Stantec

To:	Jerald Schnabel	From:	Paul Kos
	Riverbend Industries Inc.		Denver, CO 80222
File:	February 2023 Monitoring Summary	Date:	March 24, 2023

Reference: February 2023 Geotechnical Monitoring Summary Pikeview Quarry

1.0 INTRODUCTION

Stantec Consulting Services Inc. (Stantec) has prepared this February 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 February 2023. Continuous monitoring by the robotic survey system began in 2010 and has continued through the month of February 2023. Visual inspections of the slopes were performed by Riverbend employees and Stantec engineers.

1.1 PURPOSE

The purpose of this report is to summarize the February 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 February 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 February 24, 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 February 2023.
- 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 (Photo 1).
- Operators continue to place compacted material in the buttress zone. Material is 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 (Photo 2).
- Offsite topsoil was stockpiled at the base of the buttress area with the additional topsoil and growth medium. This stockpile location is preparation for spreading topsoil and revegetating the lower slopes of the buttress area, which is planned for Spring 2023.
- 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.
- No cracking was observed on the native granite slopes above the extents of the disturbed area (Photo 7).
- Compaction testing continues at the rate of at least one test per 5,000 cubic yards of fill placed in the buttress area. (Photo 8)
- Known cracks were monitored for changes. Currently the cracks are not growing in any of the areas on the slopes of the site. The hummocky field in the area immediately above the southern extent of the slide shows evidence of cracking, but they are not fresh or active. No new or open cracks were found immediately inside or next to the slide area. (Photo 7 and 8)
- 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. To date, no ponding has been observed.

- 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 15 active prisms; 2 prisms were control points located outside the slope movement area and 13 prisms were located on the slopes surrounding the landslide area. As the slope is backfilled and graded, the existing prisms will be removed, and additional prisms will be installed. No prisms were removed in February. 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 alarms 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 alarm, 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. On February 2 and 24, alarms were received from prisms P2 and P33; in each case, the subsequent readings returned to normal, and the alarms are assumed to be data errors related to weather conditions, sun glare, or animal activity. In each case the data suddenly increased and then decreased, and the readings have returned to normal. Other alarms were determined to be caused by equipment operations blocking the prism, weather conditions, or sun glare. The alarms are listed in Table 2.

Table 2 Alarm Summary

Date(s)	Alarm	Cause/Actions taken	Issue Resolved
1-Feb	CP7 not found	Single event. Believed to be related to equipment operations.	1-Feb
2-Feb	Communication errors	Single set of readings impacted before being fixed.	2-Feb
2-Feb	P2 regression limit received	Single event. Believed to be related to animal activity. No signs of movement when prism was inspected.	2-Feb
8-Feb	CP7 not found	Single event. Believed to be related to equipment operations.	8-Feb
8-Feb to 9-Feb	Points not found	Snow and fog. No work being performed at time of alerts.	9-Feb
14-Feb	CP7 not found	Single event. Believed to be related to equipment operations.	14-Feb
14-Feb to 15-Feb	Points not found	Snow and fog. No work being performed at time of alerts.	15-Feb
22-Feb	Points not found	Snow and fog. No work shut down.	22-Feb
23-Feb	Points not found	Snow and fog. Limited work due to weather.	23-Feb
24-Feb	Points not found	Snow and fog. No work being performed at time of alerts.	24-Feb
24-Feb	P33 regression limit received	Single event. Weather related data error. No work during alert.	24-Feb

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 movement for 12 of 15 prisms with recorded displacements limited to data scatter and not actual movements. Prisms BR1, BR2, and NP66 are located above the landslide, and these prisms also recorded slope creep movements at slow velocity. This settlement is likely related to the landslide material consolidating under its own weight. New prisms are placed in areas where slope creep movements are likely to be recorded; therefore, slope creep movements being recorded at more locations is expected to occur. 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	-0.055	-0.120	0.0118	0.2097	Slope creep movements.
BR2	-0.018	-0.133	0.0146	0.2334	Slope creep movements.
CP6	-0.004	0.001	-0.0188	0.0146	
CP7	-0.004	0.001	-0.0188	0.0146	
NP2	0.049	0.006	0.0072	0.0724	
NP3	0.042	-0.003	0.0271	0.0471	
NP66	0.024	-0.075	0.0065	0.1067	Slope creep movements.
P1	-0.020	-0.023	-0.0123	0.0313	
P2	-0.017	-0.005	-0.0155	0.0187	
P5	-0.018	-0.008	-0.0095	0.0197	
P25	-0.015	0.009	-0.0080	0.0212	
P32	-0.006	0.021	-0.0028	0.0396	
P33	0.008	-0.011	0.0022	0.1377	
P69A	0.076	-0.044	0.0233	0.2203	
P70	-0.019	0.015	-0.0011	0.0320	

4.0 DRONE SURVEY

The site was flown for aerial imagery using an unmanned aircraft system (UAS or 'drone') on February 27, 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 February topography was also compared to the January 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 Shop Borrow Area or imported from offsite projects, including the North Borrow Area. 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 February 2023. Fill was excavated from the Shop and North Borrow Areas and placed in the buttress and buffer zones. Importing fill also continued. All fill is moisture conditioned as necessary and then compacted. Compaction testing began March 2022 and occurs at the rate of at least one test per 5,000 yd^3 placed. During February, approximately 106,700 yd^3 was placed and compacted. This does not include approximately 3,200 yd^3 of imported topsoil. This volume placed in the buttress zone required at least 22 compaction tests. There were 45 compaction tests taken in February. As of February 28, 2022, a total of approximately 2,100,000 yd^3 had been placed and compacted. This required at least 420 compaction tests, and 718 tests have been taken. All tests in February met or exceeded the minimum compaction requirement of 90% of the optimal density as measured by a Standard Proctor Test. These areas were recompacted and the subsequent tests met the project requirements. 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 will 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 fill material continued
- Geotechnical monitoring continued

Work planned for next month includes:

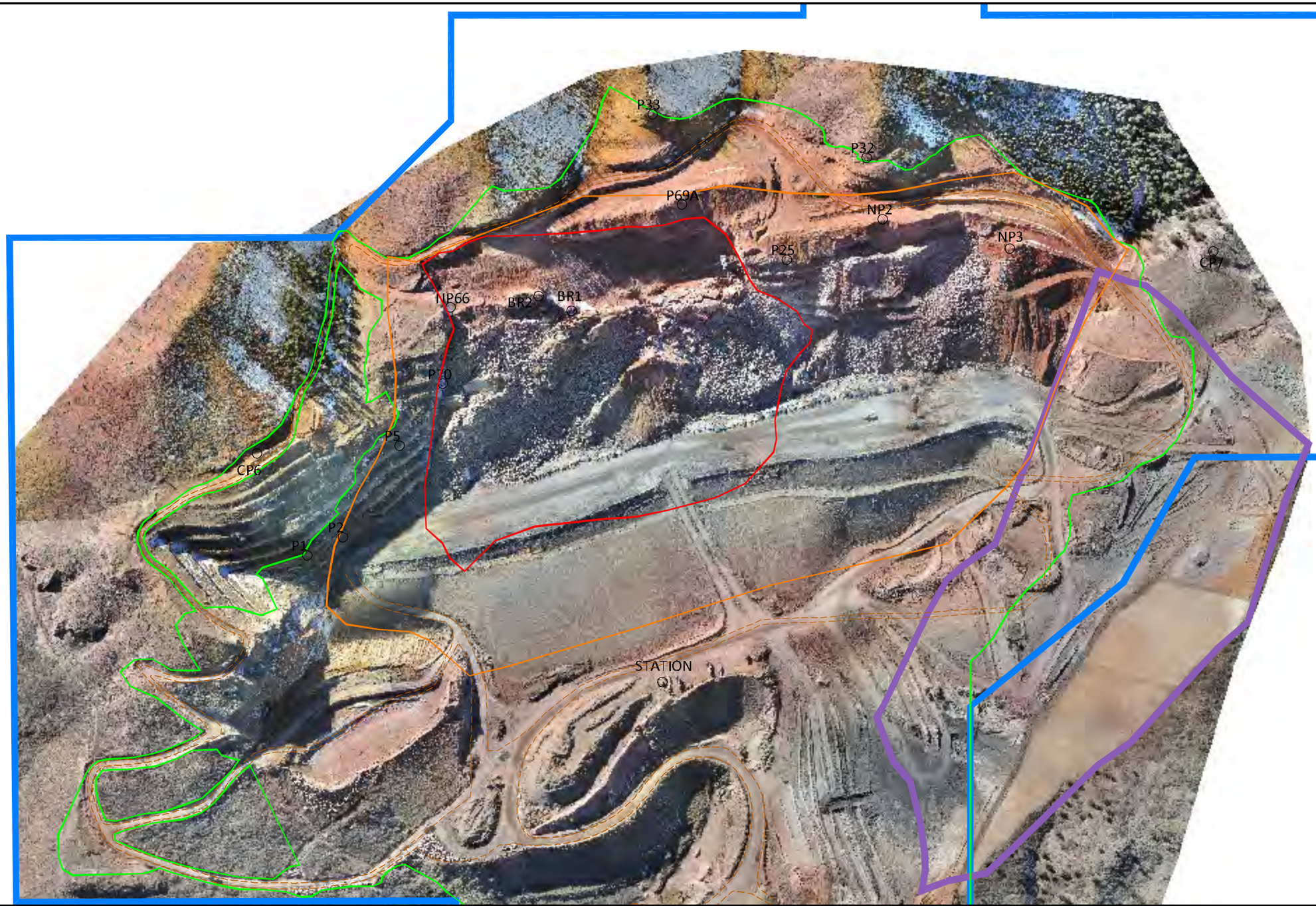
- Continue reclamation grading
- Continue importing fill material
- Continue geotechnical monitoring
- Continue removing and replacing prisms on an as-needed basis
- Continue working with USFS and the City of Colorado Springs to obtain approval to excavate the remaining material from USFS land.
- Submit Succession of Operators Application to change from CMC to Riverbend

7.0 CONCLUSIONS

The data collected in February 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 February 2023 indicate evidence of any large-scale movements that increase risk to workers or to the public. The landslide area continues to show slope creep movements with slow velocities. 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 alarms shall continue to be taken seriously even if data errors are suspected.



LEGEND

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

N

0 300' 600'

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Client/Project
RIVERBEND INDUSTRIES INC.

PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
SITE MAP

Revision
#

Date
2023.03.24

Drawn By
PK

Figure No.
1

Appendix A

Visual Inspections

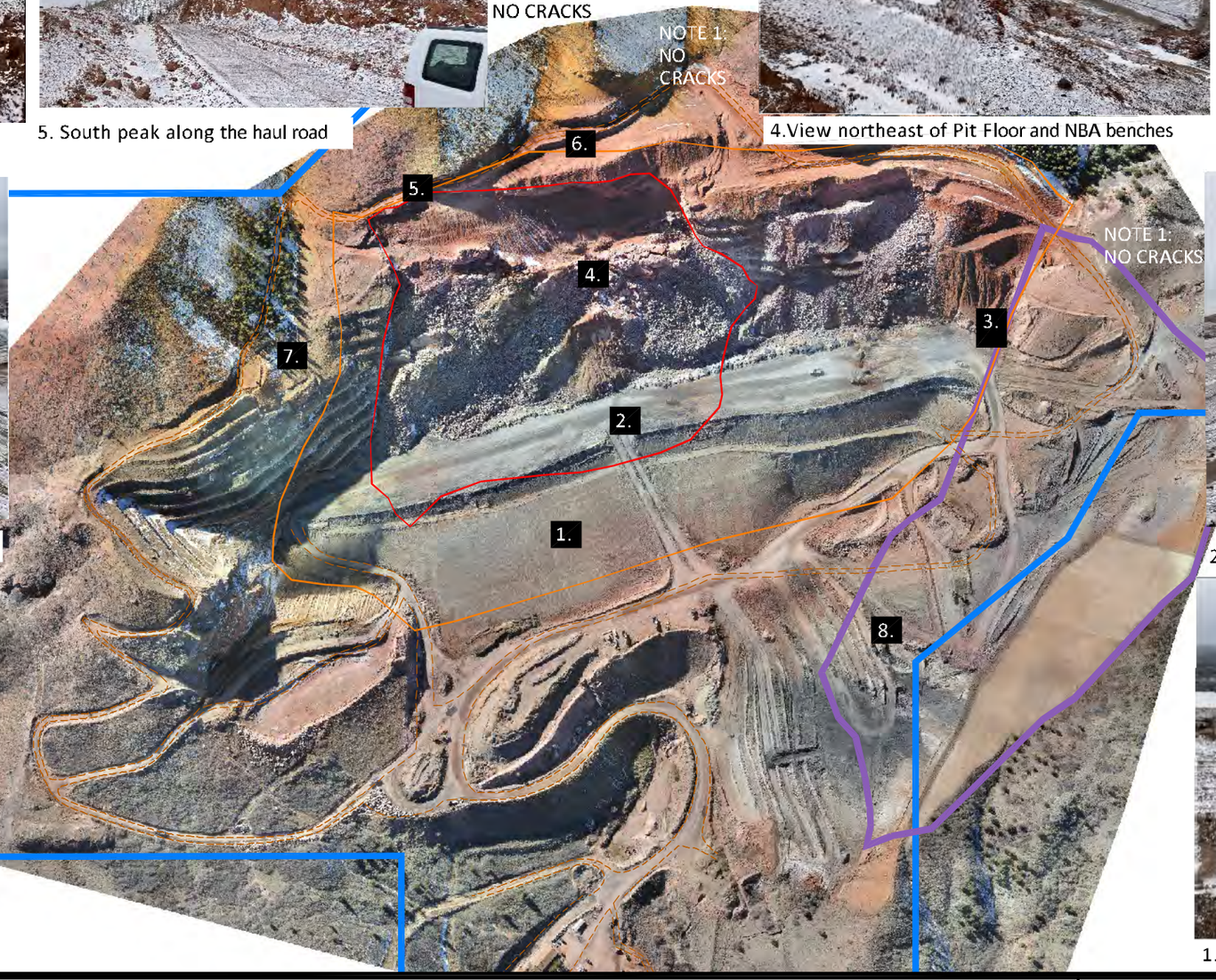
6. View east to pit floor from the haul road

5. South peak along the haul road

4.View northeast of Pit Floor and NBA benches

3. View from the haul road in North Borrow Area

7. View north of slopes above the disturbed area



2. Material is placed and compacted on first bench

8. View to the north of compaction area and NBA

1. View south of first bench slope, NBA and SBA

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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 FEBRUARY 27, 2023.

