To:	Jerald Schnabel	From:	Paul Kos
	Continental Materials Corp.		Denver, CO 80222
File:	May 2021 Monitoring Summary	Date:	June 30, 2021

Reference: May 2021 Geotechnical Monitoring Summary Pikeview Quarry

1.0 INTRODUCTION

Stantec Consulting Services Inc. (Stantec) has prepared this May 2021 Geotechnical Monitoring Summary for the Pikeview Quarry. The Pikeview Quarry is situated along the foothills of the Rocky Mountains, northwest of Colorado Springs, Colorado. Continental Materials Corp. operates the quarry, which is currently closed, pending 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 May 2021.

It is important to note that there is currently little activity at the Pikeview Quarry. Operations are limited to importing fill and preparing the growth medium, and no fill is being placed on the slopes. Continuous monitoring by the robotic survey system began in 2010 and has continued through the month of May 2021 uninterrupted. Visual inspections of the slopes were performed by Stantec engineers.

1.1 PURPOSE

The purpose of this report is to summarize the May 2021 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/Monthly
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.

When present, site operators inspect their work areas for signs of instability on a daily basis before starting work per MSHA rules and regulations. The limited work performed in May 2021 resulted in the operator visual inspections being limited to stockpiles.

Stantec conducted visual inspections of the Pikeview Quarry slopes on May 21, 2021. 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.

- Seepage was observed on the steep slopes of the middle peak, and in some of the haul roads along the slopes. (Photo 2)
- The water level of the pond at the top of the road near Mid-Peak is lower. (Photo 4)
- Pickets were placed around one of the larger cracks to track any changes over the coming months. (Photo 6)
- The culvert remains cleared but partially blocked inside. Future storm events are expected to remove the remaining sediment, but CMC will use a water truck to clean out the inside of the culvert. (Photo 1)
- Observed a new crack on the road on the north side of the quarry. The crack runs parallel to a fill slope and is likely the result of loose fill settling due to increased moisture. The crack is not in the vicinity of the landslide and runs perpendicular to the landslide; therefore, it is not related to the landslide.
- Observed a new crack on the road on the east side of the quarry. The crack is not in the vicinity of the landslide; therefore, it is not related to the landslide. The crack runs parallel to a fill slope and is likely the result of fill settling due to increased moisture.
- Prisms: Several prisms were passed along the walking route and appeared to be in their original position and operating normally. Control points are permanently cemented into the ground while some of the monitoring points are cemented into 5-gal buckets to be portable as needed.
- Open Cracks: An open crack was observed during this visit. This feature is in an area where cracking is expected to occur as a result of ongoing slope settlement and relaxation. The edges of the crack have eroded suggesting it is not a new feature. (Photo 7)
- Healed Cracks: A crack was observed on the slope adjacent to the slide where cracking had previously been observed. This crack runs parallel to the slide and appears to be “healed” and did not indicate any recent movement.
- Crack Free: No cracking was observed on the native granite slopes above the extents of the disturbed area. The hummocky field in the area immediately above the southern extent of the slide shows 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. (Note 1)

- Fill: Material is being imported and temporarily placed on the “production floor”. During the visit, different types of material including mulch and general fill were being deposited here for future placement. (Photo 3)
- 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.

The site has experienced a wet Winter and Spring, and the additional moisture is likely contributing to the settling and cracking. According to the National Weather Service, Colorado Springs has received 145% of normal precipitation in Spring, and 184% of the normal snowfall in Winter 2020-2021. Colorado Springs received 21.7 inches of snow though Spring, which is 9.9 inches above normal. Colorado Springs received 6.13 inches of precipitation though Spring, which is 1.90 inches above normal. https://www.weather.gov/pub/climate2021SpringReviewSummerPreview

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 four hours. There are currently 20 prisms; 3 prisms are control points located outside the slope movement area, 13 prisms are located on the slopes surrounding the landslide area, and 4 prisms are located at the toe of the landslide. As the slope is backfilled and graded, additional prisms will be installed. The existing 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 or if a prism cannot be located. The alarm notes and actions taken are logged, and the alarms are summarized in Table 2. Following each alarm, CMC clears the area of concern until the data can be reviewed and the slope can be inspected. CMC made sure that there were no workers in the area before inspecting the slope. A rock fall caused TOE1 to not be found, and the prism was moved by the rock. This prism was intentionally installed to monitor potential movements the toe of the landslide, and CMC knew that individual rocks could impact the prism. Consistent with this understanding, TOE1 was impacted by a single rock and not by slope movements. All other alarms were determined to be caused by animals, rain, snow, or fog. There were no alarms caused by slope movements.

Table 2 Alarm Summary

Date	Notes	Actions taken	Issue Resolved
05/02/2021 to 05/04/2021	All prisms missing after multiple scans	Snow and fog	05/04/2021
05/10/2021 to 05/13/2021	All prisms missing after multiple scans	Snow and fog	05/13/2021
05/17/2021 to 05/19/2021	All prisms missing after multiple scans	Moisture on glass in survey building, rain and fog	05/19/2021
05/22/2021	TOE1 Prism not found	Moved by animals	05/22/2021

05/23/2021	Multiple prisms missing after multiple scans	Heavy rains and wind	05/23/2021
05/23/2021	TOE2 Prism not found	Moved by animals	05/23/2021
05/23/2021	CP1 Prism not found	Attempted theft of prism	05/23/2021
05/27/2021 to 05/28/2021	TOE2 Prism not found	Moved by animals	05/28/2021
05/28/2021 to 05/29/2021	TOE1 Prism not found	Moved by rock fall turning prism	05/29/2021
05/30/2021 to 05/31/2021	All prisms missing after multiple scans	Rain	05/31/2021

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 has been several years for all the prisms except P69. Prism P69 was moved on June 20, 2020, and the displacements included in Table 3 are the displacements since that date. 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 15 of 20 prisms with recorded displacements limited to data scatter and not actual movements. Prisms P63, TOE2, and TOE3 are located at the toe of the landslide, and these locations showed slope creep movements at slow velocities (<0.001 feet per day). Prism NP1 is located above loose fill, and this prism recorded slope creep movements at slow velocity. Prism NP66 is located above the landslide, and this prism also recorded slope creep movements at slow velocity. This settlement is likely related to the increased moisture causing the landslide material to consolidate. 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)	Needs / Recommendations
CP1	-0.003	-0.031	-0.0118	0.0319	
CP2	-0.066	-0.018	-0.0025	0.4019	
CP3	0.265	-0.236	-0.0009	0.3582	
NP1	0.097	-0.091	0.0955	0.1508	Slope creep at slow velocity.
NP2	0.008	-0.081	0.0287	0.1155	
NP66	0.312	-0.395	0.1937	0.5684	Slope creep at slow velocity.
P1	0.348	-0.064	-0.0049	0.3543	
P2	0.156	-0.054	-0.0075	0.2165	
P25	-0.023	0.018	-0.0020	0.1381	
P32	-0.091	-0.111	0.0256	0.2745	
P33	-0.116	-0.068	0.0126	0.2207	
P35	0.043	-0.192	-0.0091	0.4341	
P4	0.369	-0.138	-0.0068	0.4810	
P5	0.401	-0.168	-0.0083	0.6143	
P63	15.317	-6.268	0.0191	16.5500	Slope creep at slow velocity.
P69	-0.04	-0.033	-0.0039	1.9787	
P70	0.367	-0.307	-0.0006	0.6006	
TOE1	0.262	-0.001	-0.0461	0.4372	
TOE2	0.287	-0.238	0.3672	0.4089	Prism moved by animals. Slope creep at slow velocity.
TOE3	1.435	-0.691	1.5684	1.7176	Prism repositioned. Slope creep at slow velocity.

4.0 DRONE SURVEY

The site was flown for aerial imagery using an unmanned aircraft system (UAS or ‘drone’) on, May 14, 2021. 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 create site topography.

The April topography was also compared to the May topography to identify changes in the site topography. Comparison of the two surveys showed that approximately 888 yd^3 of fill had been imported and temporarily placed. 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

No fill was permanently placed at the quarry in May. Once fill placement starts, the fill will be placed in one-foot lifts, moisture conditioned as necessary, and compacted. Compaction testing will commence at the rate of at least one test per 5,000 yd^3 placed.

Per CMC, imported material is being stockpiled onsite for placement at a later date. The material will be tested for compaction level and areas failing compaction testing will either be further compacted until the specification is met or removed and replaced in a compacted manner.

