Stantec

To:	Jerald Schnabel	From:	Paul Kos
	Riverbend Industries Inc.		Denver, CO 80222
File:	June 2023 Monitoring Summary	Date:	July 31, 2023

Reference: June 2023 Geotechnical Monitoring Summary Pikeview Quarry

1.0 INTRODUCTION

Stantec Consulting Services Inc. (Stantec) has prepared this June 2023 Geotechnical Monitoring Summary for the Pikeview Quarry. The Pikeview Quarry is situated along the foothills of the Rocky Mountains, northwest of Colorado Springs, Colorado. Riverbend Industries Inc. (Riverbend, formerly Continental Materials Corp.) operates the quarry, which is currently closed and undergoing reclamation. A geotechnical monitoring program was established to monitor reclamation activities which will affect the geotechnical performance of the existing and reclaimed slopes during and following reclamation grading. This report presents the geotechnical monitoring results for the slope reclamation activities at the site through the month of June 2023. Continuous monitoring by the robotic survey system began in 2010 and has continued through the month of June 2023. Visual inspections of the slopes were performed by Riverbend employees and Stantec engineers. Riverbend is in the process of changing contractors and plans to have a replacement contractor selected by end of July with construction resuming in August 2023.

1.1 PURPOSE

The purpose of this report is to summarize the June 2023 geotechnical monitoring results and verify the geotechnical performance of the existing and reclaimed slopes with respect to the historical performance record. The goals of the geotechnical instrumentation monitoring program can be described as:

- Meet corporate risk management requirements,
- Provide ongoing slope monitoring and advance warning of any changed conditions that could pose a hazard to workers or to the public,
- Document the geotechnical performance of the slope, and
- Document monthly site grading activities and construction quality assurance.

1.2 MONITORING SUMMARY

Major components of the instrumentation monitoring program are listed in Table 1 and shown on Figure 1.

Table 1 Monitoring Frequency

Monitoring Type	Frequency
Visual inspection	Daily (Riverbend or Stantec) and Monthly (Stantec)
Robotic theodolite/prism	Continuous
Drone inspection	Monthly
Compaction testing	Every 5,000 yd^3 (min.)

2.0 VISUAL INSPECTIONS

Inspections are completed daily by site personnel and monthly by Stantec personnel to document visual observations of slope conditions, including conditions of instability (i.e., cracking, slumping, over-steepened slopes, seeps, perched boulders, rock falls, erosion, and areas undercut by construction or maintenance activities). Certain areas of the landslide have been designated as safety exclusion zones, and these areas are inspected from adjacent locations.

On working days, site operators inspect their work areas for signs of instability daily before starting work per site safety rules and regulations. The daily inspection starts by reviewing any prism alerts/alarms and inspecting those areas before work begins in that area. The daily inspection also includes visual observations of the quarry walls and floor for any changes. No changes to the quarry conditions were identified during daily inspections in June 2023. The notes from the daily inspections are included in Table A-1 in Appendix A.

Stantec conducted visual inspections of the Pikeview Quarry slopes on June 23, 2023. The engineering inspections were conducted by traversing each area of the mine and observing the uphill slope and the downhill slope for signs of instability, and areas in need of maintenance. Slopes that have been graded and are 2 horizontal (H):1 vertical (V) or shallower are also traversed on foot. The findings are listed below, and photographs of notable observations are included on Figure 2 in Appendix A.

- Reclamation grading began in February 2022 and continued throughout June 2023. The change in primary contractors resulted in decreased volumes placed in the buttress zone; however, topsoil placement and riprap production continued throughout the month.
- Operators continue to place compacted material in the buttress zone. Material was excavated from the North and South Borrow Areas. Material is initially excavated in benches for the majority of the excavation to efficiently remove the material; these benches are removed for final grading to create the reclamation surface.
- Compaction testing continues at the rate of at least one test per 5,000 cubic yards of fill placed in the buttress area.
- No cracking was observed on the native granite slopes above the extents of the disturbed area.
- Known cracks were monitored for changes. The hummocky field in the area immediately above the southern extent of the slide shows evidence of previous cracking. The hairline crack observed in May 2023 could not be located, indicating no further movement.
- The slope below the first bench has been placed to the final grade, and this slope was traversed on foot and examined for cracks or signs of instability by Stantec engineers. No cracks or signs of instability were identified.
- The surficial slumping and cracking on the loose fill that was observed in May 2023 showed no signs of continued movement.
- A safety buffer zone is being kept between the active work areas and the toe of the slide to stop any rocks that might come loose during grading operations. Compacted fill is placed in the buffer zone as the buttress fill is placed.
- Offsite topsoil was stockpiled at the base of the buttress area with the additional topsoil and growth medium. The topsoil stockpiles contain a sufficient volume of material to place cover on all disturbed areas of the mine. Topsoil imports will continue, and any excess topsoil may be placed at increased thickness so that all topsoil is used in reclaiming the mine.
- Topsoil was placed on the buttress slope below the first bench.

- Rock was being screened, sorted, and stockpiled as riprap for use as erosion protection in the channels.
- The culvert remains cleared but mostly blocked inside. Riverbend has partially cleared the debris, but access limitations and supports within the culvert inhibit clearing all the debris. Riverbend has procured a pump and will begin pumping operations if any water collects behind the culvert. Riverbend inspects the culvert for ponded water following rain events, and should any water be observed, it will be removed using pumps
- Visual inspections of the Pikeview Quarry did not reveal any evidence of large-scale instability outside of the landslide areas previously identified. No bulging, rippling, over-steepening, depressions, slumps, or dry slip-offs were observed in areas that have been graded and/or reclaimed

3.0 PRISM SURVEY

A Leica Robotic station is used to continuously survey the prisms onsite to document slope movements. The station records the location of each prism every hour. There are currently 19 active prisms; two prisms were control points located outside the slope movement area, five prisms are located on the slopes surrounding the slope movement area, six prisms were located on the slopes within the landslide area, and six prisms were located on the buttress fill. As the slope is backfilled and graded, the existing prisms will be removed, and additional prisms will be installed. The six buttress fill prisms were installed in June 2023. A log of prism removals and installations is included in Appendix B. The prism locations are shown on the current topography in Figure 3, and the proposed prism locations are shown on the reclamation topography in Figure 4. Both figures are included in Appendix B.

The monitoring software, GeoMos, has been programed to provide automatic alerts if there is a movement recorded that is greater than 0.35 feet, if a prism cannot be located, or if there are communication errors. Following each alert, Riverbend clears the area of concern until the data can be reviewed and the slope can be inspected. Riverbend made sure that there were no workers in the area before inspecting the slope. All previous alerts for potential movement have been attributed to weather or animal activity, and no alerts have been associated with slope movements. Other alerts were determined to be caused by a power outage, equipment operations blocking the prism, weather conditions, or sun glare. The alerts are listed in Table 2.

Table 2 Alert Summary

Date(s)	Alert	Cause/Actions taken	Alert Resolved
Jun 1	CP7 not found	Single event. Likely caused by vehicle blocking prism.	Jun 1
Jun 1	Points not found	Rain, and fog. No work being performed at time of alerts.	Jun 1
Jun 1	NP66 regression limits received	Rain and fog at time of alerts. No work during alert.	Jun 1
Jun 1	P25 regression limits received	Rain and fog at time of alerts. No work during alert.	Jun 1
Jun 1	P2 regression limits received	Rain and fog at time of alerts. No work during alert.	Jun 1
Jun 1 to Jun 2	P69A regression limits received	Rain and fog at time of alerts. No work during alert.	Jun 2
Jun 1 to Jun 2	P70 regression limits received	Rain and fog at time of alerts. No work during alert.	Jun 2
Jun 1 to Jun 2	P33 regression limits received	Rain and fog at time of alerts. No work during alert.	Jun 2

Jun 2 to Jun 3	Points not found	Rain, and fog. No work being performed at time of alerts.	Jun 5
Jun 3	P25 regression limits received	Rain and fog at time of alerts. No work during alert.	Jun 5
Jun 3	P33 regression limits received	Rain and fog at time of alerts. No work during alert.	Jun 5
Jun 3	P32 regression limits received	Rain and fog at time of alerts. No work during alert.	Jun 5
Jun 4	P70 not found	Single event. No work being performed at time of alert.	Jun 5
Jun 5	Points not found	Rain, and fog. No work being performed at time of alerts.	Jun 5
Jun 6	Points not found	Rain, and fog. No work being performed at time of alerts.	Jun 6
Jun 11 to Jun 12	Points not found	Rain, and fog. No work being performed at time of alerts.	Jun 12
Jun 12	NP66 regression limit received	Rain and fog at time of alert. No work during alert.	Jun 12
Jun 12	P69A regression limit received	Rain and fog at time of alert. No work during alert.	Jun 12
Jun 12	P33 regression limit received	Rain and fog at time of alert. No work during alert.	Jun 12
Jun 13	Power outage caused missed readings and no alerts	Rain and fog. No work when system was offline.	Jun 13
Jun 16	Points not found	Rain, and fog. No work being performed at time of alerts.	Jun 16
Jun 17 to Jun 19	Power outage caused missed readings	Rain and fog. No work during alerts.	Jun 19

The prism monitoring results for transverse and height displacements, monthly change, and cumulative change are summarized in Table 3 below. The transverse displacement measures the change in the horizontal distance from the robotic station to the prism; positive displacements indicate less distance between the station and prism (movement towards the total station). The height displacement measures the change in the vertical distance from the robotic station to the prism; positive displacements indicate upward movement. The values for the last reading in the month are included in Table 3. The monthly delta is the most recent reading cumulative delta displacement (horizontal, lateral, and vertical) subtracted from the last reading from the previous month. The cumulative delta values are a total displacement and are not associated with a direction. The transverse, height, and cumulative delta displacements are the total displacement over the life of the monitoring, which was reset when the Leica station was moved in July 2022. According to Leica documentation, the survey accuracy is +/-4 mm+1.5 ppm for prisms located greater than 500m from the station; these equates to an accuracy of +/-0.016 ft.

The data show stable conditions with no movements at 14 of 19 prisms with recorded displacements limited to data scatter and not actual movements. Prisms BR1, BR2, NP3, NP66 and P69A are located above the landslide, and these prisms recorded slope creep movements at slow velocity. This settlement was likely related to the landslide material consolidating under its own weight with the addition of excess water. These prisms were placed in areas where slope creep movements are likely to occur; therefore, movements being recorded at more locations is expected. Plots of the transverse and height displacements for each prism are included in Appendix B.

Table 3 Prism Summary

Prism ID	Cumulative Transverse Displacement (ft)	Cumulative Height Displacement (ft)	Monthly Delta (ft)	Cumulative Delta (ft)	Notes / Recommendations
BR1	0.022	-0.222	0.0342	0.4303	Slope creep movements
BR2	0.093	-0.371	0.1344	0.6367	Slope creep movements
CP6	0.000	-0.022	-0.0031	0.0220	
CP7	0.097	-0.009	0.0118	0.0997	
NP3	0.129	-0.287	0.1072	0.3290	Slope creep movements
NP66	0.686	-0.767	0.0985	1.0654	Slope creep movements
P2	-0.014	-0.018	-0.0098	0.0228	
P5	-0.009	-0.018	-0.0064	0.0205	
P25	-0.002	0.004	-0.0008	0.0083	
P32	-0.006	0.013	-0.0083	0.0175	
P33	0.091	-0.014	-0.0028	0.1139	
P69A	0.268	-0.267	0.0685	0.4312	Slope creep movements
P70	0.029	-0.005	-0.0017	0.0473	
B7200-1	0.002	-0.002	-0.0032	0.0030	New prism on buttress at toe
B7200-2	0.002	0.001	0.0134	0.0171	New prism on buttress at toe
B7200-3	0.072	-0.010	0.0920	0.0975	New prism on buttress at toe
B7300-1	-0.006	0.001	0.0043	0.0073	New prism on buttress at lowest bench
B7300-2	0.010	0.000	0.0076	0.0100	New prism on buttress at lowest bench
B7300-3	0.011	-0.004	0.0093	0.0117	New prism on buttress at lowest bench

4.0 DRONE SURVEY

The site was flown for aerial imagery using an unmanned aircraft system (UAS or ‘drone’) on June 28, 2023. The imagery was inspected for signs of instability and used to supplement the onsite visual inspections. Features noted in the aerial imagery review were inspected during Stantec’s engineering inspection and are summarized in Section 2 above. The imagery was also used to create site topography.

The June topography was also compared to the May topography to identify changes in the site topography. Comparison of the two surveys showed the placement of the fill material at the toe of the landslide. Fill material is excavated from the North and South Borrow Areas or imported from offsite projects. No slope movements or other changes in topography were identified. The current imagery and topography are included in Figures 1 and 3, and the comparison surface is included as Figure 5 in Appendix C.

As previously reported in the September 2020 monitoring report, there are limitations with the method of comparing drone surveys from different months. The drone data indicate changes in the slopes along each of the reclamation benches, buildings, and areas with trees or shrubs. These areas are stable, and the changes are the result of survey limitations on or near vertical slopes.

5.0 COMPACTION TESTING

Fill placement started on February 25, 2022 and continued throughout June 2023. Fill was excavated from the South Borrow and North Borrow Areas and placed in the buttress and buffer zones. All fill is moisture conditioned as necessary and then compacted. Compaction testing began April 2022 and occurs at the rate of at least one test per 5,000 yd^3 placed. During June 2023, approximately 21,900 yd^3 was placed and compacted. This volume placed in the buttress zone required at least 5 compaction tests. There were 10 compaction tests taken in June. As of June 30, 2022, a total of approximately 2,492,600 yd^3 had been placed and compacted. This required at least 499 compaction tests, and 899 tests have been taken. There were no failing tests in June; all tests met the minimum compaction requirement of 90%. The compaction testing results are summarized in Appendix D, and the testing locations are shown on Figure 6.

6.0 RECLAMATION PROGRESS

Riverbend has initiated reclamation grading at the Pikeview Quarry and has contracted with Stantec to provide EPCM services through completion. As an updated feature of our monthly report, we provide progress of activities, anticipated milestone schedule and a one month look ahead to better communicate project objectives. A phased or 'gated" approach will be used to complete the reclamation process going forward (See milestone schedule below)

Phase 1 - Value Engineering and issue RFP to qualified contractors

Phase 2 - Commercial negotiations with successful contractor

Phase 3 - Execution planning and Contractor readiness review

Phase 4 - Site Construction execution

Phase 5 - Final revegetation (season 2)

Task/Milestone	Estimated Dates
Phase 1 – Issue RFP to Bidders	Completed June 2021
Phase 1 – RFP Evaluation & Recommendation	Completed July 2021
Phase 2 – Constructor Contract Award	Completed January 2022
Phase 3 – Project Kick-off with successful Contractor	Completed February 4, 2022
Phase 4 – Contractor Mobilization to Site	Completed February 2022
Phase 4 – Reclamation Grading	February 2022 to present
Phase 4 – Contractor Demobilize from Site	Fall 2023
Phase 5 – Final Revegetation season 2 Begins	2023 until acceptance

Progress of activities this month:

- Contractor continued earth moving activities
- Quality assurance testing continued
- Importing topsoil material continued, but at a decreased rate
- Processing of riprap continued

- Geotechnical monitoring continued
- Began cleanup operations following the heavy rains

Work planned for next month includes:

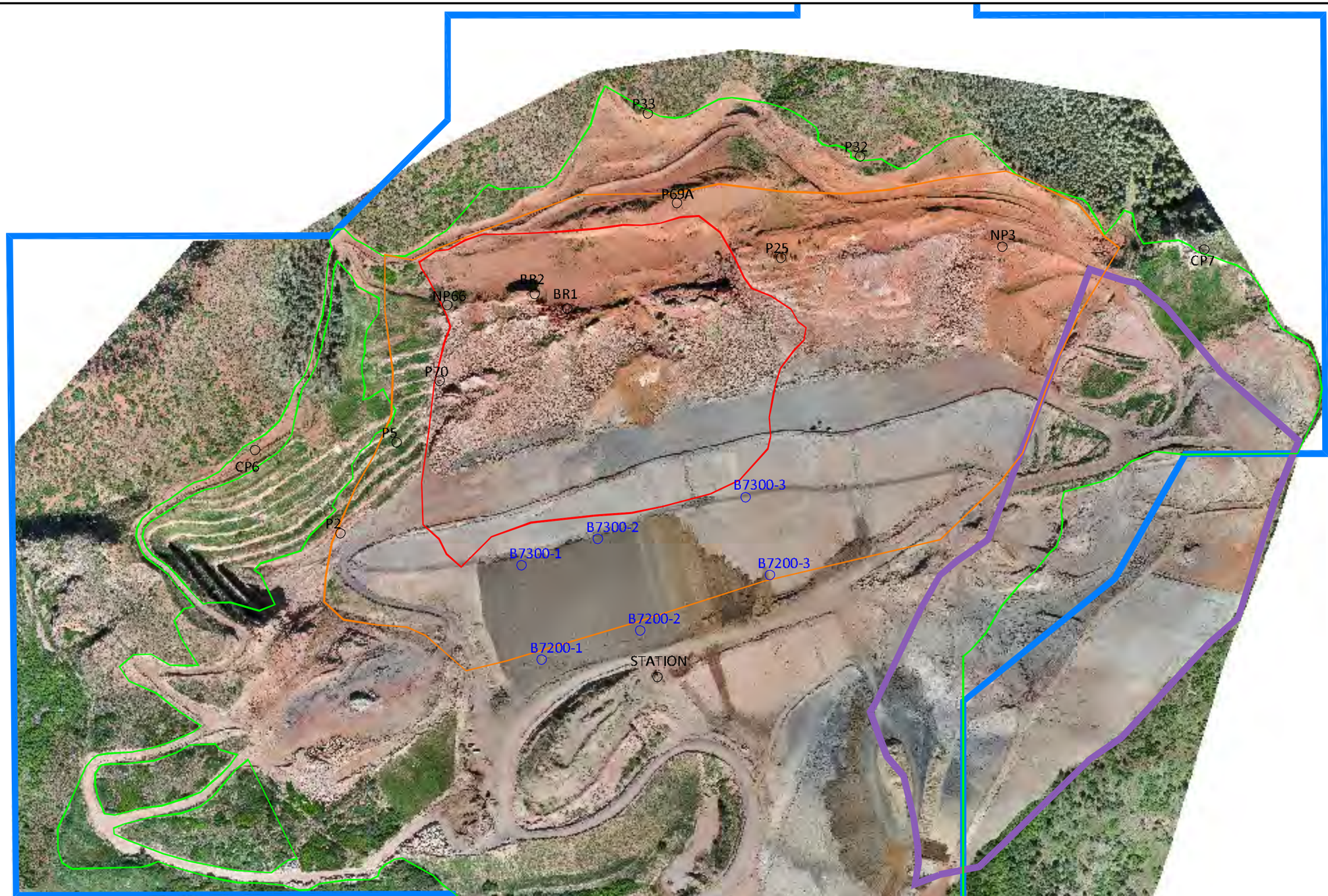
- Select new contractor by end of July and resume buttress construction in August
- Continue topsoil placement grading
- Continue importing topsoil material
- Continue processing riprap
- Continue geotechnical monitoring
- Planning for revegetation of areas that have reached the final grade.
- Continue to remove and replace prisms on an as-needed basis.
- Continue cleanup operations from the storm events

7.0 CONCLUSIONS

The data collected in June 2023 demonstrate compliance with the reclamation grading plan. The buttress fill is being placed and compacted as intended and specified.