N

0 400' 800'

Client/Project
RIVERBEND INDUSTRIES INC.

PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
OBSERVATIONS FROM FEBRUARY INSPECTION

Revision
#

Date
2023.03.24

Drawn By
PK

Figure No.
2

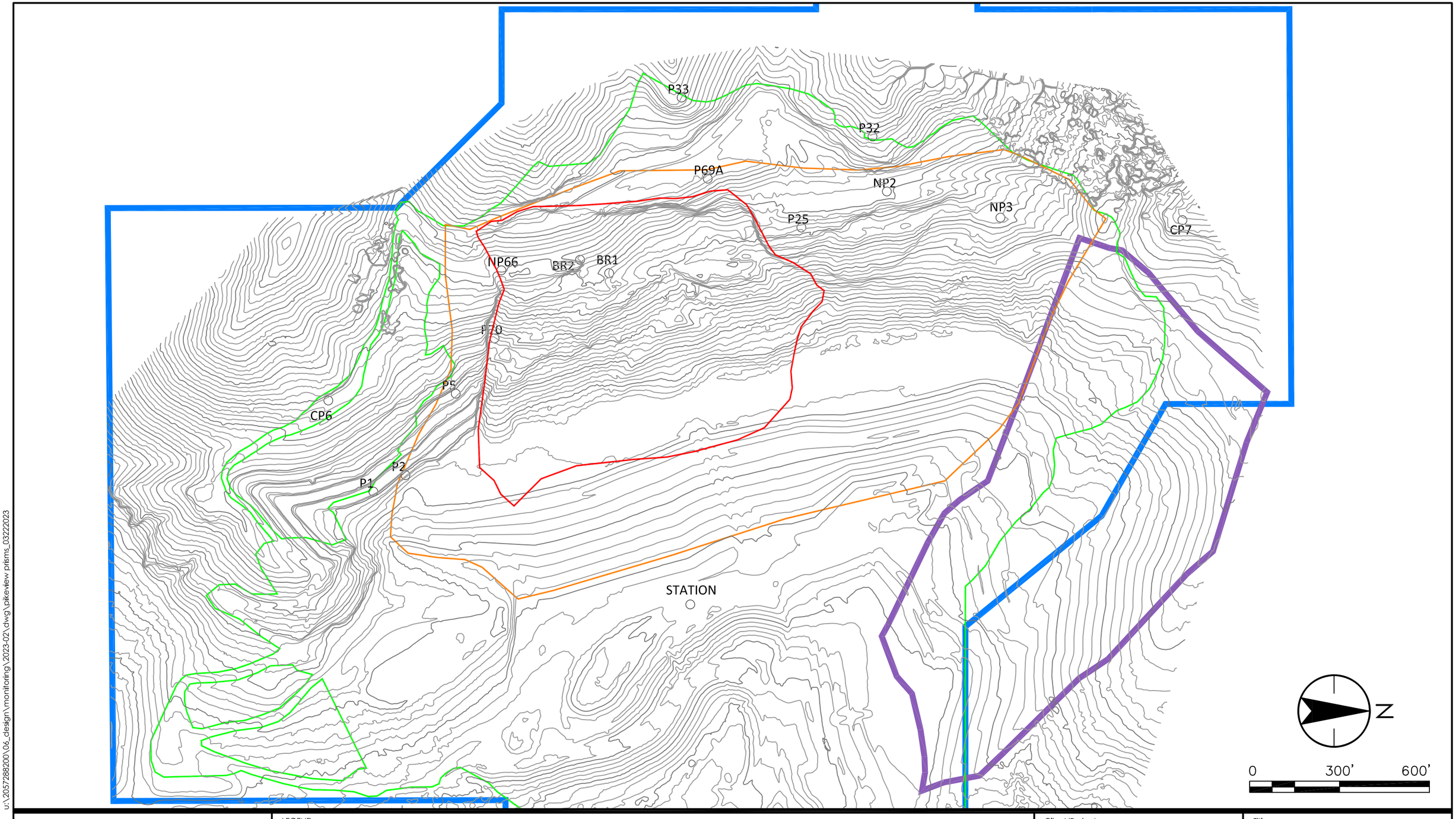
Stantec

Table A-1 Summary of Daily Inspections

Date	Notes	Inspection By
1-Feb-23	No movement observed. Good to proceed.	Jerald Schnabel
2-Feb-23	No movement observed. Good to proceed.	Jerald Schnabel
3-Feb-23	No movement observed. Good to proceed.	Jerald Schnabel
4-Feb-23	No movement observed. Good to proceed.	Jerald Schnabel
5-Feb-23	No work.	Not applicable
6-Feb-23	No movement observed. Good to proceed.	Jerald Schnabel
7-Feb-23	No movement observed. Good to proceed.	Jerald Schnabel
8-Feb-23	No movement observed. Good to proceed.	Jerald Schnabel
9-Feb-23	No movement observed but snow covered. No work.	Jerald Schnabel
10-Feb-23	No movement observed. Inspection limited due to snow cover. Good to proceed.	Jerald Schnabel
11-Feb-23	No work.	Not applicable
12-Feb-23	No work.	Not applicable
13-Feb-23	No movement observed. Good to proceed.	Leif Neufeld
14-Feb-23	No movement observed but snow covered. No work.	Leif Neufeld
15-Feb-23	No movement observed but snow covered. No work.	Leif Neufeld
16-Feb-23	No movement observed but snow covered. Limited work.	Leif Neufeld/Dave Clemans
17-Feb-23	No movement observed but snow covered. Limited work.	Leif Neufeld/Dave Clemans
18-Feb-23	No work.	Not applicable
19-Feb-23	No work.	Not applicable
20-Feb-23	No movement observed. Good to proceed.	Leif Neufeld/Dave Clemans
21-Feb-23	No movement observed. Good to proceed.	Leif Neufeld/Dave Clemans
22-Feb-23	No movement observed. Good to proceed.	Leif Neufeld/Dave Clemans
23-Feb-23	No movement observed. Good to proceed.	Dave Clemans
24-Feb-23	No movement observed. Good to proceed.	Dave Clemans
25-Feb-23	No work.	Not applicable
26-Feb-23	No work.	Not applicable
27-Feb-23	No movement observed. Good to proceed.	Dave Clemans
28-Feb-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

1. PRISMS WILL BE INSTALLED AS EACH BENCH IS FINISHED.
2. ALL PRISMS WILL BE RETAINED AS LONG AS POSSIBLE.
3. TOPOGRAPHY FROM FEBRUARY 27, 2023 DRONE SURVEY.
4. CONTOUR INTERVAL IS 10 FEET

Client/Project
RIVERBEND INDUSTRIES INC.

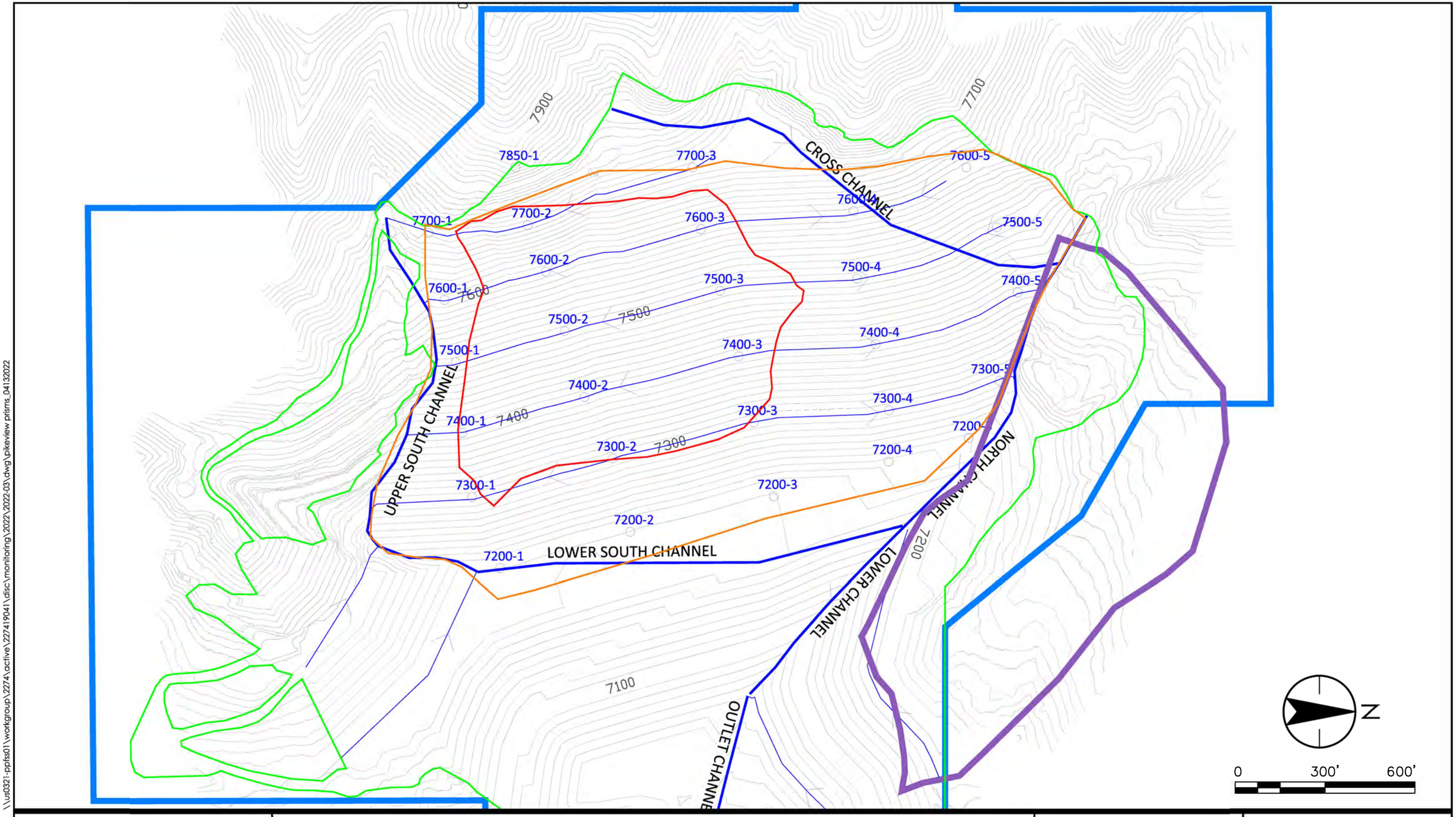
PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
EXISTING PRISMS WITH CURRENT SURFACE

Revision	Date
#	2023.03.24

Drawn By	Figure No.
PK	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
#	2023.03.24
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.