6.0 RECLAMATION PROGRESS

CMC is actively working towards reclaiming 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
Project kickoff	10 May-2021
Phase 1 – Issue RFP to Bidders	30-June-2021
Phase 1 – RFP Evaluation & Recommendation	22-July-2021
Phase 2 – Constructor Contract Award	30-July-2021
Phase 3 – Project Kick-off with successful Contractor	5-Aug-2021
Phase 4 – Contractor Mobilization to Site	7-Sept-2021
Phase 4 – Contractor Demobilize from Site	31-Dec-2022

Task/Milestone	Estimated Dates
Phase 5 – Final Revegetation season 2 Begins	20-April-2022- until acceptance

Progress of activities May 2021

- CDRMS site inspection occurred on May 21, 2021
- Development of Construction RFP begins
- Detailed engineering and construction-level design plan begins
- Culvert inlet was excavated
- Importing fill material continued
- Geotechnical monitoring continued
- Processing of Growth Medium for use as topsoil continued
- Stantec submitted the Grading and Erosion Control Plan and Construction Stormwater Plan to the City of Colorado Springs

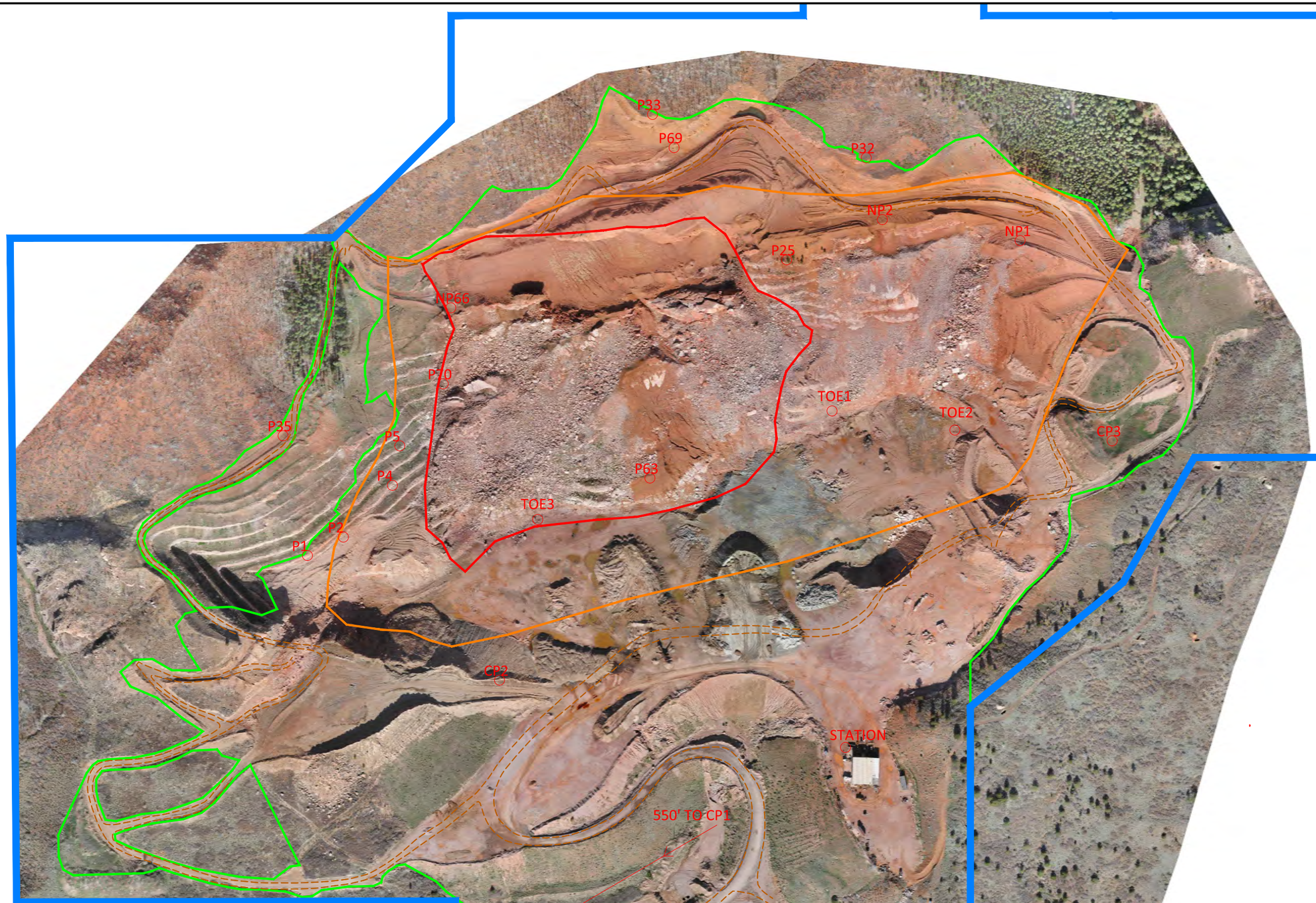
Work planned for next month includes:

- Identify and pre-qualify contractors
- Finalize Construction RFP and construction-level plans and submit to pre-qualified contractors
- Planting test plots to demonstrate Growth Medium viability
- Continue importing fill material
- Continue geotechnical monitoring
- Continue processing of Growth Medium

7.0 CONCLUSIONS

None of the data collected in May 2021 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.

- Increased precipitation results in slight increases in settlement, cracking, and movements, which is consistent with the understanding of site conditions.
- 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.



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LEGEND

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

N

0 300' 600'

Client/Project
CONTINENTAL MATERIALS CORP.
PIKEVIEW QUARRY SLOPE MONITORING

Project No.
227419041

Title
SITE MAP

Revision
#

Date
2021.06.30

Drawn By
PK

Figure No.
1

Appendix A

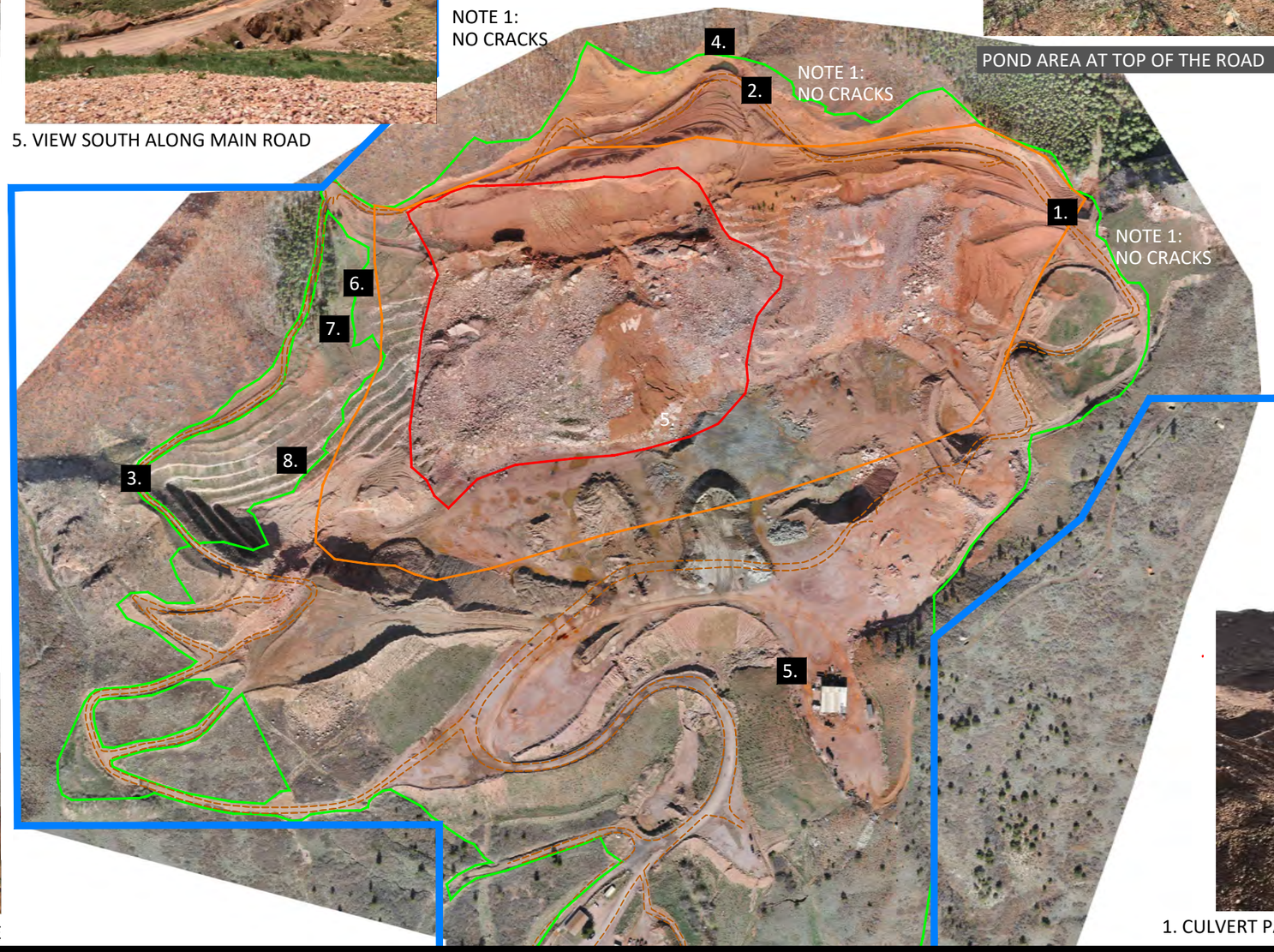
Visual Inspections

6. PICKETS PLACED AROUND CRACK

5. VIEW SOUTH ALONG MAIN ROAD

POND AREA AT TOP OF THE ROAD

3. VIEW NORTH TO PRODUCTION FLOOR



7. HEALED CRACKING PARRALEL TO SLIDE

8. RECLAMATION BENCHES ON SOUTH SIDE

2. SEEPAGE FROM ROCK AT MID-PEAK

1. CULVERT PARTIALLY CLEARED, LIGHT COMING THROUGH

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LEGEND

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

NOTES

1. NO CRACKS OBSERVED IN THIS AREA.
2. ALL PHOTOS TAKEN MAY 20, 2021.

N

0 400’ 800’