None of the data collected in June 2023 indicate evidence of any large-scale movements that increase risk to workers or to the public. Shallow surface erosion continues to occur requiring ongoing maintenance and cleanup.

- Restricted access to the ungraded landslide slopes should continue.
- All monitoring should continue at current frequencies.
- All alerts shall continue to be taken seriously even if data errors are suspected.



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LEGEND
- Permit/Affected Lands Boundary
- City Grading Permit Boundary
- Proposed Disturbance Limit
- Landslide Extent
- Buttress Fill Extent
- Existing Prism
- Removed Prism
- New Prism

N

0 300' 600'

Client/Project
RIVERBEND INDUSTRIES INC.

PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
SITE MAP

Revision
#

Date
2023.07.31

Drawn By
PK

Figure No.
1

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Appendix A

Visual Inspections

6. Vegetation growing within erosion blanket.

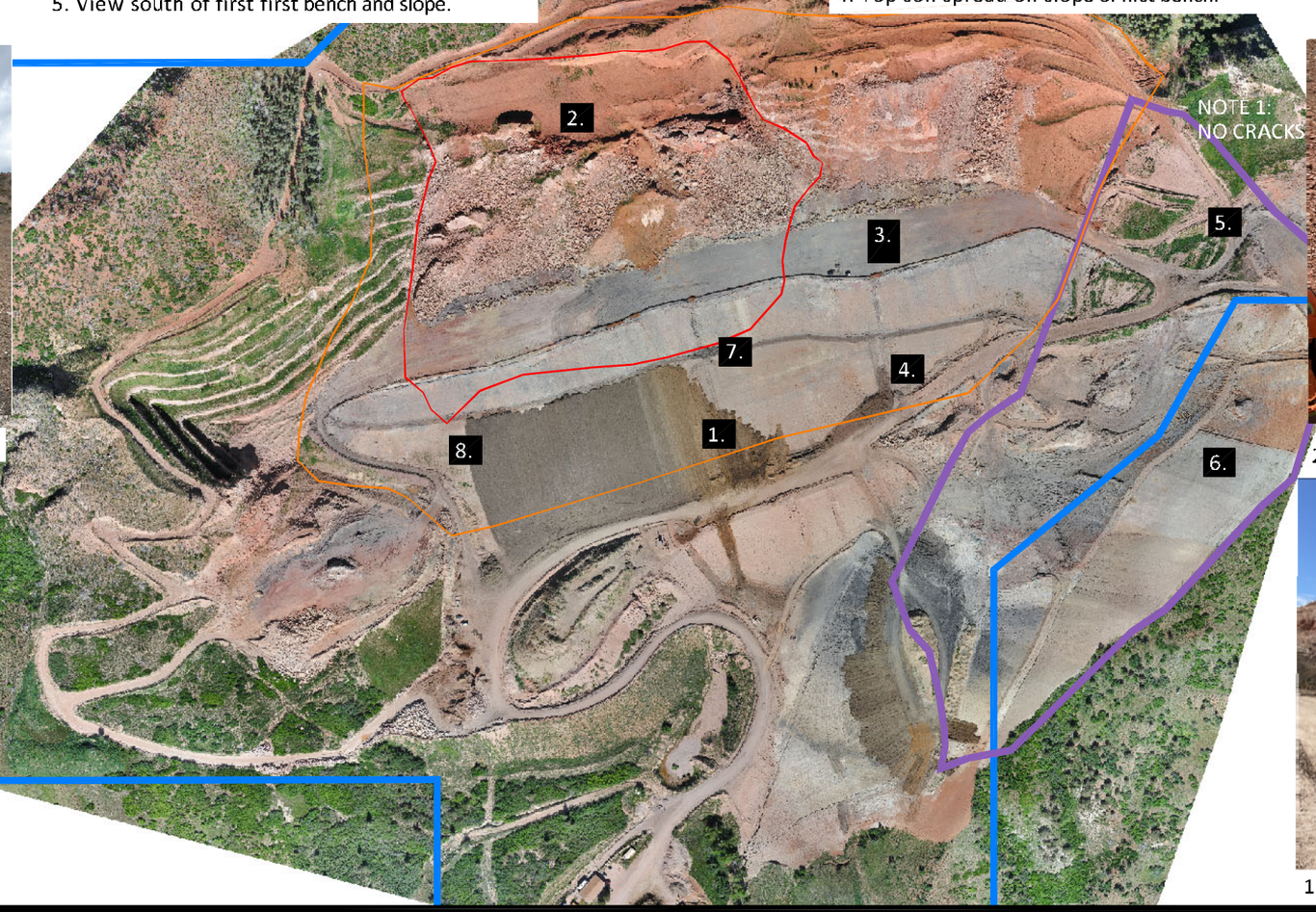
5. View south of first first bench and slope.

4. Top soil spread on slope of first bench.

3. Compacted floor of first bench.

7. No cracking on buttress slope.

8. New prism installation.



2. No continued signs of cracking or slumping.

1. Top soil spread on slope of first bench.

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LEGEND

- Permit/Affected Lands Boundary
- City Grading Permit Boundary
- Proposed Disturbance Limit
- Landslide Extent
- Buttress Fill Extent
- Observed Crack

NOTES

1. NO CRACKS OBSERVED IN THIS AREA.
2. ALL PHOTOS TAKEN JUNE 23, 2023.

N

0 400' 800'

Client/Project
RIVERBEND INDUSTRIES INC.

PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
OBSERVATIONS FROM MAY INSPECTION

Revision
#

Date
2023.07.31

Drawn By
PK

Figure No.
2

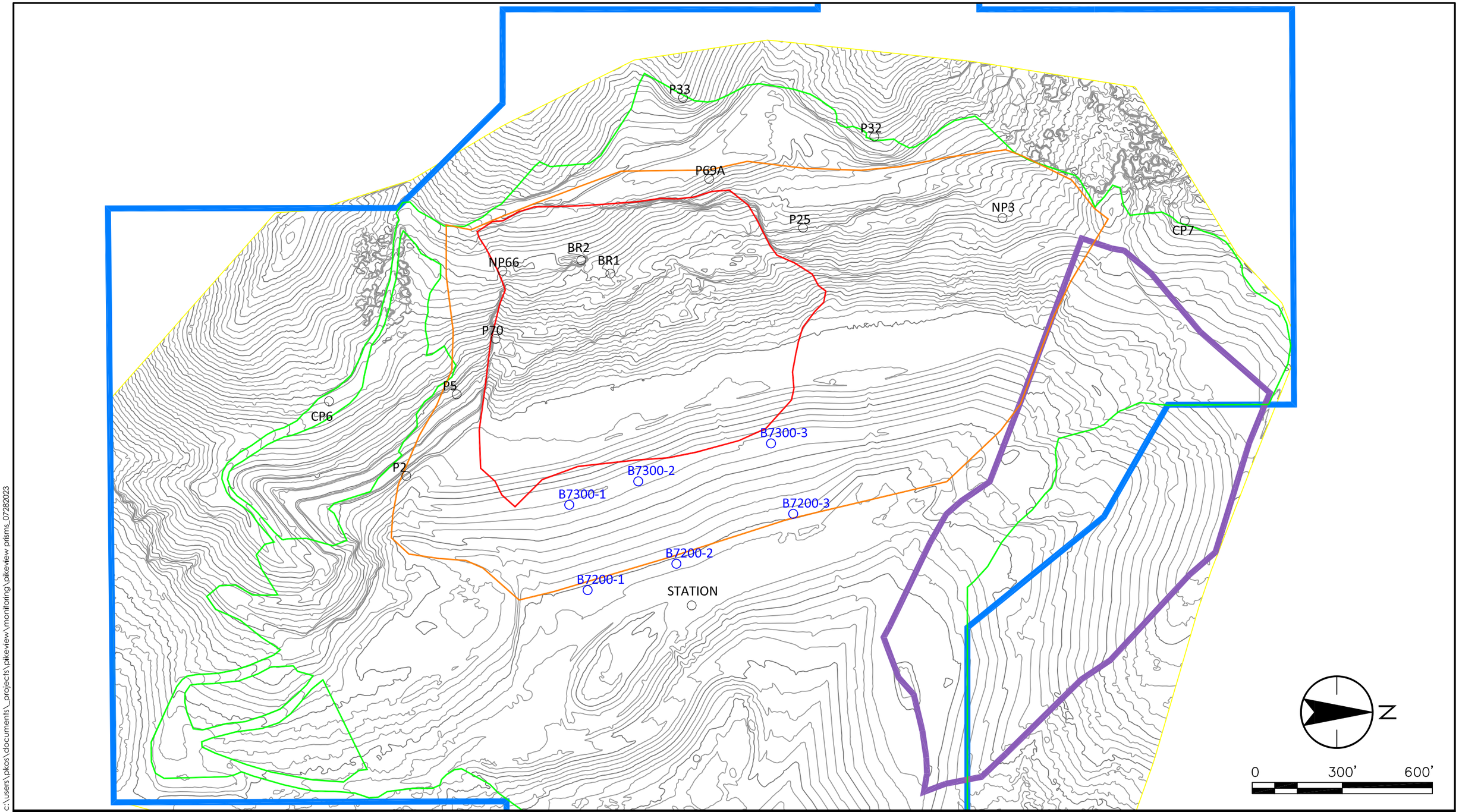
Stantec

Table A-1 Summary of Daily Inspections

Date	Notes	Inspection By
1-Jun-23	No movement observed. Good to proceed.	Jerald Schnabel
2-Jun-23	No movement observed. No work due to wet conditions.	Jerald Schnabel
3-Jun-23	No work.	Not applicable
4-Jun-23	No movement observed. No work due to wet conditions.	Jerald Schnabel
5-Jun-23	No movement observed. No work due to wet conditions.	Jerald Schnabel
6-Jun-23	No movement observed. No work due to wet conditions.	Jerald Schnabel
7-Jun-23	No movement observed. Good to proceed.	Jerald Schnabel
8-Jun-23	No movement observed. Good to proceed.	Jerald Schnabel
9-Jun-23	No movement observed. Good to proceed.	Jerald Schnabel
10-Jun-23	No work.	Not applicable
11-Jun-23	No work.	Not applicable
12-Jun-23	No movement observed. Observations limited by fog. No work due to wet conditions.	Jerald Schnabel
13-Jun-23	No movement observed. No work during contractor change.	Jerald Schnabel
14-Jun-23	No movement observed. No work during contractor change.	Jerald Schnabel
15-Jun-23	No movement observed. No work during contractor change.	Jerald Schnabel
16-Jun-23	No movement observed. No work during contractor change.	Jerald Schnabel
17-Jun-23	No work.	Not applicable
18-Jun-23	No work.	Not applicable
19-Jun-23	No movement observed. Good to proceed.	Jerald Schnabel
20-Jun-23	No movement observed. Good to proceed.	Jerald Schnabel
21-Jun-23	No movement observed. Good to proceed.	Jerald Schnabel
22-Jun-23	No movement observed. Good to proceed.	Jerald Schnabel
23-Jun-23	No movement observed. Good to proceed.	Jerald Schnabel
24-Jun-23	No work.	Not applicable
25-Jun-23	No work.	Not applicable
26-Jun-23	No movement observed. Good to proceed.	Jerald Schnabel
27-Jun-23	No movement observed. Good to proceed.	Jerald Schnabel
28-Jun-23	No movement observed. Good to proceed.	Jerald Schnabel
29-Jun-23	No work.	Not applicable
30-Jun-23	No movement observed. Good to proceed.	Jerald Schnabel

Appendix B

Prism Survey



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LEGEND

- Permit/Affected Lands Boundary
- City Grading Permit Boundary
- Proposed Disturbance Limit
- Landslide Extent
- Buttress Fill Extent
- Existing Prism
- Removed Prism
- New Prism

1. PRISMS WILL BE INSTALLED AS EACH BENCH IS FINISHED.
2. ALL PRISMS WILL BE RETAINED AS LONG AS POSSIBLE.
3. TOPOGRAPHY FROM JUNE 28, 2023 DRONE SURVEY.
4. CONTOUR INTERVAL IS 10 FEET

Client/Project
RIVERBEND INDUSTRIES INC.

PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

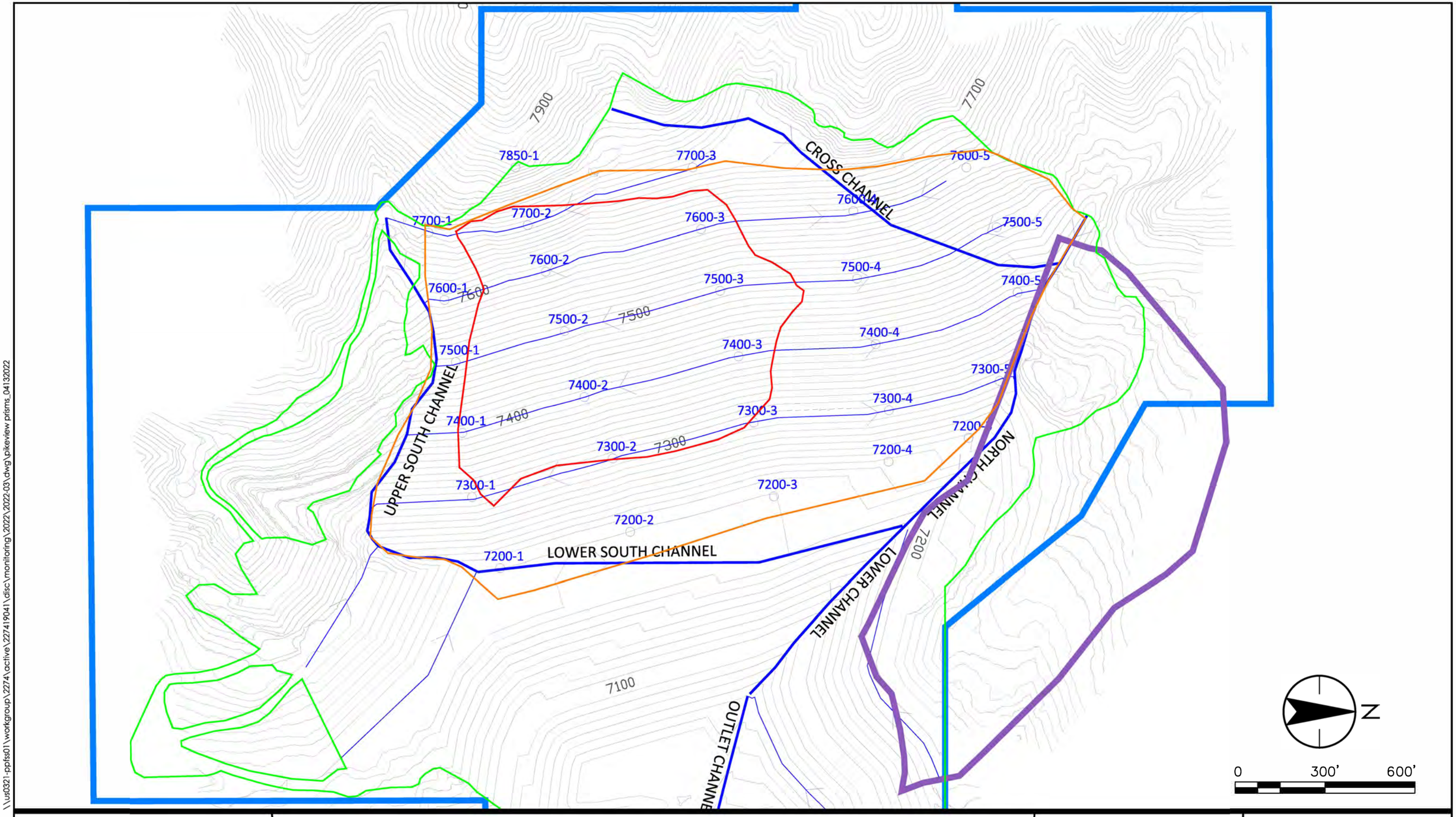
Title
EXISTING PRISMS WITH CURRENT SURFACE