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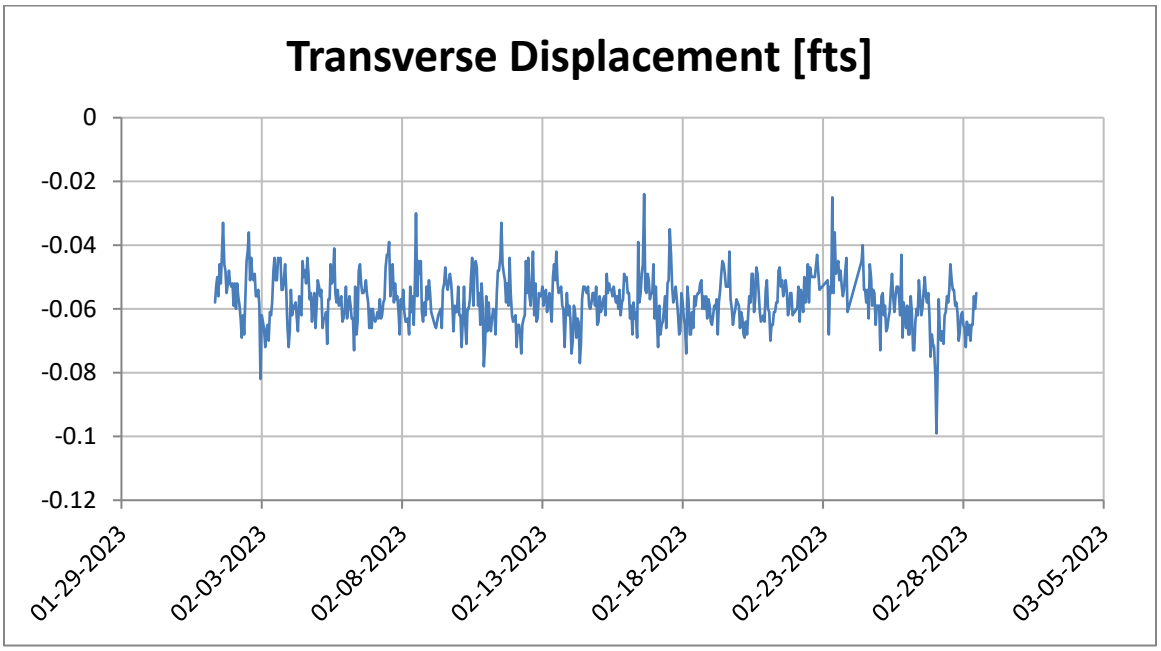
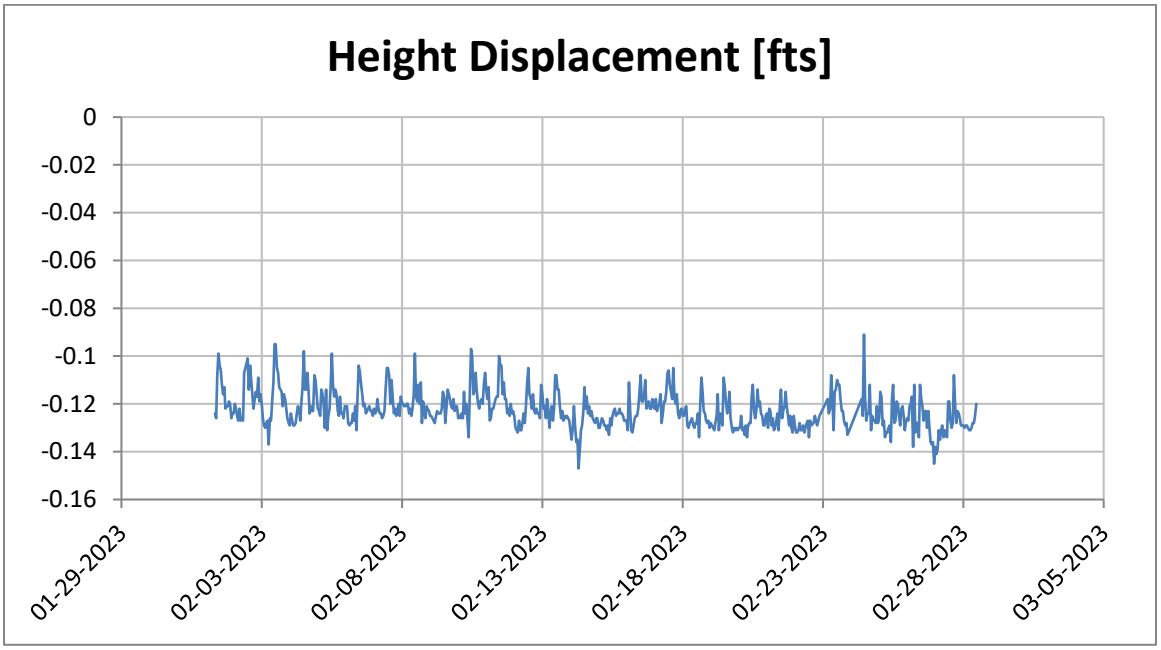
Prism BR1





Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm 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 with slow velocity.

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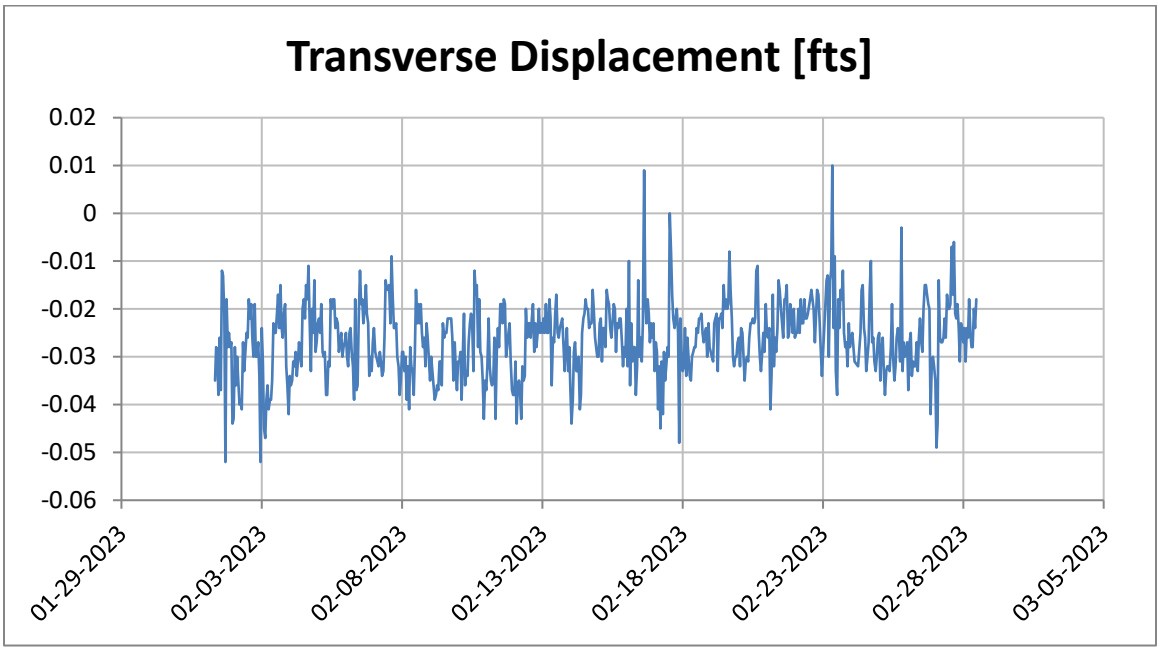
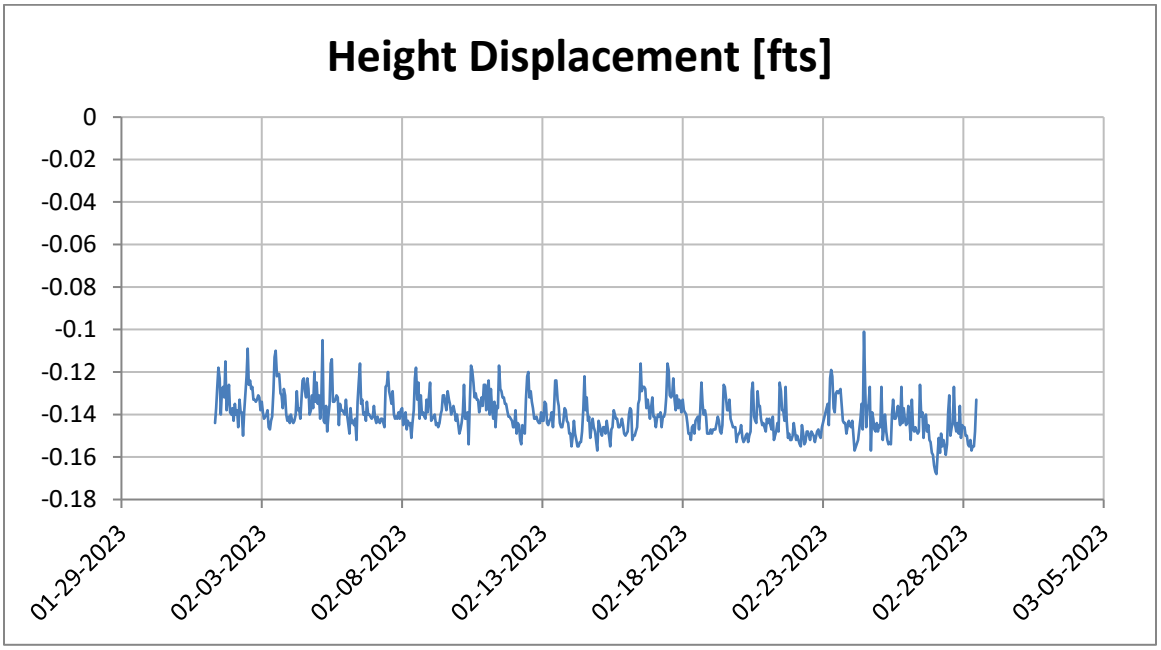
Prism BR2





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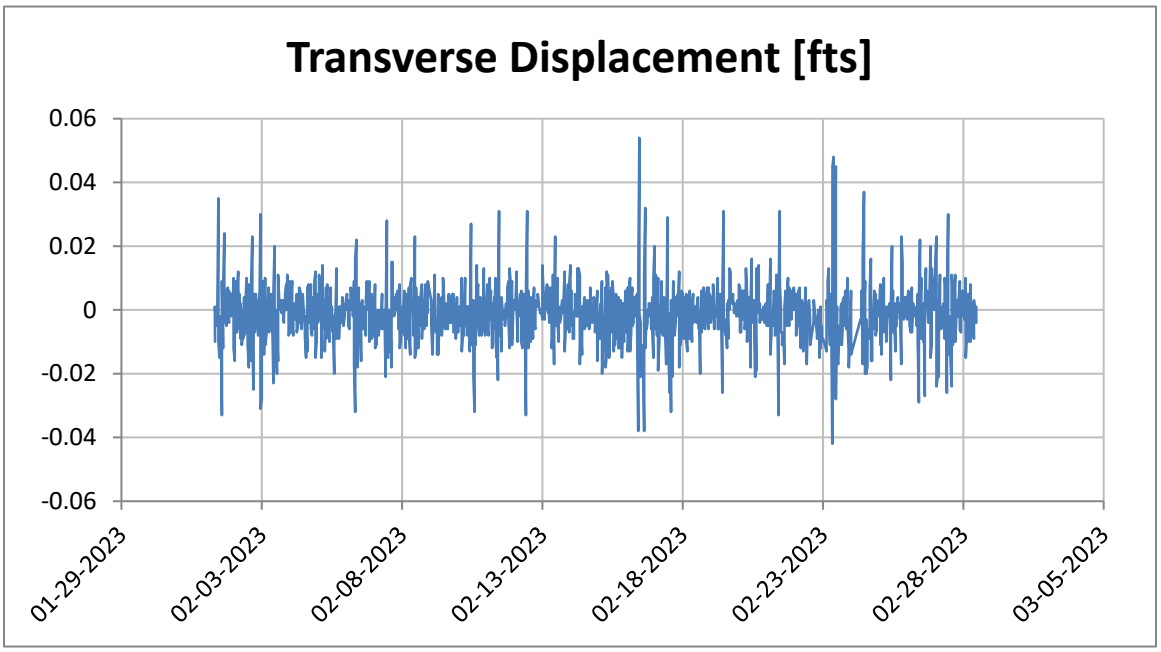
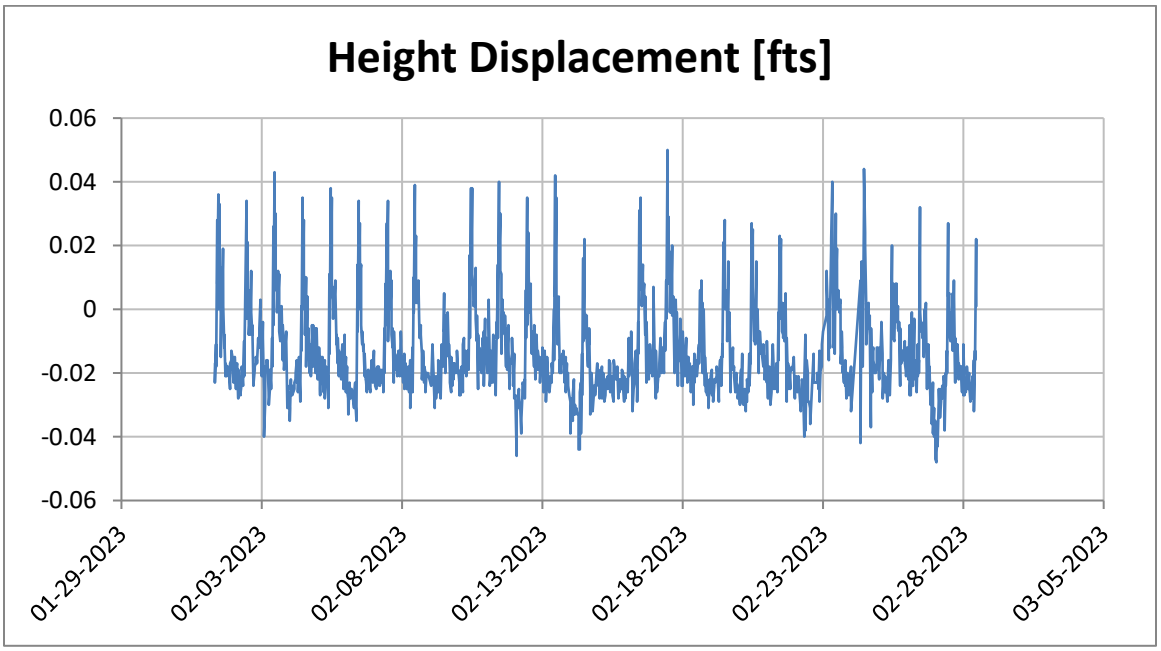
Prism CP6





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4. Height displacement is in the vertical direction. Positive direction means higher in elevation.

