

To: Jerald Schnabel
Riverbend Industries Inc.
File: August 2023 Monitoring Summary

From: Paul Kos
Denver, CO 80222
Date: September 18, 2023

Reference: August 2023 Geotechnical Monitoring Summary Pikeview Quarry

1.0 INTRODUCTION

Stantec Consulting Services Inc. (Stantec) has prepared this August 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) 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 August 2023. Continuous monitoring by the robotic survey system began in 2010 and has continued through the month of August 2023. Visual inspections of the slopes were performed by Riverbend employees and Stantec engineers. Riverbend contracted with a new construction company in August, and reclamation construction will resume in September 2023.

1.1 PURPOSE

The purpose of this report is to summarize the August 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 August 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 August 9, 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 August 2023. The change in primary contractors resulted in decreased volumes placed in the buttress zone; however, site maintenance, topsoil placement and riprap production continued throughout the month.
- Operators placed limited material in the buttress zone. Material was from offsite sources.
- No cracking was observed on the native granite slopes above the extents of the disturbed area.
- 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.
- 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.
- 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.
- 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 20 active prisms; two prisms were control points located outside the slope movement area, six prisms are located on the slopes surrounding the slope movement area, five prisms were located on the slopes within the landslide area, and seven 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. Prism P32 was damaged by a rock and was replaced by P32R in August 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, or sun glare. The alerts are listed in Table 2.

Table 2 Alert Summary

Date(s)	Alert	Cause/Actions taken	Alert Resolved
1-Aug to 4-Aug	BR1 not found	Intermittent readings and limited work. Dust and dirt on prism lens. Vegetation partially blocking prism.	4-Aug
3-Aug	Points not found	Rain, and fog. No work being performed at time of alerts.	3-Aug
3-Aug	P2 regression limits received	Rain and fog at time of alerts. No work during alert. Readings in positive and negative directions.	3-Aug
3-Aug	P69A regression limits received	Rain and fog at time of alerts. No work during alert. Readings in positive and negative directions.	3-Aug
3-Aug	P33 regression limits received	Rain and fog at time of alerts. No work during alert. Readings in positive and negative directions.	3-Aug
3-Aug	P25 regression limits received	Rain and fog at time of alerts. No work during alert. Readings in positive and negative directions.	3-Aug
3-Aug	P70 regression limit received	Rain and fog at time of alert. No work during alert.	3-Aug
3-Aug	NP66 not found	Light rain and fog at time of alert.	3-Aug
4-Aug	P69A not found	Single event. No inclement weather and no work being performed at time of alerts. Possibly related to vegetation blocking prism.	4-Aug
5-Aug	P2 not found	Single event. No inclement weather and no work being performed at time of alerts. Possibly related to animal activity.	5-Aug

5-Aug	P5 not found	Single event. No inclement weather and no work being performed at time of alerts. Possibly related to animal activity.	5-Aug
6-Aug	Points not found	Rain, and fog. No work being performed at time of alerts.	6-Aug
7-Aug	CP7 not found	No inclement weather and no work being performed at time of alerts. Possibly related to animal activity.	7-Aug
7-Aug	B7200-2 not found	Single event. Likely related to equipment operating in the area.	7-Aug
7-Aug	B7200-3 not found	Single event. Likely related to equipment operating in the area.	7-Aug
8-Aug	Points not found	Rain, and fog. No work being performed at time of alerts.	8-Aug
9-Aug	P69A not found	Single event. No inclement weather and no work being performed at time of alerts. Possibly related to vegetation blocking prism or animal activity.	10-Aug
13-Aug	BR2 not found	Single event. Rain, and fog. No work being performed at time of alert.	14-Aug
13-Aug	P5 not found	Single event. Rain, and fog. No work being performed at time of alert.	14-Aug
13-Aug	P2 not found	Single event. Rain, and fog. No work being performed at time of alert.	14-Aug
16-Aug	Points not found	Rain, and fog. No work being performed at time of alerts.	16-Aug
16-Aug	P70 regression limit received	Rain and fog at time of alert. No work during alert.	16-Aug
16-Aug	P2 regression limits received	Rain and fog at time of alert. No work during alert.	16-Aug
16-Aug	P5 regression limits received	Rain and fog at time of alert. No work during alert.	16-Aug
25-Aug	Points not found	Rain, and fog. No work being performed at time of alerts.	25-Aug
26-Aug	Points not found	Rain, and fog. No work being performed at time of alerts.	26-Aug
27-Aug	Points not found	Rain, and fog. No work being performed at time of alerts.	27-Aug
28-Aug	System offline due to software updates	No work being performed while system was offline.	28-Aug

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 $\pm 4 \text{ mm} + 1.5 \text{ ppm}$ for prisms located greater than 500m from the station; these equates to an accuracy of $\pm 0.016 \text{ ft}$.

The data show stable conditions with no movements at 15 of 20 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 loose fill or landslide material consolidating under its own weight. These prisms were placed in areas where slope creep movements are likely to occur; therefore, movements being recorded 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	-0.025	-0.290	0.075	0.543	Slope creep movements
BR2	0.126	-0.527	0.173	0.927	Slope creep movements
CP6	0.004	-0.030	0.012	0.032	
CP7	0.064	-0.021	-0.042	0.068	
NP3	0.149	-0.354	0.027	0.392	Slope creep movements
NP66	0.751	-0.857	0.059	1.185	Slope creep movements
P2	-0.008	-0.018	0.000	0.021	
P25	0.001	0.002	-0.004	0.009	
P32R	-0.019	-0.007	0.008	0.022	Replaced P32R in August 2023
P33	0.102	-0.025	0.010	0.122	
P5	0.001	-0.021	0.010	0.023	
P69A	0.316	-0.327	0.022	0.498	Slope creep movements
P70	0.028	-0.053	0.008	0.071	
B7200-1	-0.010	0.001	0.009	0.019	
B7200-2	0.009	-0.007	0.005	0.030	
B7200-3	0.099	-0.038	0.010	0.145	
B7300-0	0.012	-0.028	0.002	0.035	
B7300-1	-0.026	-0.044	0.019	0.055	
B7300-2	0.010	-0.038	0.019	0.058	
B7300-3	0.023	-0.030	0.012	0.048	

4.0 DRONE SURVEY

The site was flown for aerial imagery using an unmanned aircraft system (UAS or 'drone') on August 30, 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 August topography was also compared to the July 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. 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 August 2023. Limited fill from offsite sources was placed in the buttress and buffer zones. During August 2023, approximately 1,000 yd³ of material was placed in the buttress area. Compaction testing began April 2022 and occurs at the rate of at least one test per 5,000 yd³ placed. The change in primary contractors resulted in decreased volumes placed, and there were no compaction tests taken in August. The material placement, compaction and testing will resume once the new contractor starts. As of August 31, 2022, a total of approximately 2,493,000 yd³ had been placed and compacted. This required at least 499 compaction tests, and 899 tests have been taken.

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 August 2023
Phase 3 – Project Kick-off with successful Contractor	Completed August 2023
Phase 4 – Contractor Mobilization to Site	Planned September 2023
Phase 4 – Reclamation Grading	February 2022 to January 2024 (est.)
Phase 4 – Contractor Demobilize from Site	Winter 2024
Phase 5 – Final Revegetation season 2 Begins	2024 until acceptance

Progress of activities this month:

- Contracting with a new contractor was completed, and mobilization to the site began
- Earth moving activities continued, but at a decreased rate during contractor change

- Importing topsoil material continued, but at a decreased rate during contractor change
- Processing of riprap continued
- Geotechnical monitoring continued
- Cleanup operations following the heavy rains continued

Work planned for next month includes:

- Complete new contractor mobilization and resume buttress construction
- Submit Technical Revision (TR) for site drainage and weed control
- Planting seed on the lower buttress slope
- Continue topsoil placement and grading
- Continue importing topsoil material
- Continue processing riprap
- Continue geotechnical monitoring
- Continue to remove and replace prisms on an as-needed basis.
- Continue cleanup operations from the storm events

7.0 CONCLUSIONS

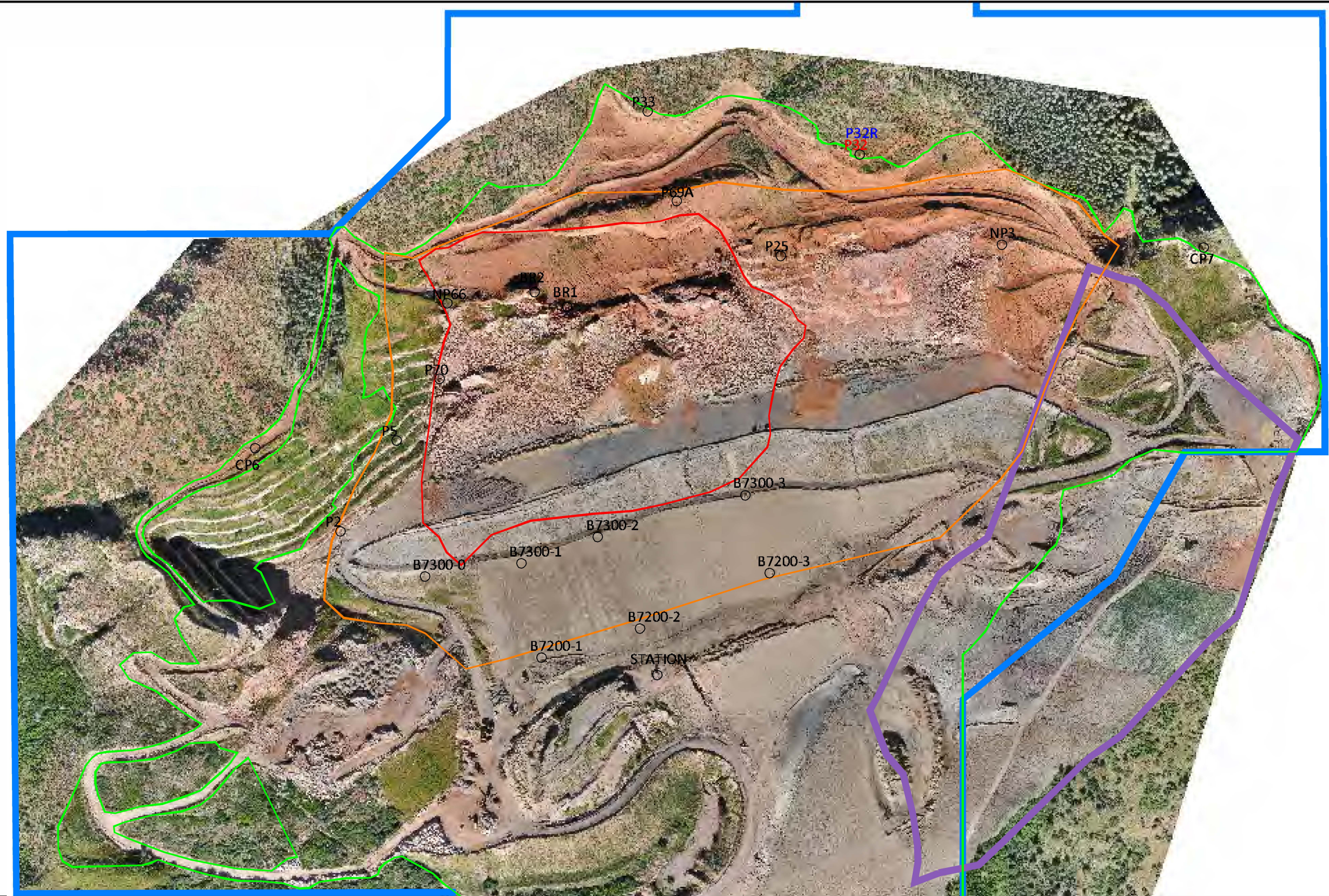
The data collected in August 2023 demonstrate compliance with the reclamation grading plan. The buttress fill is being placed and compacted as intended and specified.

None of the data collected in August 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.

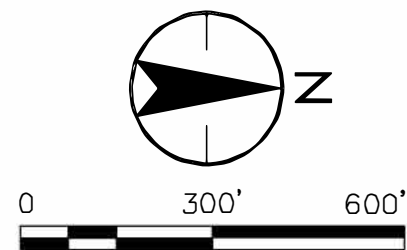
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- LEGEND
- Permit/Affected Lands Boundary
 - City Grading Permit Boundary
 - Proposed Disturbance Limit
 - Landslide Extent
 - Buttress Fill Extent
 - Existing Prism
 - Removed Prism
 - New Prism



Client/Project
RIVERBEND INDUSTRIES INC.

PIKEVIEW QUARRY SLOPE
MONITORING

Project No.
2057288200

Title
SITE MAP

Revision #	Date
Drawn By PK	2023.09.18
	Figure No. 1

Appendix A

Visual Inspections



6. Vegetation growing in North Borrow Area.



5. Sheep water hole.

NOTE 1:
NO CRACKS

NOTE 1:
NO CRACKS
5.



4. North slope of Middle Peak. P32 area - no cracks.



3. Reclamation benches and first bench slopes.



7. Tree planting on the North Borrow slopes.



2. Compacted floor of first bench.



1. First bench slope seen from the North Borrow Area.



8. Measuring topsoil thickness.



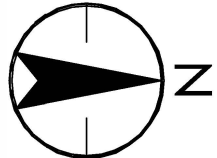
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LEGEND

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

NOTES

1. NO CRACKS OBSERVED IN THIS AREA.
2. NO NEW CRACKS OBSERVED IN THIS AREA.
3. ALL PHOTOS TAKEN AUGUST 9, 2023.



Client/Project

RIVERBEND INDUSTRIES INC.

PIKEVIEW QUARRY SLOPE
MONITORING

Project No.

2057288200

Title

OBSERVATIONS FROM
SEPTEMBER INSPECTION

Revision

#

Drawn By
PK

Date

2023.09.18

Figure No.