Client/Project
CONTINENTAL MATERIALS CORP.
PIKEVIEW QUARRY SLOPE MONITORING

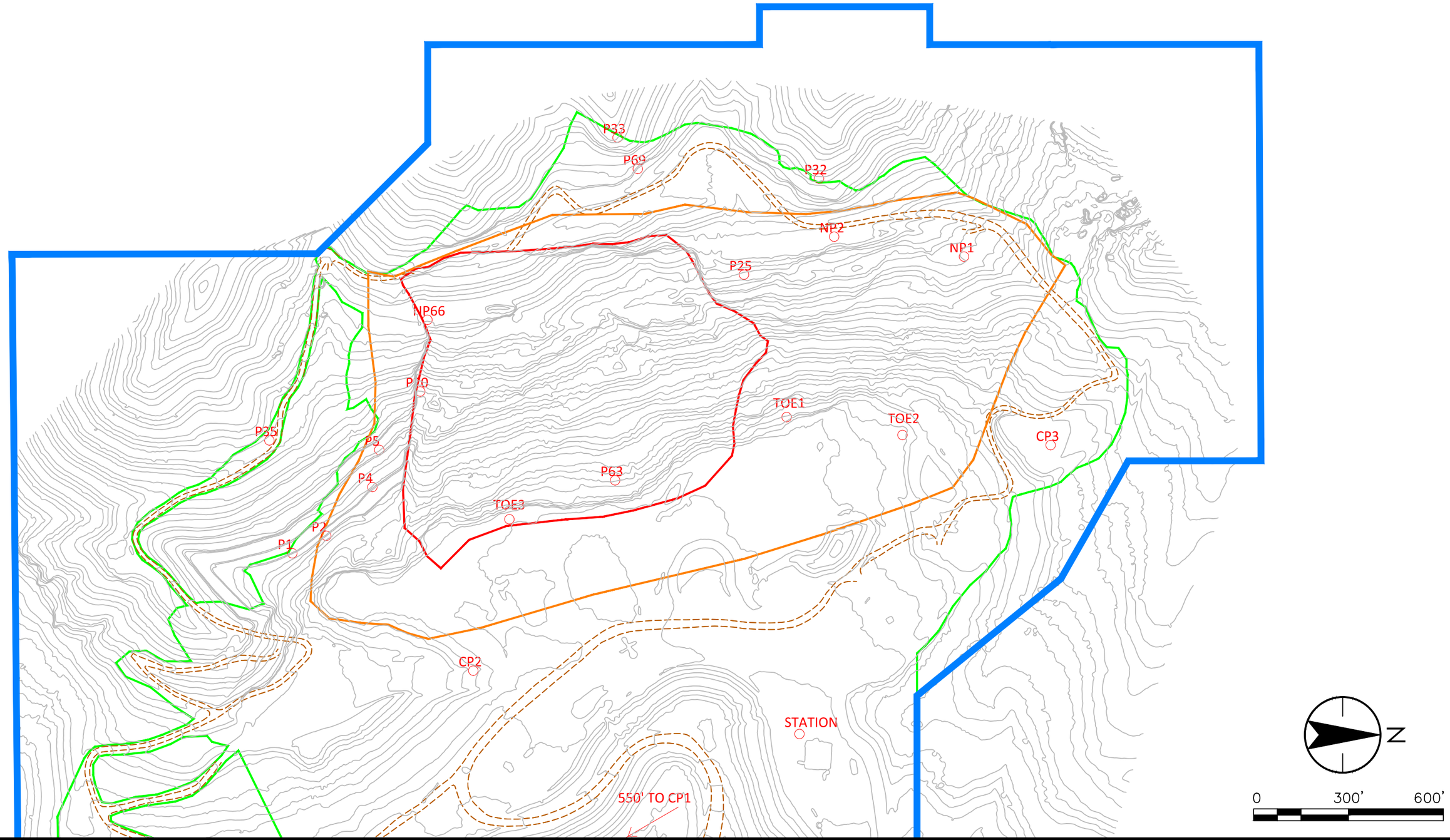
Project No.
227419041

Title
OBSERVATIONS FROM MAY INSPECTION

Revision	Date
#	2021.06.30
Drawn By	Figure No.
PK	2

Appendix B

Prism Survey



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LEGEND

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

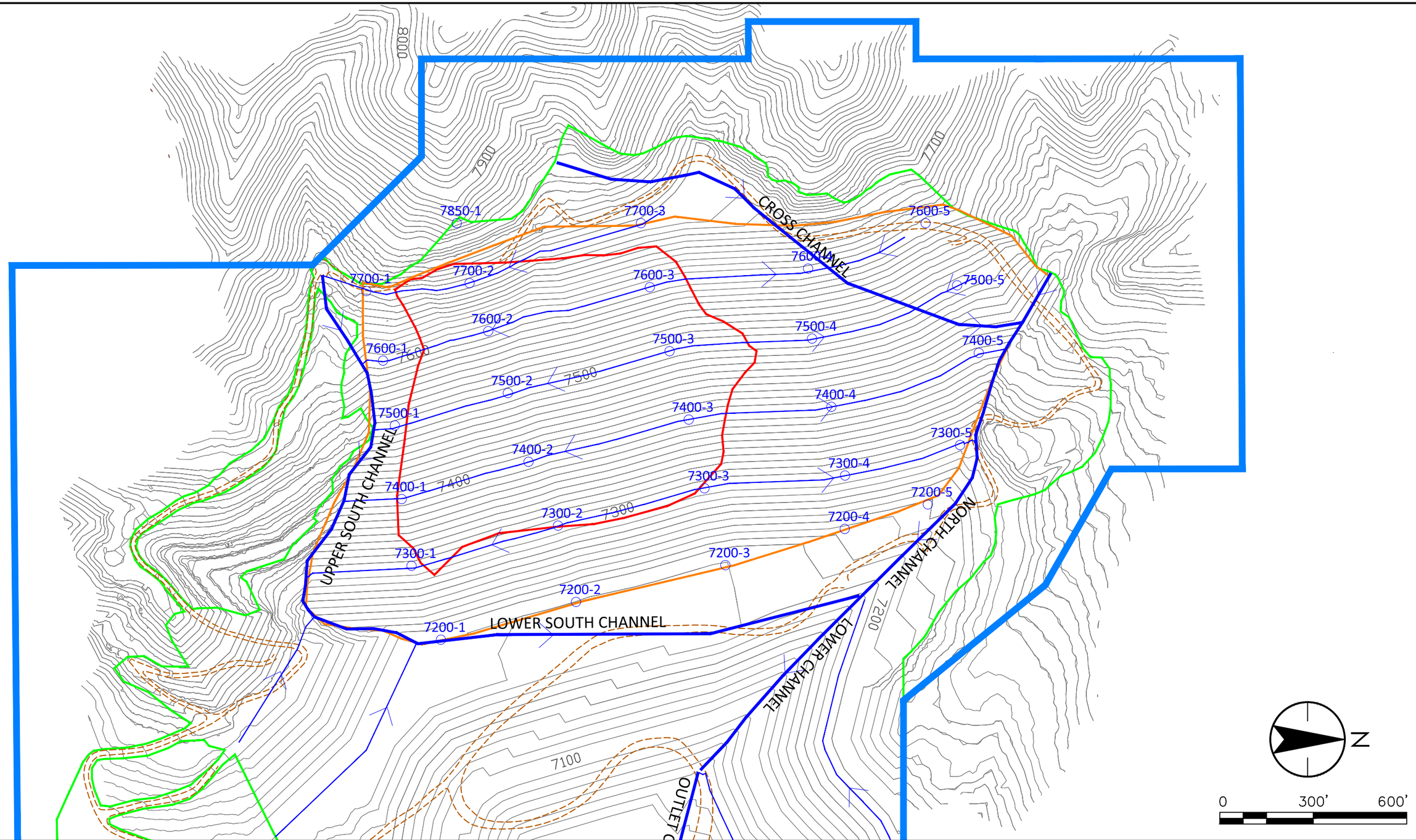
1. GRADING AND MOVEMENT OF STATION WILL BE EXTENDED AS LONG AS POSSIBLE.
2. PRISMS WILL BE INSTALLED AS EACH BENCH IS FINISHED.
3. ALL PRISMS WILL BE RETAINED AS LONG AS POSSIBLE.
4. TOPOGRAPHY FROM MAY 14, 2021 DRONE SURVEY.
5. CONTOUR INTERVAL IS 10 FEET

Client/Project
CONTINENTAL MATERIALS CORP.
PIKEVIEW QUARRY SLOPE MONITORING

Project No.
227419041

Title
EXISTING PRISMS WITH CURRENT SURFACE

Revision	Date
#	2021.06.30
Drawn By	Figure No.
PK	3



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LEGEND

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

NOTES

1. GRADING AND MOVEMENT OF STATION WILL BE EXTENDED AS LONG AS POSSIBLE.
2. PRISMS WILL BE INSTALLED AS EACH BENCH IS FINISHED.
3. ALL PRISMS WILL BE RETAINED AS LONG AS POSSIBLE.