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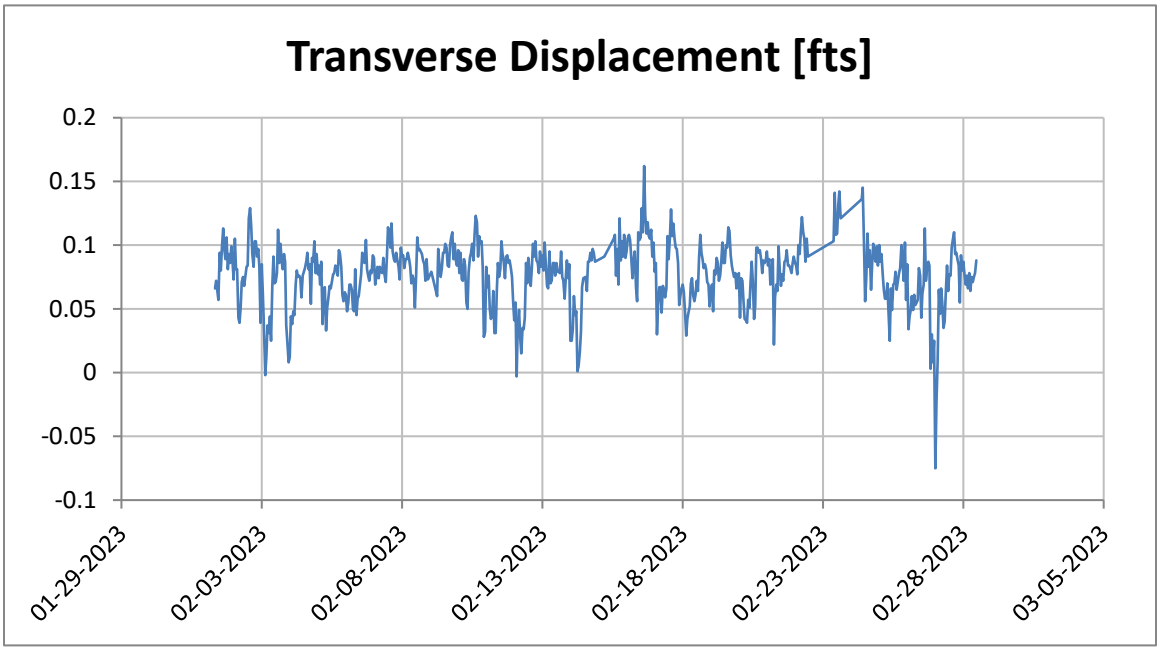
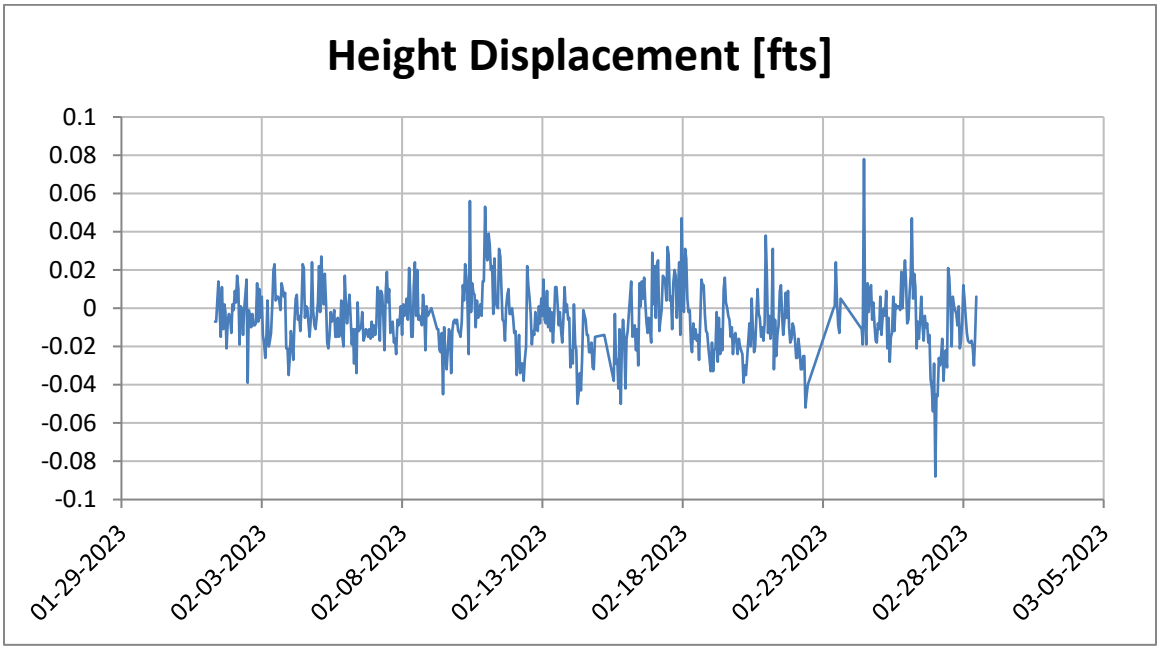
Prism CP7



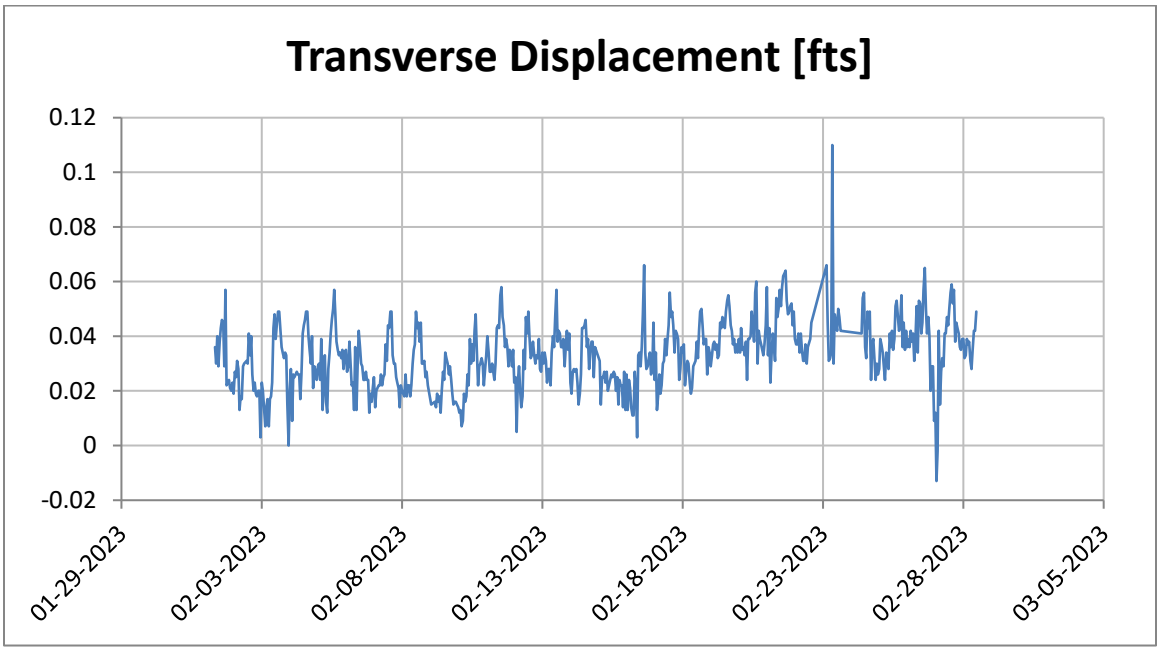


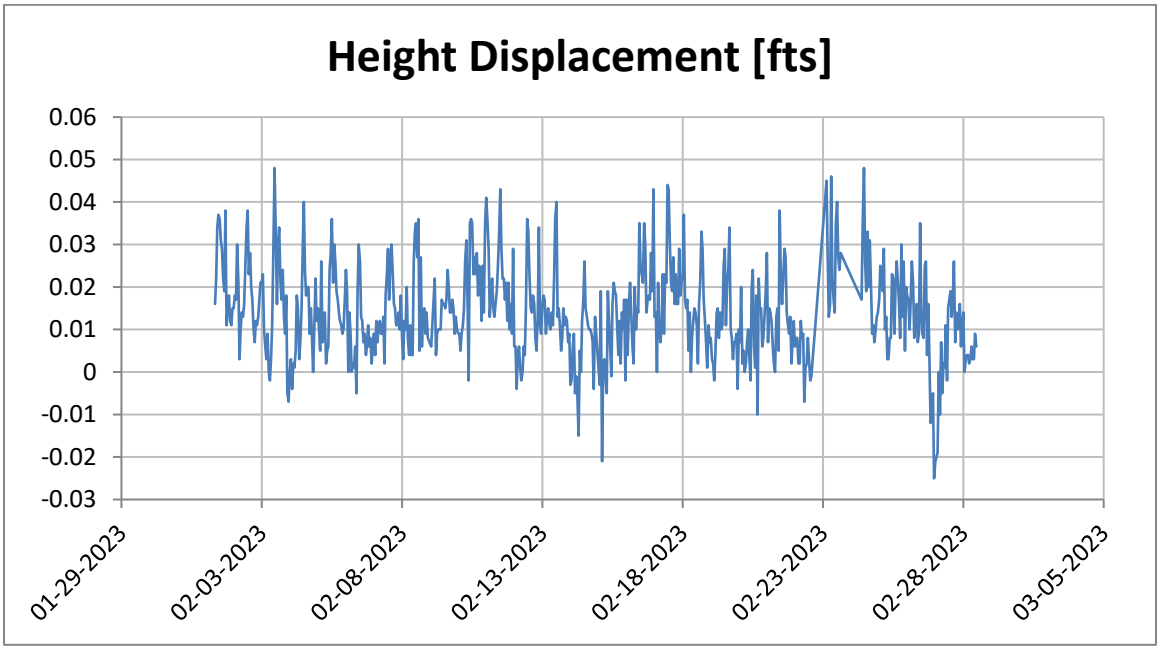
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm 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 NP2



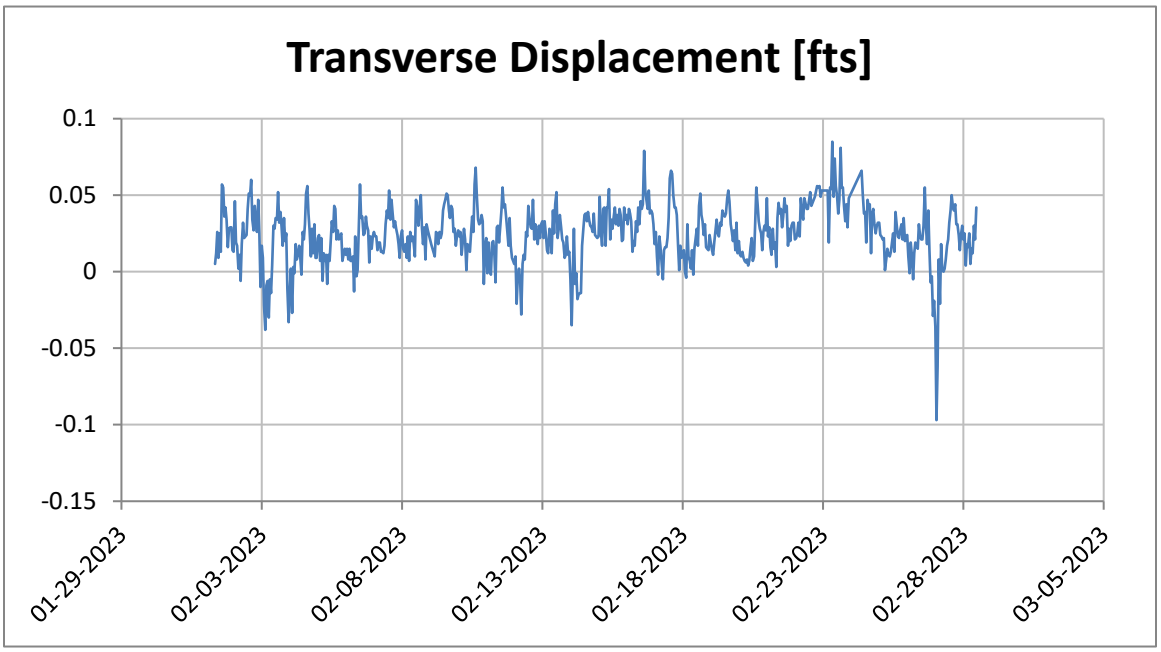


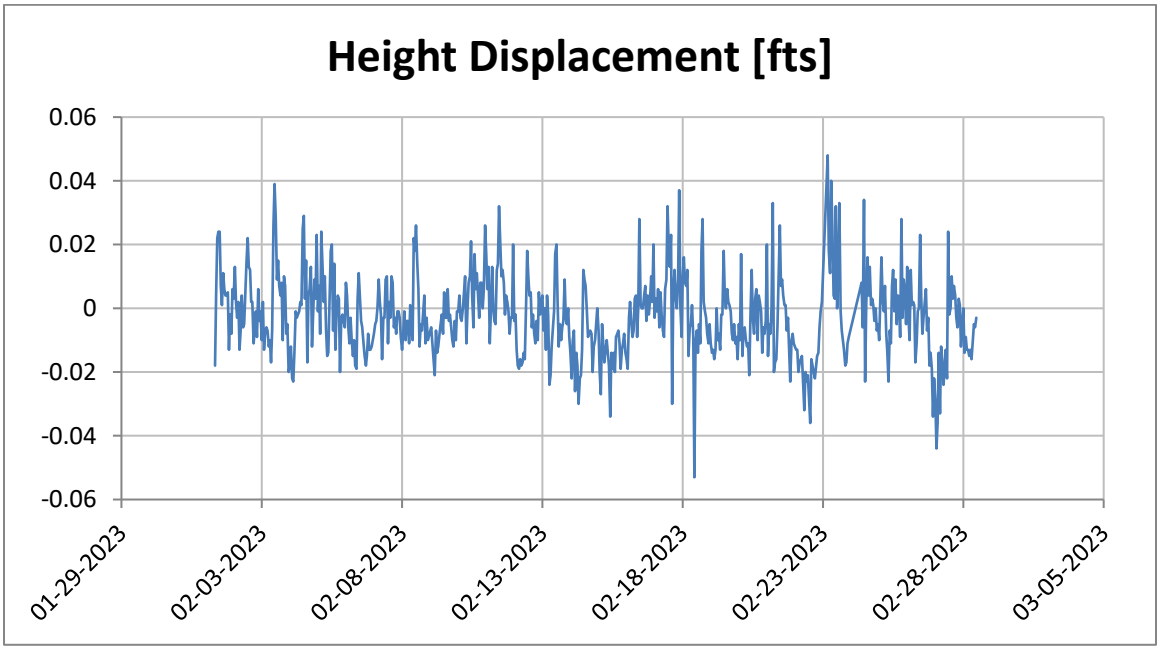
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm 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 NP3