Revision
#

Date
2023.07.31

Drawn By
PK

Figure No.
3



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LEGEND

- Permit/Affected Lands Boundary
- City Grading Permit Boundary
- Proposed Disturbance Limit
- Landslide Extent
- Buttress Fill Extent
- Proposed Prism

NOTES

1. PRISMS WILL BE INSTALLED AS EACH BENCH IS FINISHED.
2. ALL PRISMS WILL BE RETAINED AS LONG AS POSSIBLE.

Client/Project
RIVERBEND INDUSTRIES INC.
PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
PROPOSED PRISMS WITH RECLAMATION SURFACE

Revision	Date
#	2023.07.31
Drawn By	Figure No.
PK	4

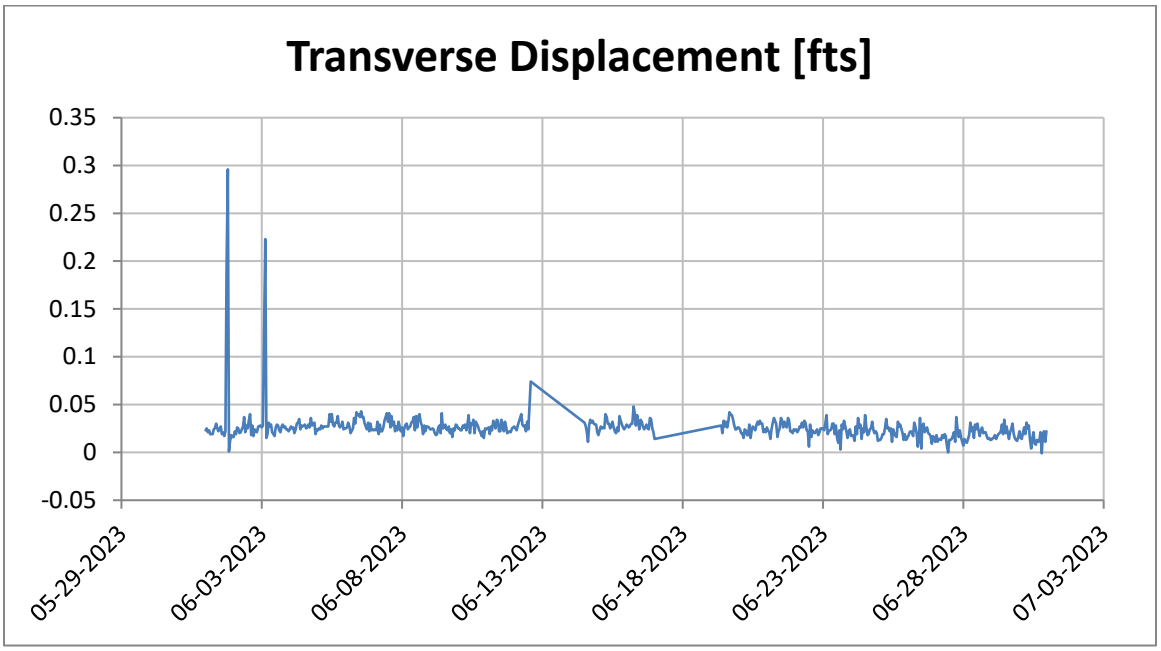
Stantec

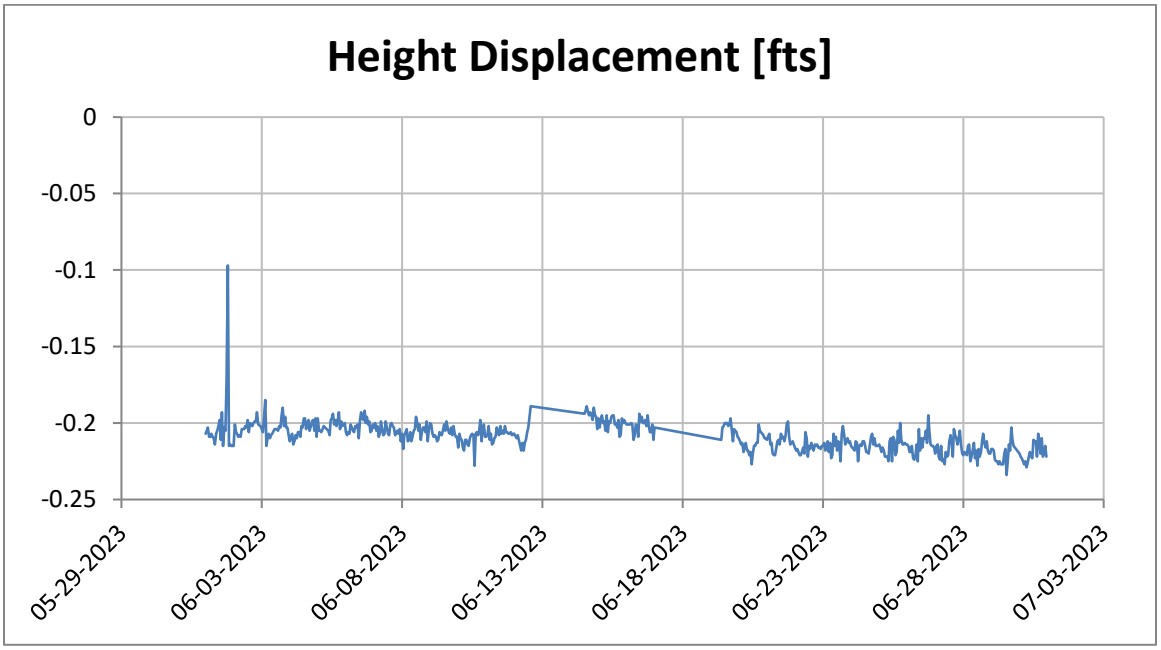
Prism Log

Prism	Date	Action	Comment
CP2	11-Mar-22	Prism Removed	Reclamation grading to affect prism in near future
CP3	11-Mar-22	Prism Removed	Reclamation grading to affect prism in near future
NP1	11-Mar-22	Prism Removed	Reclamation grading to affect prism in near future
TOE2	11-Mar-22	Prism Removed	Reclamation grading to affect prism in near future
CP4	11-Mar-22	Prism Added	Control Point Replacement
CP5	11-Mar-22	Prism Added	Control Point Replacement
TS1	12-Mar-22	Prism Added	New Prism Added
TOE3	30-Mar-22	Prism Removed	Reclamation grading to affect buffer filling activities
TOE4	8-Apr-22	Prism Added	New Prism Added
TOE5	8-Apr-22	Prism Added	New Prism Added
BR1	8-Apr-22	Prism Added	New Prism Added
BR2	8-Apr-22	Prism Added	New Prism Added
NP1	22-Apr-22	Prism Removed	Originally NP1. Prism re-set in same spot and is now NP3
NP3	22-Apr-22	Prism Added	
TOE3	22-Apr-22	Prism Removed	Originally TOE3. Prism moved to a higher elevation and is now TOE6
TOE6	22-Apr-22	Prism Added	
TOE1	22-Apr-22	Prism Removed	Reclamation grading to affect buffer filling activities
P4	17-Jun-22	Prism Removed	Prism removed due to rock deterioration
P69	20-Jul-22	Prism Removed	Prism was originally P69. It has been re-set to Higher Elevation and is now P69A. Related to base station relocation.
P69A	20-Jul-22	Prism Added	
P35	20-Jul-22	Prism Renamed	Prism was originally P35. It has been re-set to Higher Elevation and is now CP6. Related to base station relocation.
CP6	20-Jul-22	Prism Added	
CP5	20-Jul-22	Prism Renamed	Prism was originally CP5. It has been re-set to Higher Elevation and is now CP7. Related to base station relocation.
CP7	20-Jul-22	Prism Added	
CP1	20-Jul-22	Prism Removed	Not in line of sight of new base station.
CP4	20-Jul-22	Prism Removed	Not in line of sight of new base station.
TOE4	20-Jul-22	Prism Removed	Not in line of sight of new base station.
TOE6	20-Jul-22	Prism Removed	Not in line of sight of new base station.
TOE5	4-Aug-2022	Prism Removed	Out of line of sight of base station.
P63	15-Aug-2022	Prism Removed	Out of line of sight of base station.
NP2	28-Apr-2023	Prism Removed	Prism location eroded.
P1	12-May-2023	Prism Removed	Prism hit by falling rock.
B7200-1	1-Jun	Prism Added	New Prism Added
B7200-2	1-Jun	Prism Added	New Prism Added
B7200-3	28-Jun	Prism Added	New Prism Added
B7300-1	28-Jun	Prism Added	New Prism Added
B7300-2	28-Jun	Prism Added	New Prism Added
B7300-3	28-Jun	Prism Added	New Prism Added

Stantec

Prism BR1





Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Prism records slope creep movements.

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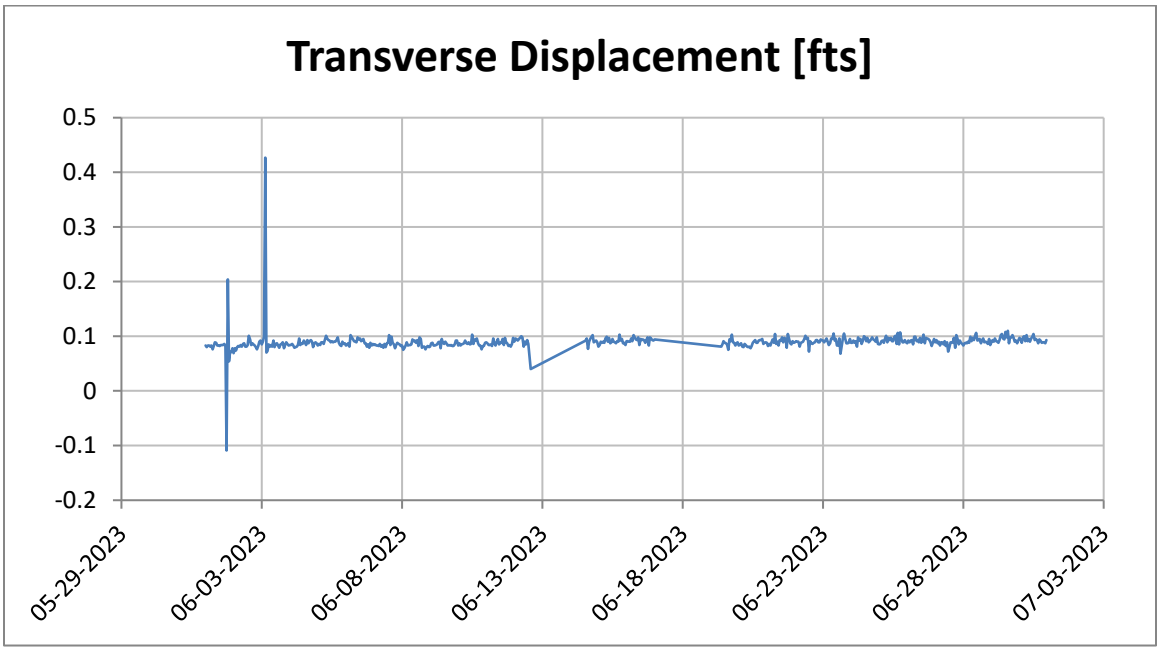
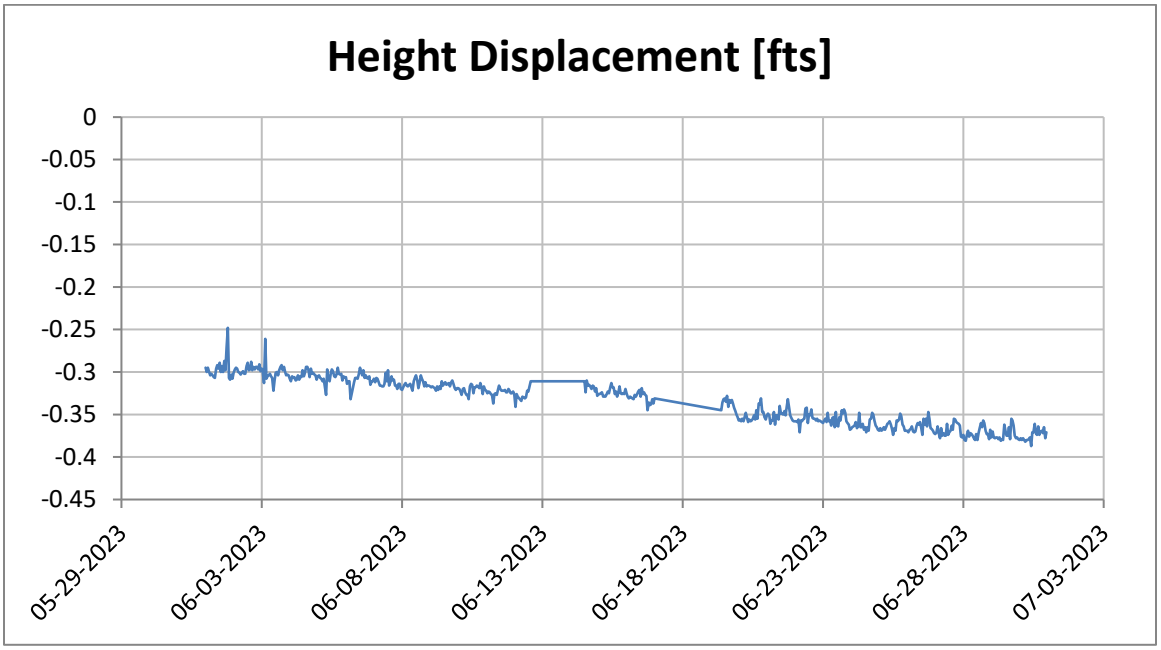
Stantec

Prism BR2



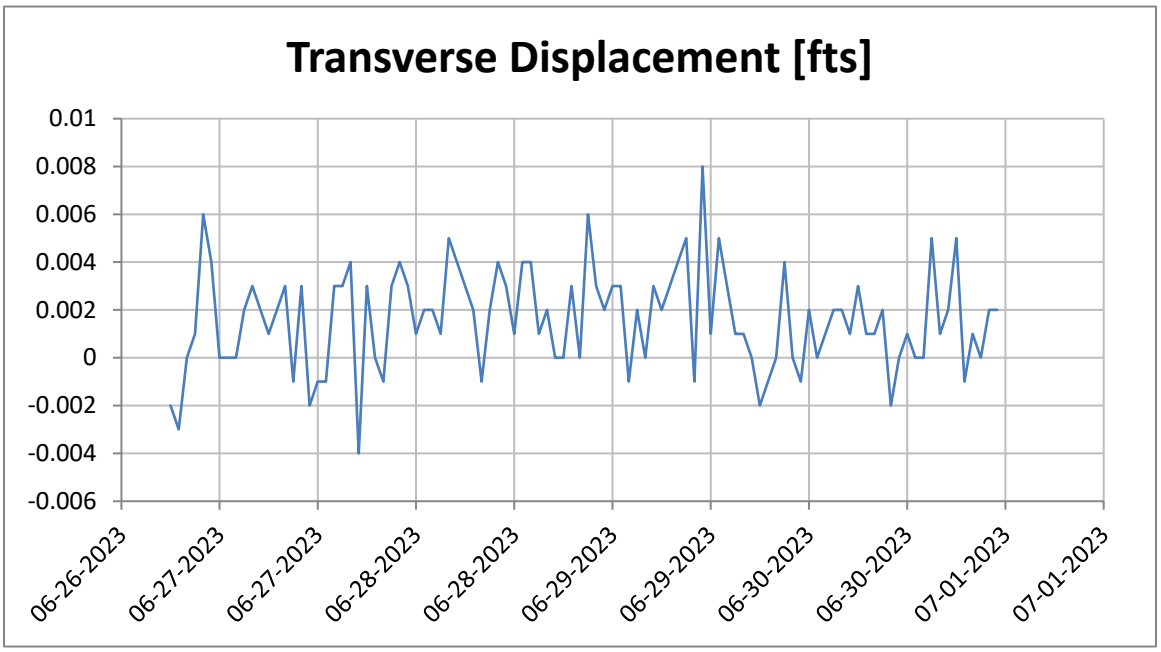


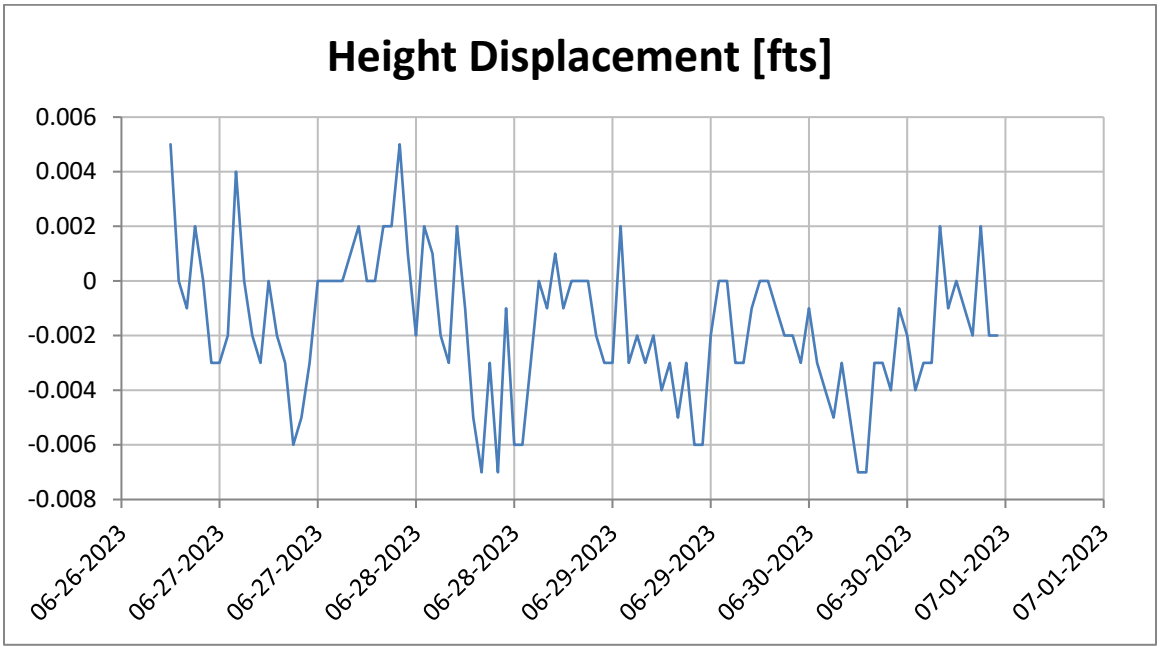
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Prism records slope creep movements.

