13	-2	-3	2	4	n/a	n/a	n/a	n/a
5	December 11, 2018	224.12	-1	-4	-0.4	3.6	3		2	
6	May 8, 2019	224.1	-2	-6	1.4	5.0	3		4	
7	November 11, 2019	224.1	0	-6	3.1	8.1	7		4	
8	April 3, 2020	224.09	-1	-7	-0.1	8.0	5		6	

**NOTES:**

- I. Actual elevation: corresponds to elevation recorded at the date of reading.
- II. Partial settlement: corresponds to change of elevation since previous reading date.
- III. Accumulated settlement: corresponds to change of elevation since date of installation, i.e., January 13, 2015.
- IV. Resolution of displacements is  $\pm 1$  cm

<b>Interpretation</b>	
Time interval	Rate of settlement (accumulated)
days	0.037 mm/day
years	13.398 mm/year
	down
	Total
	Rate of horizontal displacement
	N-S
	E-W
	0.042
	0.026
	0.031
	11.484
	9.570
	mm/day
	mm/year

<b>MP-03-14</b>		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>		
		<b>Elevation</b>			<b>Horizontal Displacement</b>					
Reading Number	Date	Actual Elevation [m]	Partial Settlement [cm]	Accumulated Settlement [cm]	Partial Displacement [cm]	Total cm	Alignment N cm	Alignment S cm	Alignment E cm	Alignment W cm
		1	January 13, 2015	216.41	0	0	0	0	n/a	n/a
2	April 24, 2015	216.39	-2	-2	2	2	n/a	n/a	n/a	n/a
3	November 5, 2015	216.43	4	2	1	3	n/a	n/a	n/a	n/a
4	May 8, 2018	216.37	-6	-4	0	3	n/a	n/a	n/a	n/a
5	December 11, 2018	216.37	0	-4	1.1	4.1	4		1	
6	May 8, 2019	216.37	0	-4	0.3	4.5	4		2	
7	November 11, 2019	216.37	0	-4	4.5	8.9	8		4	
8	April 3, 2020	216.35	-2	-6	1.1	10.0	7		7	

**NOTES:**

- I. Actual elevation: corresponds to elevation recorded at the date of reading.
- II. Partial settlement: corresponds to change of elevation since previous reading date.
- III. Accumulated settlement: corresponds to change of elevation since date of installation, i.e., January 13, 2015.
- IV. Resolution of displacements is  $\pm 1$  cm

<b>Interpretation</b>	
Time interval	Rate of settlement (accumulated)
days	0.031 mm/day
years	11.484 mm/year
	<b>down</b>
	Total
	Rate of horizontal displacement
	N-S
	E-W
	0.052
	0.037
	0.037
	13.398
	13.398
	mm/day
	mm/year

<b>MP-04-14</b>		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>		
		<b>Elevation</b>			<b>Horizontal Displacement</b>					
Reading Number	Date	Actual Elevation [m]	Partial Settlement [cm]	Accumulated Settlement [cm]	Partial Displacement [cm]	Total cm	Alignment N cm	Alignment S cm	Alignment E cm	Alignment W cm
		1	January 13, 2015	205.93	0	0	0	0	n/a	n/a
2	April 24, 2015	205.95	2	2	2	2	n/a	n/a	n/a	n/a
3	November 5, 2015	205.91	-4	-2	3	5	n/a	n/a	n/a	n/a
4	May 8, 2018	205.88	-3	-5	0	5	n/a	n/a	n/a	n/a
5	December 11, 2018	205.85	-3	-8	-0.5	4.5	4		2	
6	May 8, 2019	205.84	-1	-9	-3.1	1.4	1		1	
7	November 11, 2019	205.85	1	-8	4.9	6.3	6		2	
8	April 3, 2020	205.81	-4	-12	-0.3	6.0	5		3	

**NOTES:**

- I. Actual elevation: corresponds to elevation recorded at the date of reading.
- II. Partial settlement: corresponds to change of elevation since previous reading date.
- III. Accumulated settlement: corresponds to change of elevation since date of installation, i.e., January 13, 2015.
- IV. Resolution of displacements is  $\pm 1$  cm