2

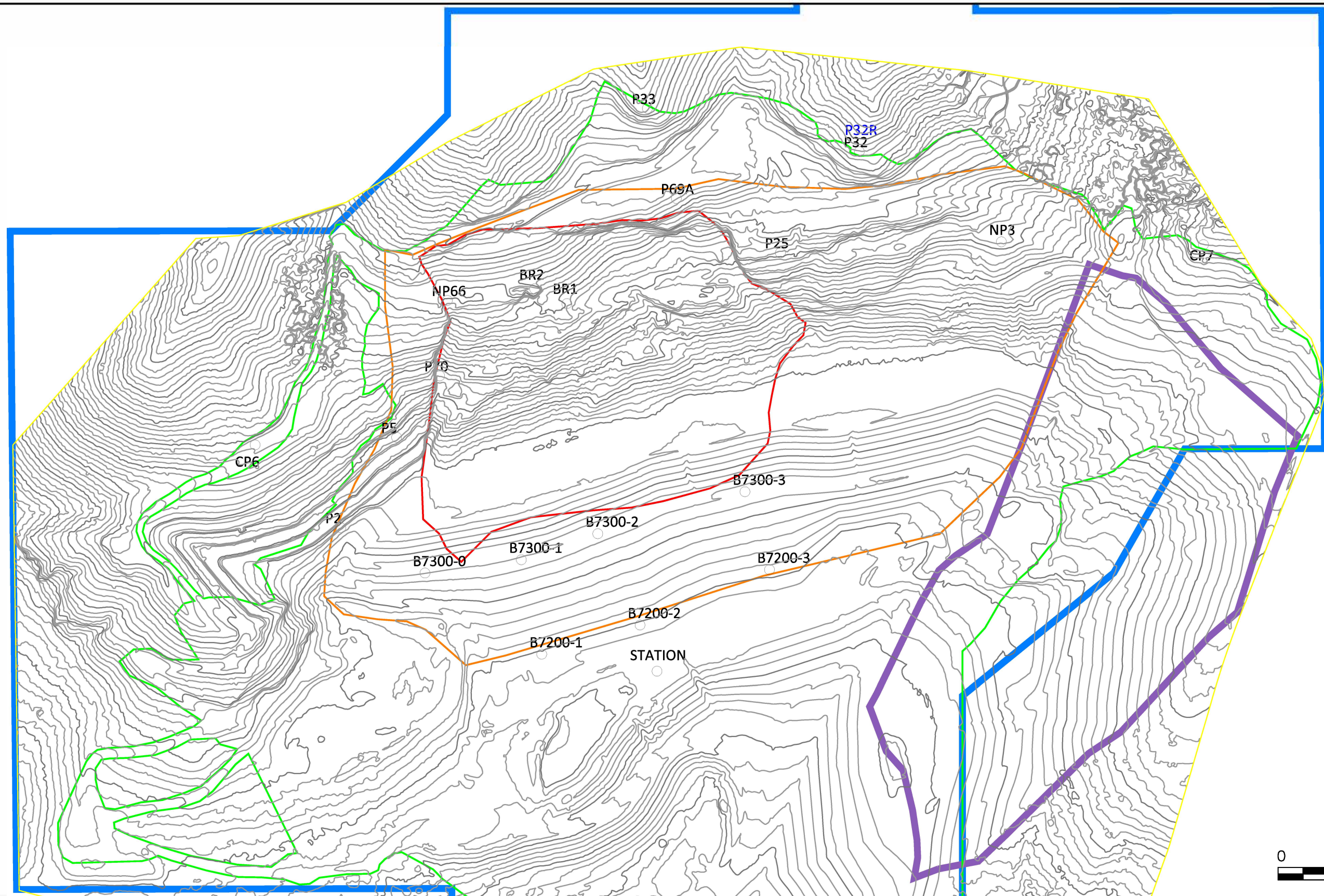
Table A-1 Summary of Daily Inspections

Date	Notes	Inspection By
1-Aug-23	No movement observed. No work.	Jerald Schnabel
2-Aug-23	No movement observed. No work.	Jerald Schnabel
3-Aug-23	No movement observed. Good to proceed.	Jerald Schnabel
4-Aug-23	No movement observed. Good to proceed.	Jerald Schnabel
5-Aug-23	No movement observed. Good to proceed.	Jerald Schnabel
6-Aug-23	No work.	Not applicable
7-Aug-23	No movement observed. Limited work due to rain overnight.	Jerald Schnabel
8-Aug-23	No movement observed. Good to proceed.	Jerald Schnabel
9-Aug-23	No movement observed. Good to proceed.	Jerald Schnabel
10-Aug-23	No movement observed. Good to proceed.	Jerald Schnabel
11-Aug-23	No movement observed. Good to proceed.	Jerald Schnabel
12-Aug-23	No work.	Not applicable
13-Aug-23	No work.	Not applicable
14-Aug-23	No movement observed. Good to proceed.	Jerald Schnabel
15-Aug-23	No movement observed. Good to proceed.	Jerald Schnabel
16-Aug-23	No movement observed. Good to proceed.	Jerald Schnabel
17-Aug-23	No movement observed. Good to proceed.	Jerald Schnabel
18-Aug-23	No movement observed. Good to proceed.	Jerald Schnabel
19-Aug-23	No work.	Not applicable
20-Aug-23	No work.	Not applicable
21-Aug-23	No movement observed. Good to proceed.	Jerald Schnabel
22-Aug-23	No movement observed. Good to proceed.	Jerald Schnabel
23-Aug-23	No movement observed. Good to proceed.	Jerald Schnabel
24-Aug-23	No movement observed. Good to proceed.	Jerald Schnabel
25-Aug-23	No movement observed. Good to proceed.	Jerald Schnabel
26-Aug-23	No work.	Not applicable
27-Aug-23	No work.	Not applicable
28-Aug-23	No movement observed. Good to proceed.	Jerald Schnabel
29-Aug-23	No movement observed. Good to proceed.	Jerald Schnabel
30-Aug-23	No movement observed. Good to proceed.	Jerald Schnabel

Appendix B

Prism Survey

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- LEGEND
- Permit/Affected Lands Boundary
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 - 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 AUGUST 30, 2023 DRONE SURVEY.
4. CONTOUR INTERVAL IS 10 FEET

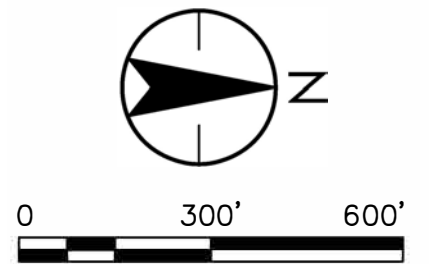
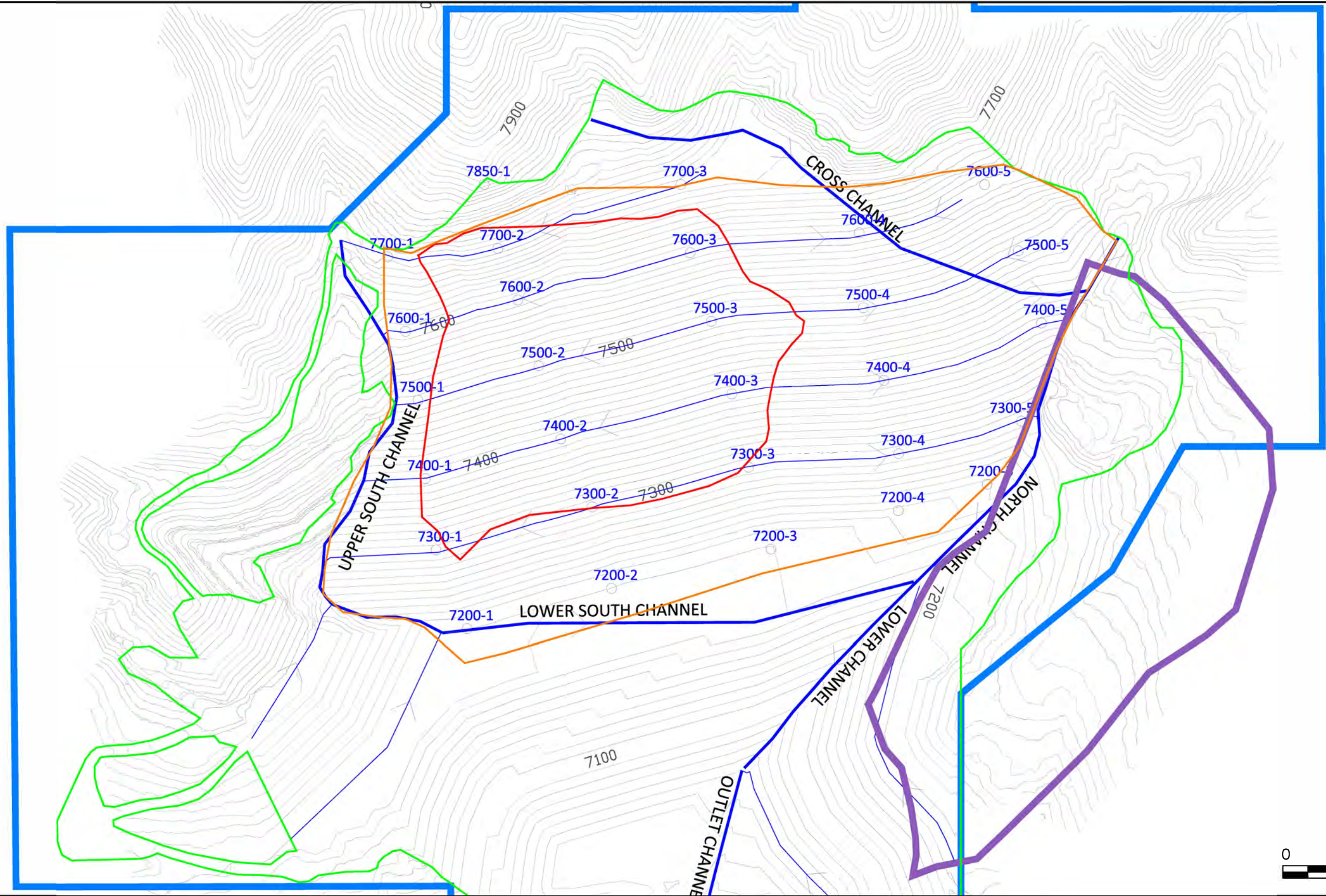
Client/Project
RIVERBEND INDUSTRIES INC.
PIKEVIEW QUARRY SLOPE
MONITORING

Project No.
2057288200

Title	
EXISTING PRISMS WITH CURRENT SURFACE	
Revision #	Date 2023.09.18
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

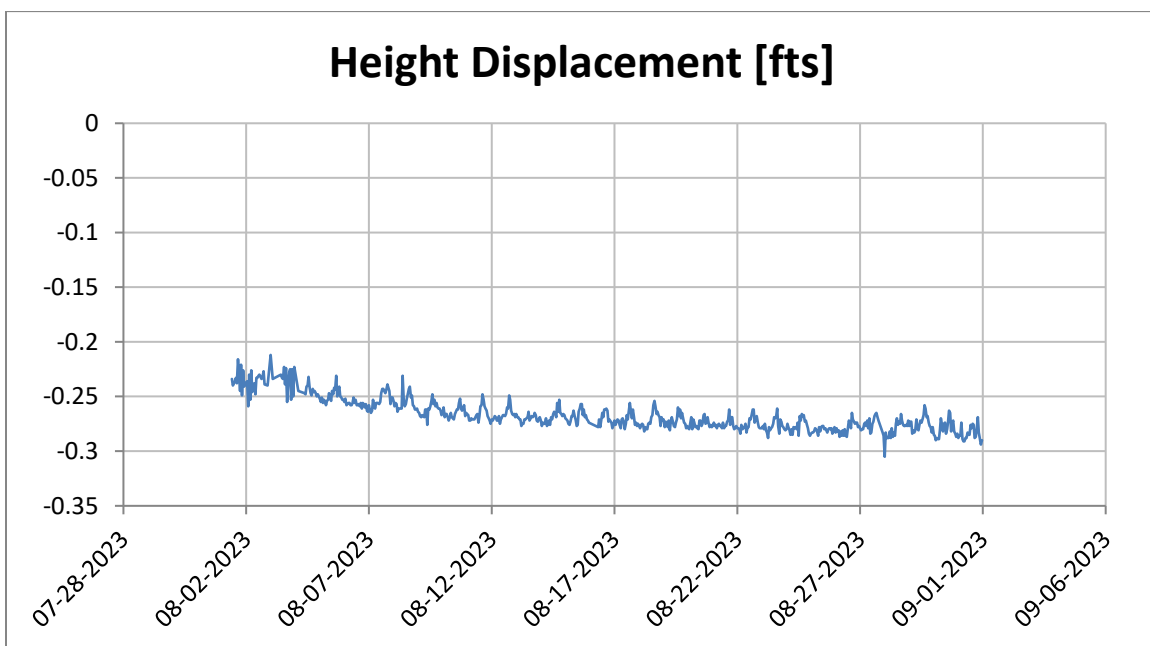
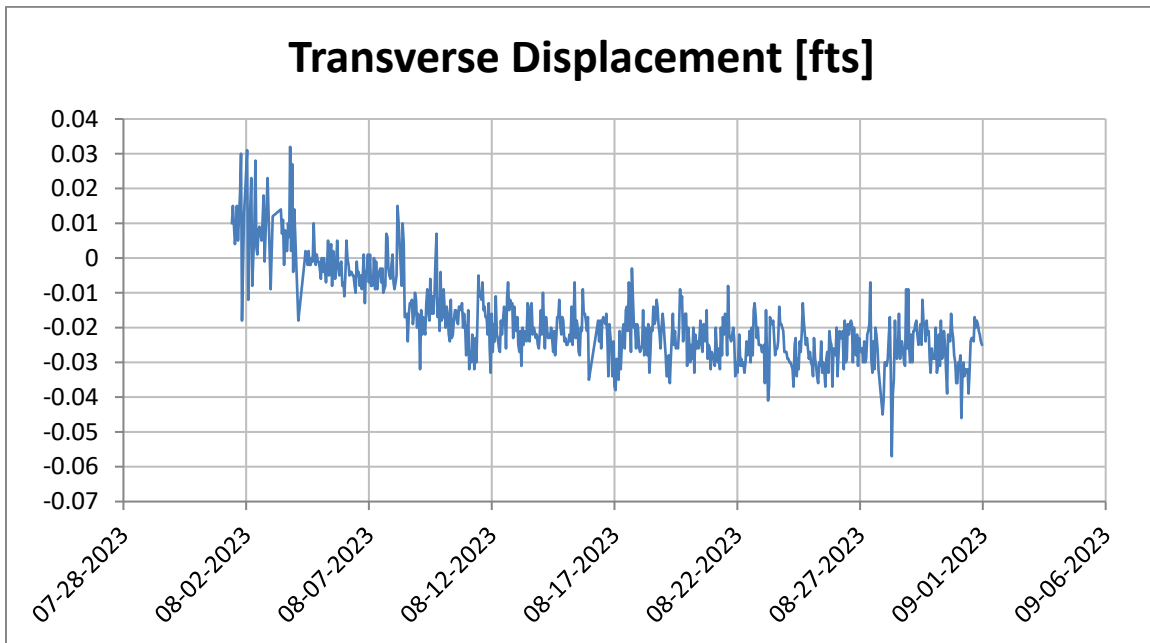
Revision #	Date 2023.09.18
Drawn By PK	Figure No. 4

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-2023	Prism Added	New Prism Added
B7200-2	1-Jun-2023	Prism Added	New Prism Added
B7200-3	28-Jun-2023	Prism Added	New Prism Added
B7300-1	28-Jun-2023	Prism Added	New Prism Added
B7300-2	28-Jun-2023	Prism Added	New Prism Added
B7300-3	28-Jun-2023	Prism Added	New Prism Added
B7300-0	27-Jul-2023	Prism Added	New Prism Added

Prism	Date	Action	Comment
P32	8/1/2023	Prism Removed	P32 was damaged by a falling rock. P32R was installed in the same location.
P32R	8/1/2023	Prism Added	