Stantec

Prism B7200-1



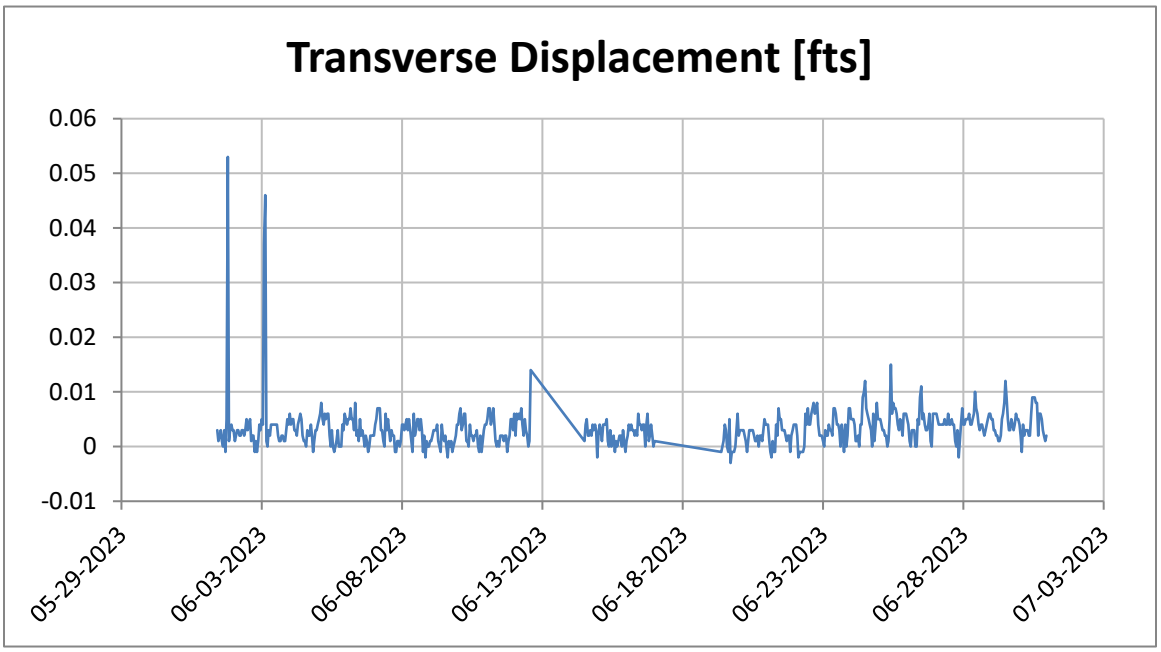


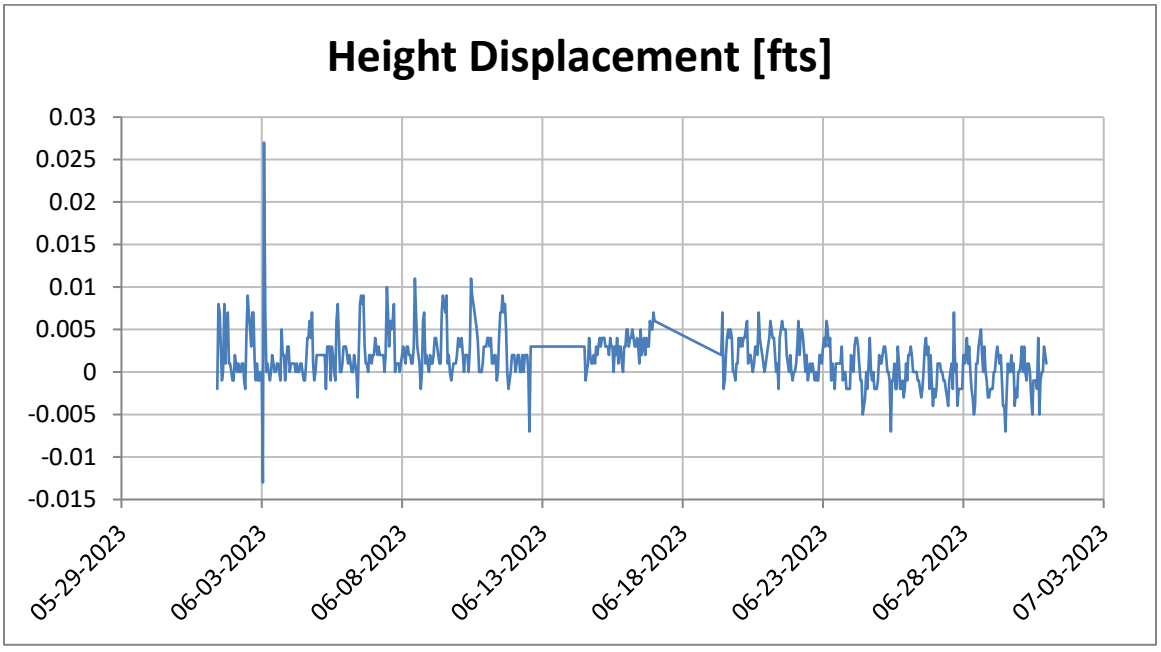
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. New prism installed in June.

Stantec

Prism B7200-2



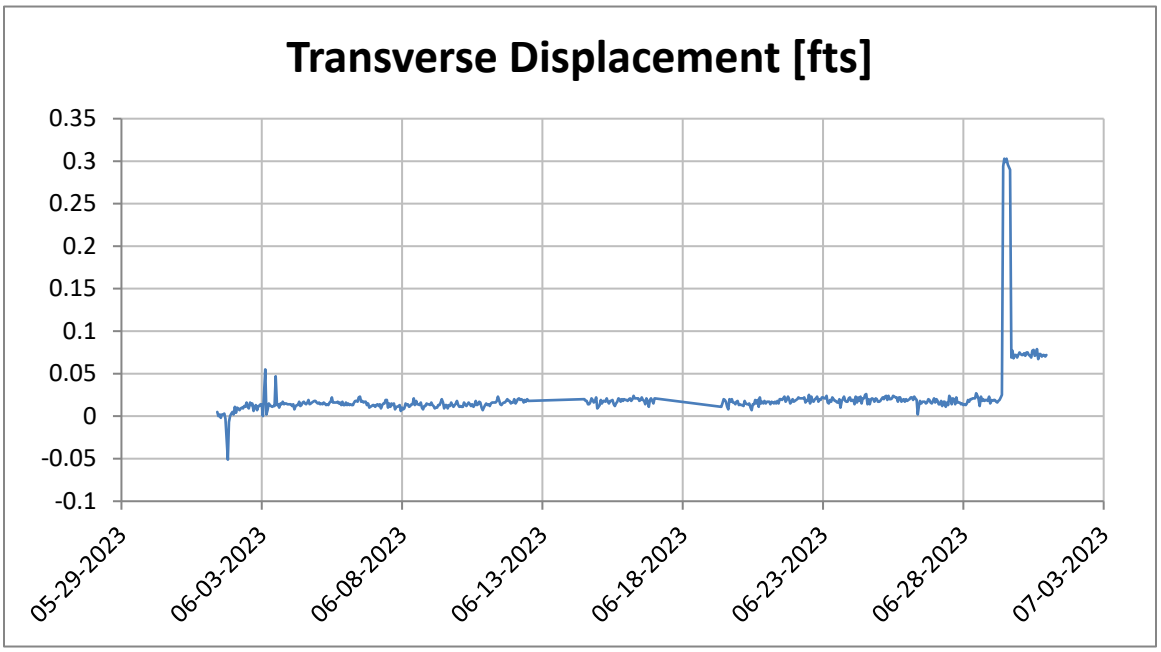


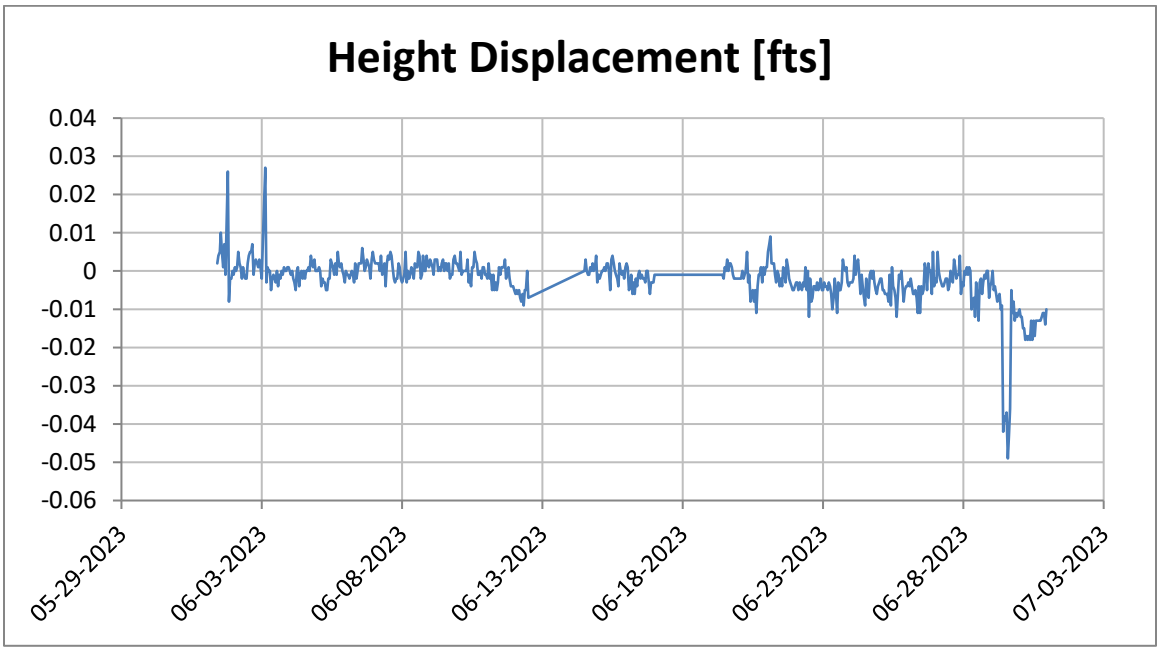
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. New prism installed in June.

Stantec

Prism B7200-3





Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. New prism installed in June.

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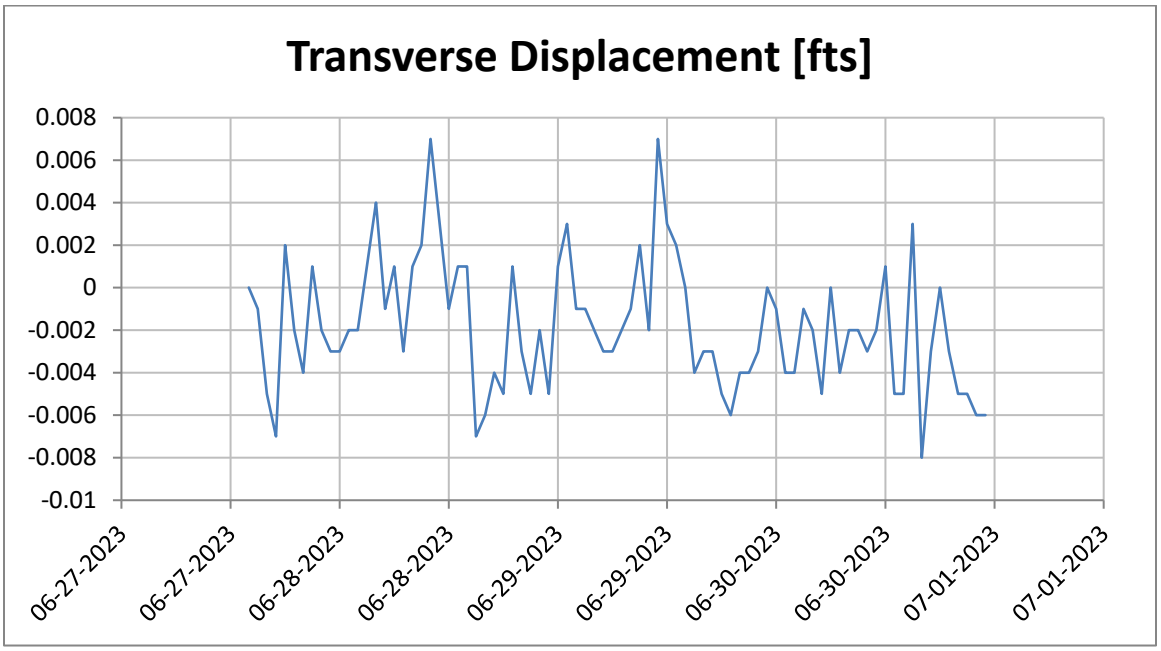
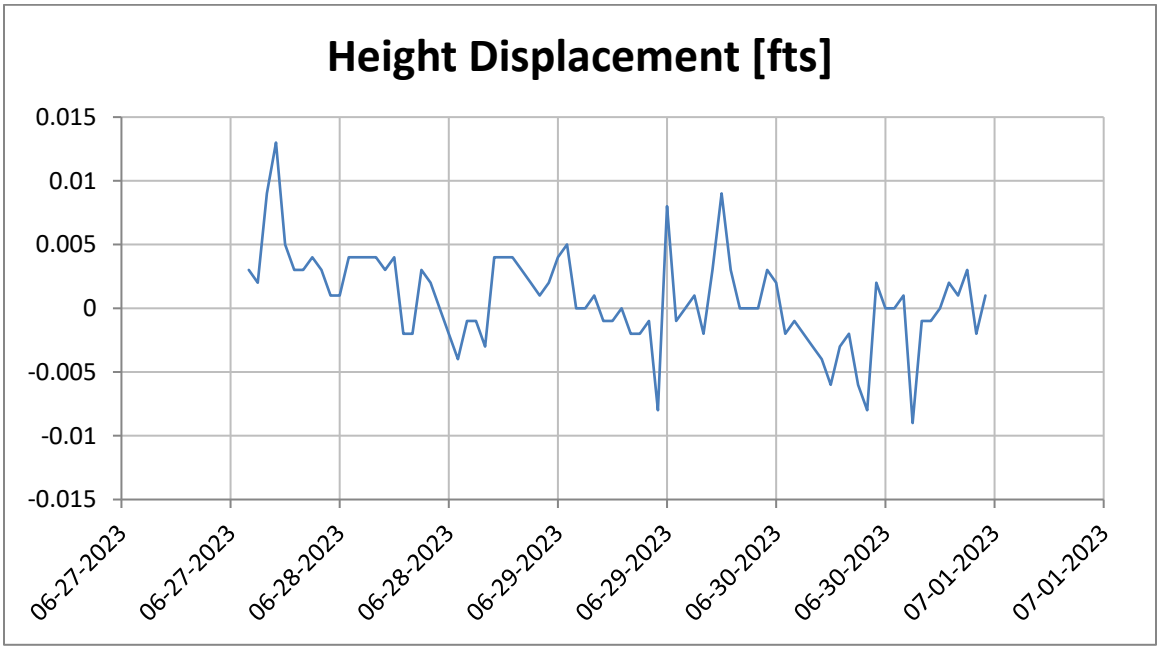
Stantec

Prism B7300-1





Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. New prism installed in June.