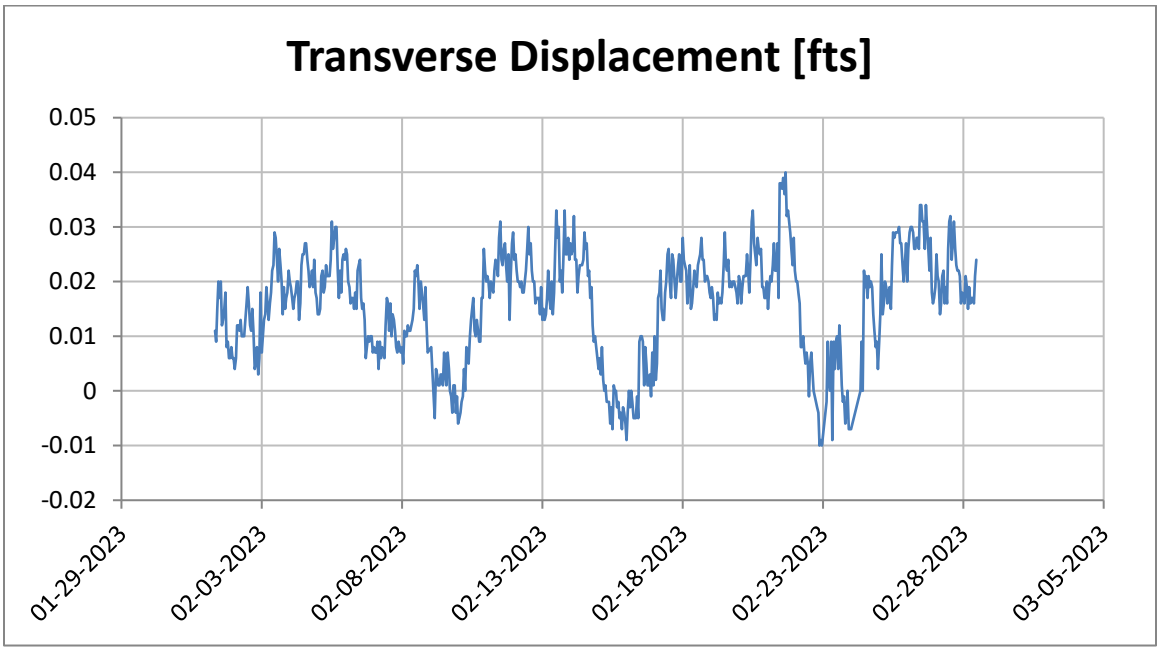


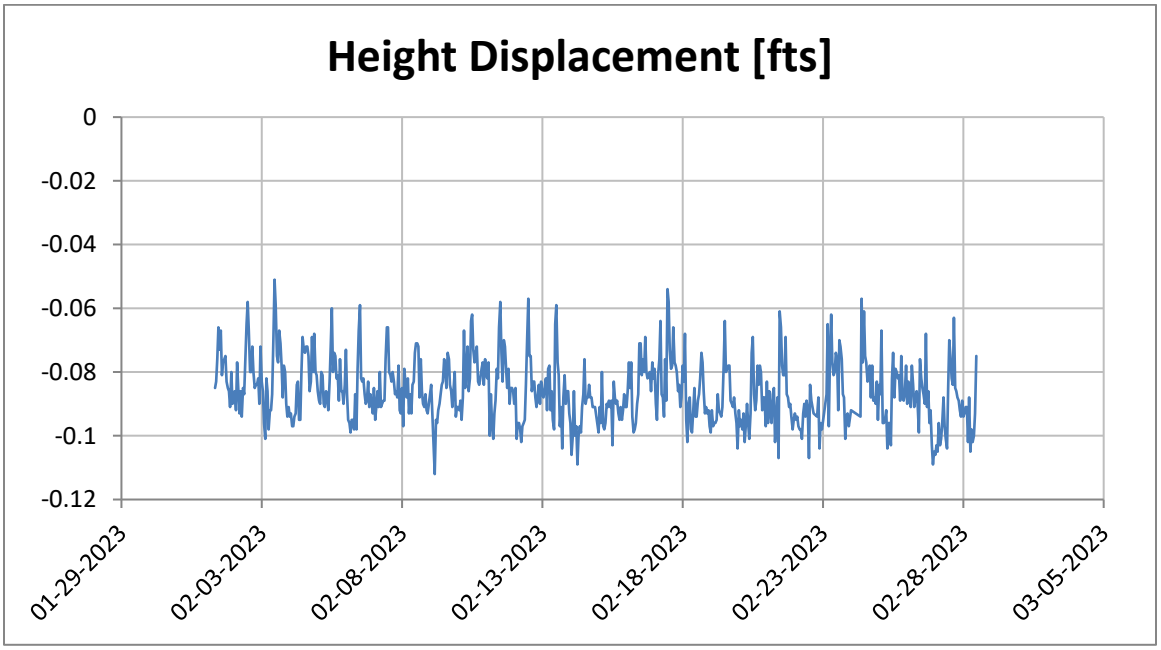
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm 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 NP66



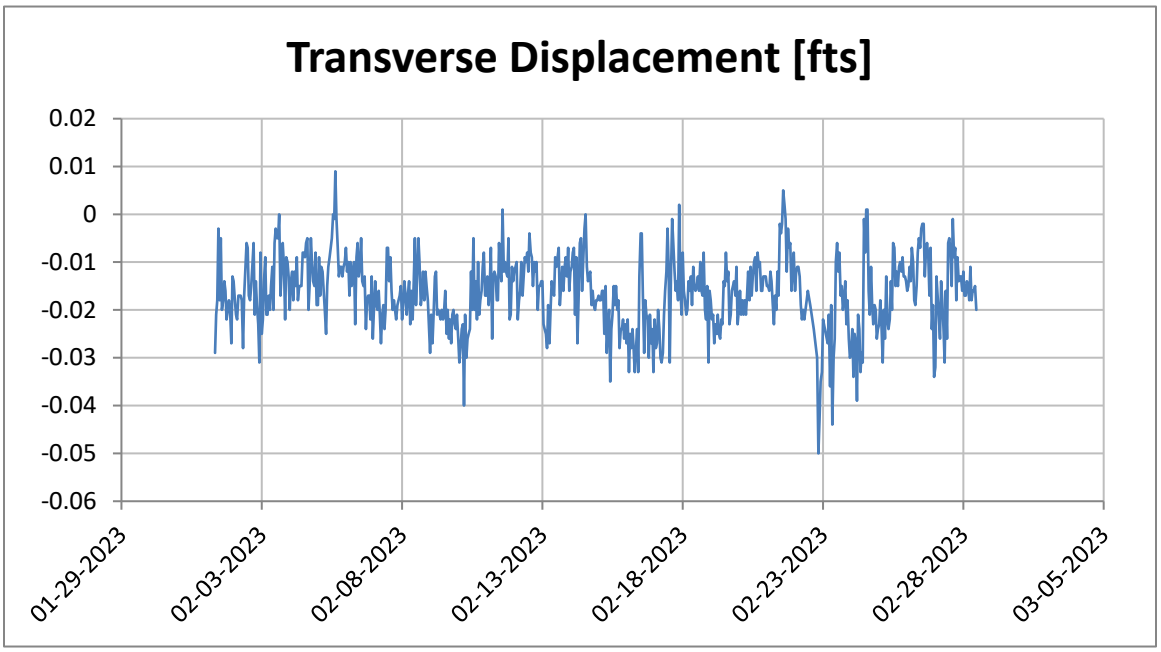


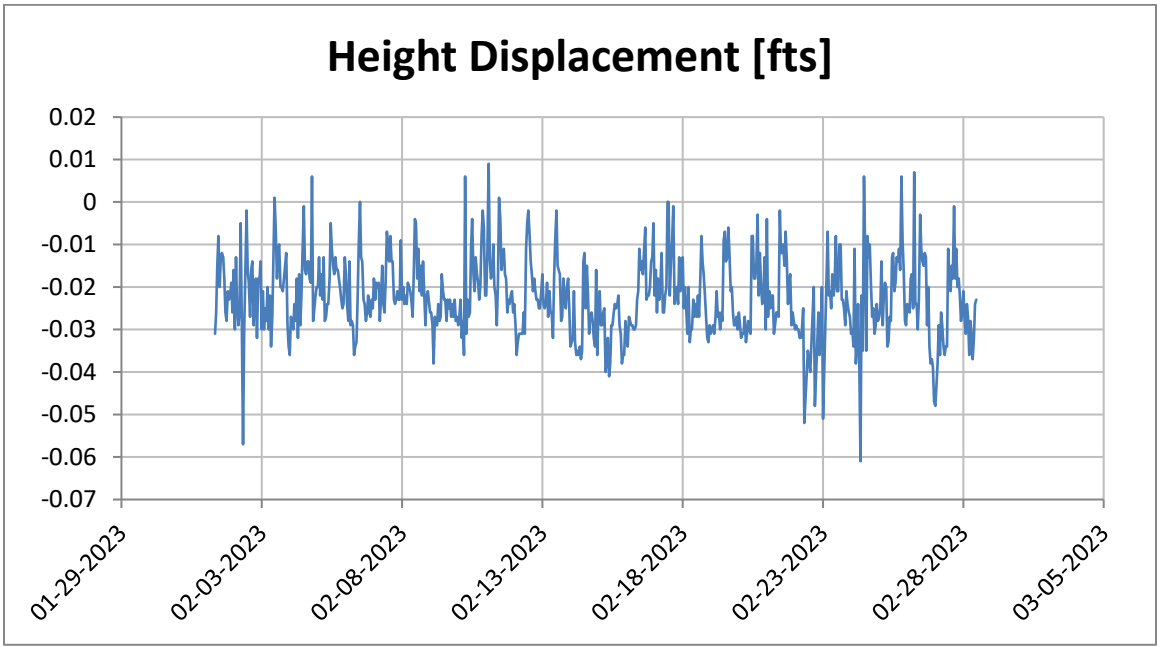
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm 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 with slow velocity.

Stantec

Prism P1



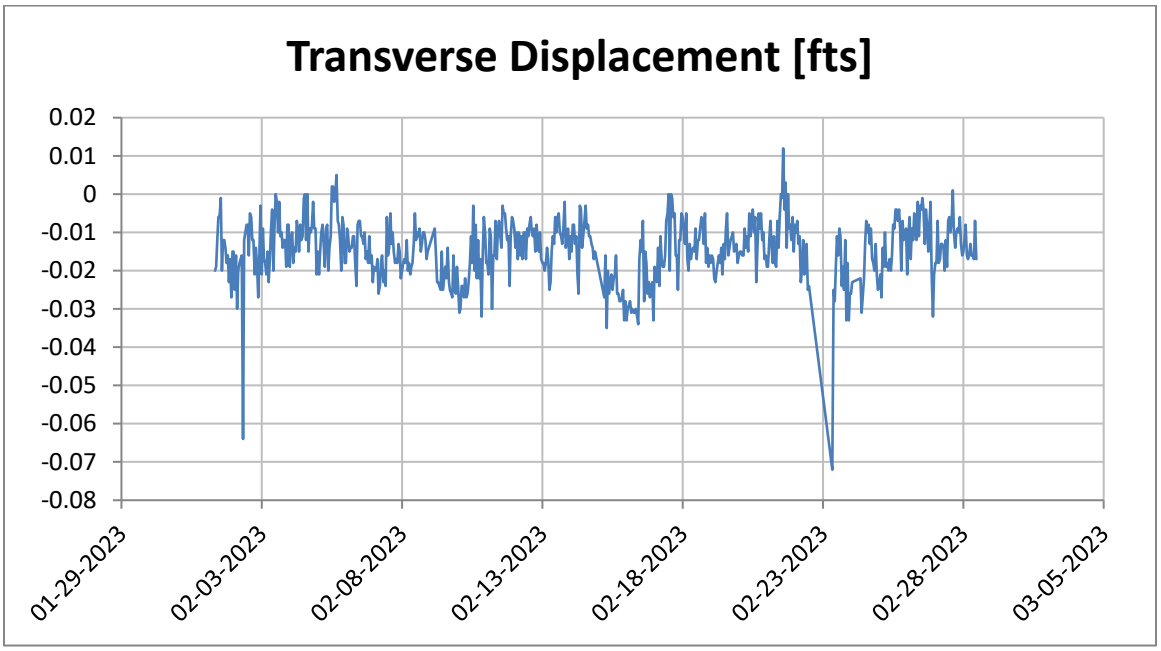


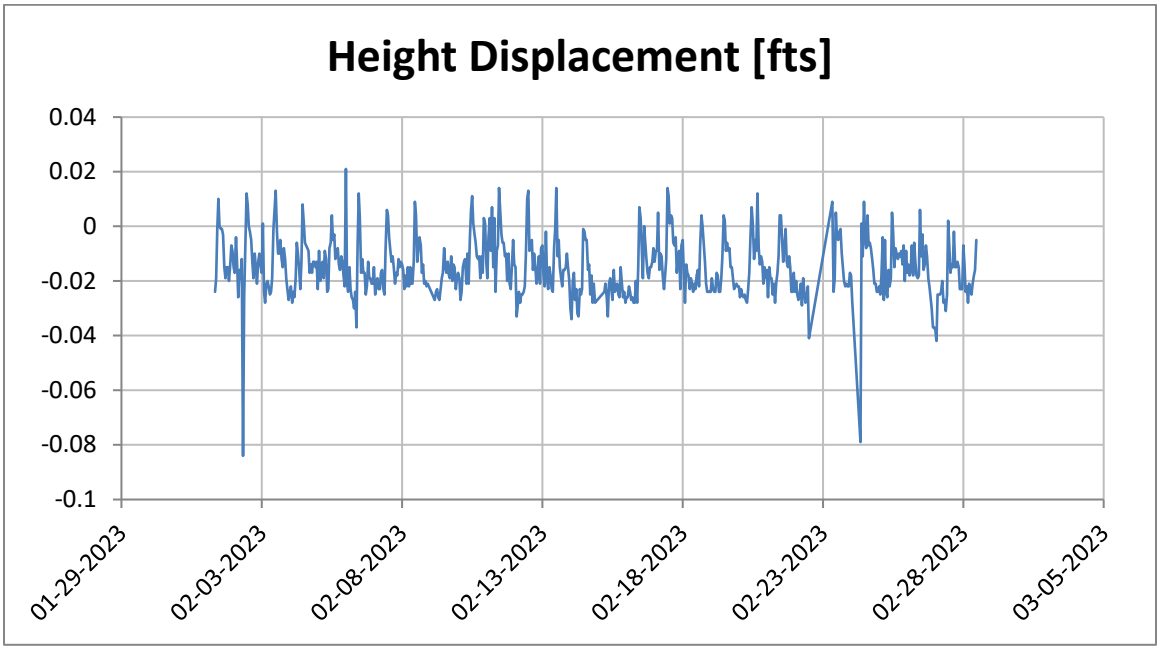
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm 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