Client/Project
CONTINENTAL MATERIALS CORP.
PIKEVIEW QUARRY SLOPE MONITORING

Project No.
227419041

Title
PROPOSED PRISMS WITH RECLAMATION SURFACE

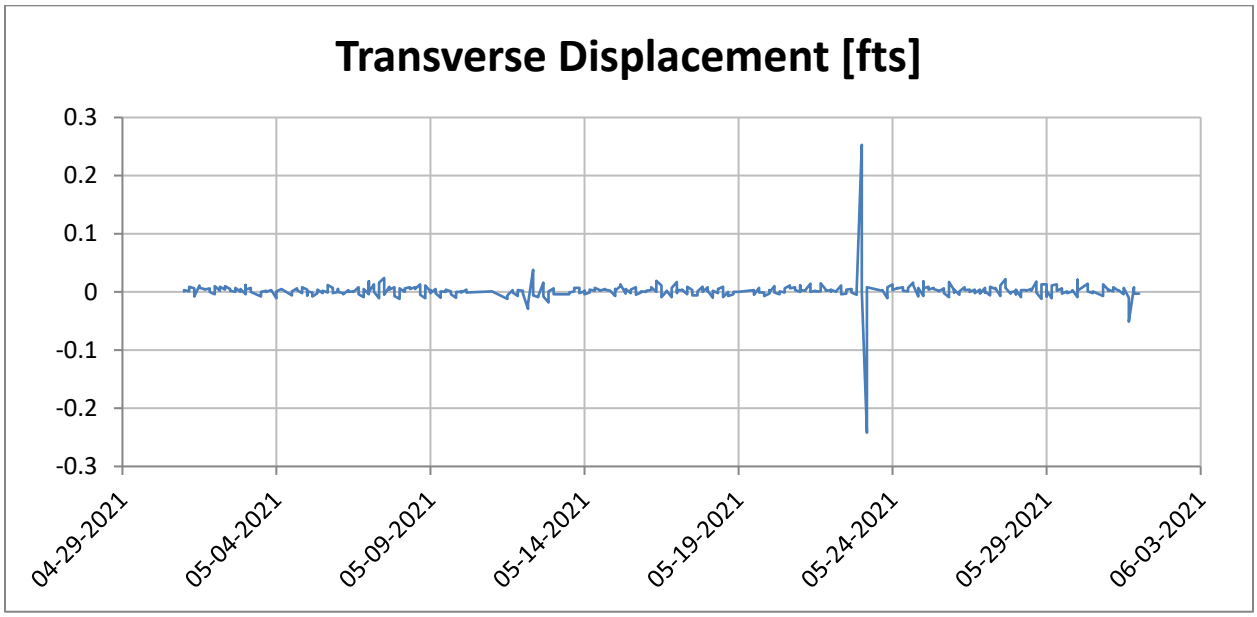
Revision
#

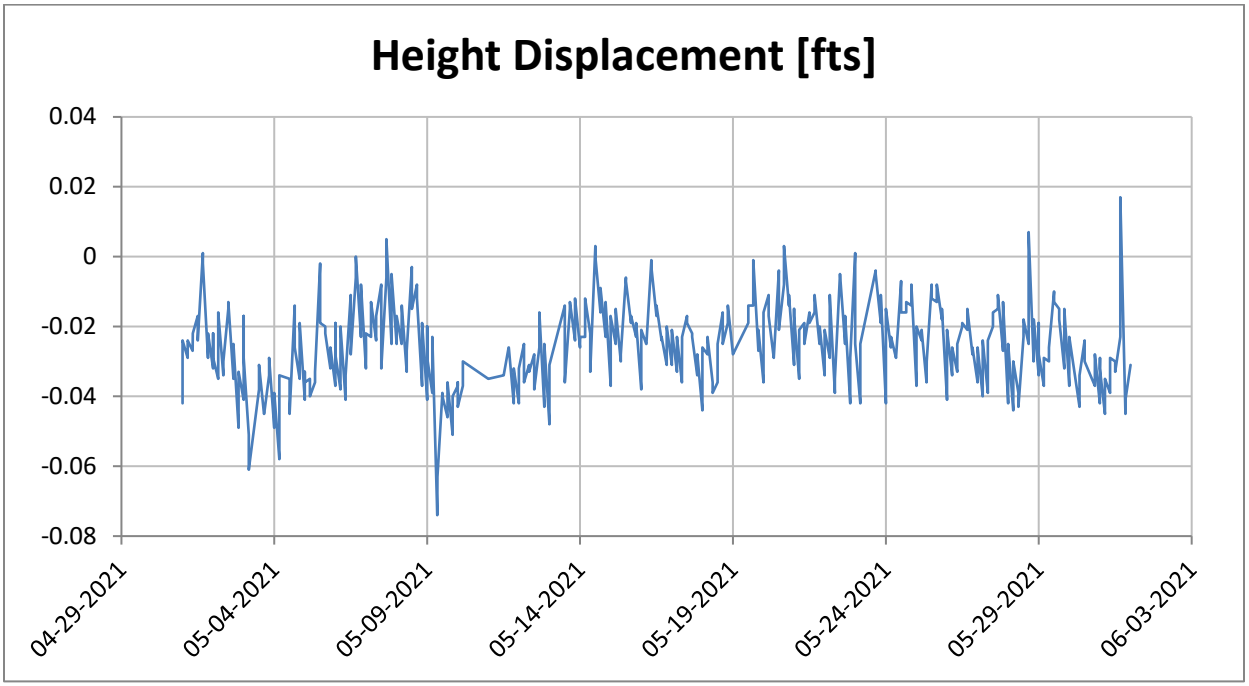
Date
2021.06.30

Drawn By
PK

Figure No.
4

Prism CP1