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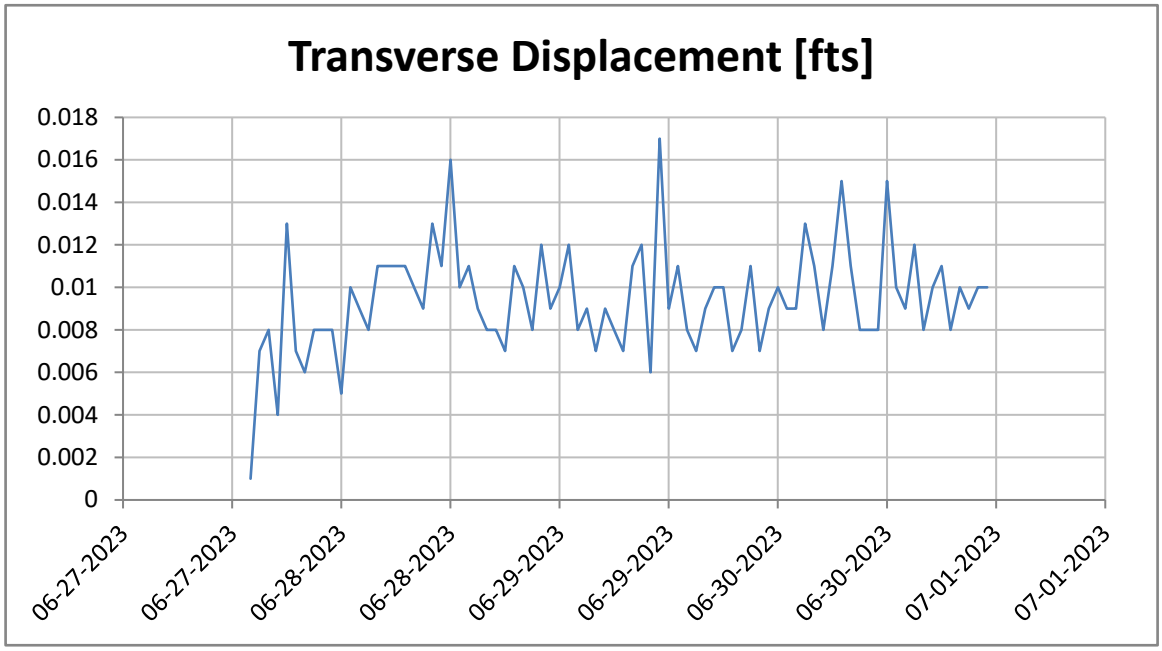
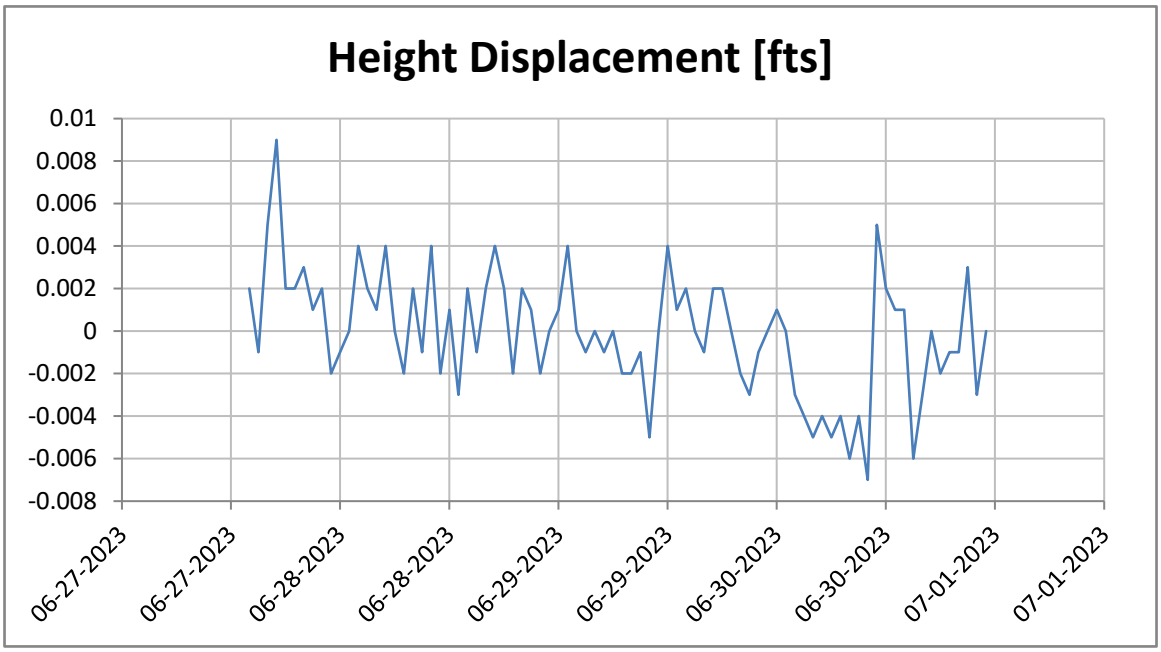
Stantec

Prism B7300-2



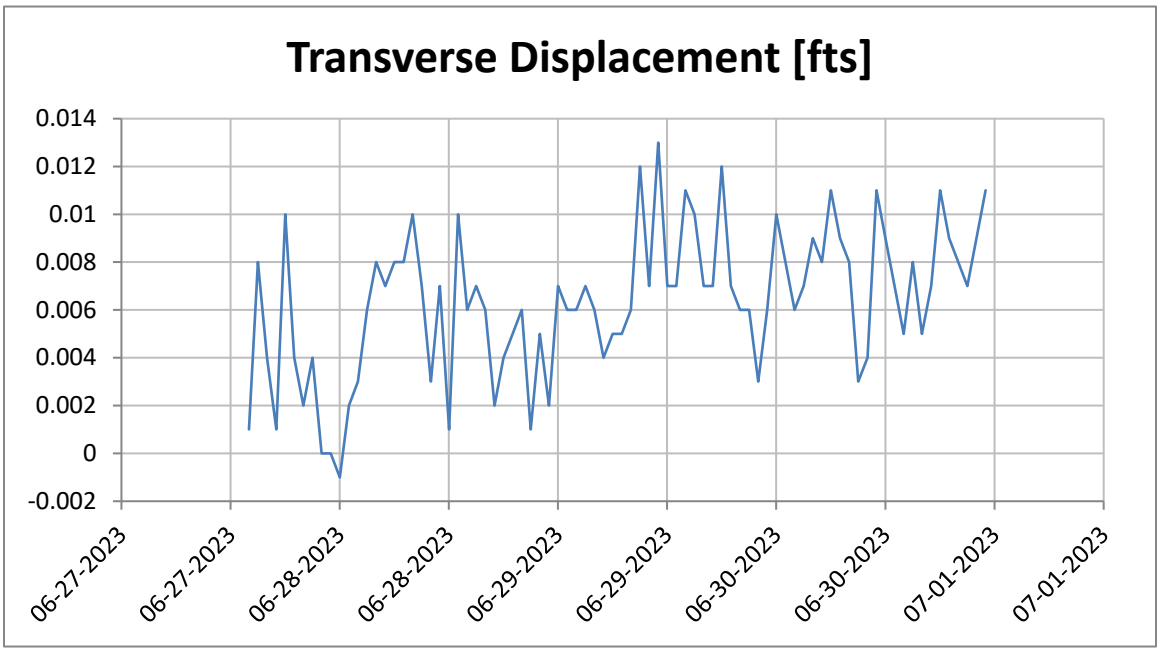


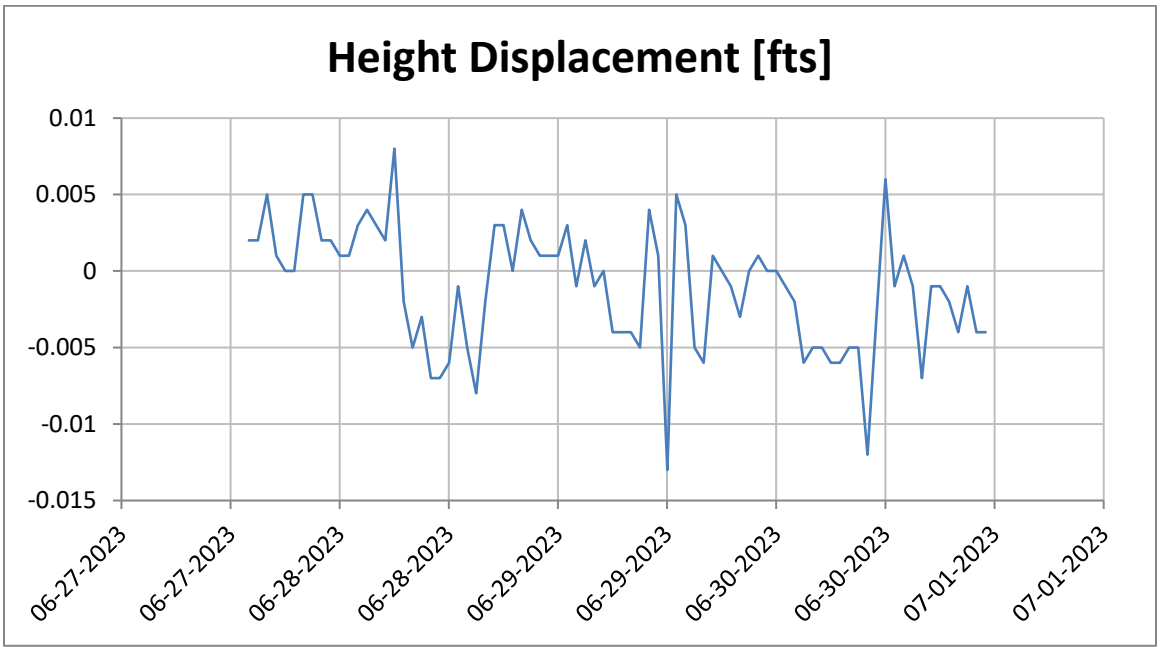
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. New prism installed in June.

Stantec

Prism B7300-3



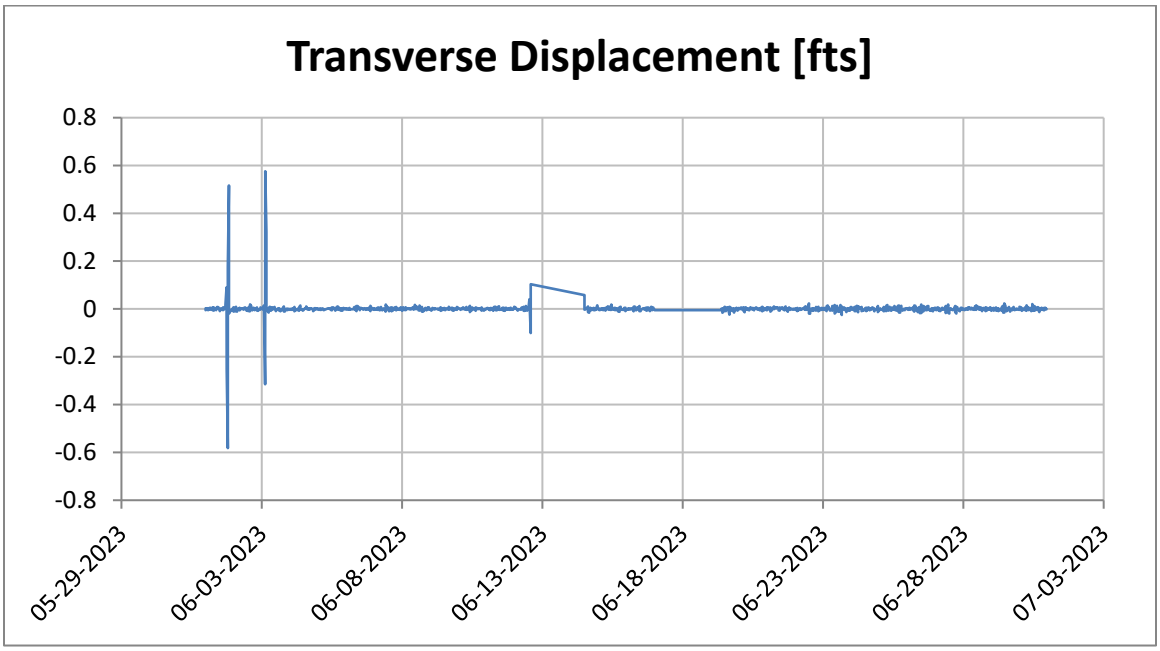


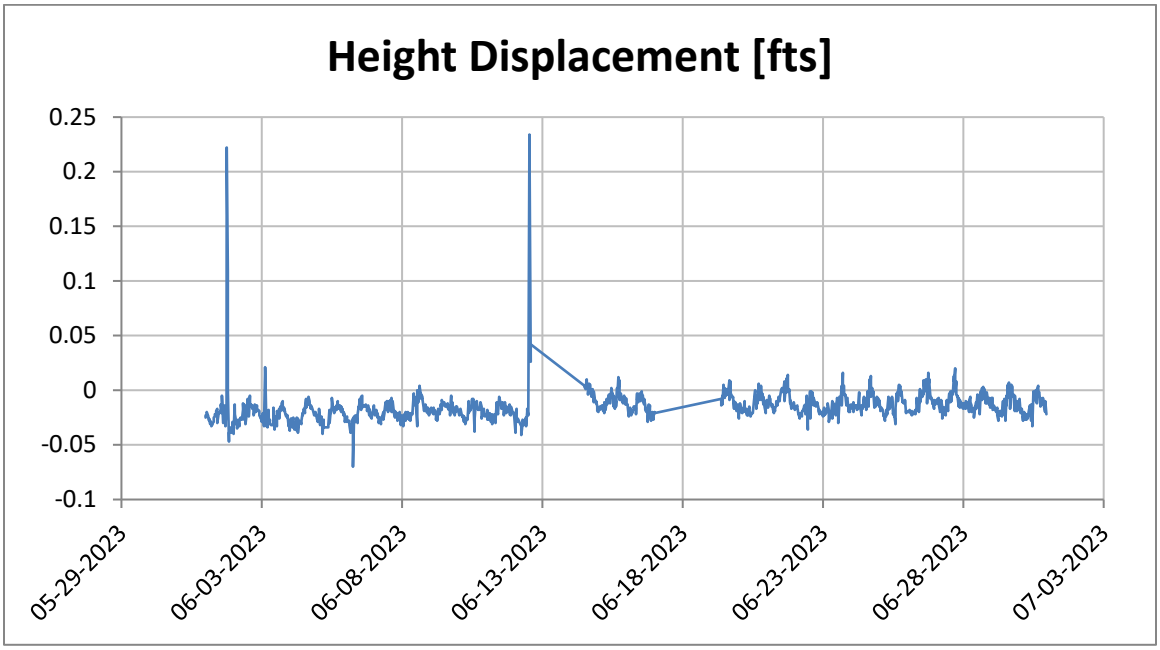
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. New prism installed in June.

Stantec

Prism CP6



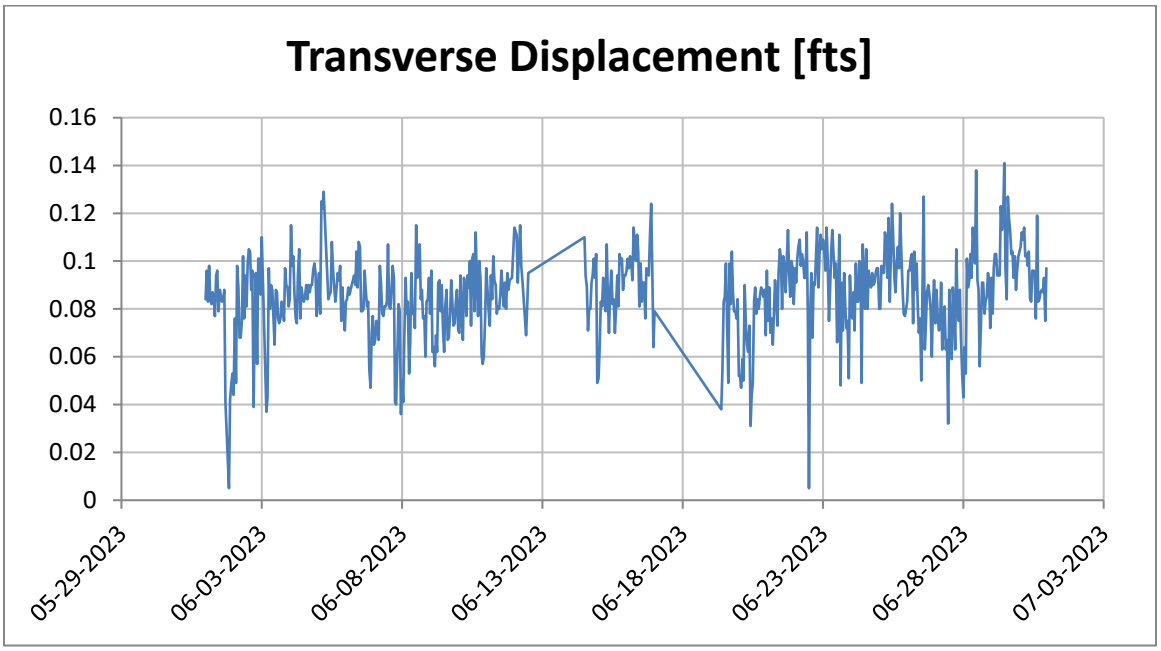


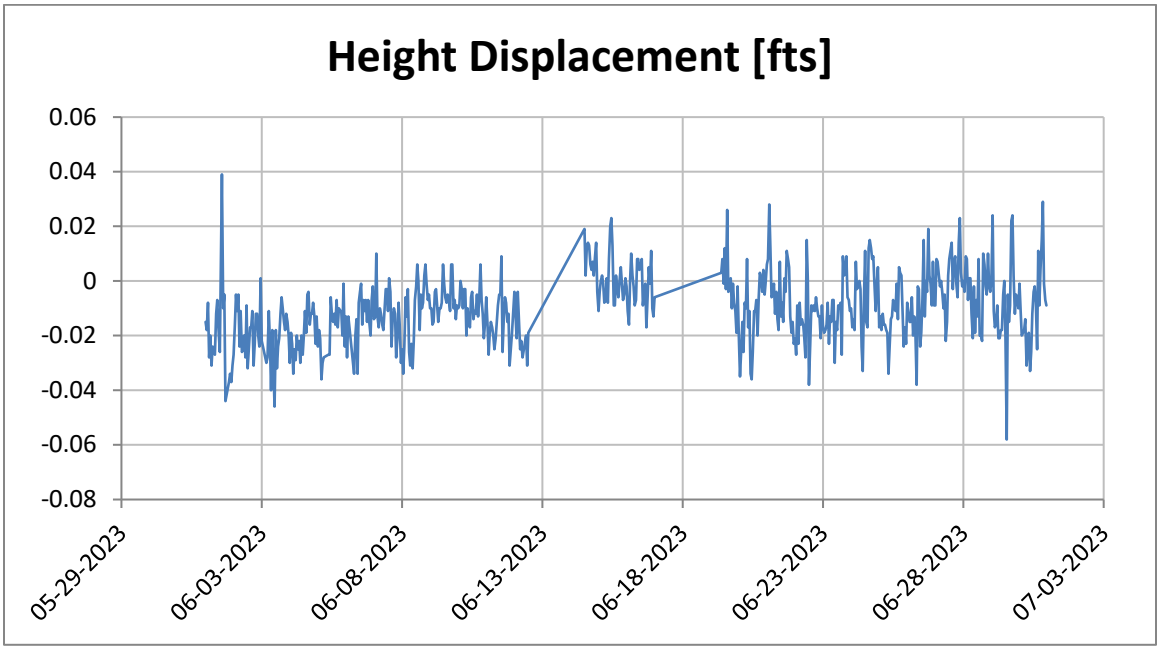
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.