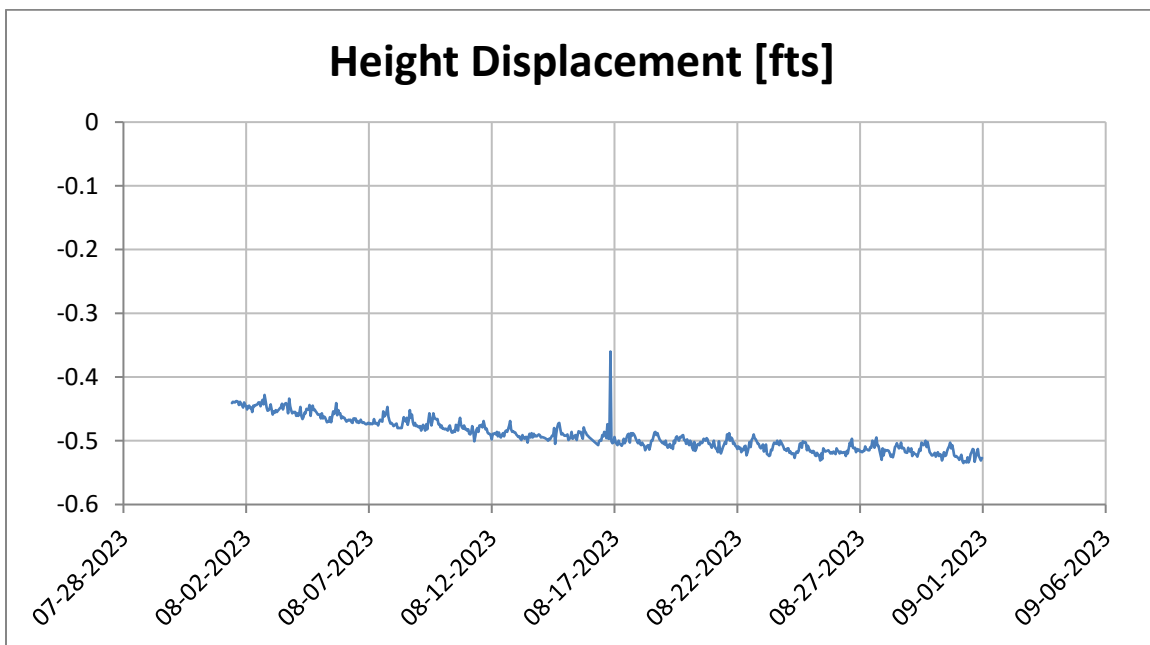
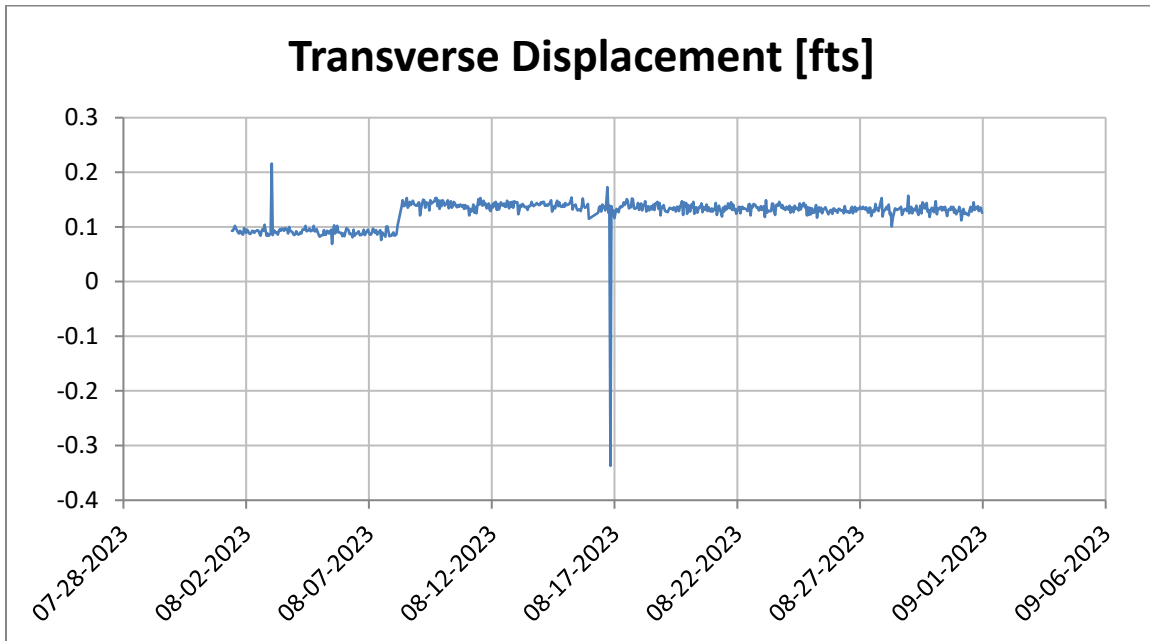
Prism BR1



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.

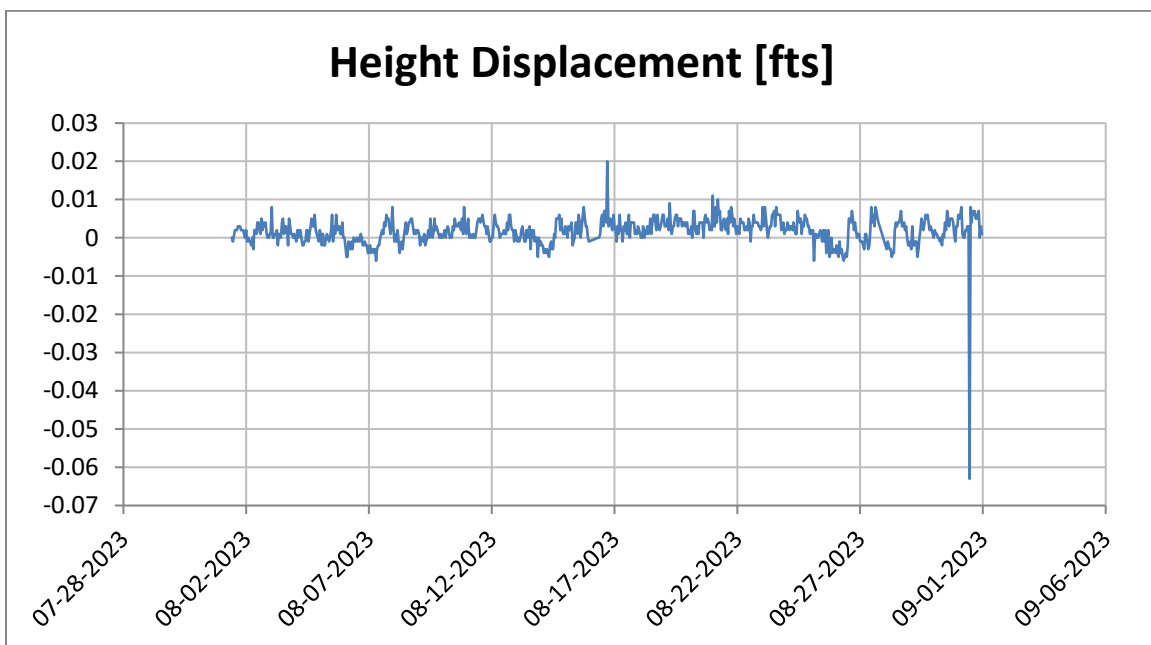
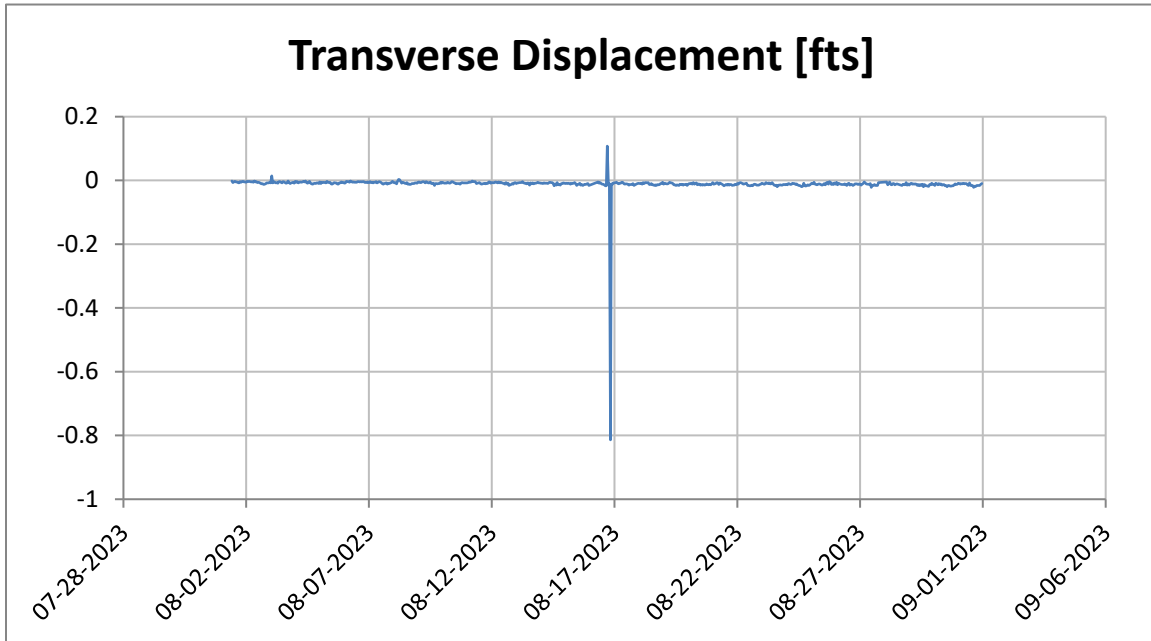
Prism BR2



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.

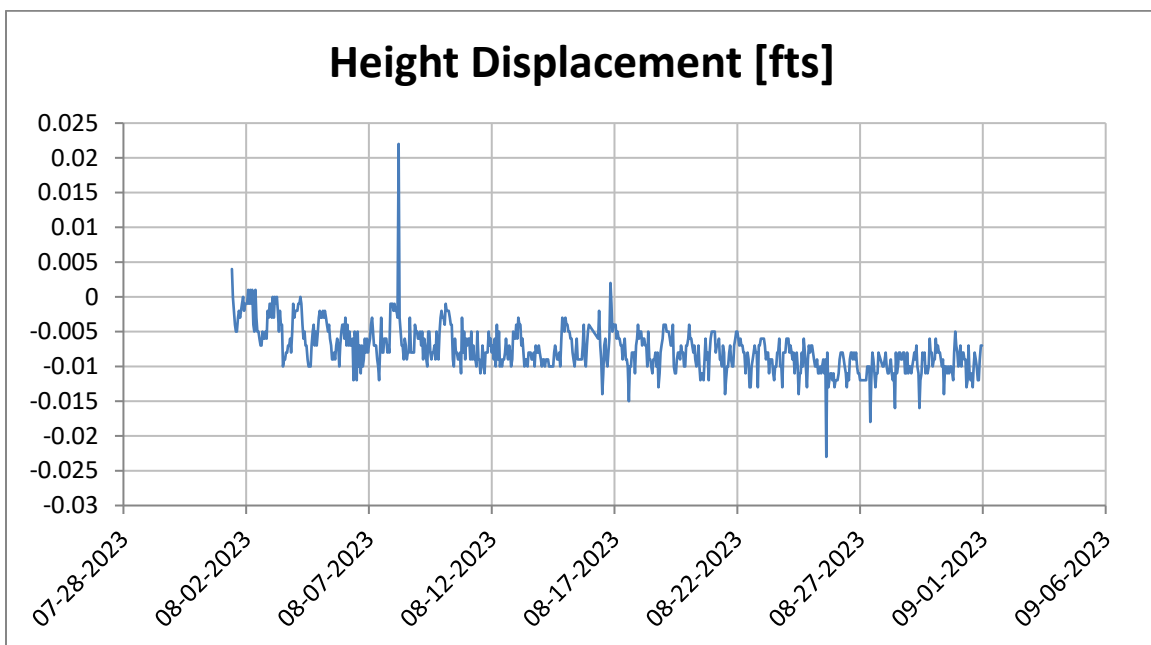
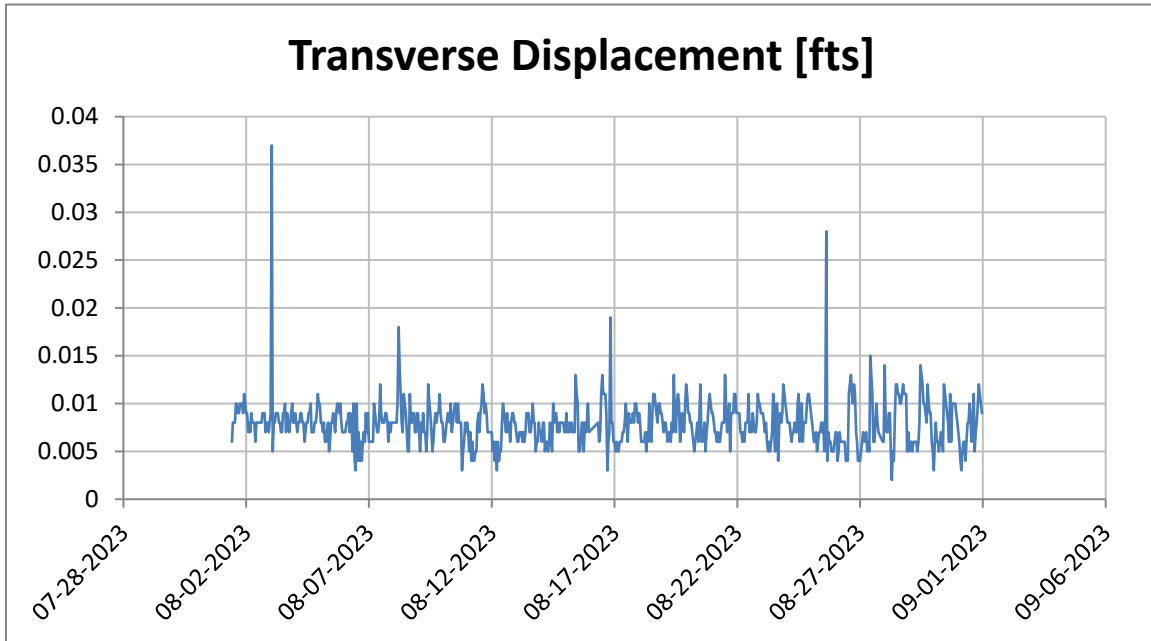
Prism B7200-1



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.

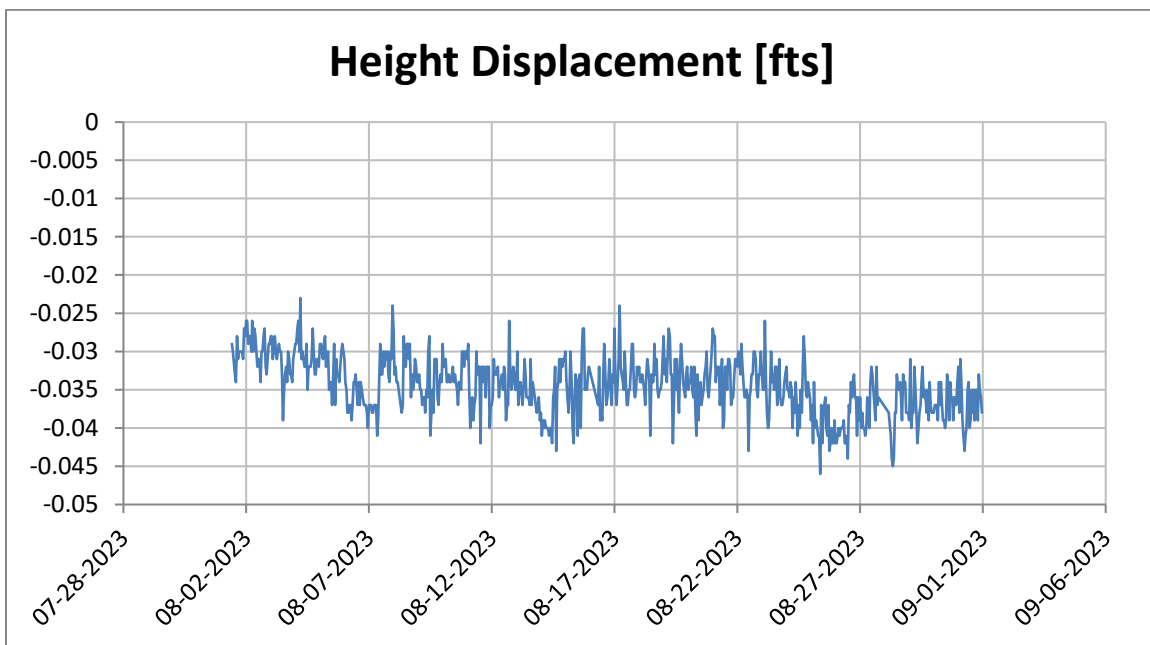
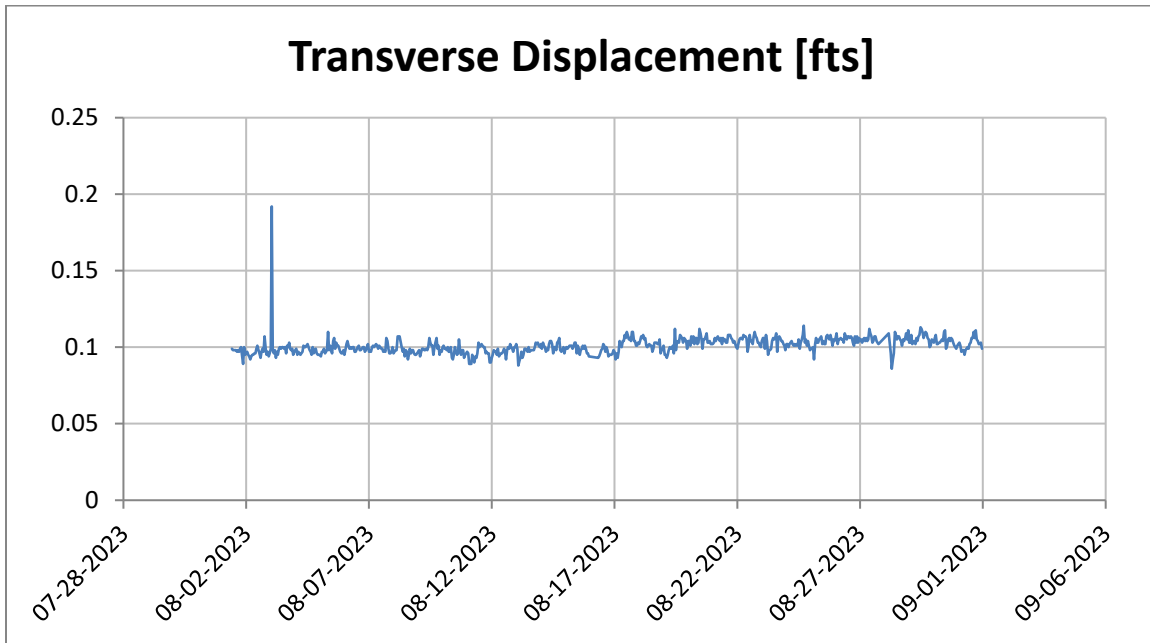
Prism B7200-2



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. Apparent movements believed to be the result of topsoil placement around prism.