<b>Interpretation</b>	
Time interval	Rate of settlement (accumulated)
days	0.063 mm/day
years	22.968 mm/year
	<b>down</b>
	Total
	Rate of horizontal displacement
	N-S
	E-W
	0.031
	0.026
	0.016
	11.484
	9.570
	5.742
	mm/day
	mm/year

<b>MP-05-14</b>		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>		
		<b>Elevation</b>			<b>Horizontal Displacement</b>					
Reading Number	Date	Actual Elevation [m]	Partial Settlement [cm]	Accumulated Settlement [cm]	Partial Displacement [cm]	Total cm	Alignment N cm	Alignment S cm	Alignment E cm	Alignment W cm
1	January 13, 2015	199.24	0	0	0	0	n/a	n/a	n/a	n/a
2	April 24, 2015	199.16	-8	-8	1	1	n/a	n/a	n/a	n/a
3	November 5, 2015	199.23	7	-1	1	2	n/a	n/a	n/a	n/a
4	May 8, 2018	199.16	-7	-8	3	5	n/a	n/a	n/a	n/a
5	December 11, 2018	199.15	-1	-9	2.3	7.3	7	7	2	2
6	May 8, 2019	199.15	0	-9	-0.3	7.0	7	7	0	0
7	November 11, 2019	199.18	3	-6	4.4	11.4	11	11	3	3
8	April 3, 2020	199.18	0	-6	2.6	14.0	13	13	6	6

**NOTES:**

- I. Actual elevation: corresponds to elevation recorded at the date of reading.
- II. Partial settlement: corresponds to change of elevation since previous reading date.
- III. Accumulated settlement: corresponds to change of elevation since date of installation, i.e., January 13, 2015.
- IV. Resolution of displacements is  $\pm 1$  cm

<b>Interpretation</b>	
Time interval	Rate of settlement (accumulated)
days	0.031 mm/day
years	11.484 mm/year
	<b>down</b>
	Total
	Rate of horizontal displacement
	N-S
	E-W
	0.073
	0.068
	0.031
	26.796
	24.882
	11.484
	mm/year
	mm/day

<b>MP-06-14</b>		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>		
		<b>Elevation</b>			<b>Horizontal Displacement</b>					
Reading Number	Date	Actual Elevation [m]	Partial Settlement [cm]	Accumulated Settlement [cm]	Partial Displacement [cm]	Total cm	Alignment N cm	Alignment S cm	Alignment E cm	Alignment W cm
		1	January 13, 2015	203.01	0	0	0	0	n/a	n/a
2	April 24, 2015	203.00	-1	-1	5	5	n/a	n/a	n/a	n/a
3	November 5, 2015	203.00	0	-1	-3	2	n/a	n/a	n/a	n/a
4	May 8, 2018	202.94	-6	-7	0	2	n/a	n/a	n/a	n/a
5	December 11, 2018	202.96	2	-5	3.4	5.4	5		2	
6	May 8, 2019	203.11	15	10	-1.3	4.1		1	4	
7	November 11, 2019	202.95	-16	-6	2.0	6.1	6		1	
8	April 3, 2020	202.96	1	-5	1.1	7.2	6		4	

**NOTES:**

- I. Actual elevation: corresponds to elevation recorded at the date of reading.
- II. Partial settlement: corresponds to change of elevation since previous reading date.
- III. Accumulated settlement: corresponds to change of elevation since date of installation, i.e., January 13, 2015.
- IV. Resolution of displacements is  $\pm 1$  cm

<b>Interpretation</b>	
Time interval	Rate of settlement (accumulated)
days	0.034 mm/day
years	12.422 mm/year
	<b>down</b>
	Total
	Rate of horizontal displacement
	N-S
	E-W
	0.041
	0.034
	0.023
	14.929
	12.422
	8.281
	mm/day
	mm/year