Stantec

Prism CP7



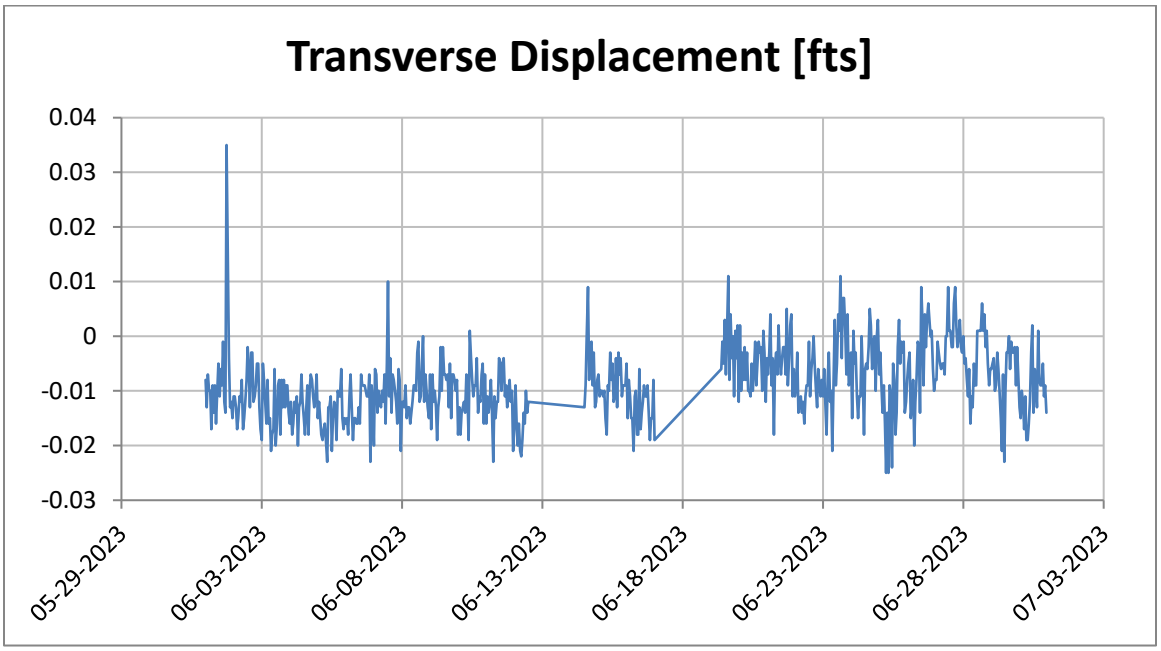


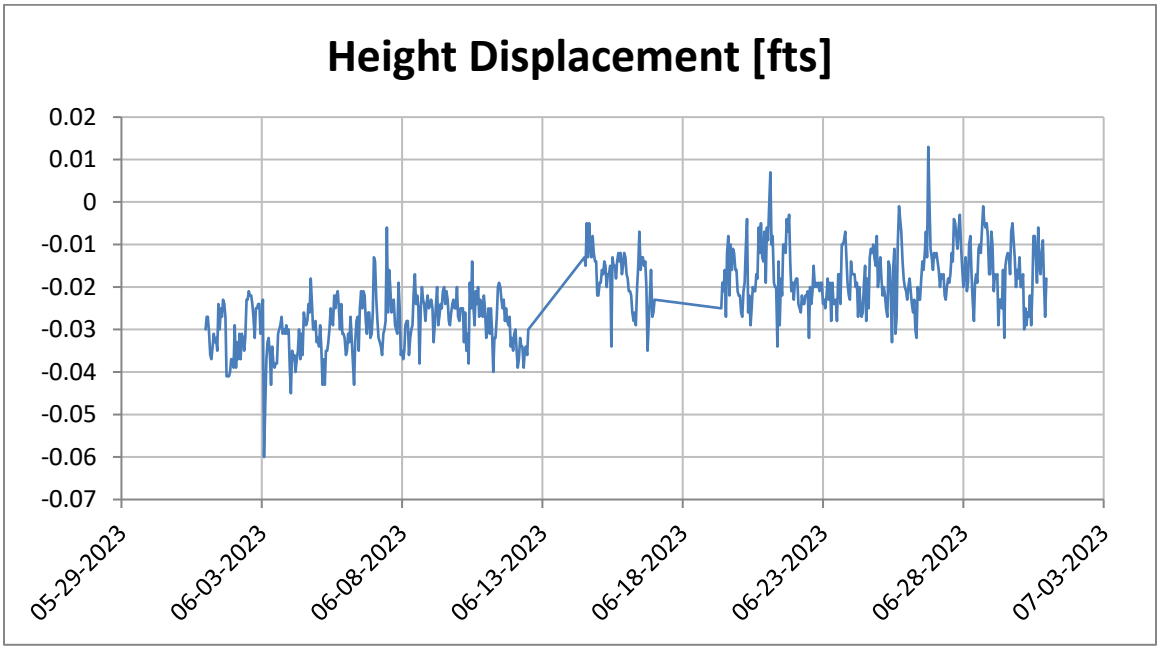
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.

Stantec

Prism P2



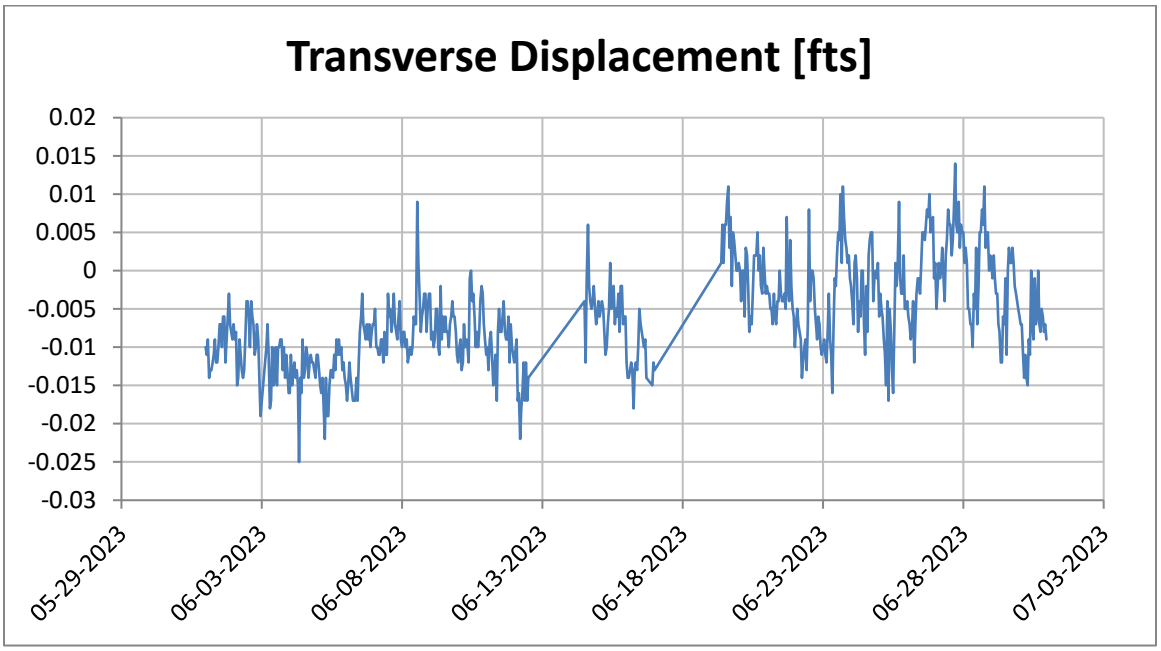


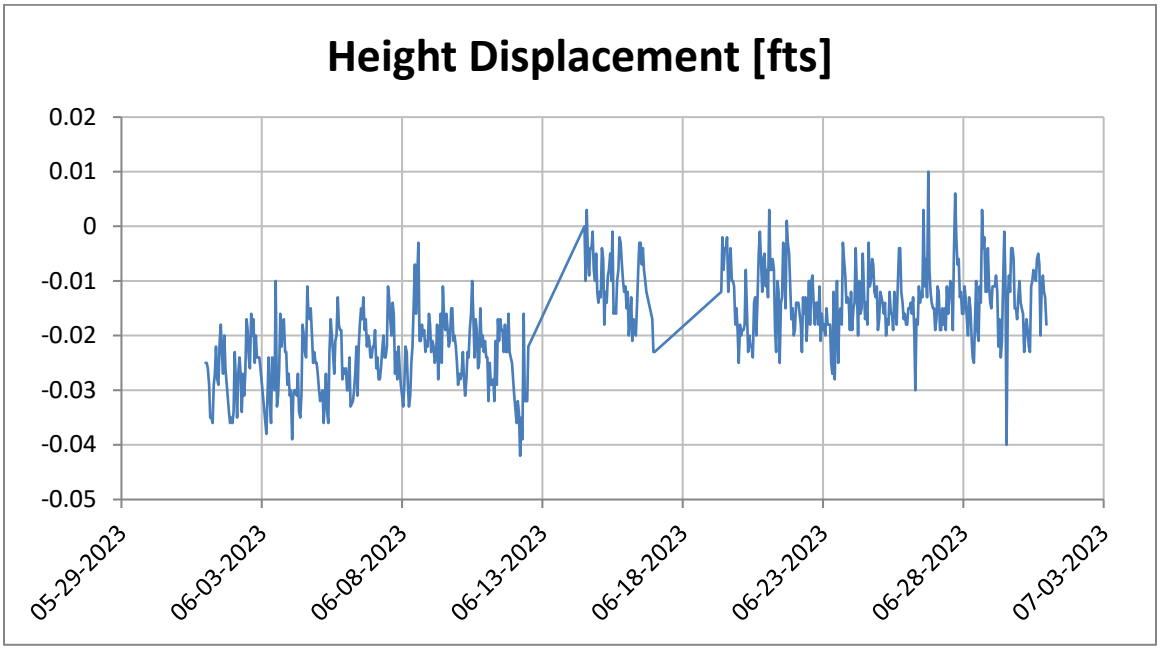
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Regression limit alert received on June 1.

Stantec

Prism P5



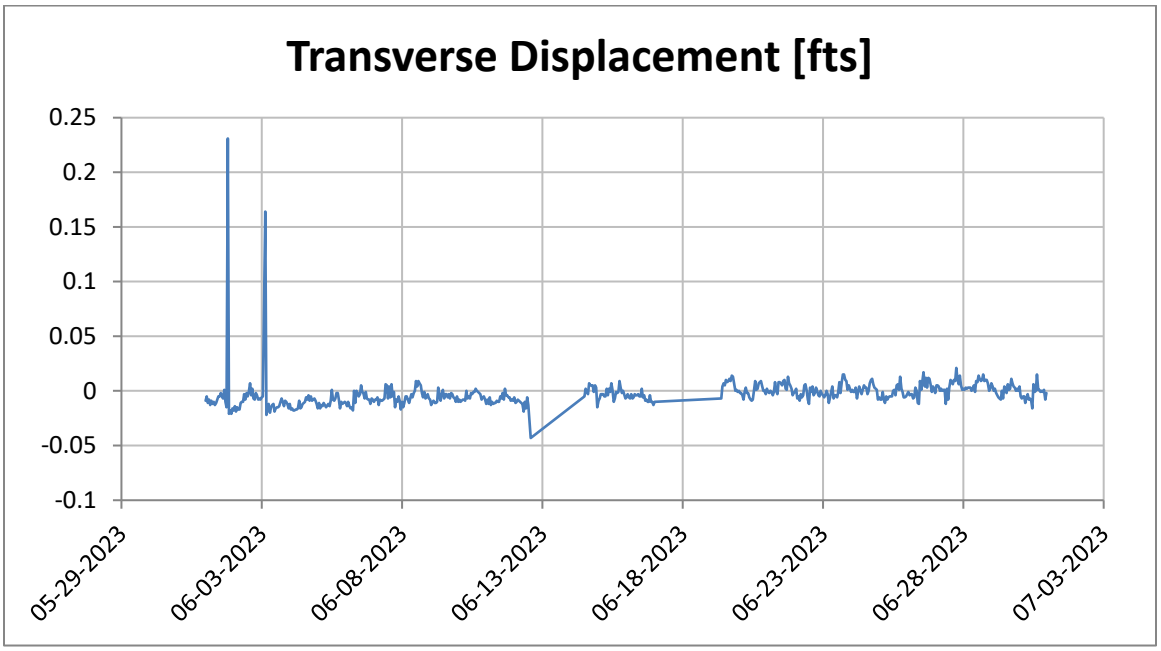


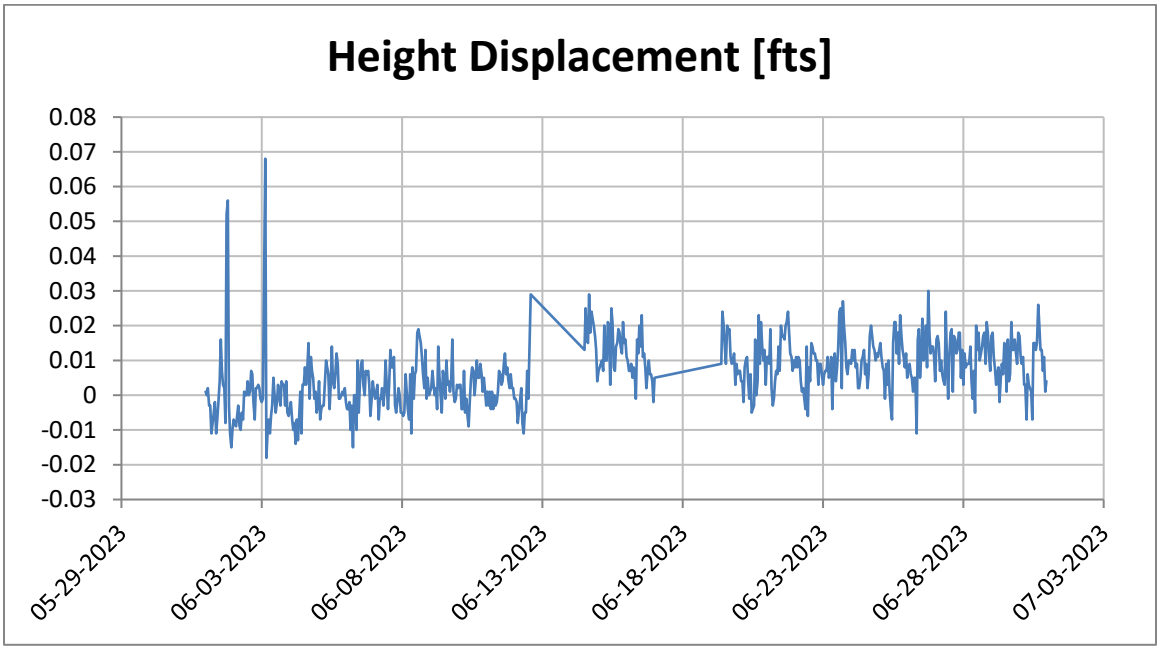
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.