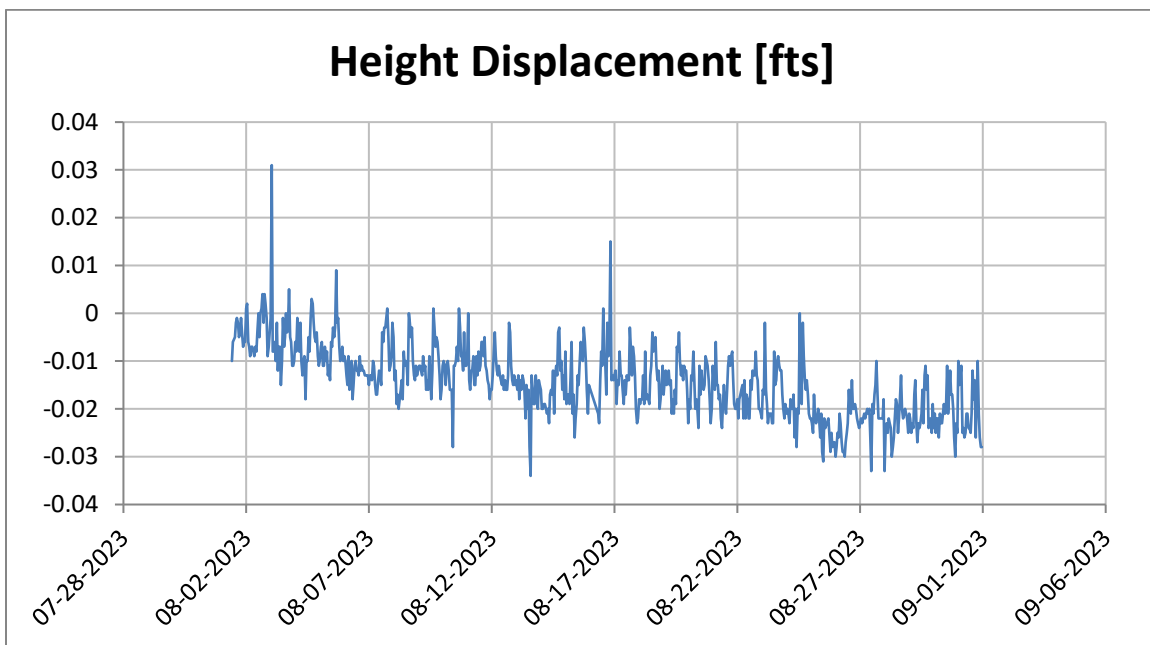
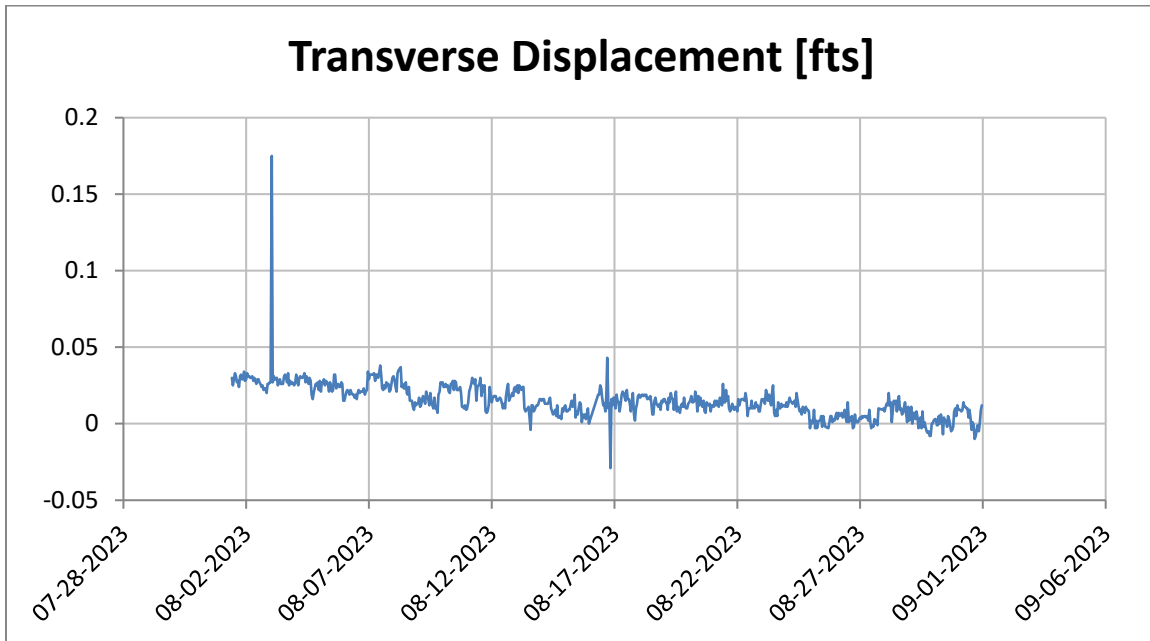
Prism B7200-3



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. Apparent movements believed to be the result of topsoil placement around prism.

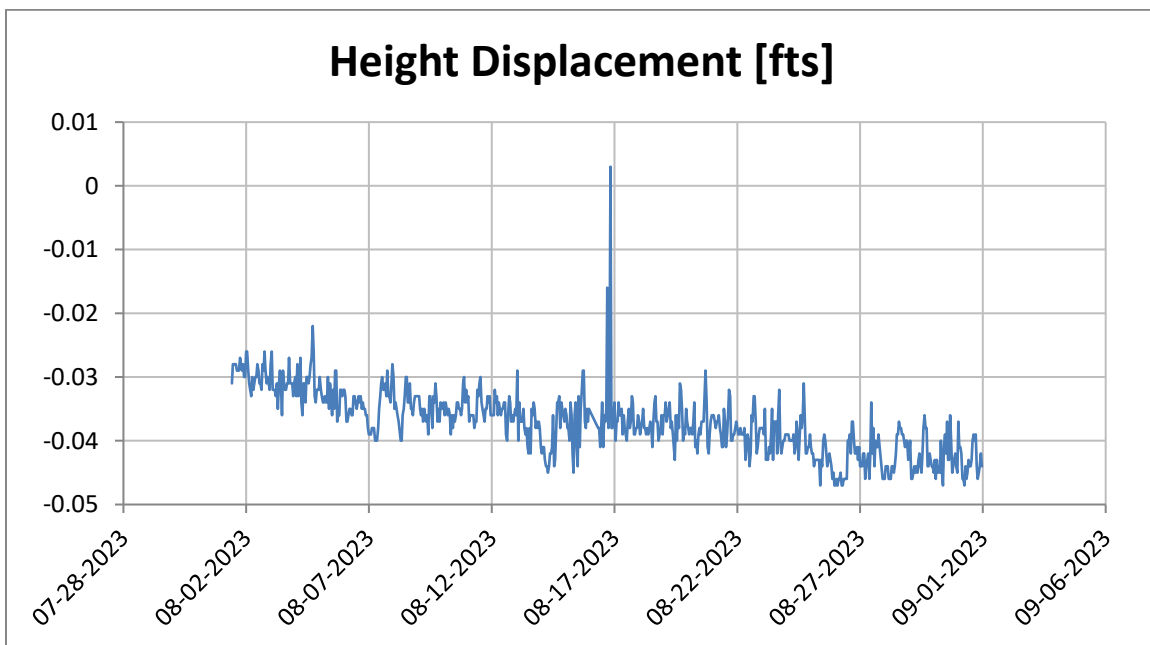
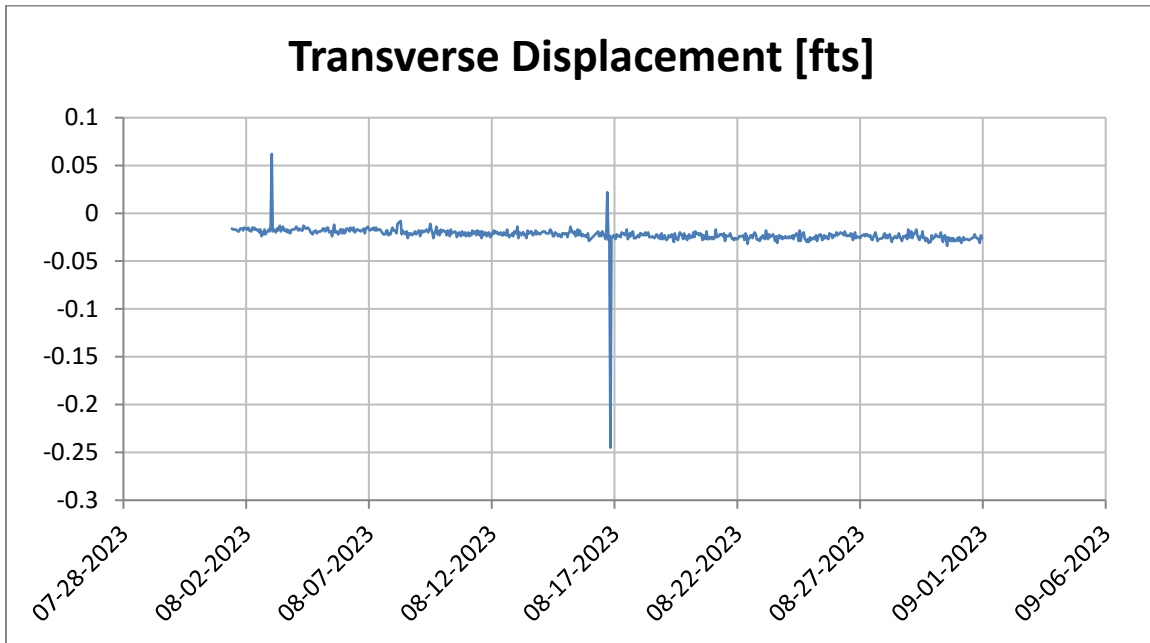
Prism B7300-0



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. Apparent movements believed to be the result of topsoil placement around prism.

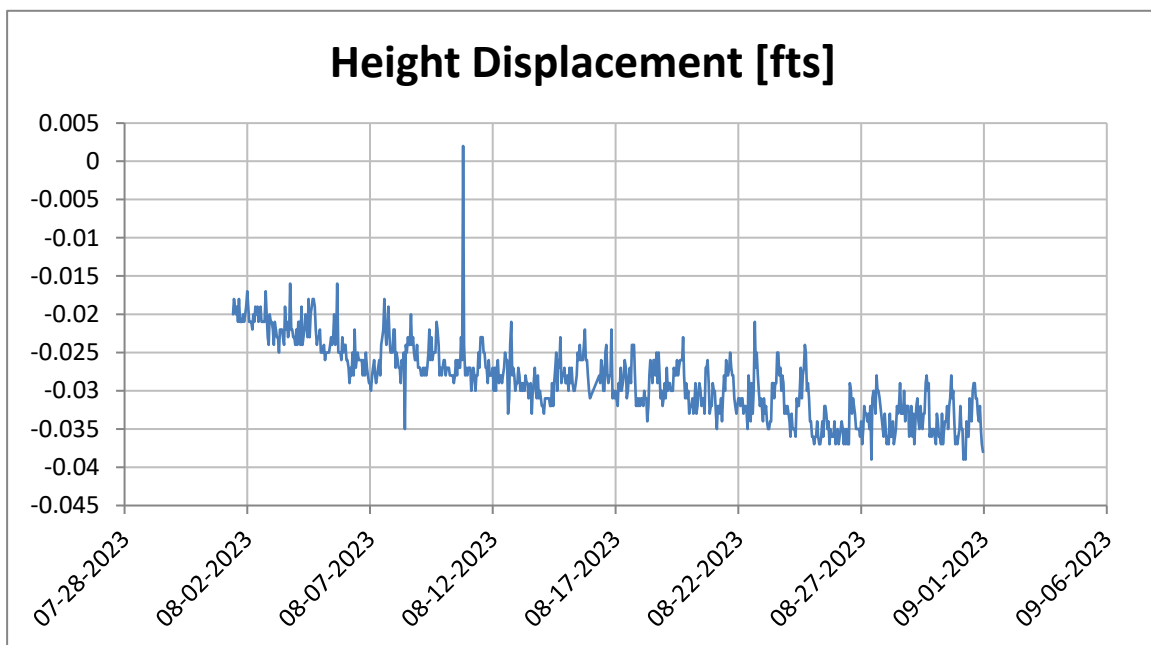
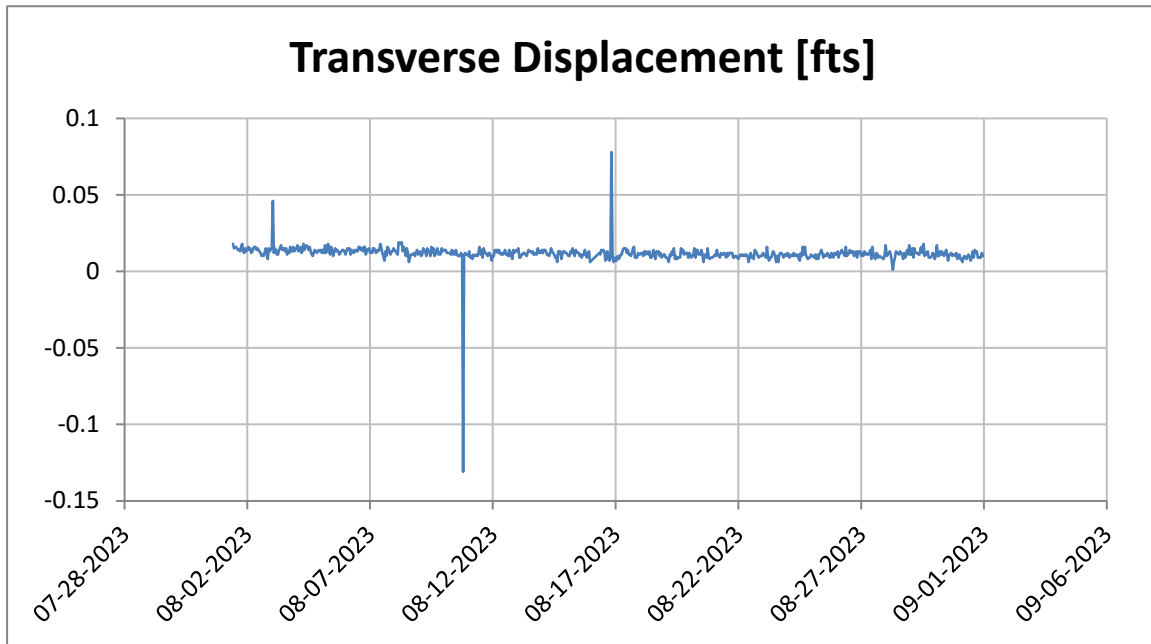
Prism B7300-1



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. Apparent movements believed to be the result of topsoil placement around prism.