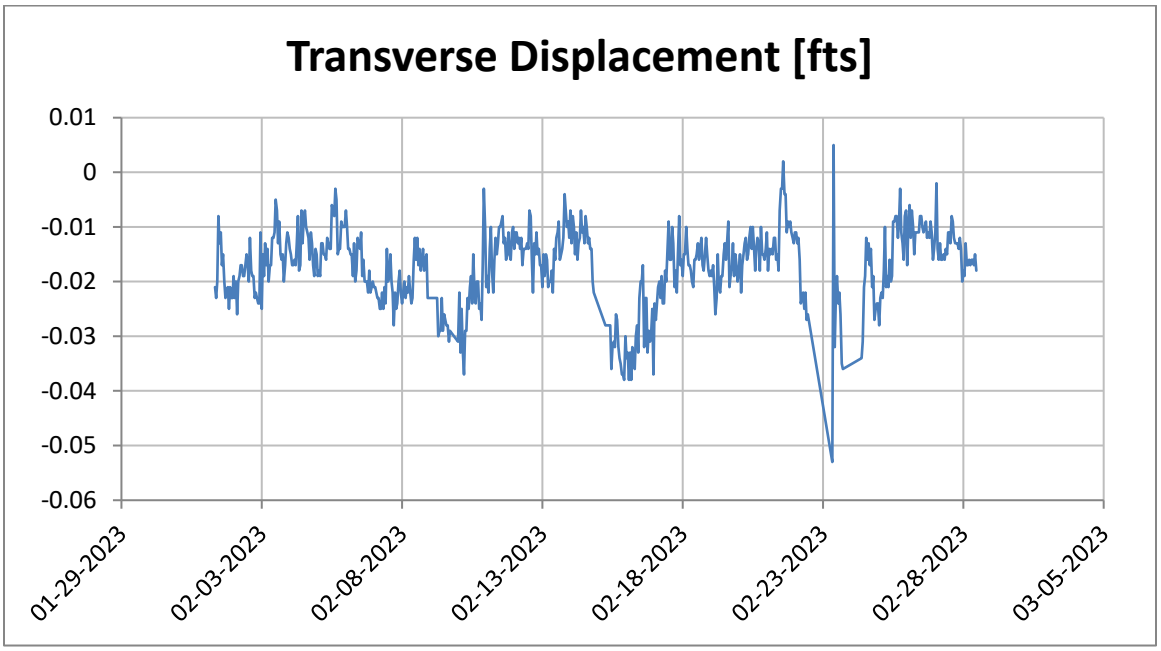


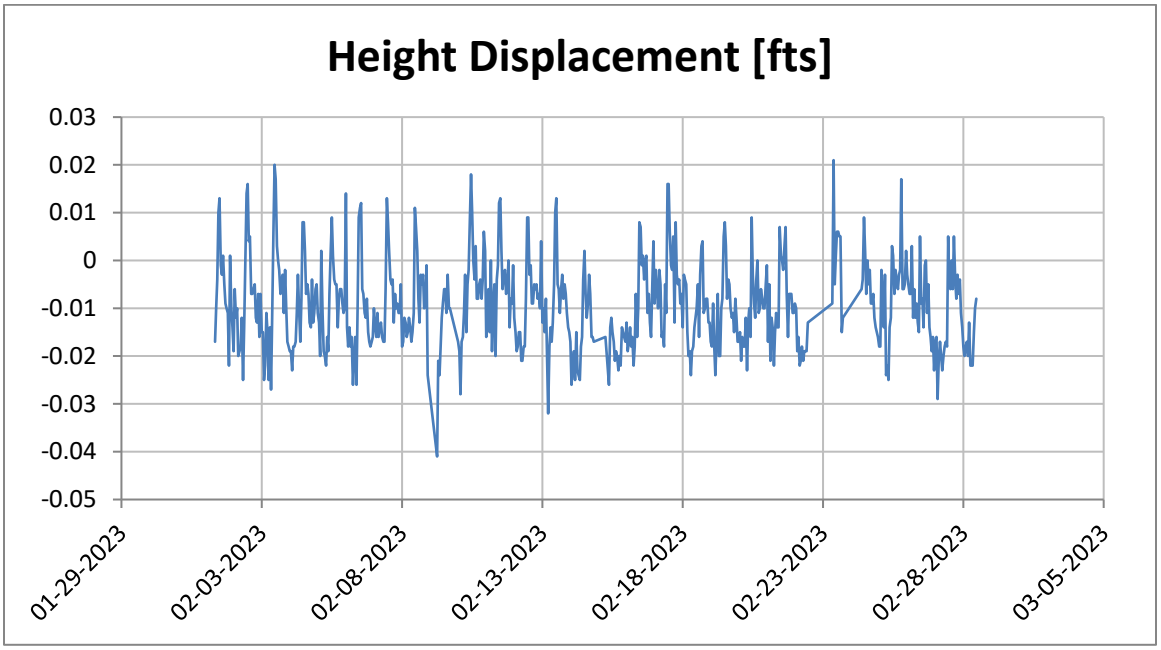
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm 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 February 2.

Stantec

Prism P5



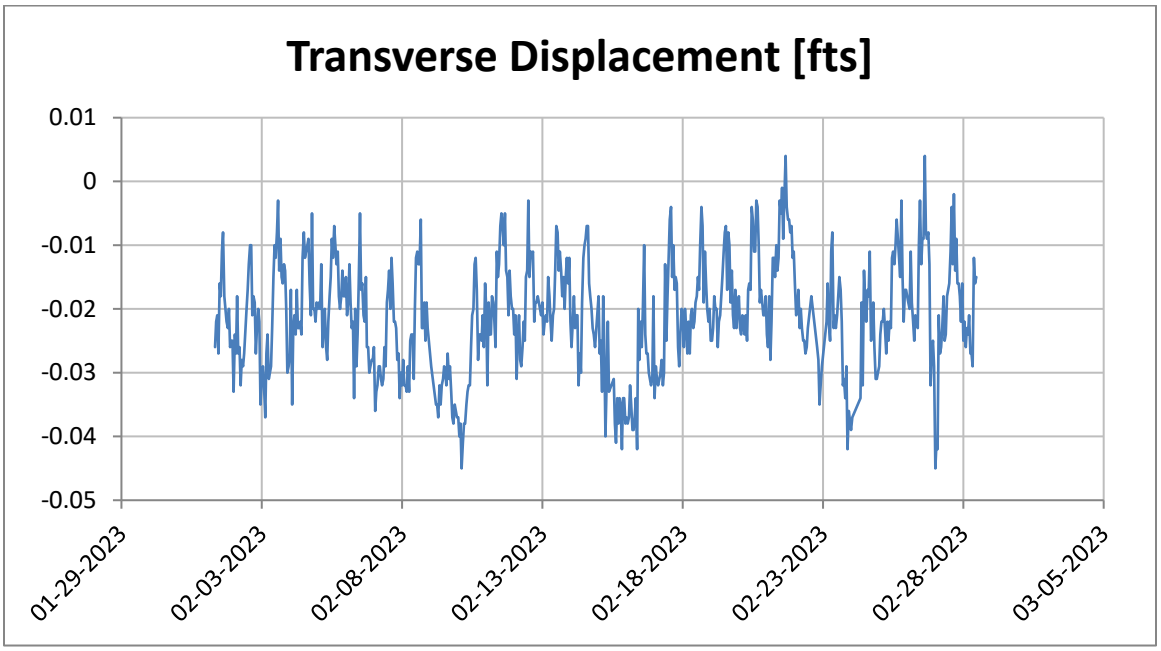


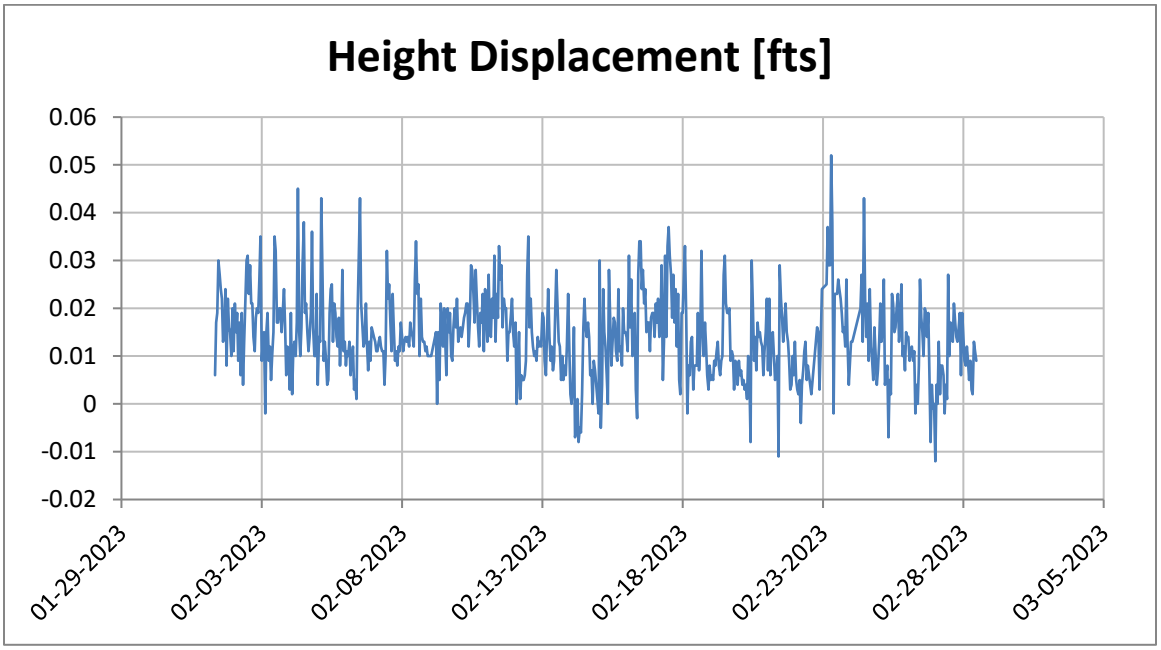
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm 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