Stantec

Prism P25



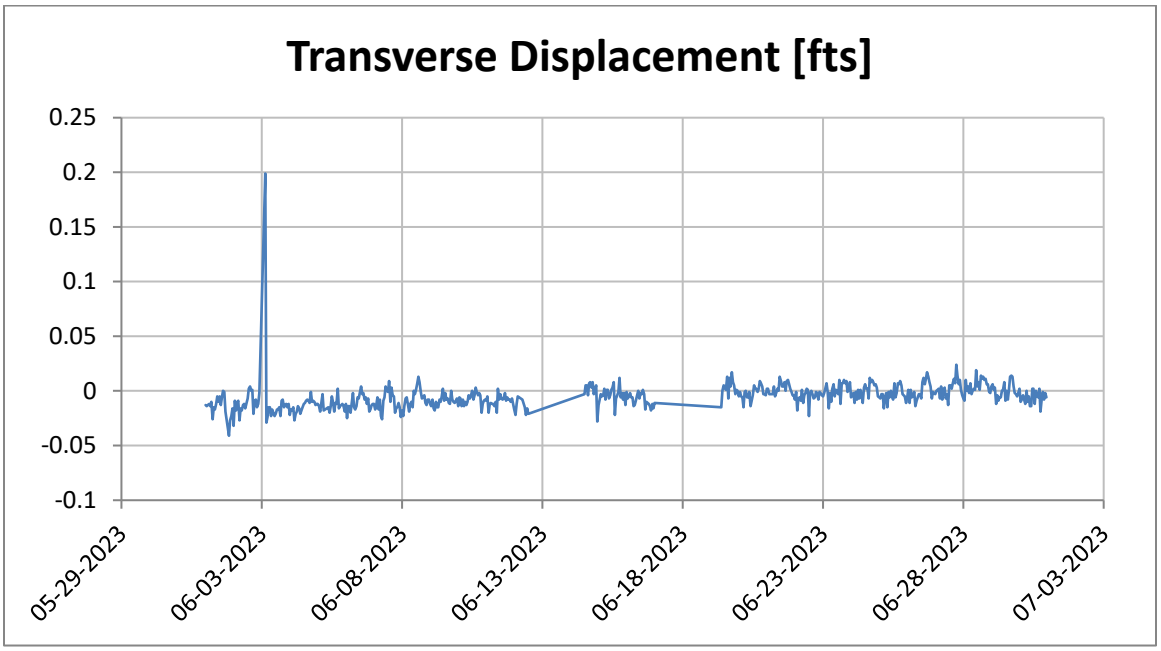


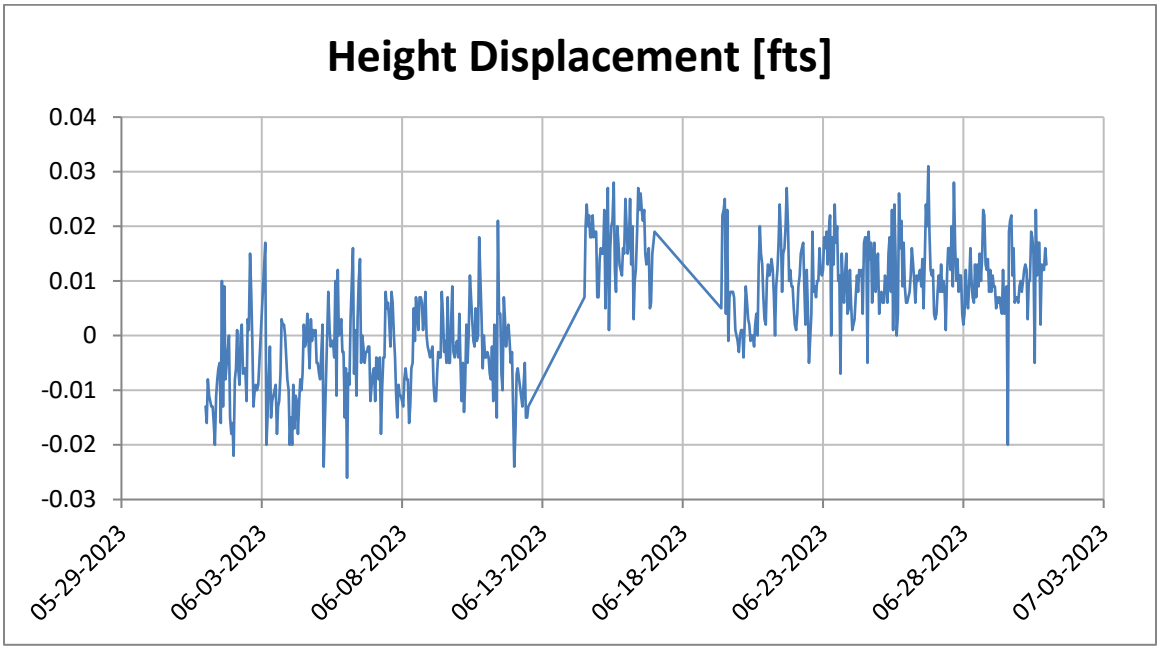
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Regression limit alerts received on June 1 and June 3.

Stantec

Prism P32



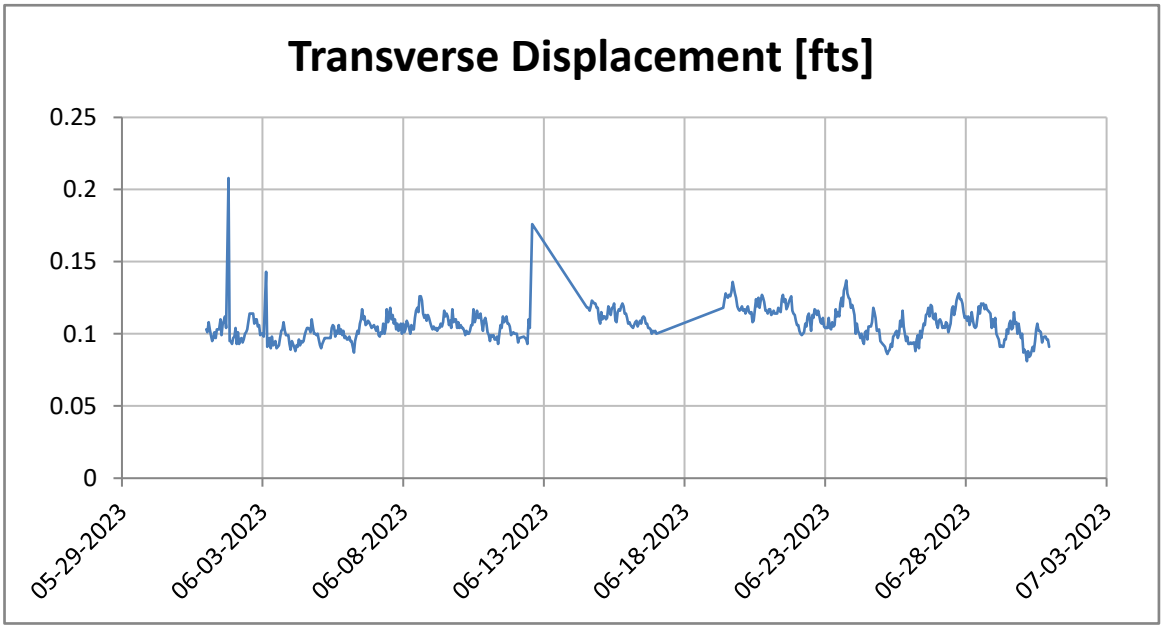


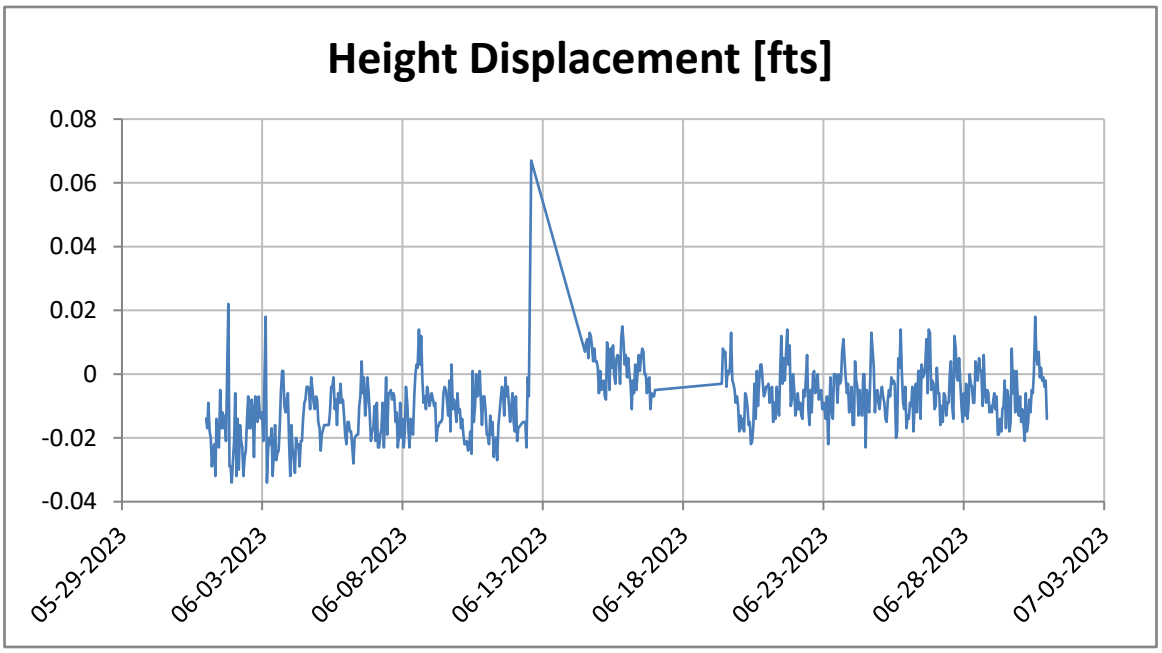
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Regression limit alert received on June 3.

Stantec

Prism P33





Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Regression limit alerts received on June 1, June 2, June 3, and June 12.

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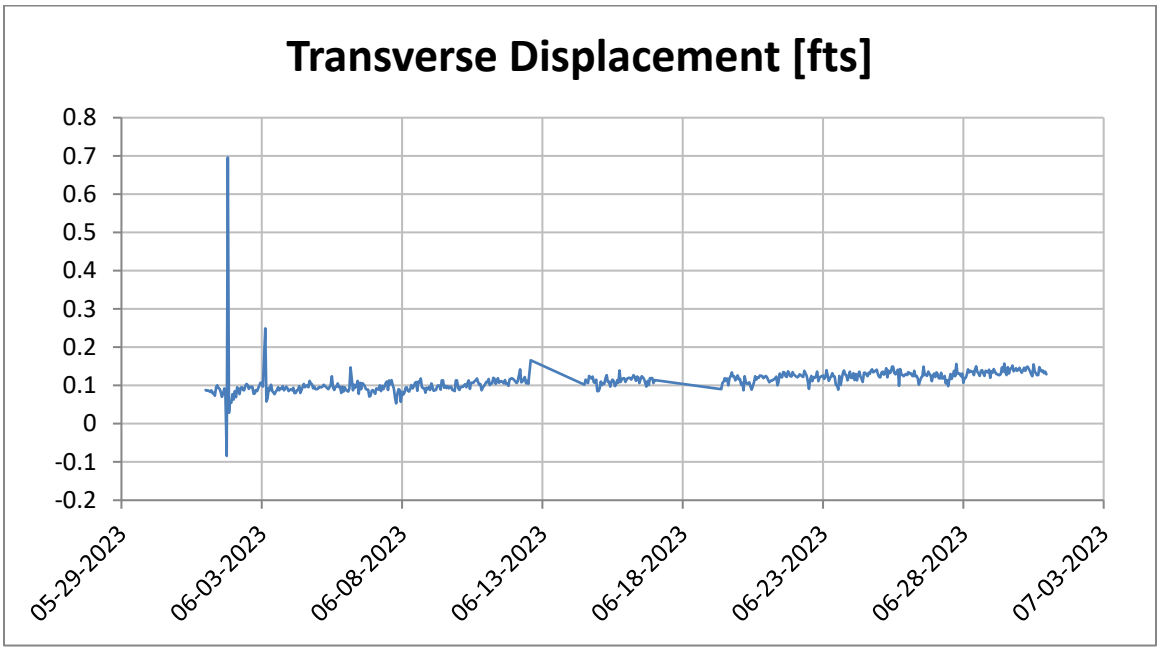
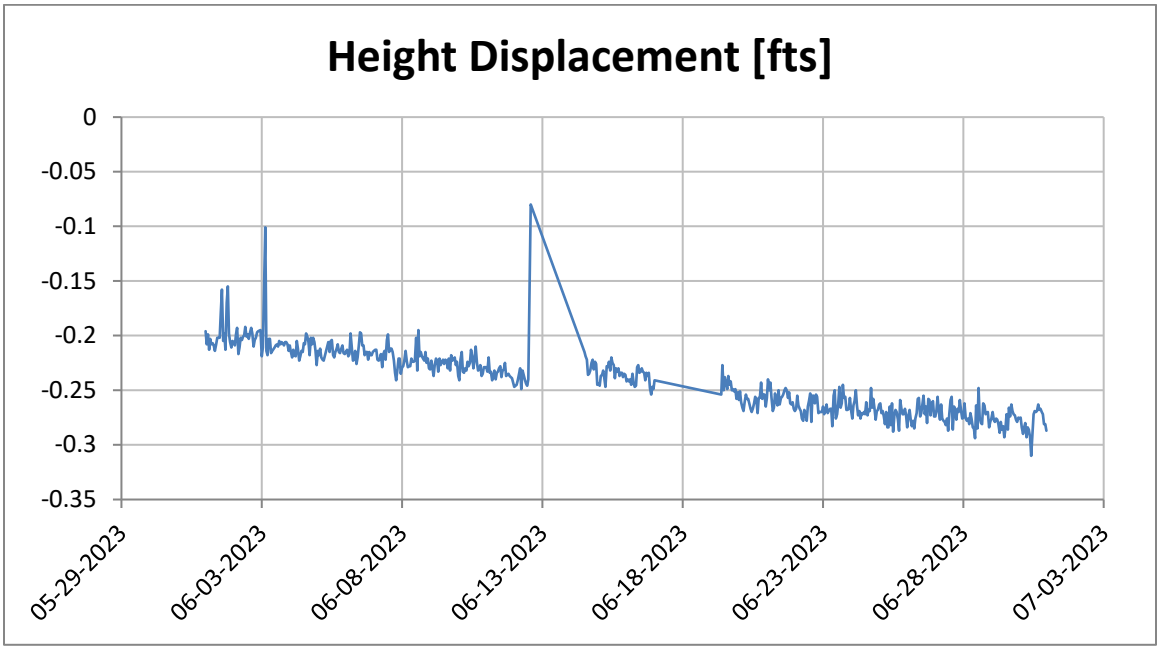
Stantec

NP3



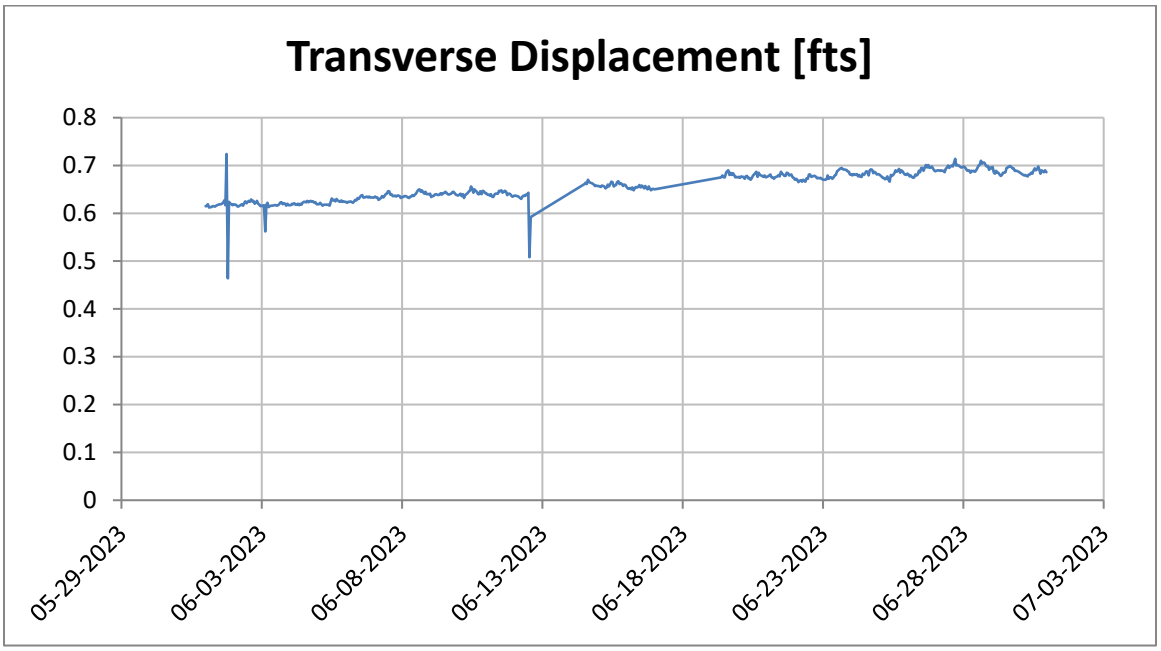


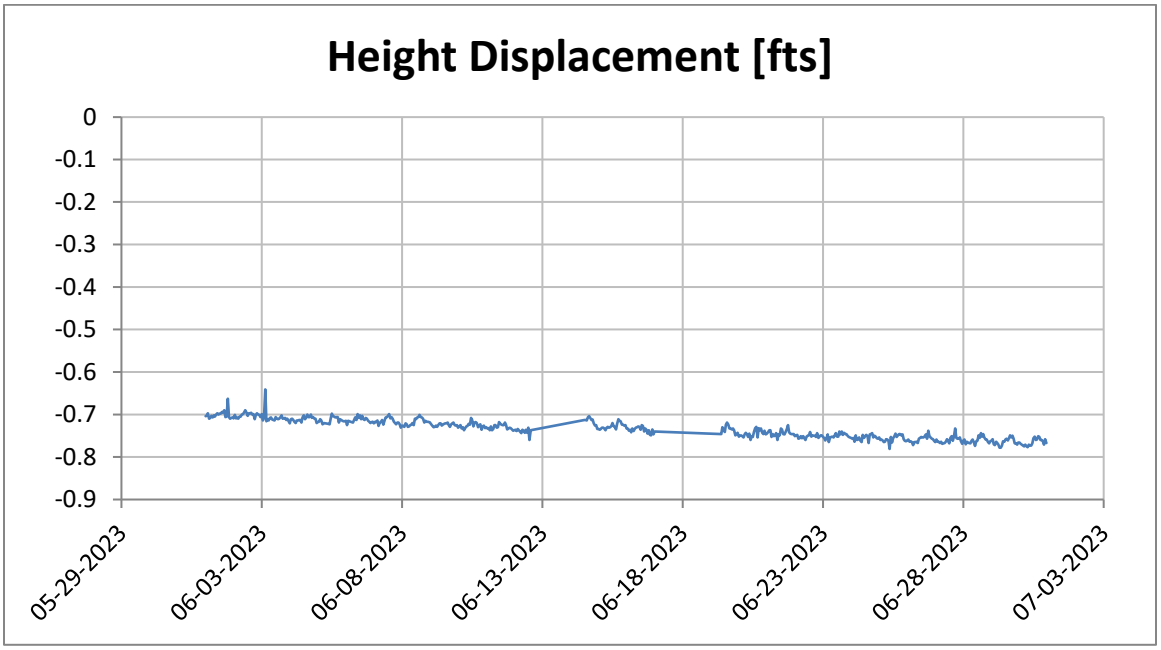
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Prism records slope creep movements.