<b>MP-07-14</b>		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>		
		<b>Elevation</b>			<b>Horizontal Displacement</b>					
Reading Number	Date	Actual Elevation [m]	Partial Settlement [cm]	Accumulated Settlement [cm]	Partial Displacement [cm]	Total cm	Alignment N cm	Alignment S cm	Alignment E cm	Alignment W cm
1	January 13, 2015	198.54	0	0	0	0	n/a	n/a	n/a	n/a
2	April 24, 2015	198.54	0	0	4	4	n/a	n/a	n/a	n/a
3	November 5, 2015	198.55	1	1	-2	2	n/a	n/a	n/a	n/a
4	May 8, 2018	198.52	-3	-2	5	7	n/a	n/a	n/a	n/a
5	December 11, 2018	198.50	-2	-4	0.1	7.1	7			1
6	May 8, 2019	198.52	2	-2	1.0	8.1	8			1
7	November 11, 2019	198.67	15	13	27.2	35.2	35			4
8	April 3, 2020	198.48	-19	-6	-0.2	35	35			2

**NOTES:**

- I. Actual elevation: corresponds to elevation recorded at the date of reading.
- II. Partial settlement: corresponds to change of elevation since previous reading date.
- III. Accumulated settlement: corresponds to change of elevation since date of installation, i.e., January 13, 2015.
- IV. Resolution of displacements is  $\pm 1$  cm

<b>Interpretation</b>	
Time interval	Rate of settlement (accumulated)
days	0.031 mm/day
years	11.484 mm/year
	<b>down</b>
	Total
	Rate of horizontal displacement
	N-S
	E-W
	0.184 0.184 0.010 mm/day
	66.990 66.990 3.828 mm/year

<b>MP-08-14</b>		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	
Reading Number	Date	Elevation			Horizontal Displacement				
		Actual Elevation [m]	Partial Settlement [cm]	Accumulated Settlement [cm]	Partial Displacement [cm]	Total cm	Alignment N cm	Alignment S cm	Alignment E cm
1	January 13, 2015	202.13	0	0	0	0	n/a	n/a	n/a
2	April 24, 2015	202.11	-2	-2	4	4	n/a	n/a	n/a
3	November 5, 2015	202.10	-1	-3	-2	2	n/a	n/a	n/a
4	May 8, 2018	202.06	-4	-7	29	31	n/a	n/a	n/a
5	December 11, 2018	202.09	3	-4	5.7	36.7	35	11	11
6	May 8, 2019	201.97	-12	-16	9.9	46.6	45	12	12
7	November 11, 2019	201.99	2	-14	6.3	52.9	51	14	14
8	April 3, 2020	202.01	2	-12	4.1	57	55	14	14

**NOTES:**

- I. Actual elevation: corresponds to elevation recorded at the date of reading.
- II. Partial settlement: corresponds to change of elevation since previous reading date.
- III. Accumulated settlement: corresponds to change of elevation since date of installation, i.e., January 13, 2015.
- IV. Resolution of displacements is  $\pm 1$  cm

<b>Interpretation</b>	
Time interval	Rate of settlement (accumulated)
days	0.068 mm/day
years	24.844 mm/year
	<b>down</b>
	Total
	Rate of horizontal displacement
	N-S
	E-W
	0.323 0.312 0.079 mm/day
	118.009 113.868 28.985 mm/year

<b>MP-09-14</b>		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>
Reading Number	Date	Elevation			Partial Displacement [cm]	Horizontal Displacement		
		Actual Elevation [m]	Partial Settlement [cm]	Accumulated Settlement [cm]		Total cm	Alignment N cm	Alignment S cm
1	January 13, 2015	198.52	0	0	0	0	n/a	n/a
2	April 24, 2015	198.52	0	0	3	3	n/a	n/a
3	November 5, 2015	198.50	-2	-2	-3	0	n/a	n/a
4	May 8, 2018	198.48	-2	-4	5	5	n/a	n/a
5	December 11, 2018	198.46	-2	-6	-0.5	4.5	4	2
6	May 8, 2019	198.45	-1	-7	3.6	8.1	7	4
7	November 11, 2019	198.44	-1	-8	5.0	13.0	13	1
8	April 3, 2020	198.41	-3	-11	2.0	15	15	3

**NOTES:**

- I. Actual elevation: corresponds to elevation recorded at the date of reading.
- II. Partial settlement: corresponds to change of elevation since previous reading date.
- III. Accumulated settlement: corresponds to change of elevation since date of installation, i.e., January 13, 2015.
- IV. Resolution of displacements is ± 1 cm