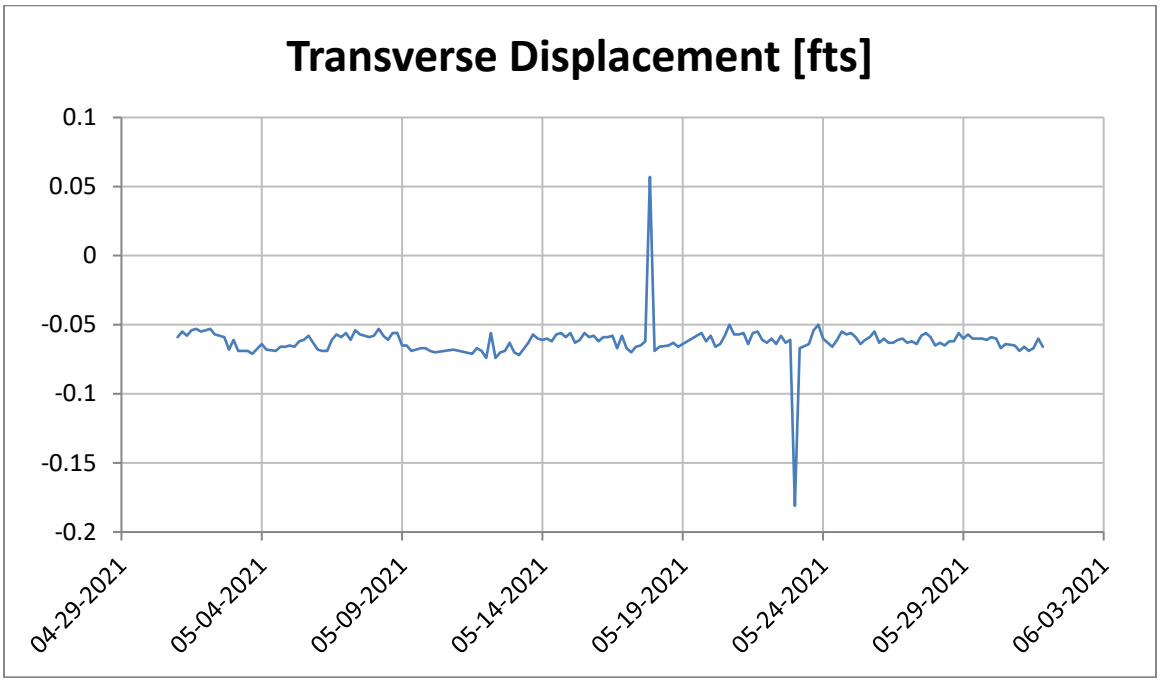


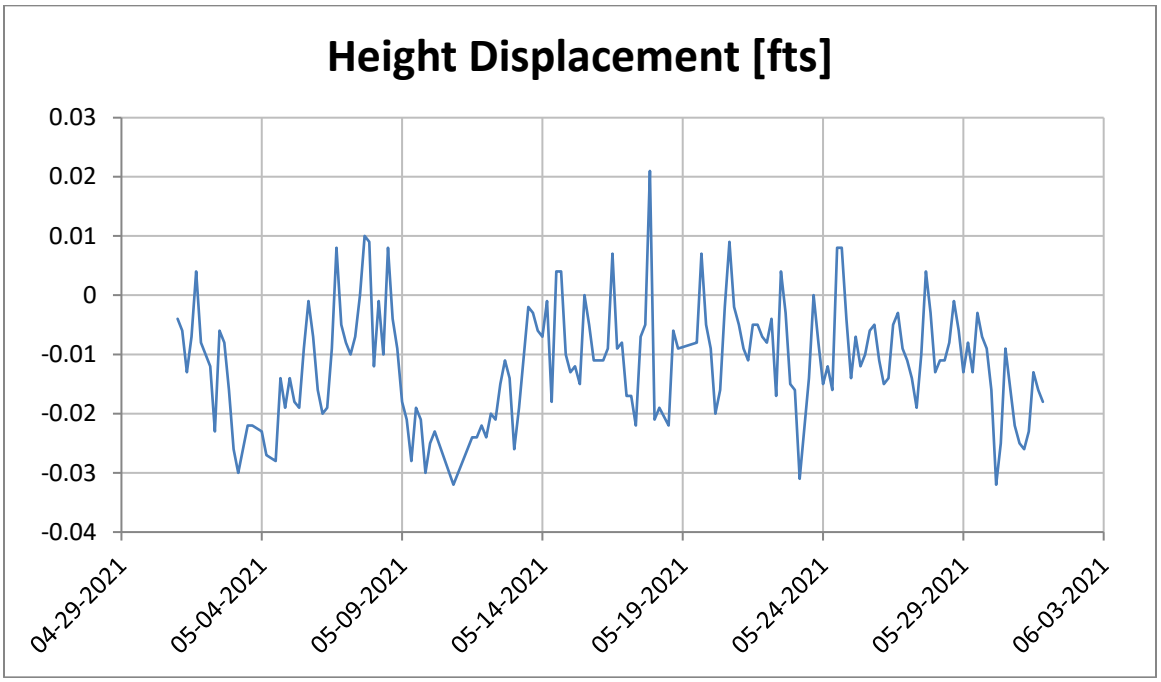


Notes:

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.

Prism CP2





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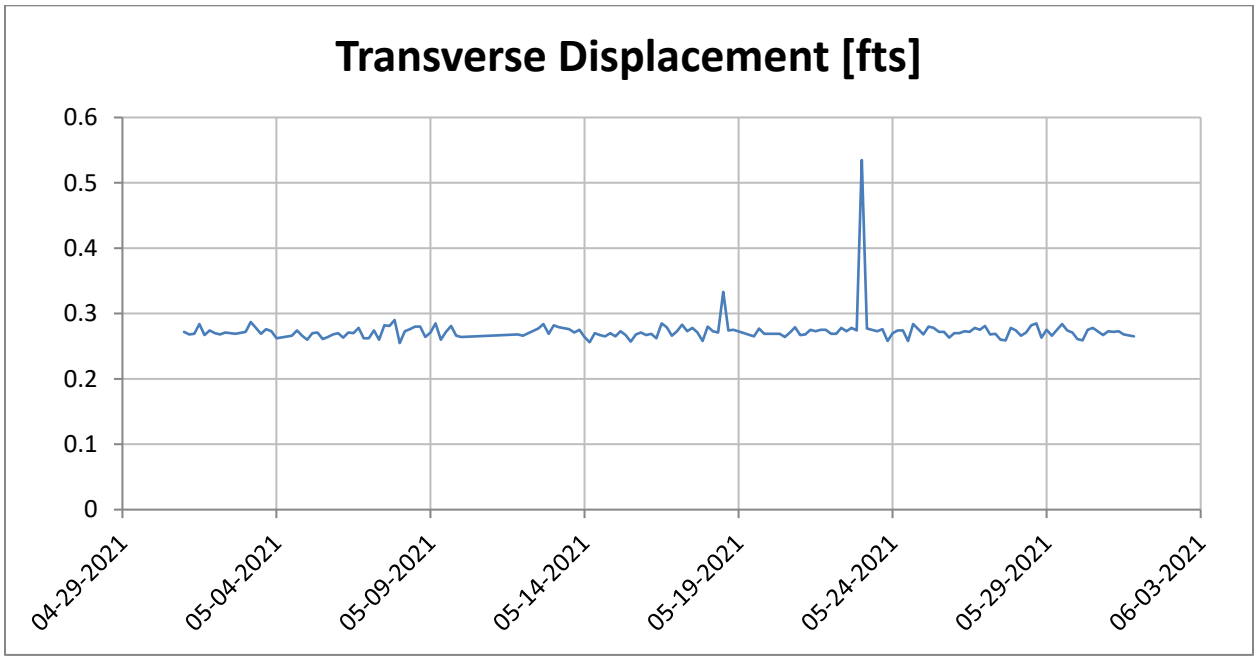
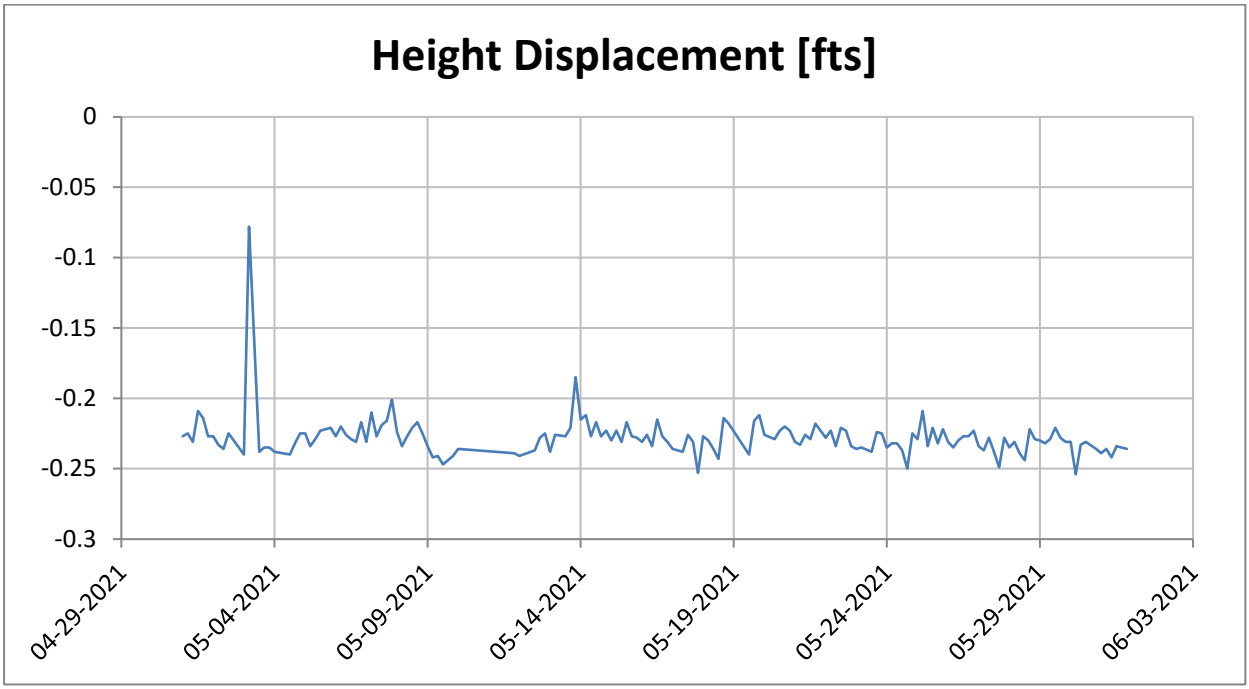
Prism CP3