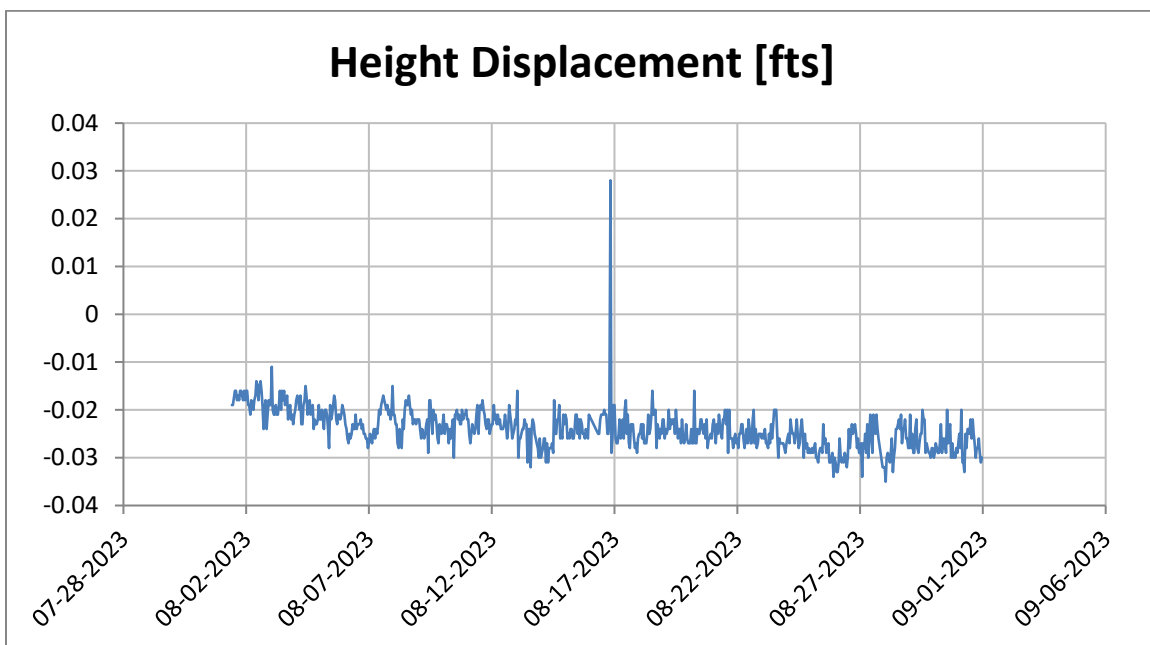
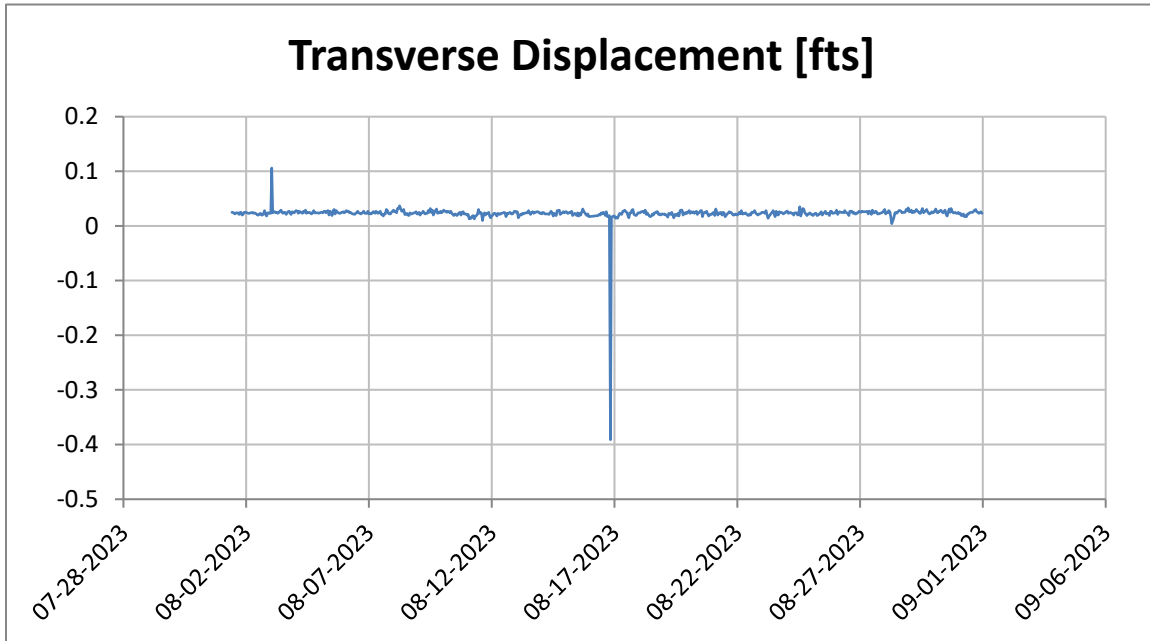
Prism B7300-2



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. Apparent movements believed to be the result of topsoil placement around prism.

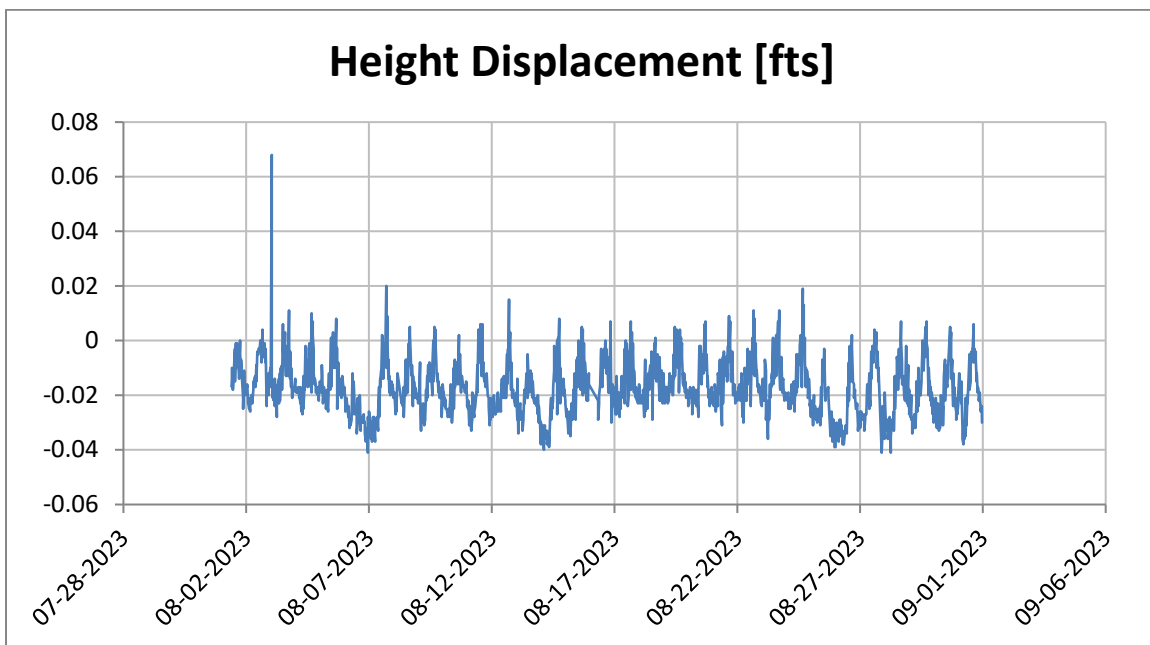
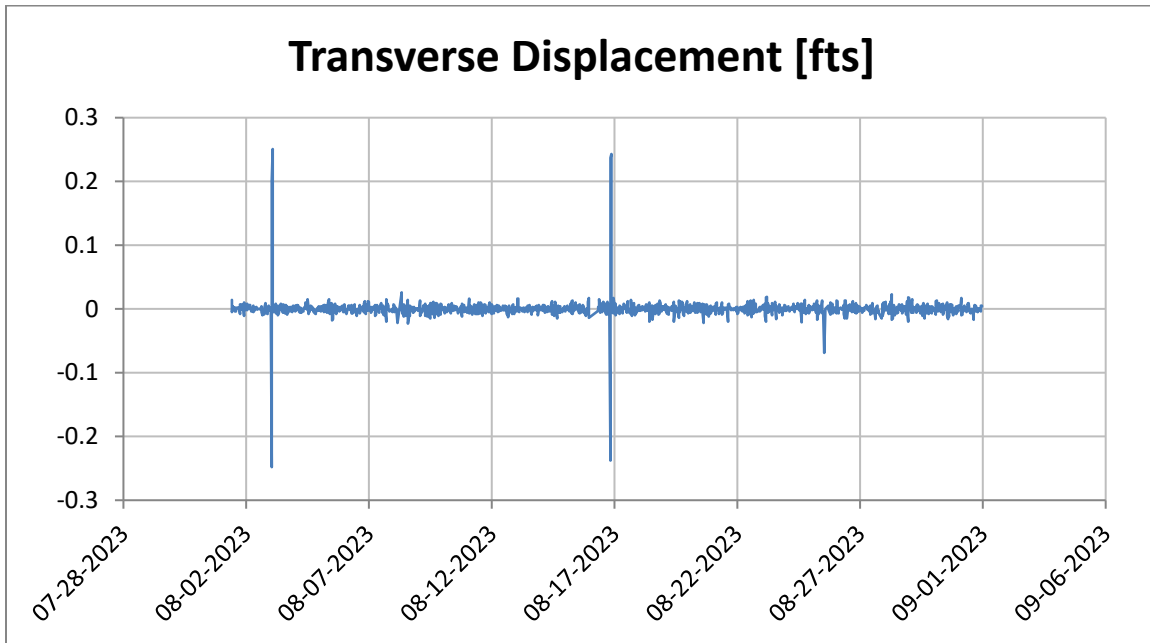
Prism B7300-3



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. Apparent movements believed to be the result of topsoil placement around prism.

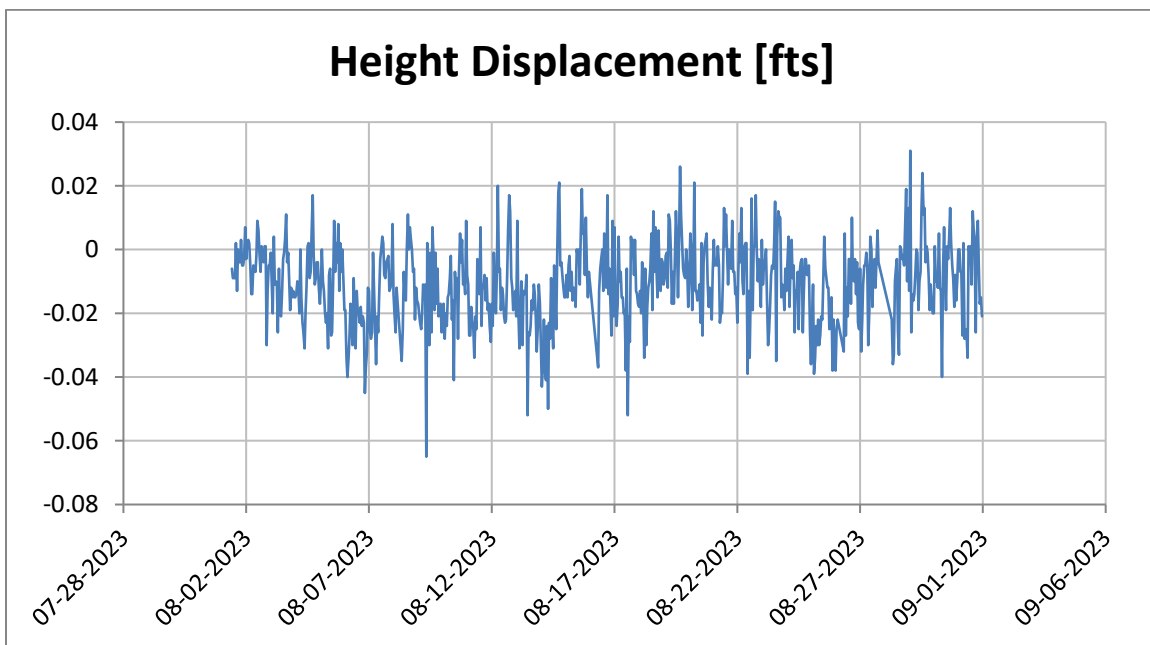
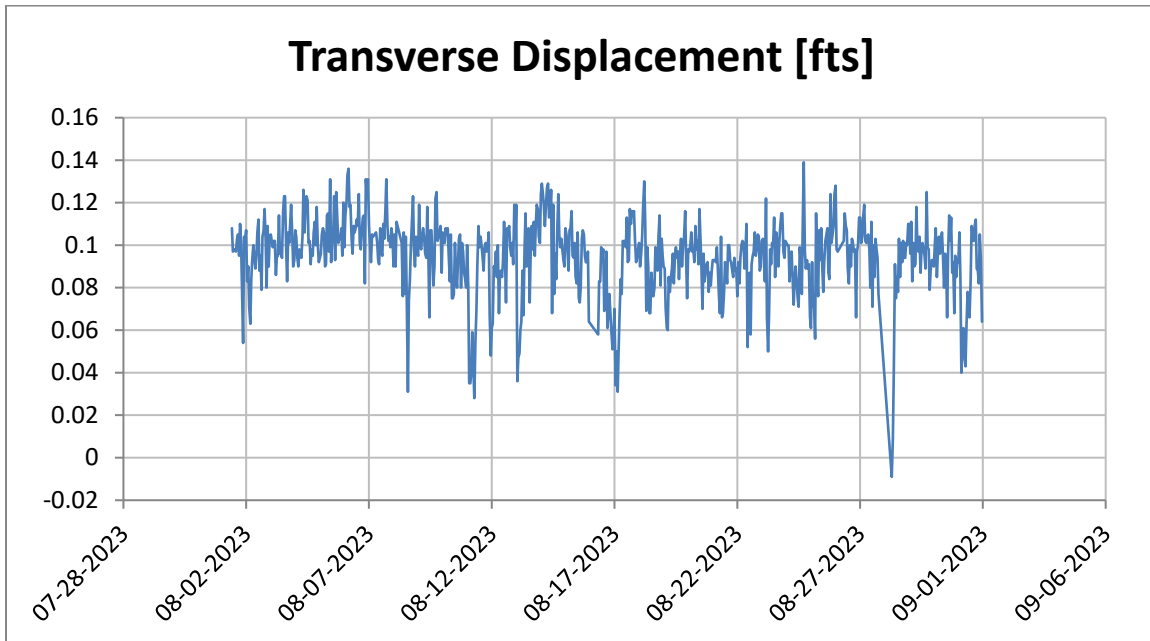
Prism CP6



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.