Stantec

NP66



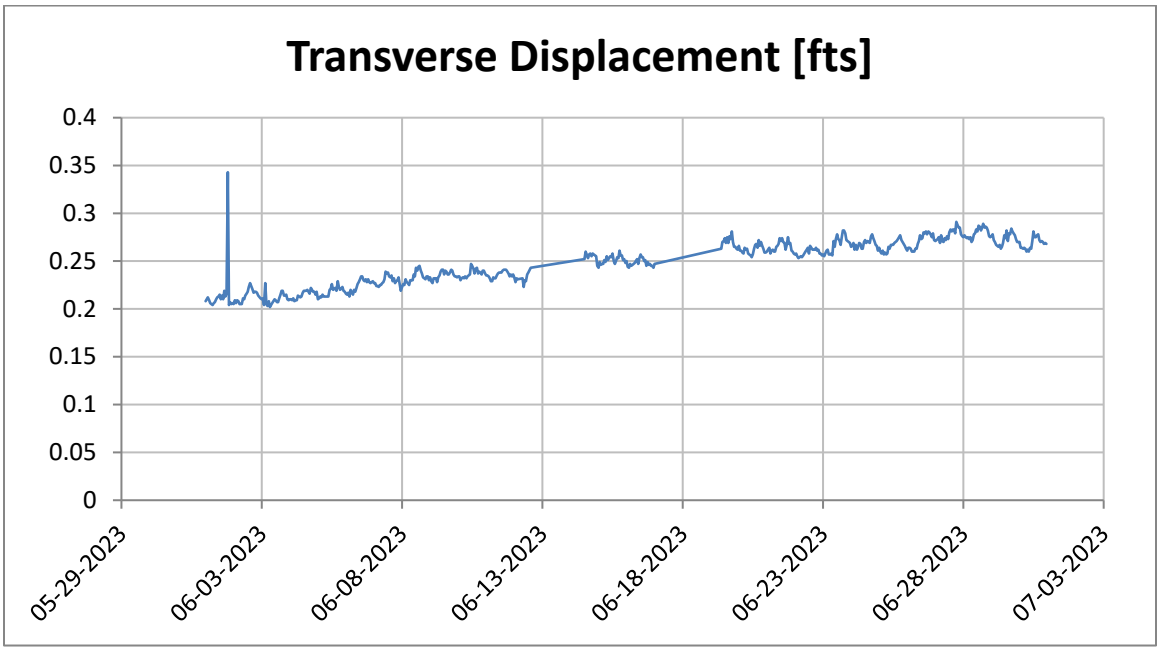


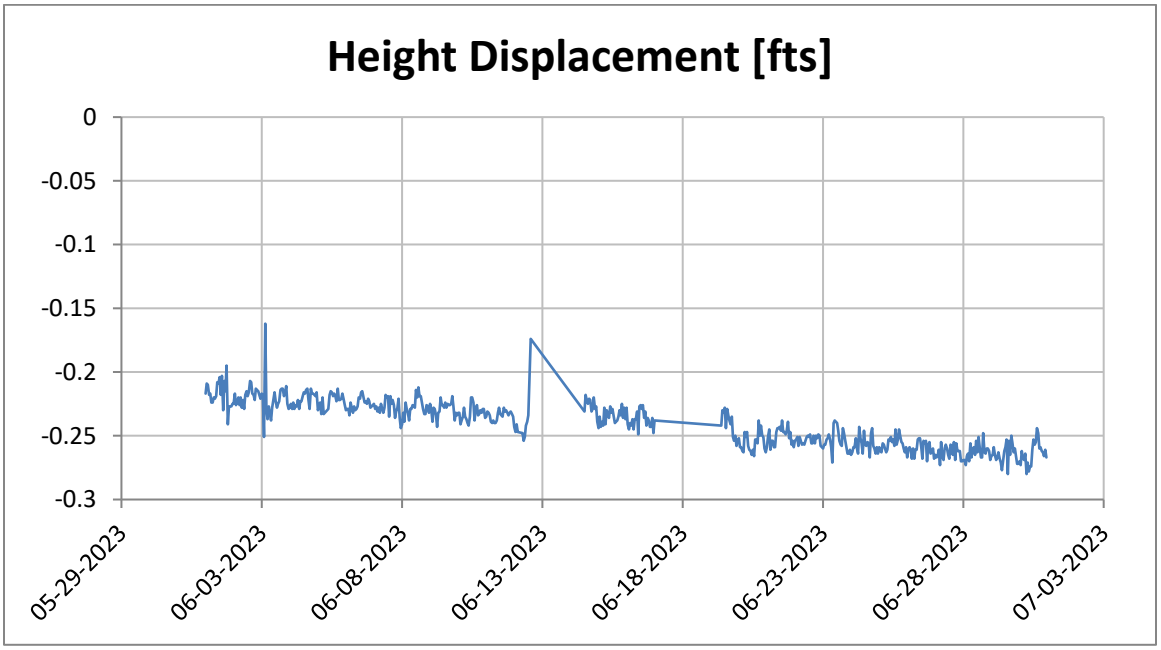
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Prism records slope creep movements.
6. Regression limit alerts received on June 1 and June 12.

Stantec

P69A



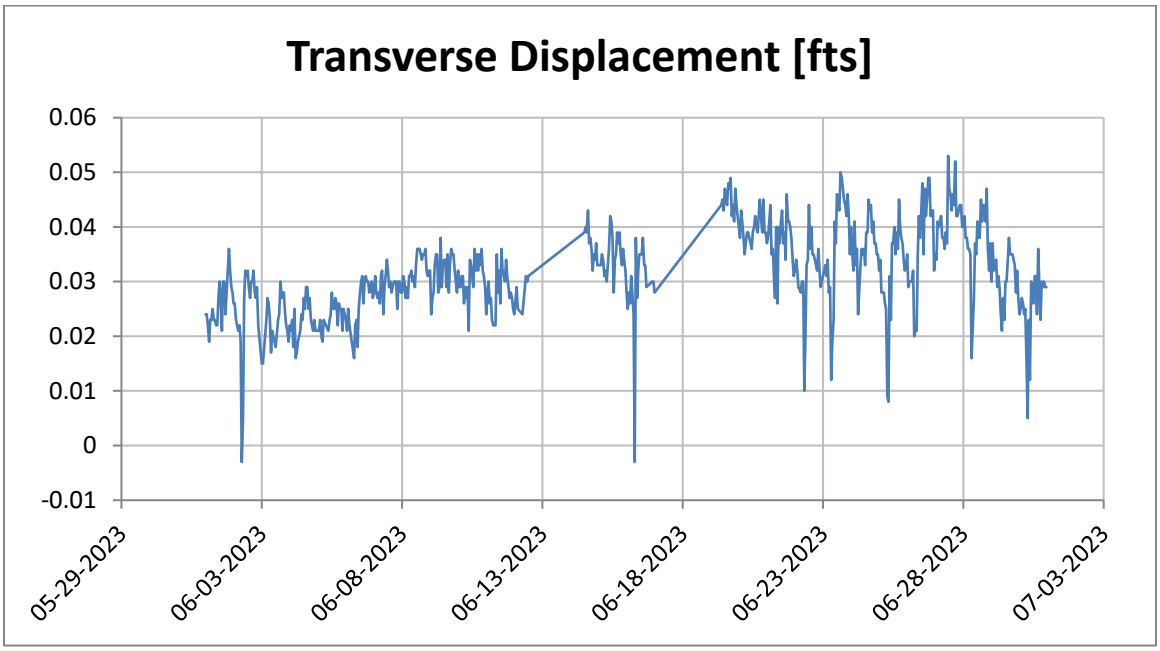


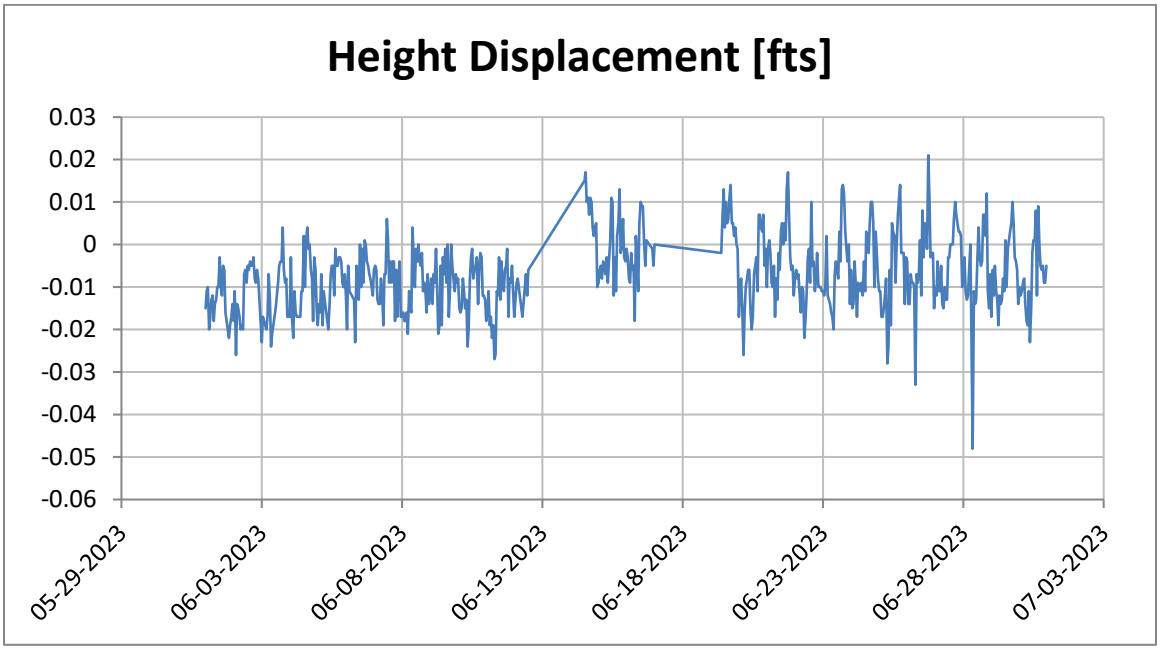
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Prism records slope creep movements.
6. Regression limit alerts received on June 1, June 2, and June 12.

Stantec

Prism P70



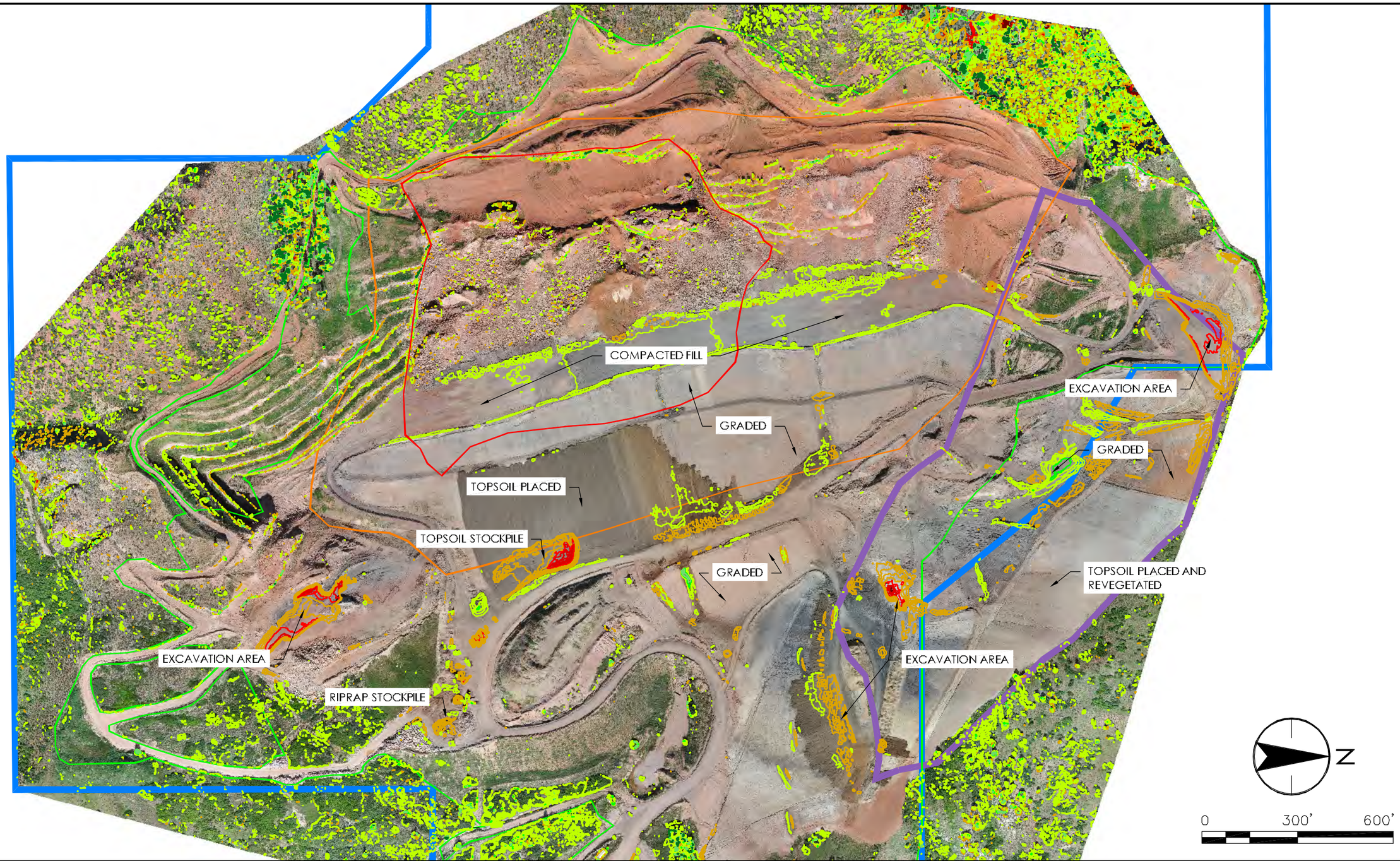


Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Regression limit alerts received on June 1 and June 2.

Appendix C

Drone Survey



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Stantec

Stantec Consulting Services Inc.
2000 South Colorado Boulevard Suite 2-300
Denver CO 80222-7933
Tel (303) 758-4358
www.stantec.com

LEGEND

- Permit/Affected Lands Boundary
- City Grading Permit Boundary
- Proposed Disturbance Limit
- Landslide Extent
- Buttress Fill Extent
- Comparison Contour. Increase in elevation. (CI=2')
- Comparison Contour. Decrease in elevation. (CI=2')

1. COMPARISON OF DRONE FLIGHTS FROM 05/30/2023 to 06/28/2023.

Client/Project
RIVERBEND INDUSTRIES INC.

PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
EXISTING PRISMS WITH CURRENT SURFACE

Revision	Date
#	2023.07.31
Drawn By	Figure No.
PK	5

Appendix D

Compaction Testing Results

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Stantec Consulting Services Inc.
2000 South Colorado Boulevard Suite 2-300
Denver CO 80222-7933
Tel (303) 758-4058
www.stantec.com

LEGEND

- Permit/Affected Lands Boundary
- City Grading Permit Boundary
- Proposed Disturbance Limit
- Landslide Extent
- Buttress Fill Extent
- Compaction Test Location

N

0 150' 300'

Client/Project
RIVERBEND INDUSTRIES INC.

PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
COMPACTION TEST LOCATIONS

Revision
#

Date
2023.07.31

Drawn By
PK

Figure No.
6

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Stantec

Compaction Testing Log

BCC Test	Test No.	Date	Elevation (ft)	Northing (ft)	Easting (ft)	Wet Density (pcf)	Moisture Content (%)	Dry Density (pcf)	Compaction (%)
Test EEEE7	#671	1-Jun	1401650	3173119	133.3	9	122.3	99	#671
Test EEEE8	#672	1-Jun	1401467	3173202	129.7	8.2	119.8	97	#672
Test EEEE9	#673	1-Jun	1401214	3173207	129.9	13.3	114.6	93	#673
Test EEEE10	#674	1-Jun	1401071	3173309	132.7	4.6	127	100	#674
Test FFFF1	#675	7-Jun	1402748	3172898	130.5	15.9	114.5	93	#675
Test FFFF2	#676	7-Jun	1402002	3172907	127.6	16.4	111.2	90	#676
Test FFFF3	#677	9-Jun	1402509	3172922	128.7	13.2	115	94	#677
Test FFFF4	#678	9-Jun	1402401	3172974	132.5	16.5	116	95	#678
Test FFFF5	#679	9-Jun	1402225	3172954	131.5	16.5	115	94	#679
Test FFFF6	#680	9-Jun	1402019	3172989	133.2	9.5	125.7	100	#680

Notes:

1. As of June 30, 2022, a total of 2,492,600 yd3 had been placed and compacted. This requires at least 499 compaction tests, and 899 tests have been taken.