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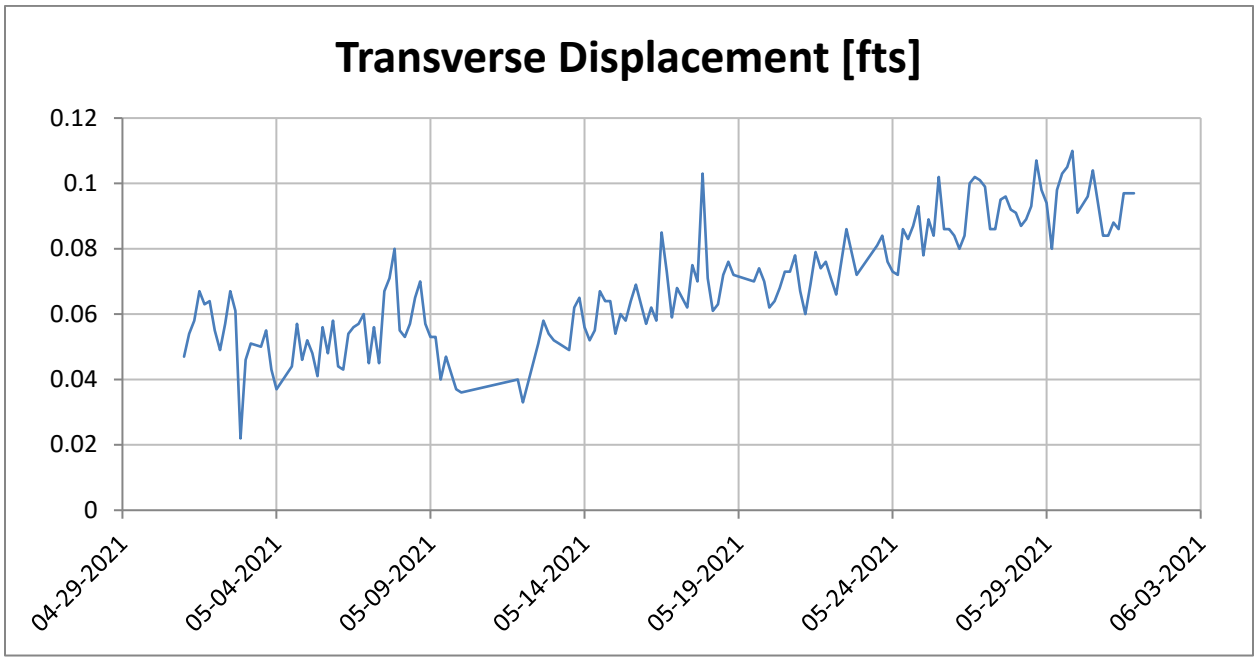
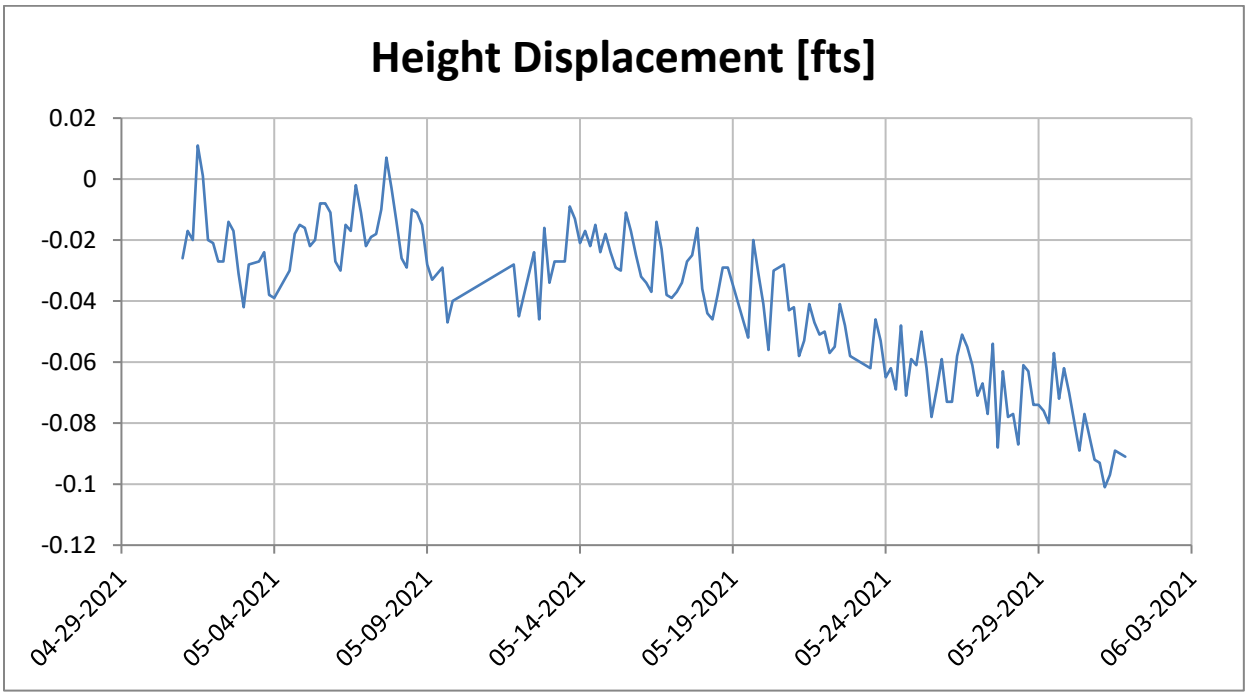
Prism NP1





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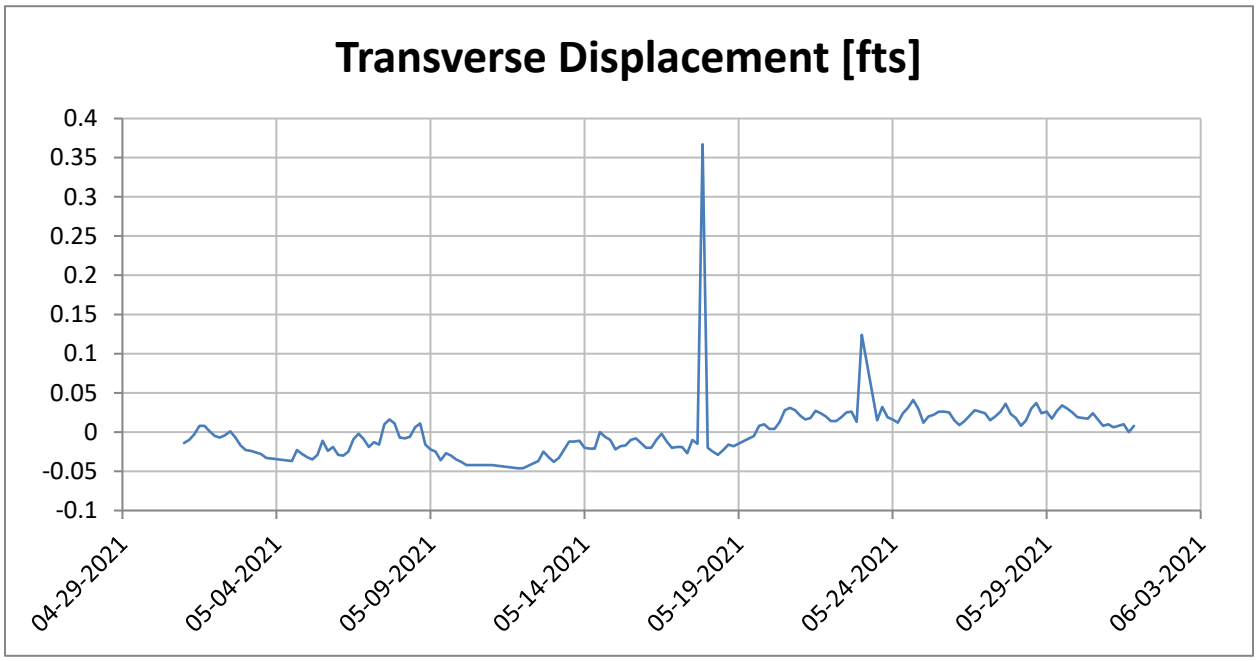
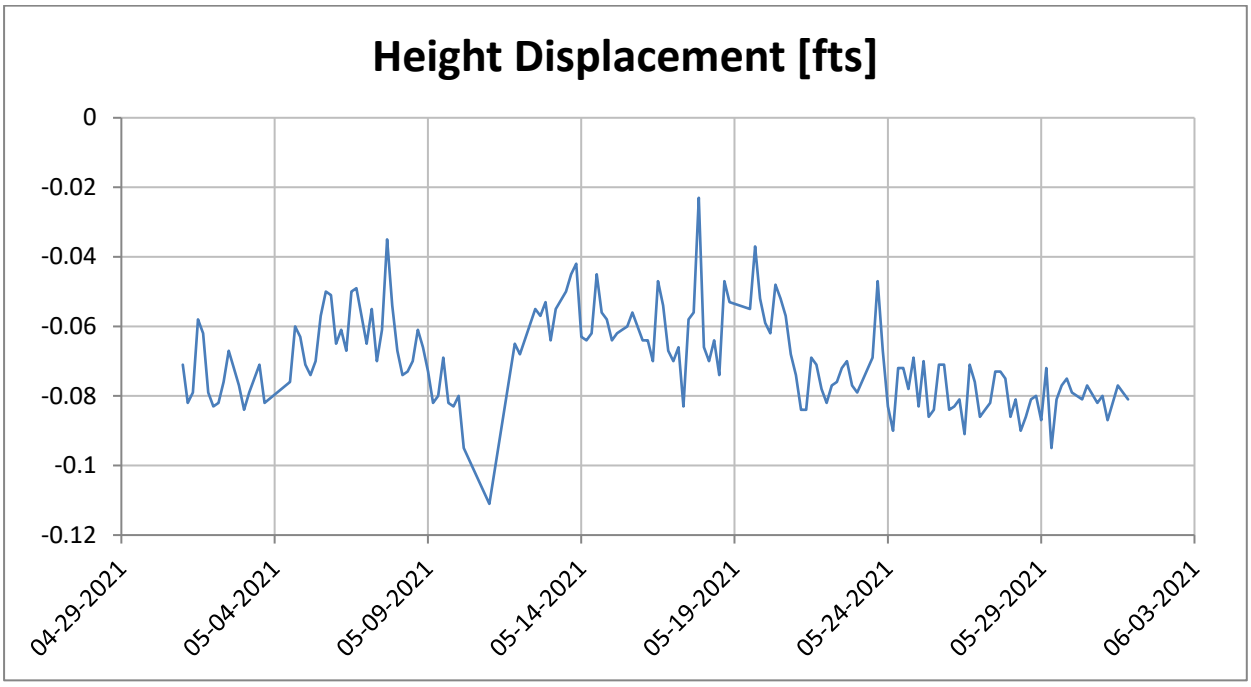
Prism NP2