<b>Interpretation</b>	
Time interval	Rate of settlement (accumulated)
days	0.058 mm/day
years	21.054 mm/year
	<b>down</b>
	Total
	Rate of horizontal displacement
	N-S
	E-W
	0.079 0.079 0.016
	28.710 28.710 5.742
	mm/day
	mm/year

<b>MP-10-14</b>		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>
Reading Number	Date	Elevation			Partial Displacement [cm]	Horizontal Displacement		
		Actual Elevation [m]	Partial Settlement [cm]	Accumulated Settlement [cm]		Total cm	Alignment N cm	Alignment S cm
1	January 13, 2015	200.05	0	0	0	0	n/a	n/a
2	April 24, 2015	200.08	3	3	2	2	n/a	n/a
3	November 5, 2015	200.01	-7	-4	2	4	n/a	n/a
4	May 8, 2018	200.00	-1	-5	0	4	n/a	n/a
5	December 11, 2018	200.03	3	-2	-0.8	3.2	3	1
6	May 8, 2019	200.04	1	-1	1.9	5.1	5	1
7	November 11, 2019	200.01	-3	-4	-1.0	4.1	4	1
8	April 3, 2020	200.02	1	-3	-1.1	3	3	0

**NOTES:**

- I. Actual elevation: corresponds to elevation recorded at the date of reading.
- II. Partial settlement: corresponds to change of elevation since previous reading date.
- III. Accumulated settlement: corresponds to change of elevation since date of installation, i.e., January 13, 2015.
- IV. Resolution of displacements is ± 1 cm

<b>Interpretation</b>	
Time interval	Rate of settlement (accumulated)
days	0.016 mm/day
years	5.742 mm/year
	<b>down</b>
	Total
	Rate of horizontal displacement
	N-S
	E-W
	0.016
	0.000
	5.742
	0.000
	5.742
	mm/day
	mm/year

<b>MP-11-14</b>		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>
Reading Number	Date	Elevation			Partial Displacement [cm]	Horizontal Displacement		
		Actual Elevation [m]	Partial Settlement [cm]	Accumulated Settlement [cm]		Total cm	Alignment N cm	Alignment S cm
1	January 13, 2015	207.59	0	0	0	0	n/a	n/a
2	April 24, 2015	207.60	1	1	1	1	n/a	n/a
3	November 5, 2015	207.60	0	1	3	4	n/a	n/a
4	May 8, 2018	207.57	-3	-2	17	21	n/a	n/a
5	December 11, 2018	207.53	-4	-6	2.4	23.4	15	18
6	May 8, 2019	207.47	-6	-12	25.6	49.0	31	38
7	November 11, 2019	207.38	-9	-21	11.4	60.4	38	47
8	April 3, 2020	207.40	2	-19	2.6	63	40	49

**NOTES:**

- I. Actual elevation: corresponds to elevation recorded at the date of reading.
- II. Partial settlement: corresponds to change of elevation since previous reading date.
- III. Accumulated settlement: corresponds to change of elevation since date of installation, i.e., January 13, 2015.
- IV. Resolution of displacements is ± 1 cm

<b>Interpretation</b>	
Time interval	Rate of settlement (accumulated)
days	0.119 mm/day
years	43.477 mm/year
	<b>down</b>
	<b>Total</b>
	Rate of horizontal displacement
	N-S
	E-W
	0.343
	0.216
	0.267
	mm/day
	125.131
	78.673
	97.306
	mm/year

MP-12-14		A	B	C	D	E	F	G		
		Elevation			Horizontal Displacement					
Reading Number	Date	Actual Elevation [m]	Partial Settlement [cm]	Accumulated Settlement [cm]	Partial Displacement [cm]	Total cm	Alignment N cm	Alignment S cm	Alignment E cm	Alignment W cm
1	January 13, 2015	204.28	0	0	0	0.0	n/a	n/a	n/a	n/a
2	April 24, 2015	204.22	-6	-6	4	4.0	n/a	n/a	n/a	n/a
3	November 5, 2015	204.27	5	-1	-2	2.0	n/a	n/a	n/a	n/a
4	May 8, 2018	204.27	0	-1	0	2.0	n/a	n/a	n/a	n/a
5	December 11, 2018	204.21	-6	-7	2.1	4.1	4			1
6	May 8, 2019	204.24	3	-4	5.9	10.0	8			6
7	November 11, 2019	204.25	1	-3	7.0	17.0	12			12
8	April 3, 2020	204.22	-3	-6	1.0	18.0	13			12