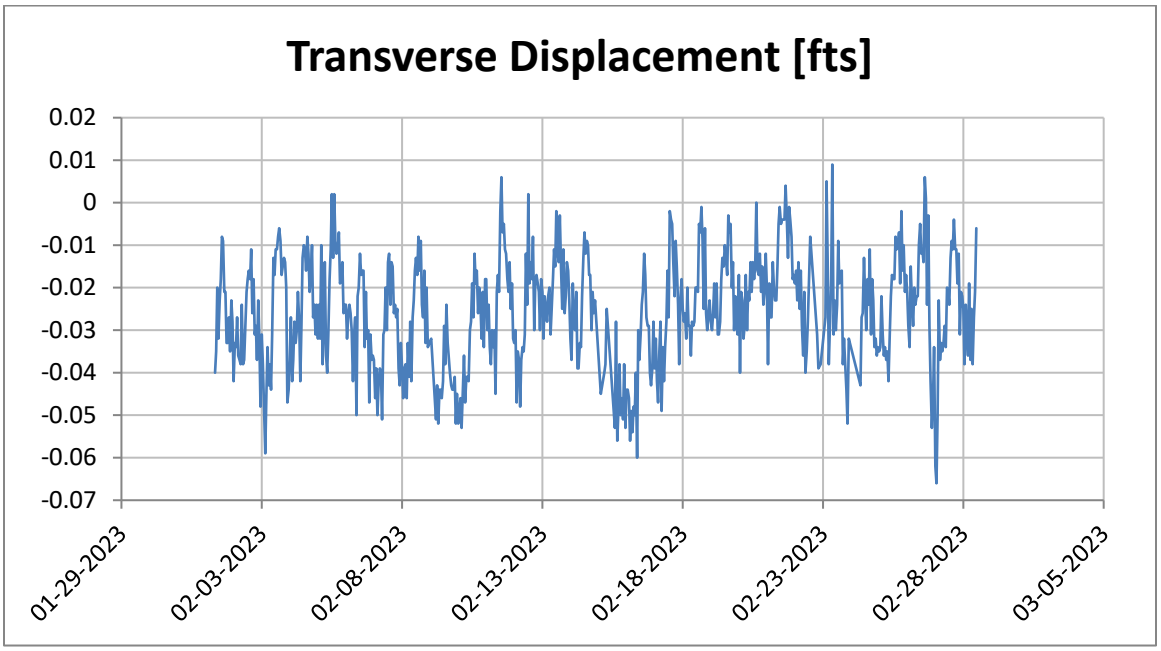


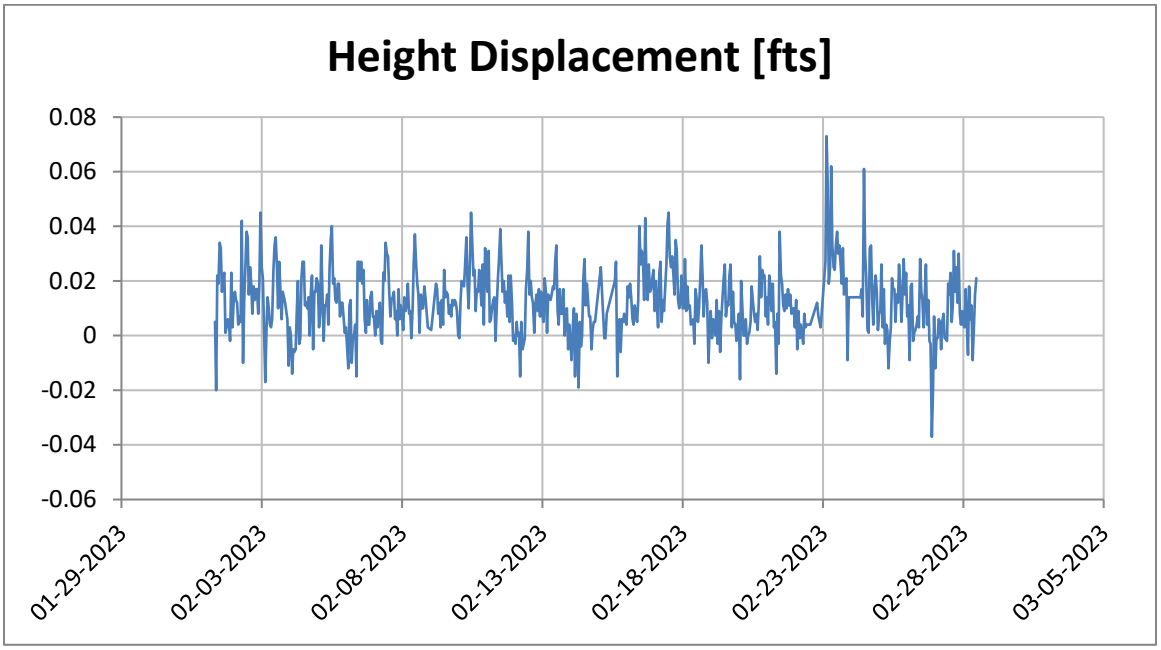
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm 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 P32



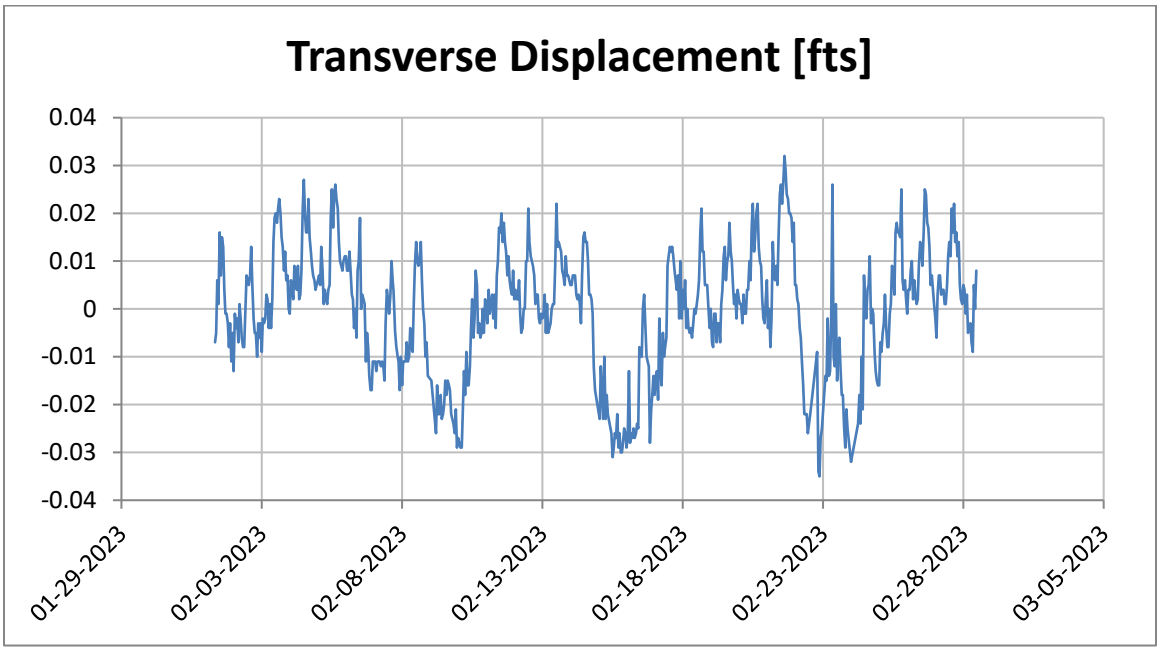


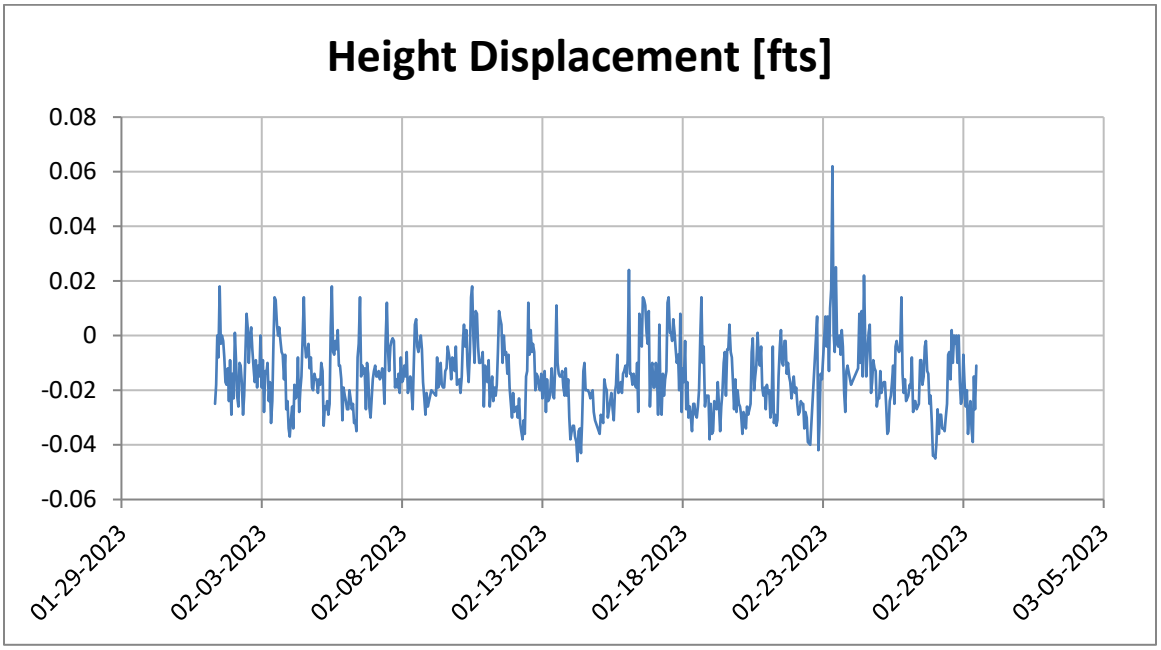
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm 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 P33





Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm 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 February 24.

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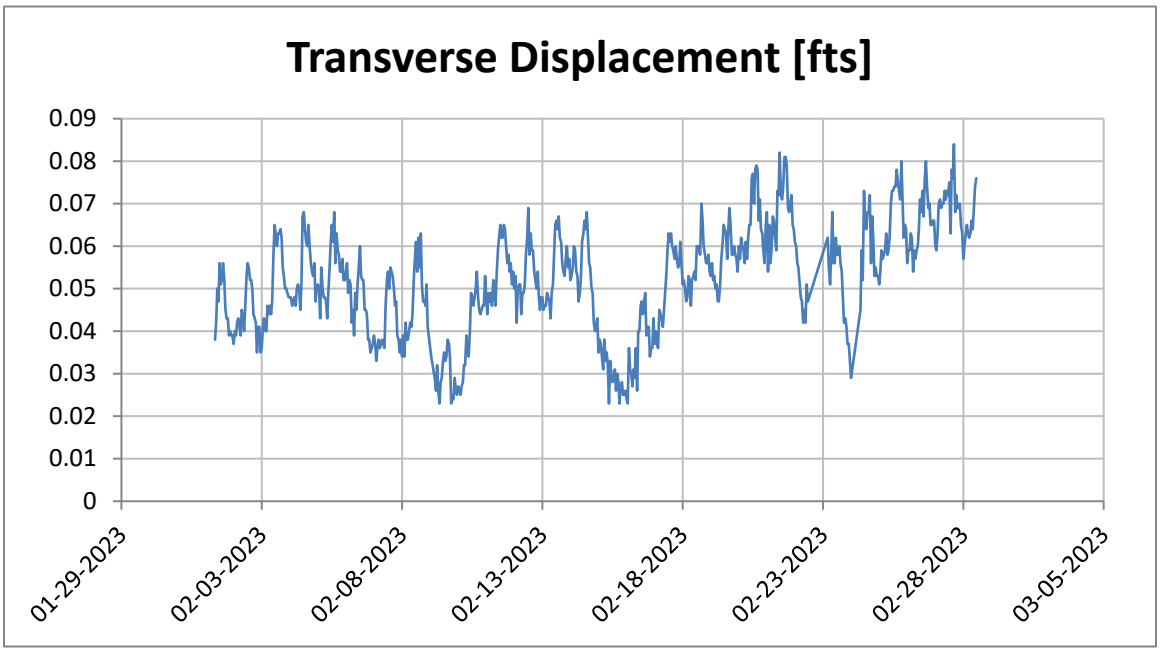
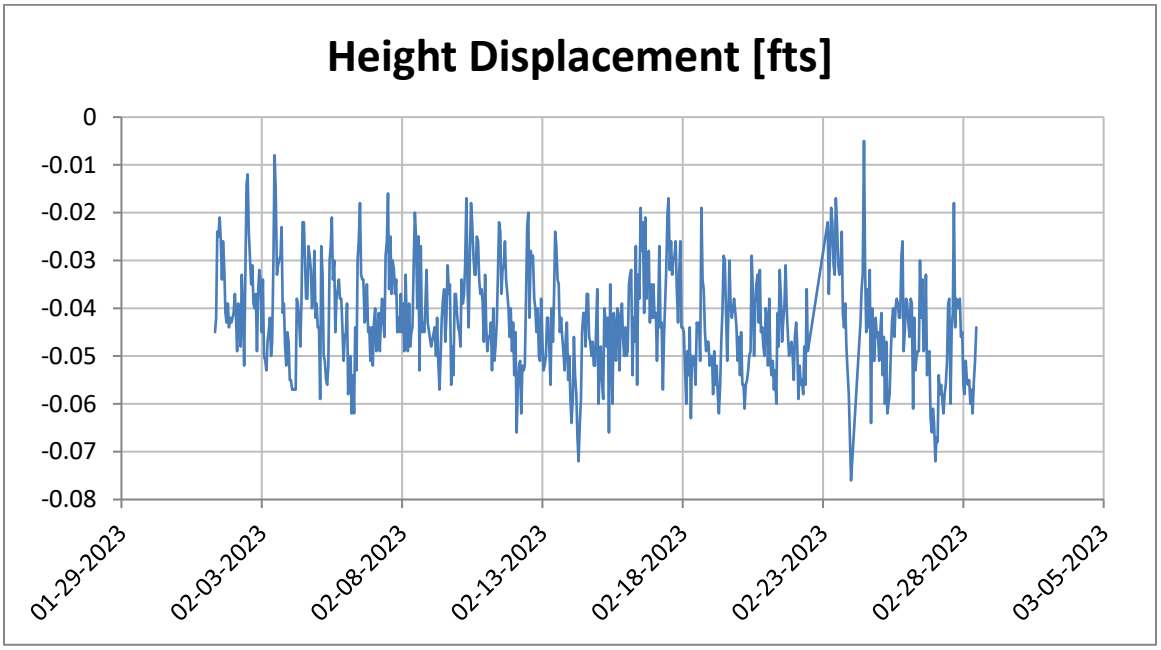
Prism P69A