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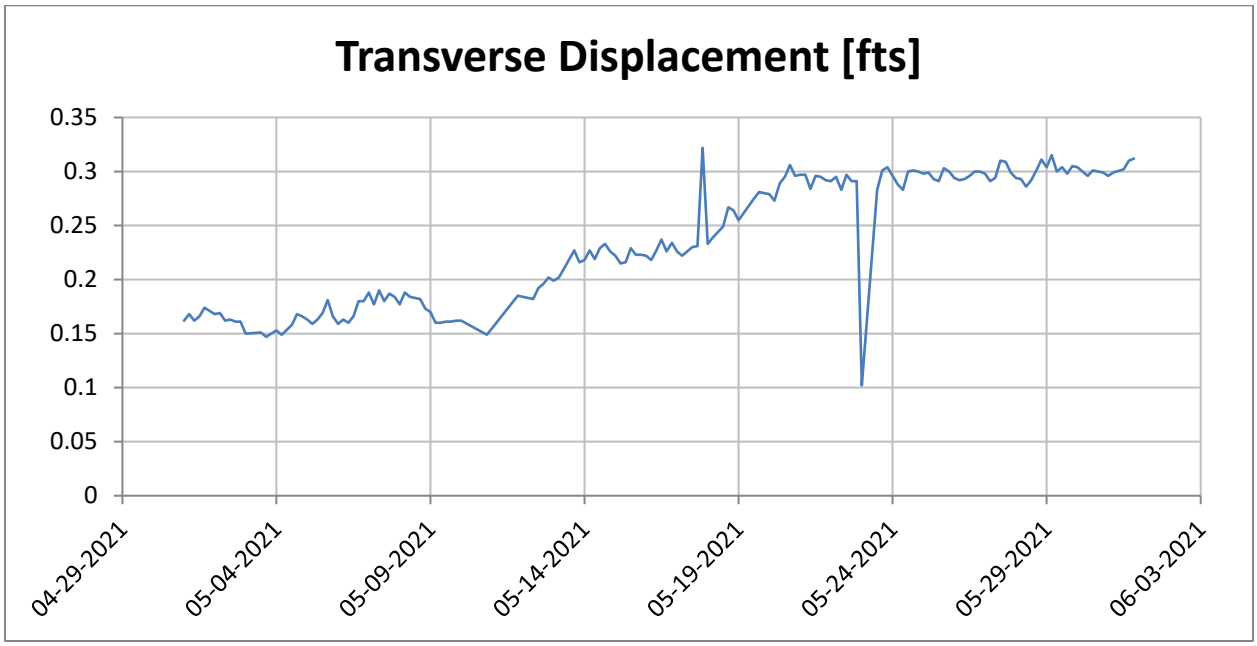
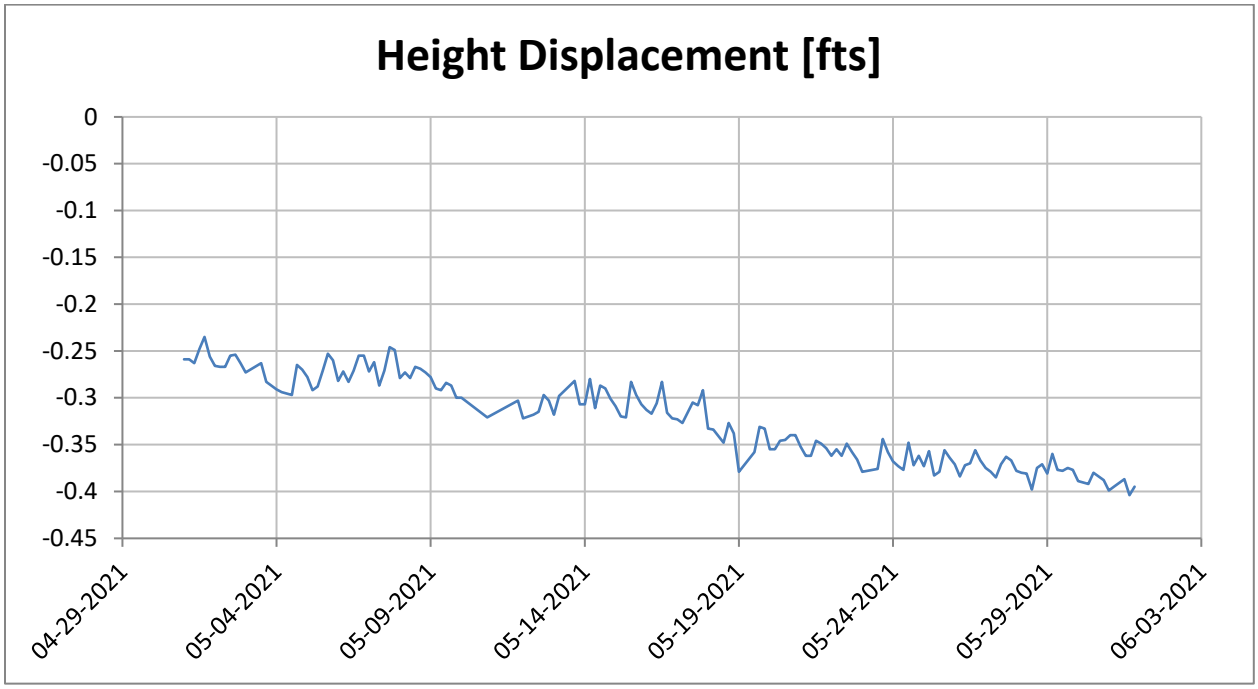
Prism NP66