**NOTES:**

- I. Actual elevation: corresponds to elevation recorded at the date of reading.
- II. Partial settlement: corresponds to change of elevation since previous reading date.
- III. Accumulated settlement: corresponds to change of elevation since date of installation, i.e., January 13, 2015.
- IV. Resolution of displacements is ± 1 cm

Interpretation	
Time interval	Rate of settlement (accumulated)
days	0.031 mm/day
years	11.484 mm/year
	<b>down</b>
	Total
	Rate of horizontal displacement
	N-S
	E-W
	0.094
	0.068
	0.063
	34,452
	24,882
	22,968
	mm/day
	mm/year

<b>MP-13-14</b>		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>
Reading Number	Date	Elevation			Partial Displacement [cm]	Horizontal Displacement		
		Actual Elevation [m]	Partial Settlement [cm]	Accumulated Settlement [cm]		Total cm	Alignment N cm	Alignment S cm
1	January 13, 2015	202.96	0	0	0	0.0	n/a	n/a
2	April 24, 2015	202.98	2	2	1	1.0	n/a	n/a
3	November 5, 2015	202.96	-2	0	0	1.0	n/a	n/a
4	May 8, 2018	202.95	-1	-1	5	6.0	n/a	n/a
5	December 11, 2018	202.99	4	3	-1.0	5.0	5	0
6	May 8, 2019	202.98	-1	2	0.7	5.7	4	4
7	November 11, 2019	202.90	-8	-6	-0.7	5.0	5	0
8	April 3, 2020	202.98	8	2	-1.0	4.0	4	0

**NOTES:**

- I. Actual elevation: corresponds to elevation recorded at the date of reading.
- II. Partial settlement: corresponds to change of elevation since previous reading date.
- III. Accumulated settlement: corresponds to change of elevation since date of installation, i.e., January 13, 2015.
- IV. Resolution of displacements is ± 1 cm

<b>Interpretation</b>	
Time interval	Rate of settlement (accumulated)
days	-0.010 mm/day
years	-3.828 mm/year
	up
	Total
	Rate of horizontal displacement
	N-S
	EW
	0.021
	0.000
	7.656
	0.000
	7.656
	mm/day
	mm/year

<b>MP-14-14</b>		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>
Reading Number	Date	Elevation			Partial Displacement [cm]	Horizontal Displacement		
		Actual Elevation [m]	Partial Settlement [cm]	Accumulated Settlement [cm]		Total cm	Alignment N cm	Alignment S cm
1	January 13, 2015	212.07	0	0	0	0.0	n/a	n/a
2	April 24, 2015	212.07	0	0	5	5.0	n/a	n/a
3	November 5, 2015	212.04	-3	-3	0	5.0	n/a	n/a
4	May 8, 2018	212.03	-1	-4	22	27.0	n/a	n/a
5	December 11, 2018	212.02	-1	-5	0.0	27.0	27	1
6	May 8, 2019	212.01	-1	-6	2.1	29.2	29	3
7	November 11, 2019	212.04	3	-3	2.8	32.0	32	0
8	April 3, 2020	212.00	-4	-7	0.0	32.0	32	1

**NOTES:**

- I. Actual elevation: corresponds to elevation recorded at the date of reading.
- II. Partial settlement: corresponds to change of elevation since previous reading date.
- III. Accumulated settlement: corresponds to change of elevation since date of installation, i.e., January 13, 2015.
- IV. Resolution of displacements is ± 1 cm

<b>Interpretation</b>	
Time interval	Rate of settlement (accumulated)
days	0.037 mm/day
years	13.398 mm/year
	<b>down</b>
	Total
	Rate of horizontal displacement
	N-S
	E-W
	0.168 0.168 0.005 mm/day
	61.248 61.248 1.914 mm/year