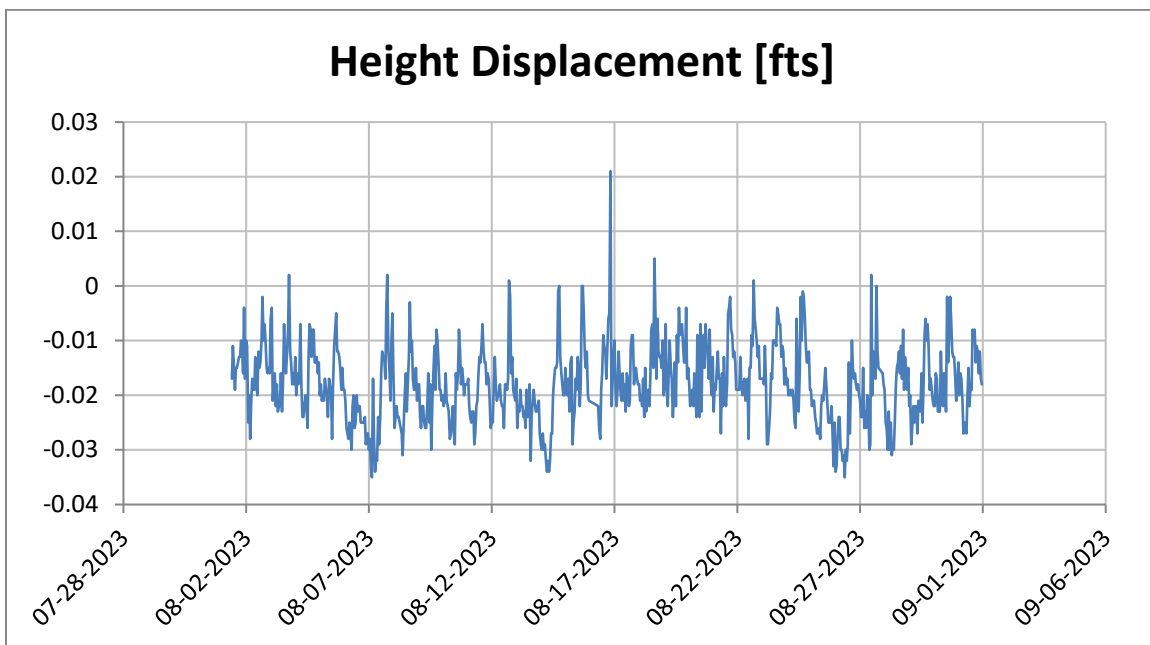
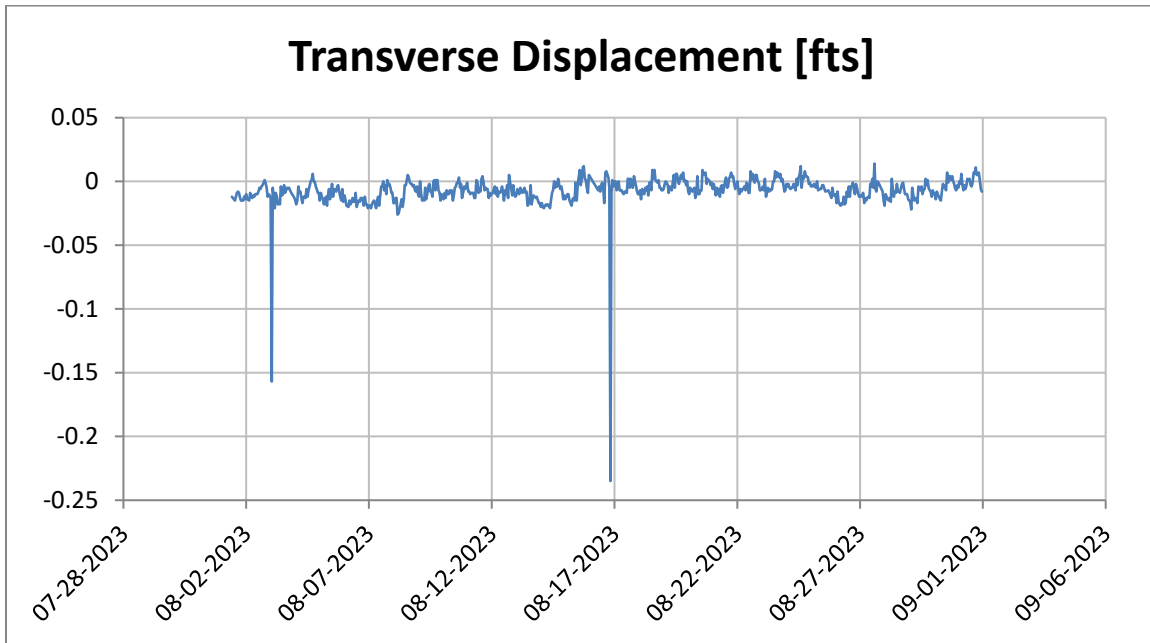
Prism CP7



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.

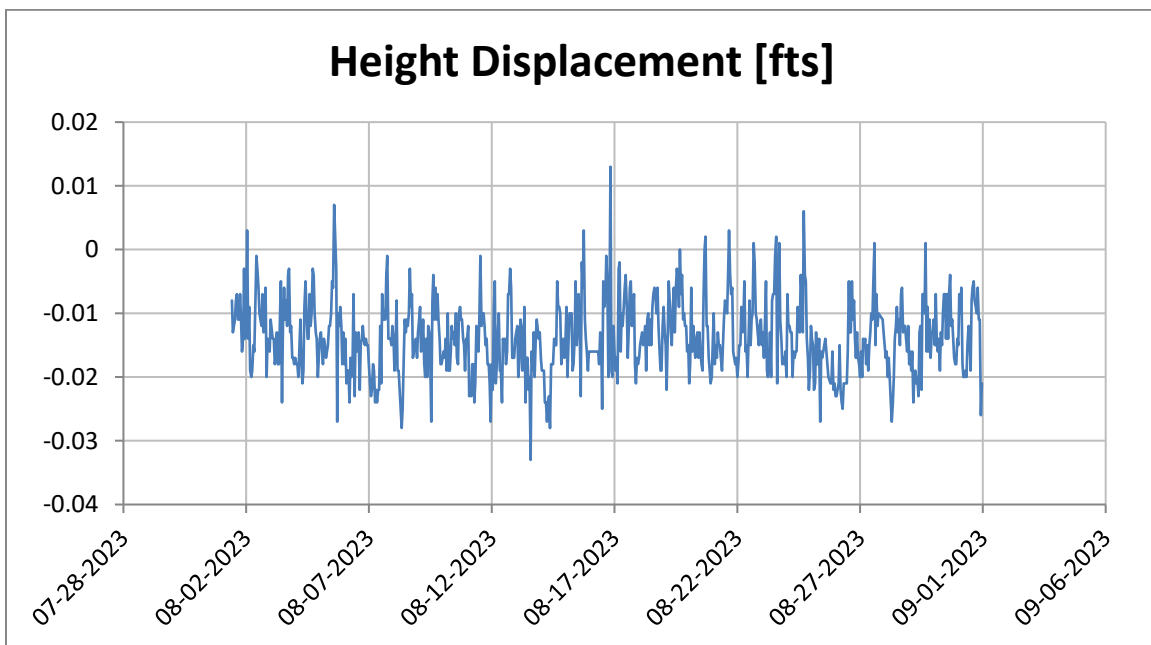
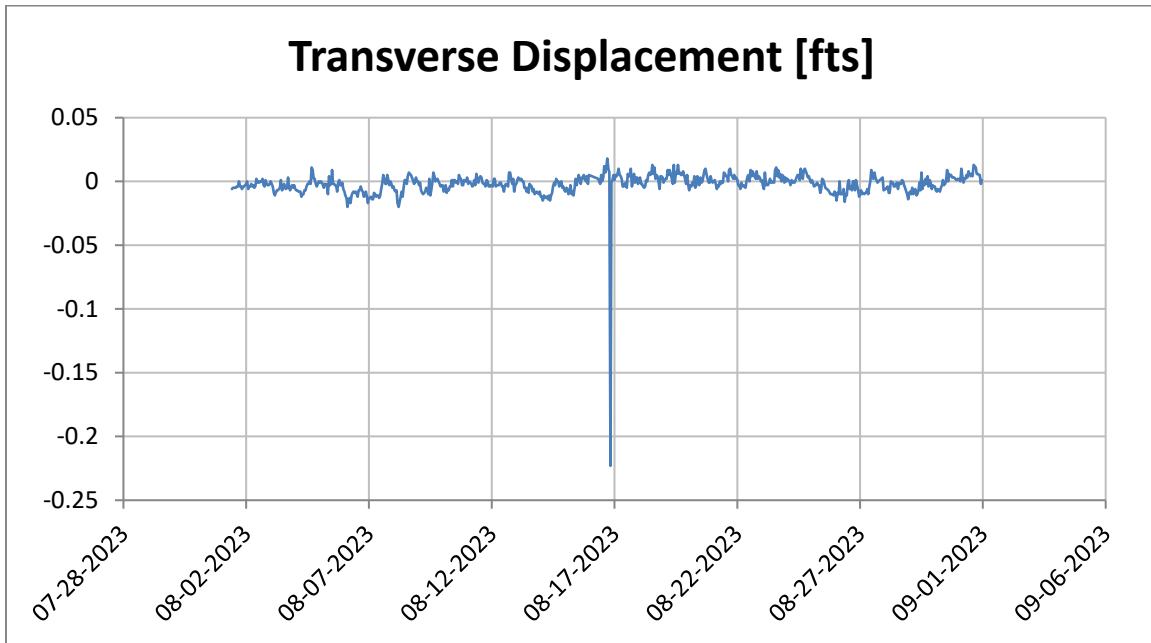
Prism P2



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 alerts received on August 3 and 16.

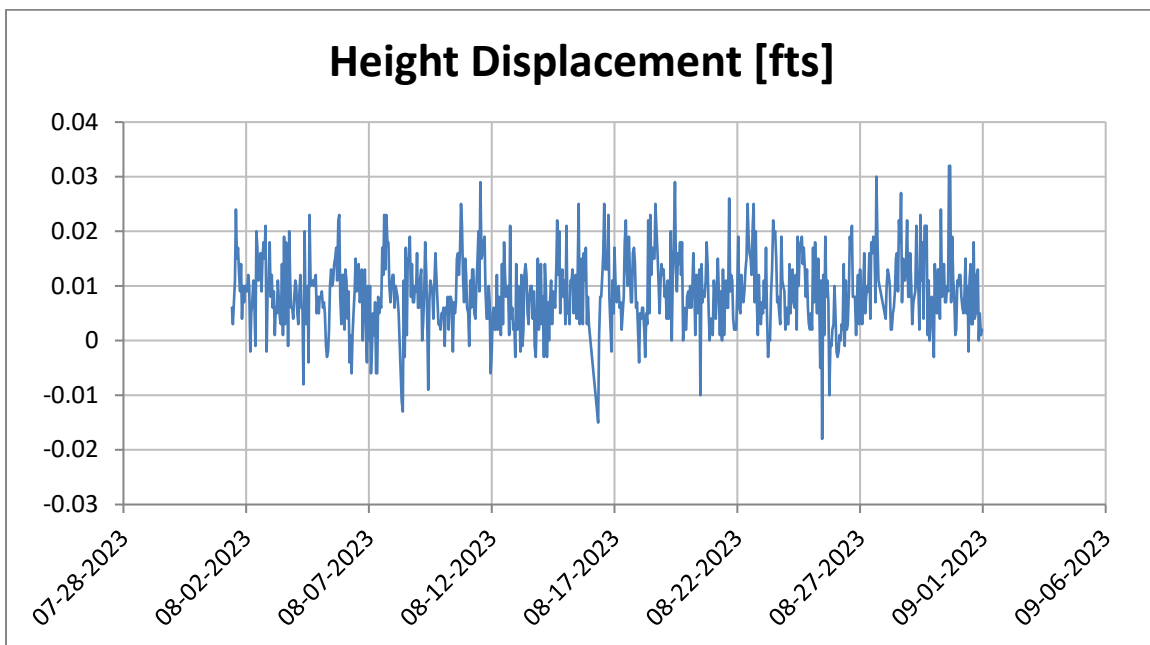
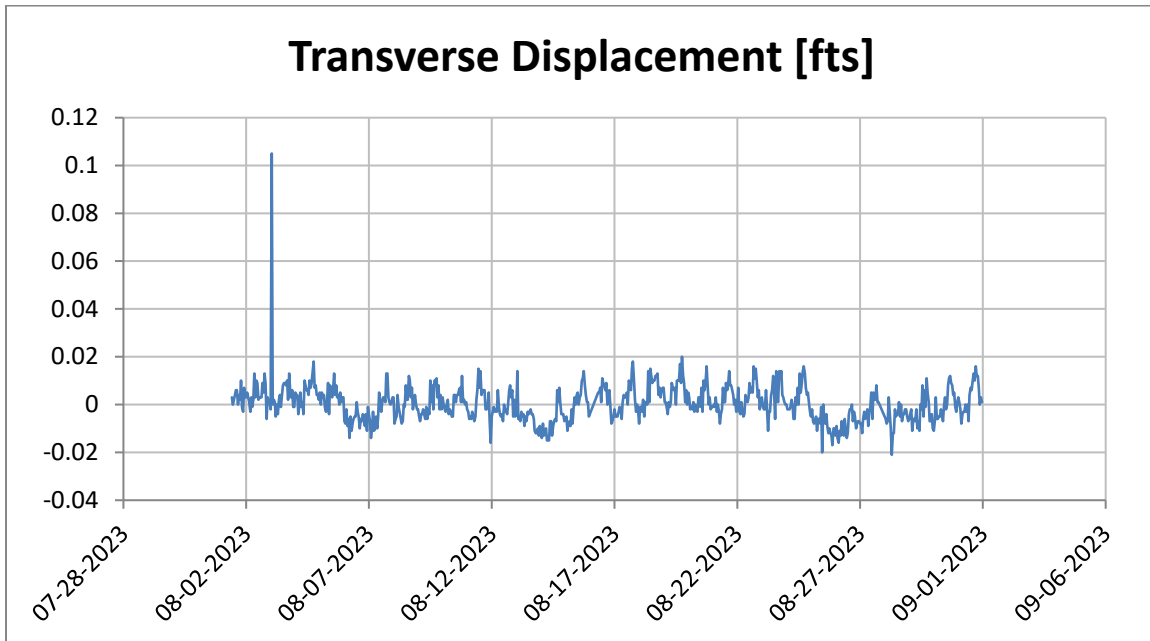
Prism P5



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.
5. Regression limit alerts received on August 16.