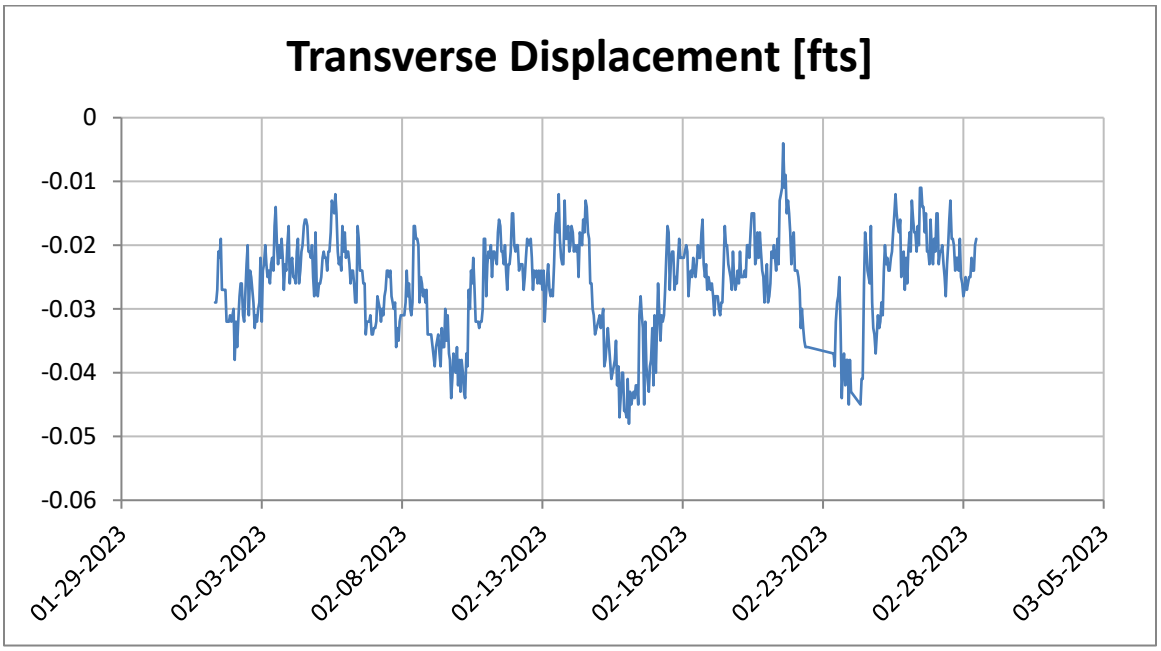


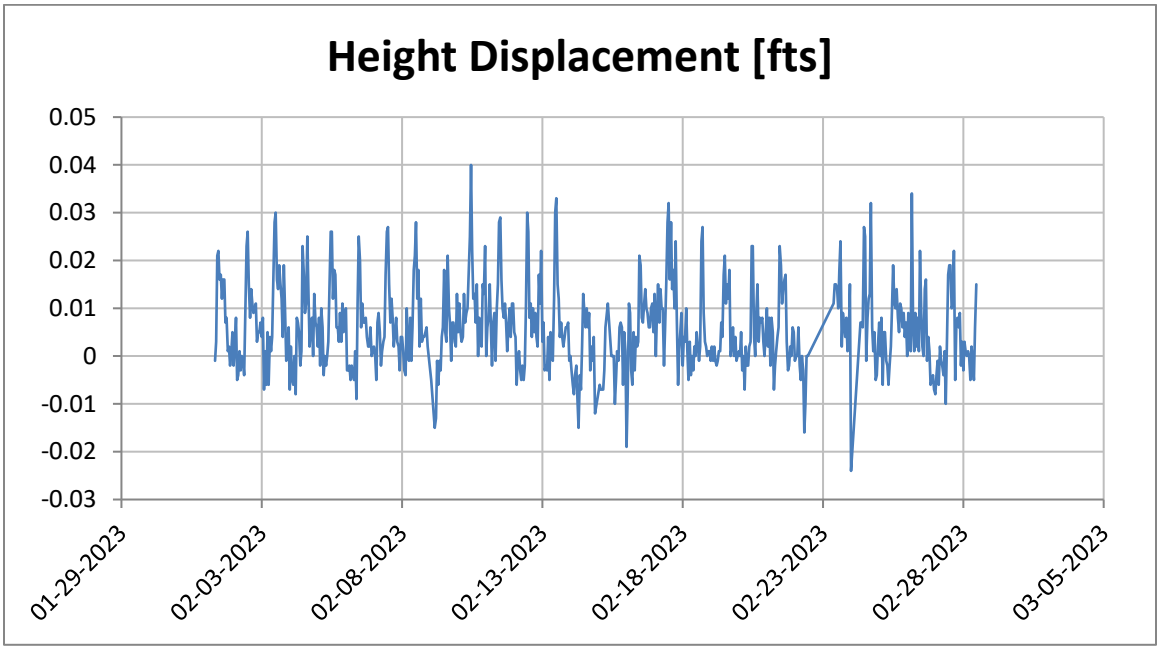
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm 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 P70



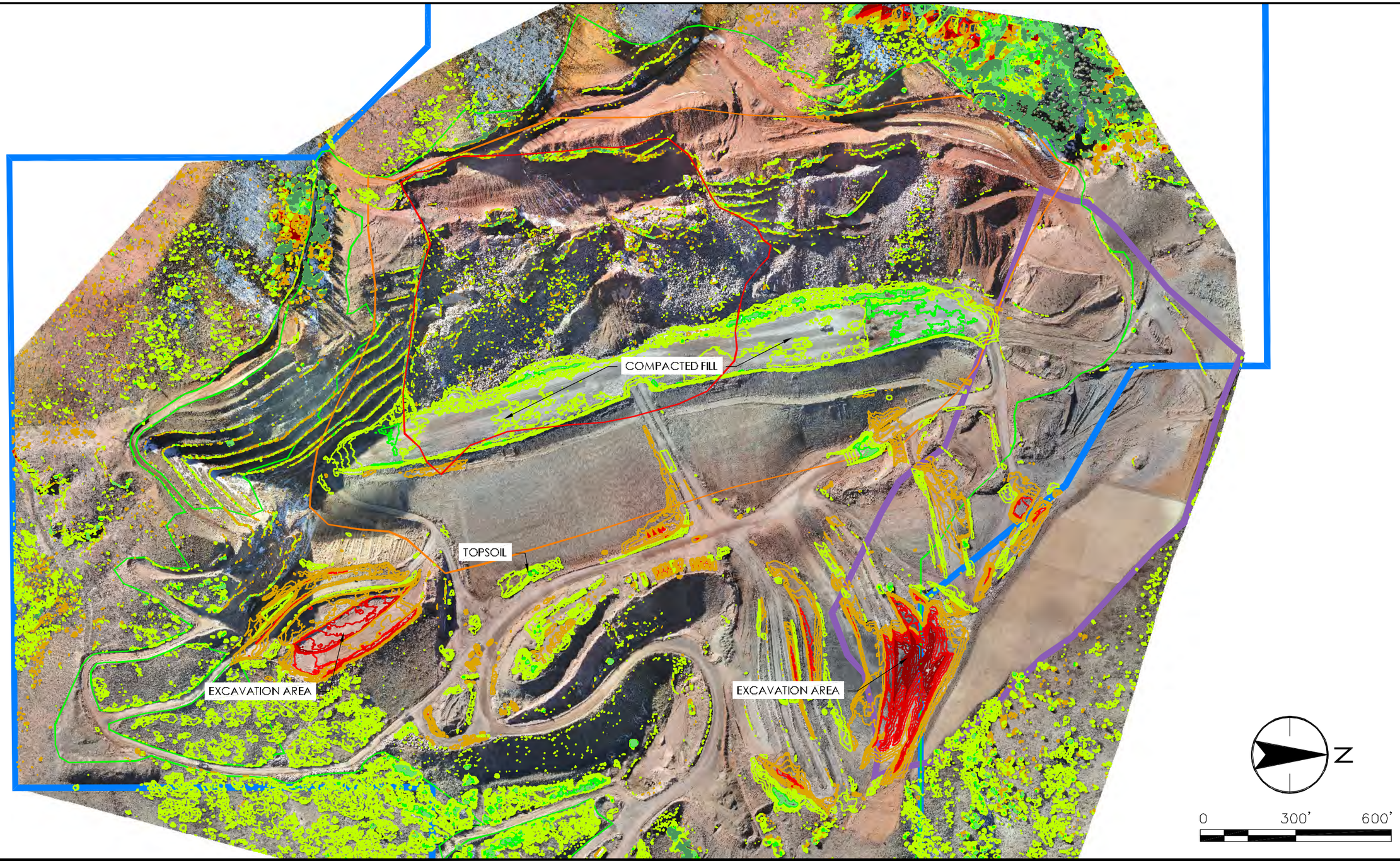


Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm 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.

Appendix C

Drone Survey



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 01/27/2023 to 02/27/2023.

Stantec

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

Client/Project
RIVERBEND INDUSTRIES INC.

PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
EXISTING PRISMS WITH CURRENT SURFACE

Revision
#

Date
2023.03.24

Drawn By
PK

Figure No.
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
#	2023.03.24
Drawn By	Figure No.
PK	6

2023.03.22 12:57:40 PM

U:\2057288200\06_design\monitoring\2023-02\dwg\pitreview plans_03222023

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Compaction Testing Log

BCC Test	Test No.	Date	Elevation (ft)	Northing (ft)	Easting (ft)	Wet Density (pcf)	Moisture Content (%)	Dry Density (pcf)	Compaction (%)
Test JJJ1	#725	1-Feb	7305	1402557	3173032	121.1	10	111.1	91
Test JJJ2	#726	1-Feb	7304	1402427	3173059	123.4	8.4	115	93
Test JJJ3	#727	2-Feb	7305	1402005	3173091	123.7	11	112.7	94
Test JJJ4	#728	2-Feb	7305	1401804	3173105	122.2	8.4	113.8	93
Test JJJ5	#729	2-Feb	7305	1401690	3173195	129.2	8	122.1	99
Test JJJ6	#730	2-Feb	7307	1401636	3173138	121.1	10.4	110.8	90
Test JJJ7	#731	3-Feb	7306	1401608	3173225	128.3	8.6	119.7	97
Test JJJ8	#732	3-Feb	7303	1401404	3173325	120.6	5.2	115.4	94
Test JJJ9	#733	3-Feb	7304	1401229	3173273	120.6	5	115.5	94
Test JJJ10	#734	3-Feb	7302	1401055	3173365	122.2	8.5	113.7	93
Test KKK1	#735	6-Feb	7307	1402442	3173998	124.2	13.1	111.1	90
Test KKK2	#736	6-Feb	7306	1402368	3173053	123.3	12.2	111.2	91
Test KKK3	#737	6-Feb	7307	1402500	3172989	124.2	11	113.2	93
Test KKK4	#738	7-Feb	7306	1401930	3173119	131.4	14.4	117	98
Test KKK5	#739	7-Feb	7306	1401809	3173080	139.8	11.2	128.6	100
Test KKK6	#740	8-Feb	7308	1401145	3173219	126.7	10.7	116	95
Test KKK7	#741	8-Feb	7305	1401407	3173288	123.1	12.5	110.7	90
Test KKK8	#742	8-Feb	7305	1401303	3173260	123.8	10.9	113	92
Test KKK9	#743	13-Feb	7305	1400592	3173336	122.3	8.5	114	93
Test KKK10	#744	13-Feb	7303	1401002	3173394	118.8	6.1	112.6	92
Test LLL1	#745	21-Feb	7311	1402642	3172979	125.8	7.3	118.5	94
Test LLL2	#746	21-Feb	7310	1402600	3173016	128.1	7.6	120.5	98
Test LLL3	#747	21-Feb	7311	1402476	3172944	129.8	6.3	123.5	99
Test LLL4	#748	21-Feb	7310	1402359	3173020	123.3	10.5	112.8	93
Test LLL5	#749	21-Feb	7308	1402191	3173090	126.3	10.6	115.7	95
Test LLL6	#750	21-Feb	7309	1402011	3173084	133	10.1	123.5	99
Test LLL7	#751	21-Feb	7311	1401601	3173152	132.1	7.6	124.6	100
Test LLL8	#752	21-Feb	7309	1401453	3173273	134.7	8.3	126.5	100
Test LLL9	#753	21-Feb	7308	1401223	3173262	123.1	7.1	116.1	95
Test LLL10	#754	21-Feb	7308	1401183	3173349	128.8	9.8	118.9	97
Test MMM1	#755	23-Feb	7312	1402657	3173006	130.2	16.4	113.8	94
Test MMM2	#756	23-Feb	7312	1402596	3173012	132.9	17.5	115.4	95
Test MMM3	#757	23-Feb	7312	1402535	3172954	139.9	7	133	100
Test MMM4	#758	23-Feb	7312	1402422	3172961	135.5	11.9	123.6	99
Test MMM5	#759	27-Feb	7311	1401846	3173083	124.2	13.7	110.5	90

BCC Test	Test No.	Date	Elevation (ft)	Northing (ft)	Easting (ft)	Wet Density (pcf)	Moisture Content (%)	Dry Density (pcf)	Compaction (%)
Test MMM6	#760	27-Feb	7313	1401668	3173125	126.3	9.4	116.9	95
Test MMM7	#761	27-Feb	7312	1401528	3173194	131.6	15.3	116.3	95
Test MMM8	#762	27-Feb	7311	1401347	3173258	129.8	15.7	114.1	94
Test MMM9	#763	27-Feb	7310	1401233	3173317	125.5	10.4	115.1	95
Test MMM10	#764	27-Feb	7309	1401172	3173364	122.2	11.5	110.8	90
Test NNN1	#765	28-Feb	7315	1402676	3172938	128.1	9.2	117.4	95
Test NNN2	#766	28-Feb	7313	1402544	3172993	143.1	10.8	129.2	100
Test NNN3	#767	28-Feb	7313	1402400	3173075	124.1	8.1	114.7	95
Test NNN4	#768	28-Feb	7313	1402273	3173031	129.4	6.2	121.9	98
Test NNN5	#769	28-Feb	7313	1402105	3173013	127.9	14.1	112.1	92

Notes:

1. As of February 28, 2022, a total 2,100,000 yd3 had been placed and compacted. This requires at least 420 compaction tests, and 718 tests have been taken.