<b>MP-15-14</b>		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>
Reading Number	Date	Elevation			Partial Displacement [cm]	Horizontal Displacement		
		Actual Elevation [m]	Partial Settlement [cm]	Accumulated Settlement [cm]		Total cm	Alignment N cm	Alignment S cm
1	January 13, 2015	223.24	0	0	0	0.0	n/a	n/a
2	April 24, 2015	223.24	0	0	4	4.0	n/a	n/a
3	November 5, 2015	223.21	-3	-3	-3	1.0	n/a	n/a
4	May 8, 2018	223.16	-5	-8	3	4.0	n/a	n/a
5	December 11, 2018	223.22	6	-2	-2.6	1.4	1	1
6	May 8, 2019	223.22	0	-2	3.1	4.5	2	4
7	November 11, 2019	223.20	-2	-4	-1.3	3.2	1	3
8	April 3, 2020	223.18	-2	-6	0.8	4.0	2	4

**NOTES:**

- I. Actual elevation: corresponds to elevation recorded at the date of reading.
- II. Partial settlement: corresponds to change of elevation since previous reading date.
- III. Accumulated settlement: corresponds to change of elevation since date of installation, i.e., January 13, 2015.
- IV. Resolution of displacements is  $\pm 1$  cm

<b>Interpretation</b>	
Time interval	Rate of settlement (accumulated)
days	0.031 mm/day
years	11.484 mm/year
	<b>down</b>
	Total
	Rate of horizontal displacement
	N-S
	E-W
	0.021 mm/day
	0.021 mm/day
	7.656 mm/year
	7.656 mm/year

<b>MP-16-14</b>		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>
Reading Number	Date	Elevation			Partial Displacement [cm]	Horizontal Displacement		
		Actual Elevation [m]	Partial Settlement [cm]	Accumulated Settlement [cm]		Total cm	Alignment N cm	Alignment S cm
1	January 13, 2015	204.28	0	0	0	0.0	n/a	n/a
2	April 24, 2015	204.27	-1	-1	2	2.0	n/a	n/a
3	November 5, 2015	204.28	1	0	-1	1.0	n/a	n/a
4	May 8, 2018	204.21	-7	-7	4	5.0	n/a	n/a
5	December 11, 2018	204.21	0	-7	-1.4	3.6	3	2
6	May 8, 2019	204.16	-5	-12	2.1	5.7	4	4
7	November 11, 2019	204.16	0	-12	3.3	8.9	8	4
8	April 3, 2020	204.15	-1	-13	0.1	9.0	9	3

**NOTES:**

- I. Actual elevation: corresponds to elevation recorded at the date of reading.
- II. Partial settlement: corresponds to change of elevation since previous reading date.
- III. Accumulated settlement: corresponds to change of elevation since date of installation, i.e., January 13, 2015.
- IV. Resolution of displacements is ± 1 cm

<b>Interpretation</b>	
Time interval	Rate of settlement (accumulated)
days	0.068 mm/day
years	24.882 mm/year
	<b>down</b>
	Total
	Rate of horizontal displacement
	N-S
	E-W
	0.047
	0.016
	17.226
	17.226
	0.016
	5.742
	mm/day
	mm/year

<b>MP-17-14</b>		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>		
		<b>Elevation</b>			<b>Horizontal Displacement</b>					
Reading Number	Date	Actual Elevation [m]	Partial Settlement [cm]	Accumulated Settlement [cm]	Partial Displacement [cm]	Total cm	Alignment N cm	Alignment S cm	Alignment E cm	Alignment W cm
		1	January 13, 2015	210.25	0	0	0	0.0	n/a	n/a
2	April 24, 2015	210.25	0	0	1	1.0	n/a	n/a	n/a	n/a
3	November 5, 2015	210.26	1	1	0	1.0	n/a	n/a	n/a	n/a
4	May 8, 2018	210.24	-2	-1	2	3.0	n/a	n/a	n/a	n/a
5	December 11, 2018	210.24	0	-1	0.2	3.2	1	3		
6	May 8, 2019	210.25	1	0	1.0	4.1	1	4		
7	November 11, 2019	210.32	7	7	-1.9	2.2	1	2		
8	April 3, 2020	210.19	-13	-6	0.8	3.0	2	2		