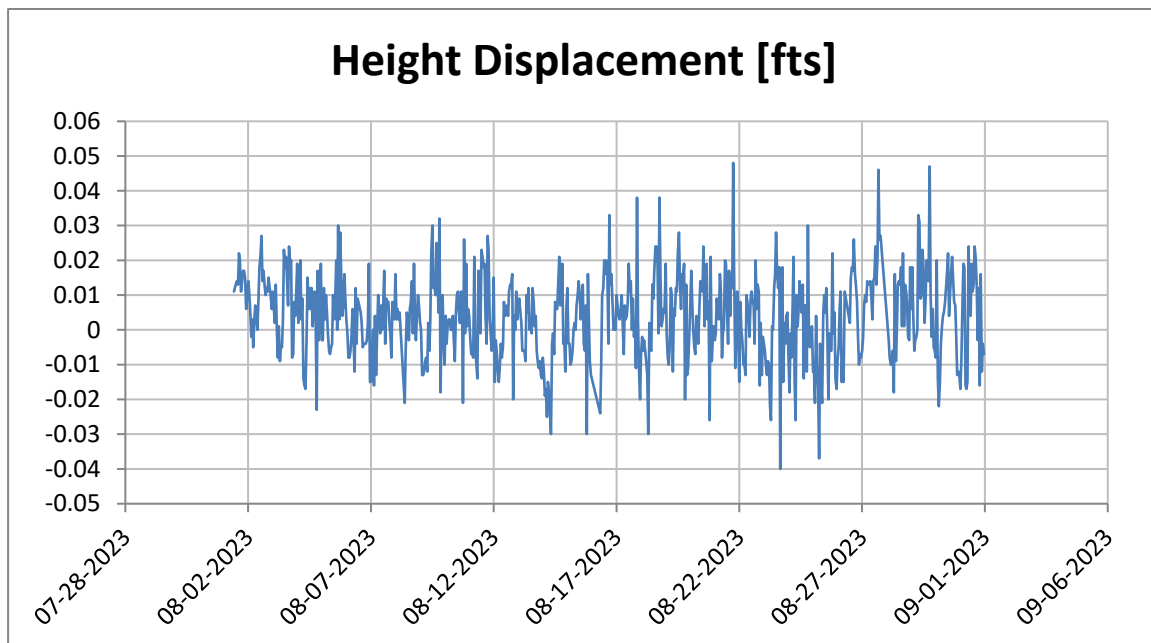
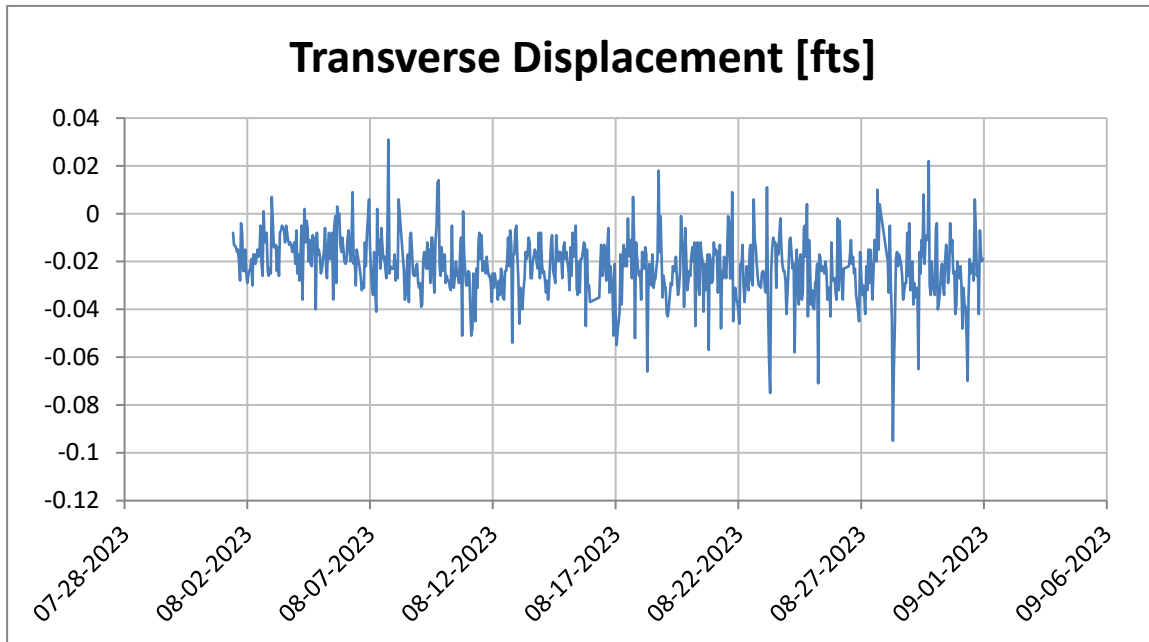
Prism P25



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 August 3.

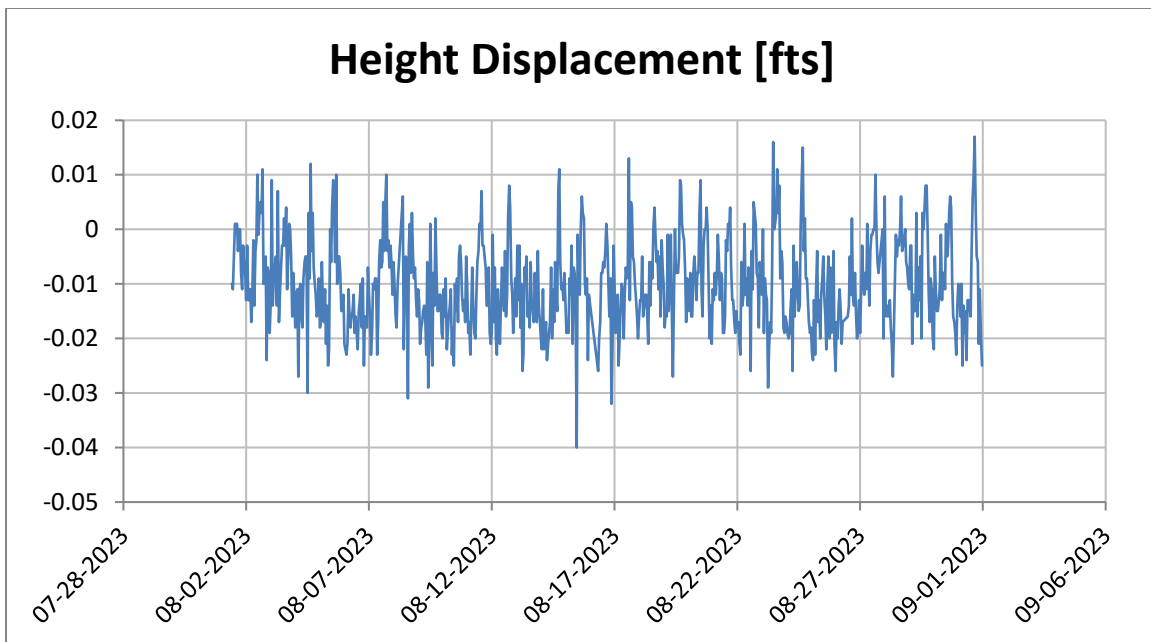
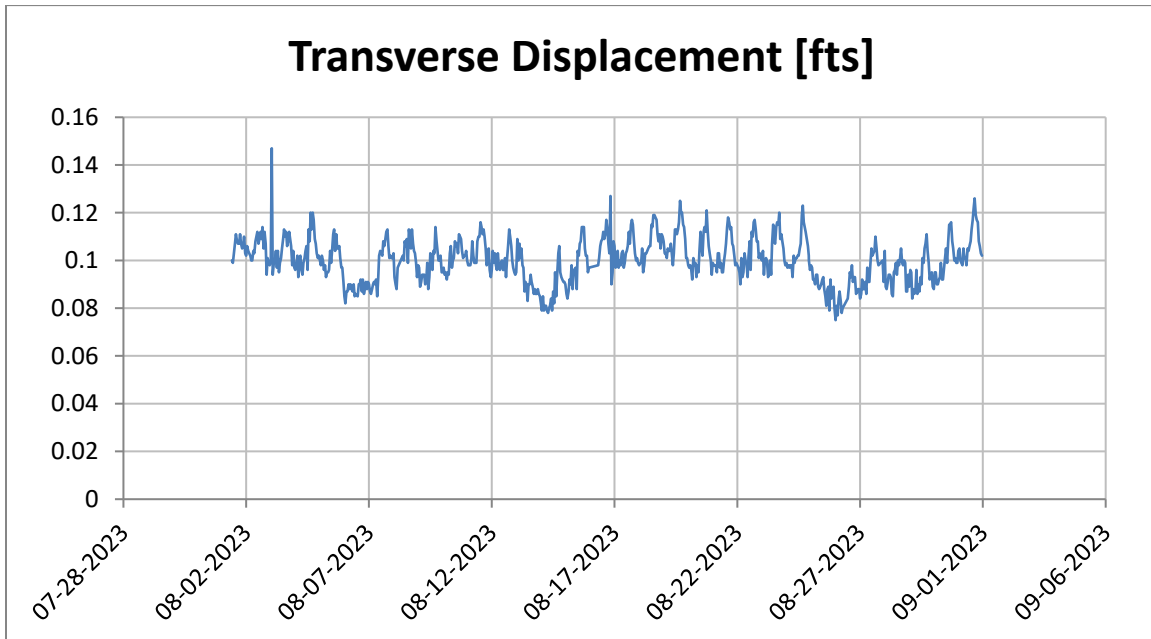
Prism P32R



Notes:

1. P32R replaced P32 on August 1, 2023.
2. Survey accuracy is ± 0.016 feet.
3. Alert threshold is ± 0.35 feet.
4. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
5. Height displacement is in the vertical direction. Positive direction means higher in elevation.

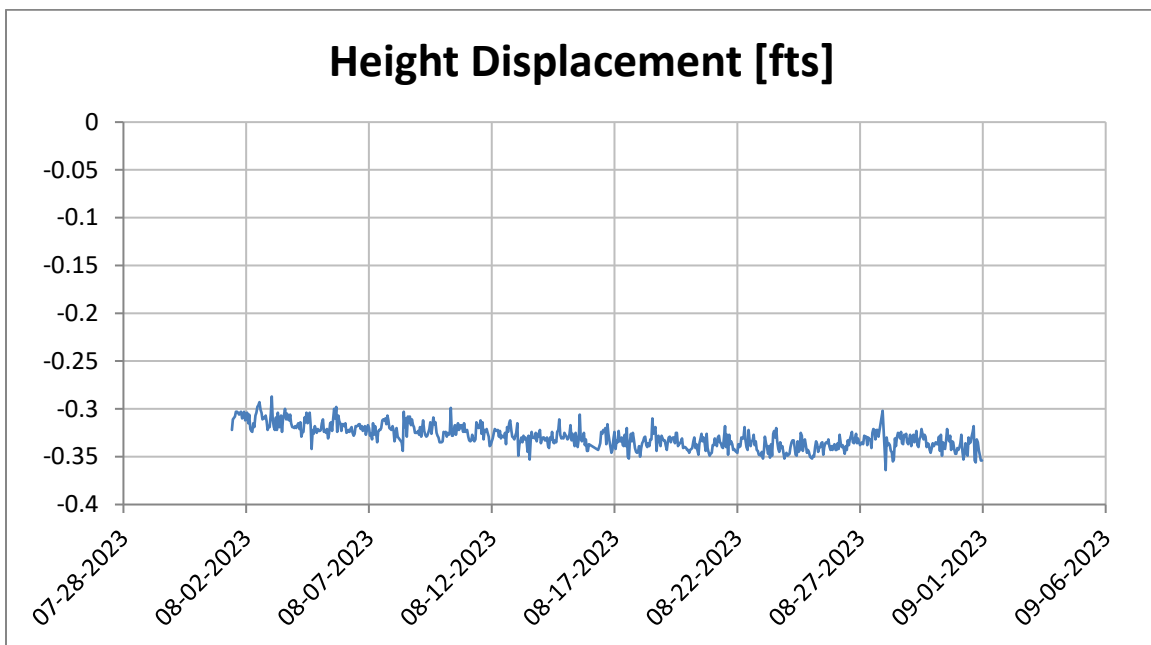
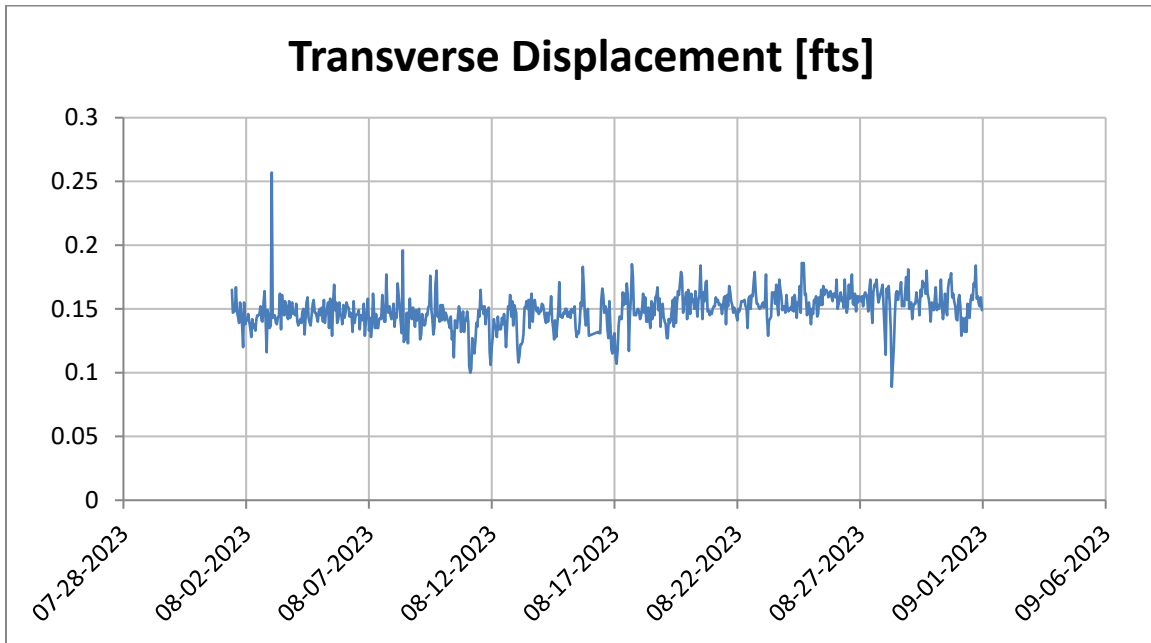
Prism P33



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 August 3.

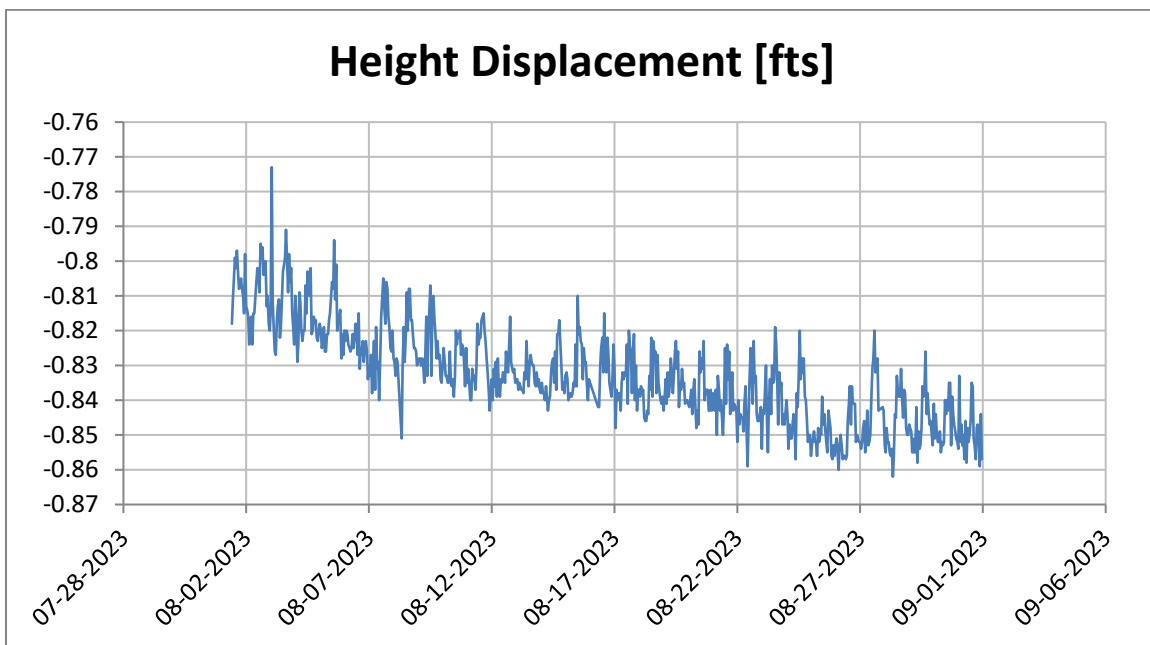
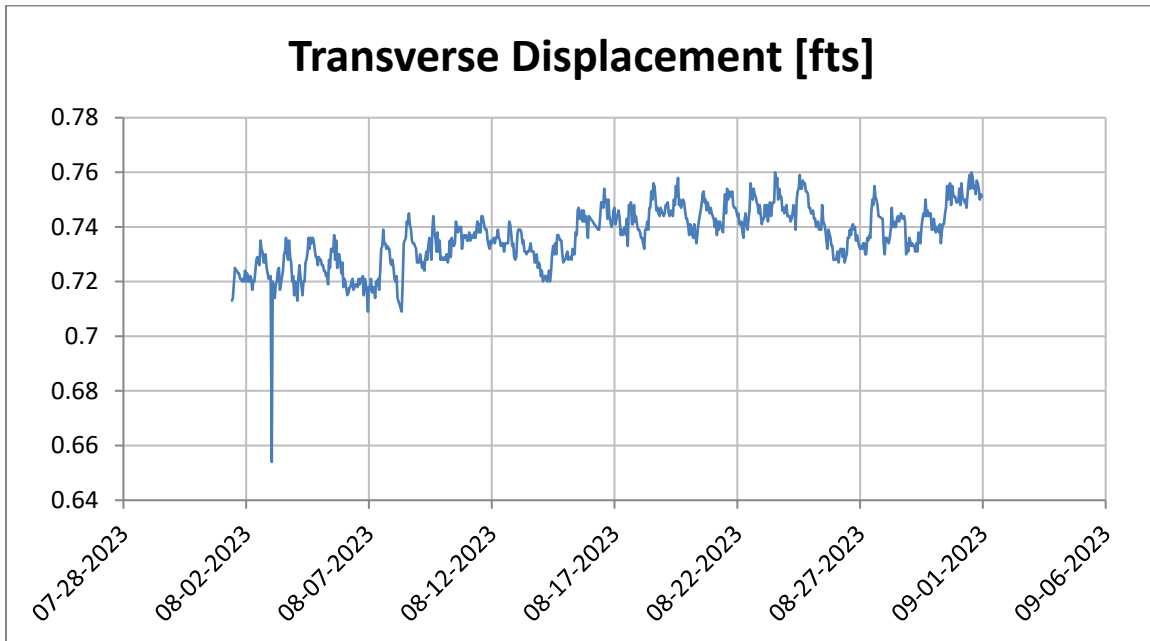
NP3



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.