**NOTES:**

- I. Actual elevation: corresponds to elevation recorded at the date of reading.
- II. Partial settlement: corresponds to change of elevation since previous reading date.
- III. Accumulated settlement: corresponds to change of elevation since date of installation, i.e., January 13, 2015.
- IV. Resolution of displacements is  $\pm 1$  cm

<b>Interpretation</b>	
Time interval	Rate of settlement (accumulated)
days	0.031 mm/day
years	11.484 mm/year
	<b>down</b>
	Total
	N-S
	E-W
	Rate of horizontal displacement
	0.016
	0.010
	3.828
	mm/day
	mm/year

<b>MP-18-14</b>		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>
Reading Number	Date	Elevation			Partial Displacement [cm]	Horizontal Displacement		
		Actual Elevation [m]	Partial Settlement [cm]	Accumulated Settlement [cm]		Total cm	Alignment N cm	Alignment S cm
1	January 13, 2015	218.75	0	0	0	0	n/a	n/a
2	April 24, 2015	218.73	-2	-2	3	3	n/a	n/a
3	November 5, 2015	218.74	1	-1	-1	2	n/a	n/a
4	May 8, 2018	218.73	-1	-2	1	3	n/a	n/a
5	December 11, 2018	218.72	-1	-3	-0.8	2.2	2	1
6	May 8, 2019	218.74	2	-1	-1.2	1.0	0	1
7	November 11, 2019	218.72	-2	-3	-1.0	0.0	0	0
8	April 3, 2020	218.71	-1	-4	1.0	1	1	1

**NOTES:**

- I. Actual elevation: corresponds to elevation recorded at the date of reading.
- II. Partial settlement: corresponds to change of elevation since previous reading date.
- III. Accumulated settlement: corresponds to change of elevation since date of installation, i.e., January 13, 2015.
- IV. Resolution of displacements is ± 1 cm

<b>Interpretation</b>	
Time interval	Rate of settlement (accumulated)
days	0.021 mm/day
years	7.656 mm/year
	<b>down</b>
	Total
	Rate of horizontal displacement
	N-S
	E-W
	0.005
	0.005
	1.914
	1.914
	mm/day
	mm/year

<b>MP-19-14</b>		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>		
		<b>Elevation</b>			<b>Horizontal Displacement</b>					
Reading Number	Date	Actual Elevation [m]	Partial Settlement [cm]	Accumulated Settlement [cm]	Partial Displacement [cm]	Total cm	Alignment N cm	Alignment S cm	Alignment E cm	Alignment W cm
		1	January 13, 2015	221.72	0	0	0	0.0	n/a	n/a
2	April 24, 2015	221.71	-1	-1	4	4.0	n/a	n/a	n/a	n/a
3	November 5, 2015	221.71	0	-1	-3	1.0	n/a	n/a	n/a	n/a
4	May 8, 2018	221.69	-2	-3	2	3.0	n/a	n/a	n/a	n/a
5	December 11, 2018	221.70	1	-2	-0.8	2.2	1		2	
6	May 8, 2019	221.71	1	-1	0.9	3.2		1	3	
7	November 11, 2019	221.72	1	0	-1.7	1.4		1	1	
8	April 3, 2020	221.67	-5	-5	0.6	2.0		1	2	

**NOTES:**

- I. Actual elevation: corresponds to elevation recorded at the date of reading.
- II. Partial settlement: corresponds to change of elevation since previous reading date.
- III. Accumulated settlement: corresponds to change of elevation since date of installation, i.e., January 13, 2015.
- IV. Resolution of displacements is ± 1 cm

<b>Interpretation</b>	
Time interval	Rate of settlement (accumulated)
days	0.026 mm/day
years	9.570 mm/year
	<b>down</b>
	Total
	N-S 0.010
	E-W 0.010
	3.828 1.914
	0.010 3.828
	mm/day mm/year