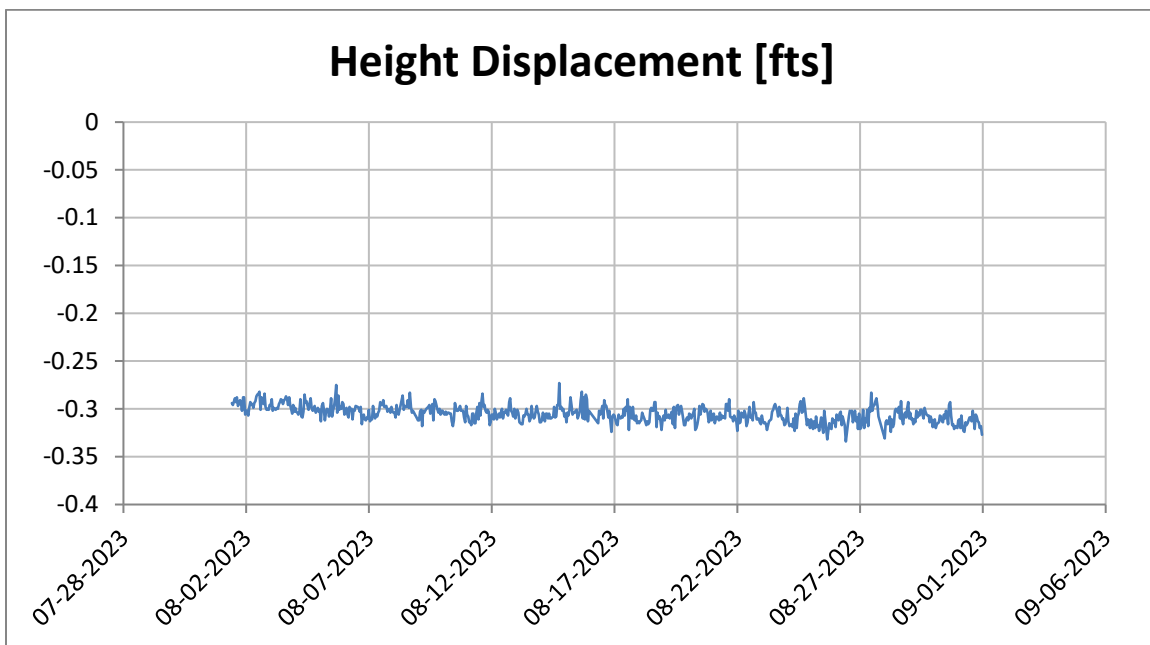
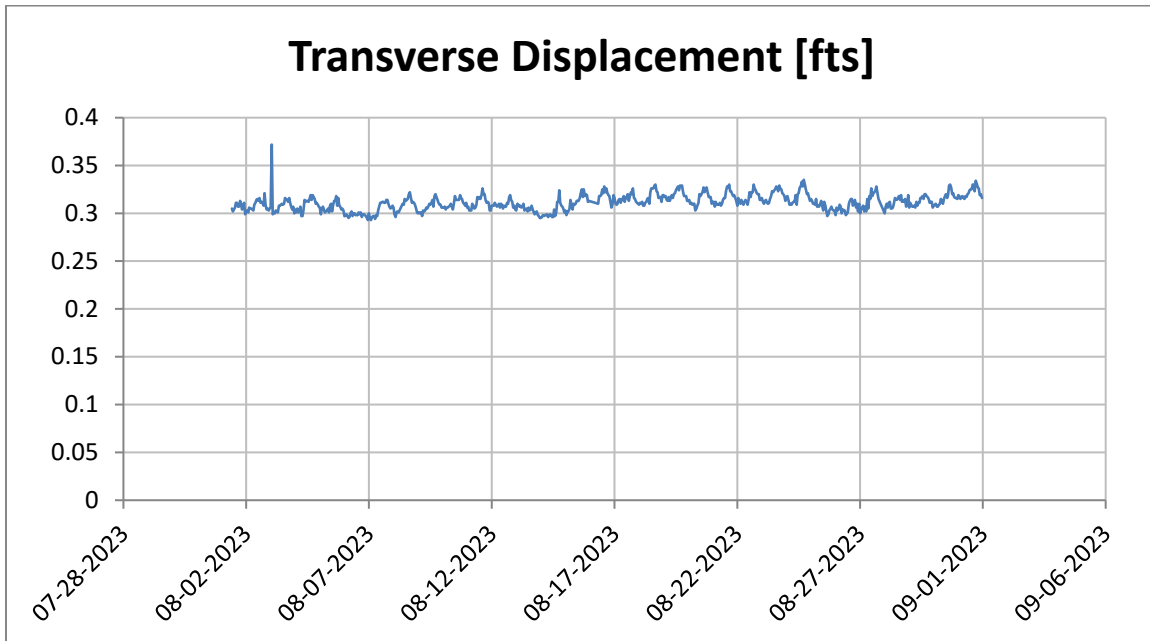
NP66



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.

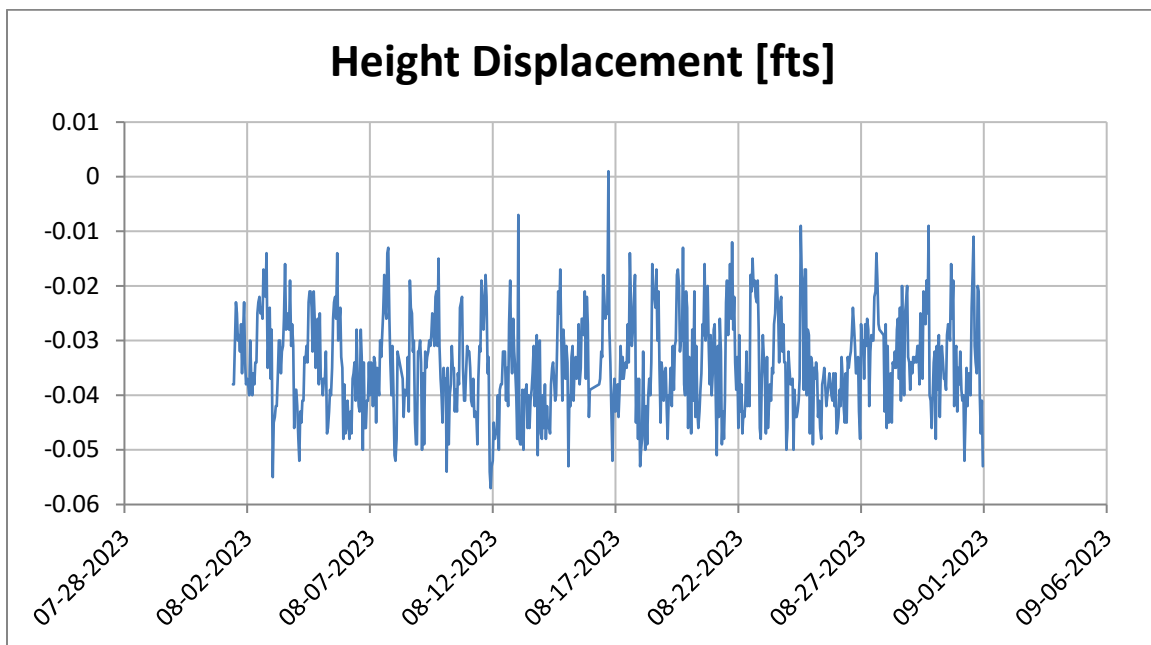
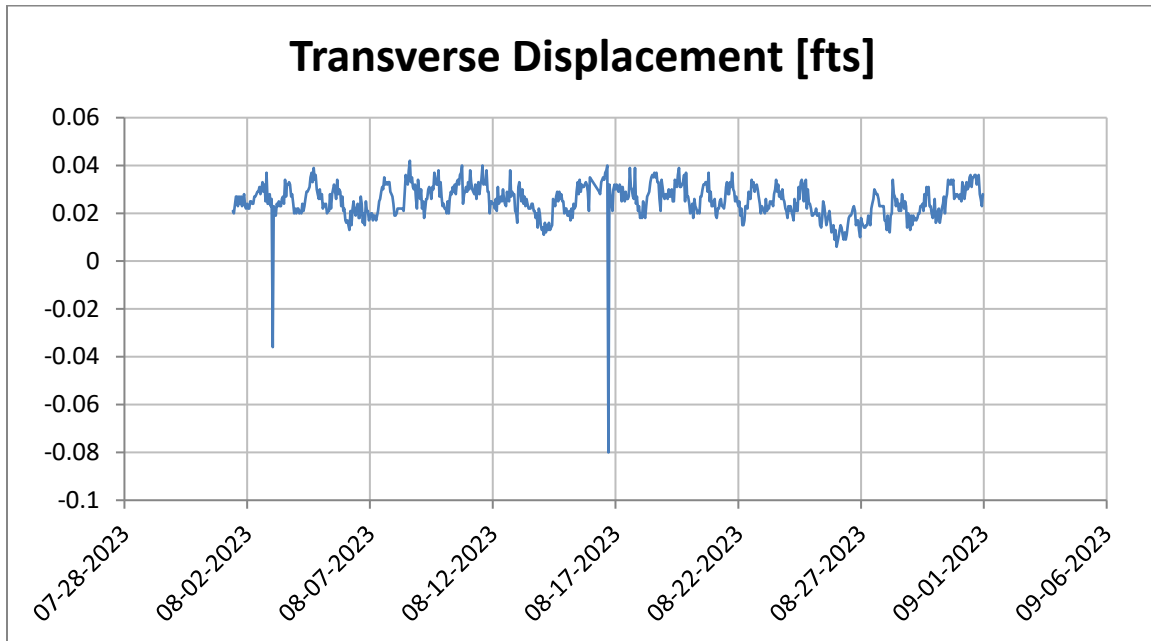
P69A



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 August 3.

Prism P70



Notes:

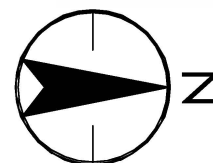
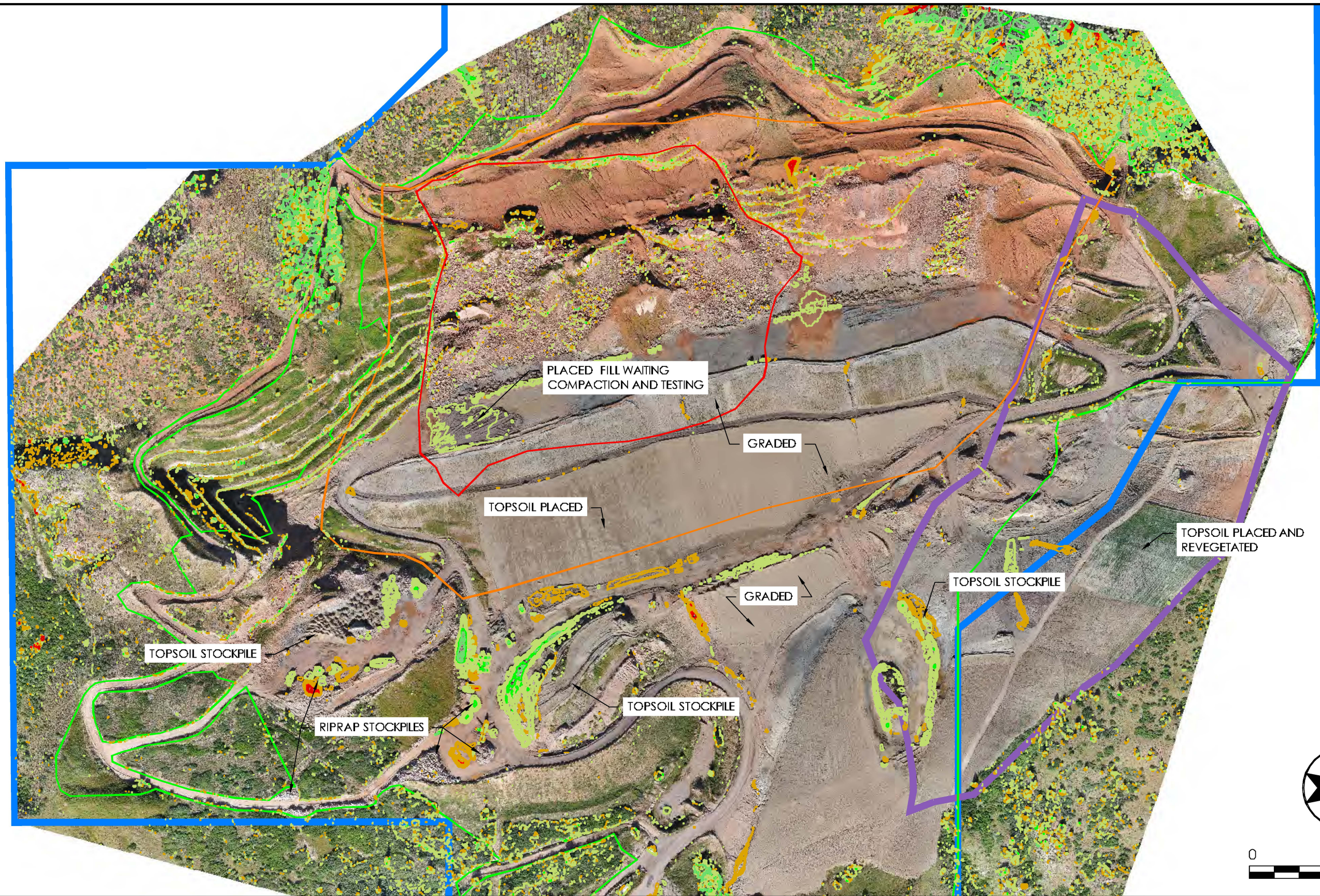
1. Survey accuracy is ± 0.016 feet.
2. Alert threshold is ± 0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Regression limit alerts received on August 3 and 16.

Appendix C

Drone Survey

u:\2057288200\04_design\monitoring\2023-08\dwg\pikreview ptms_08012023

2023.09.13 11:43:58 AM



Stantec Consulting Services Inc.
410 17th Street Suite 1400
Denver CO 80202-4427
Tel: (303) 295-1717
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 07/28/2023 to 08/30/2023.

Client/Project
RIVERBEND INDUSTRIES INC.
PIKEVIEW QUARRY SLOPE
MONITORING

Project No.
2057288200

Title
EXISTING PRISMS WITH
CURRENT SURFACE

Revision #	Date
5	2023.09.18
Drawn By PK	Figure No. 5