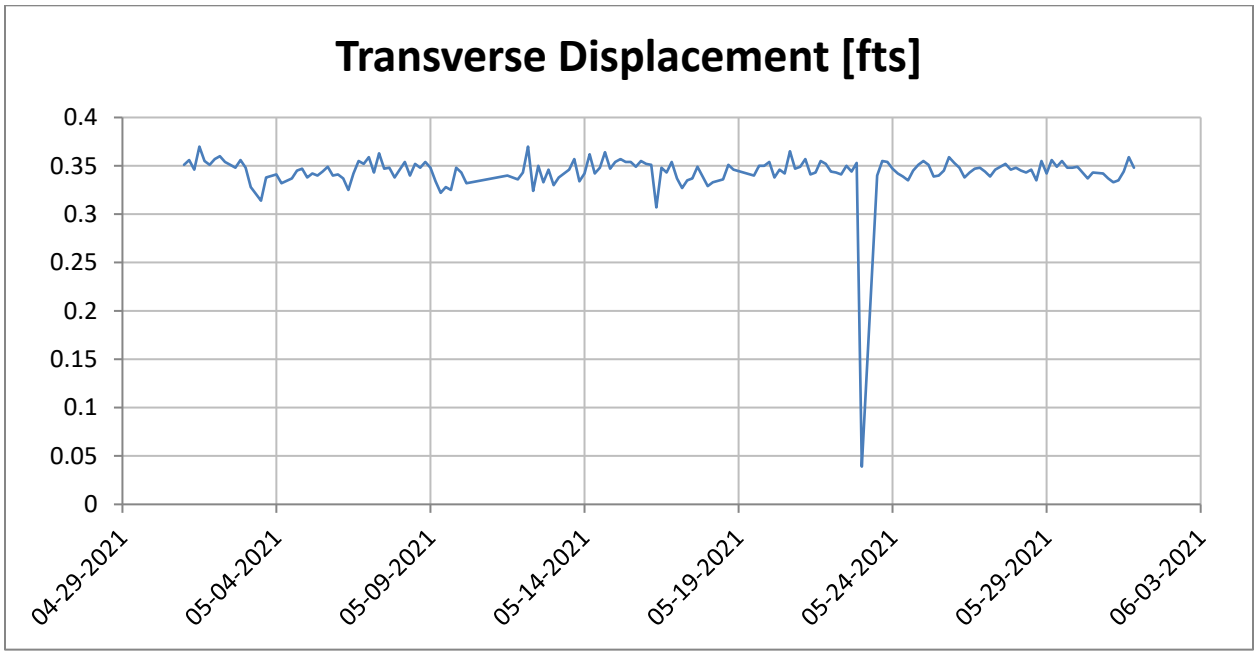


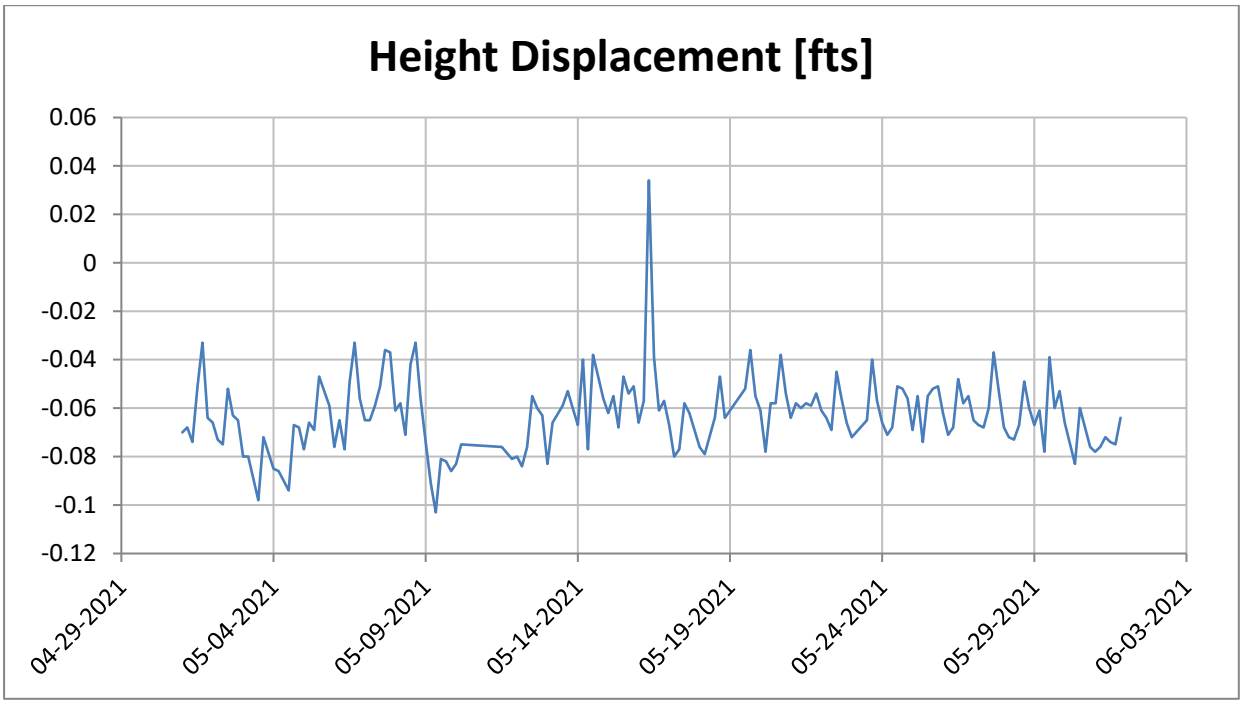


Notes:

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.

Prism P1





Notes:

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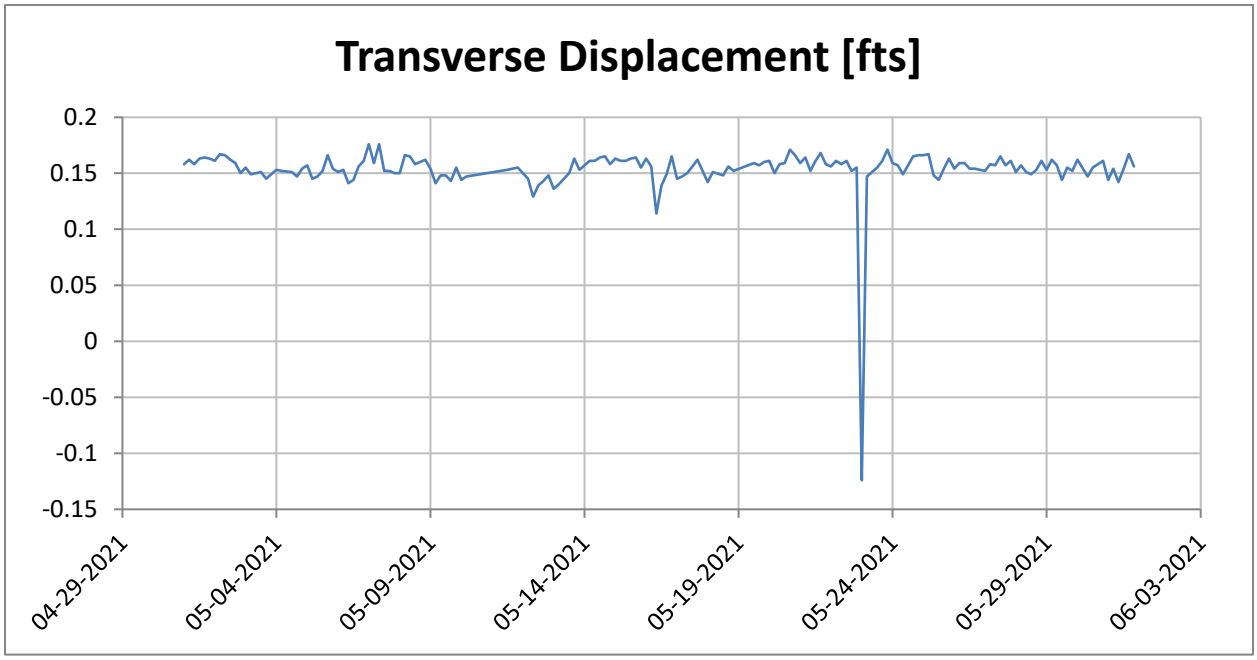
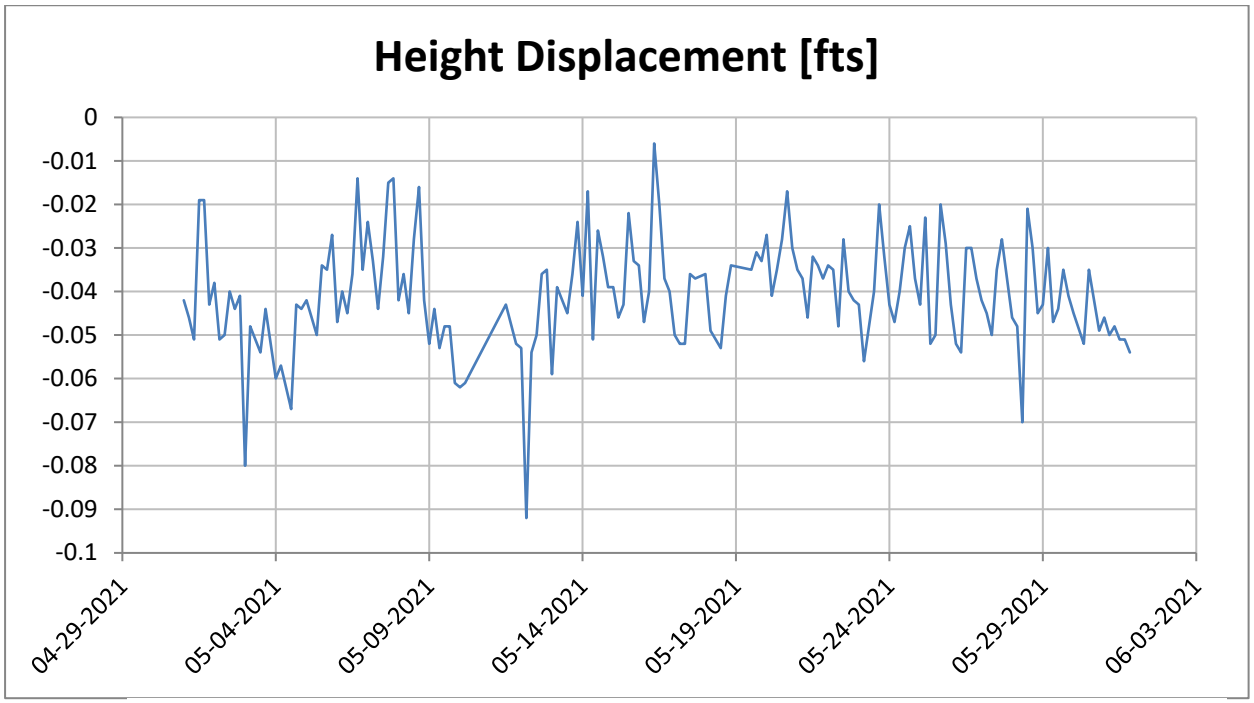
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.

Prism P2





Notes:

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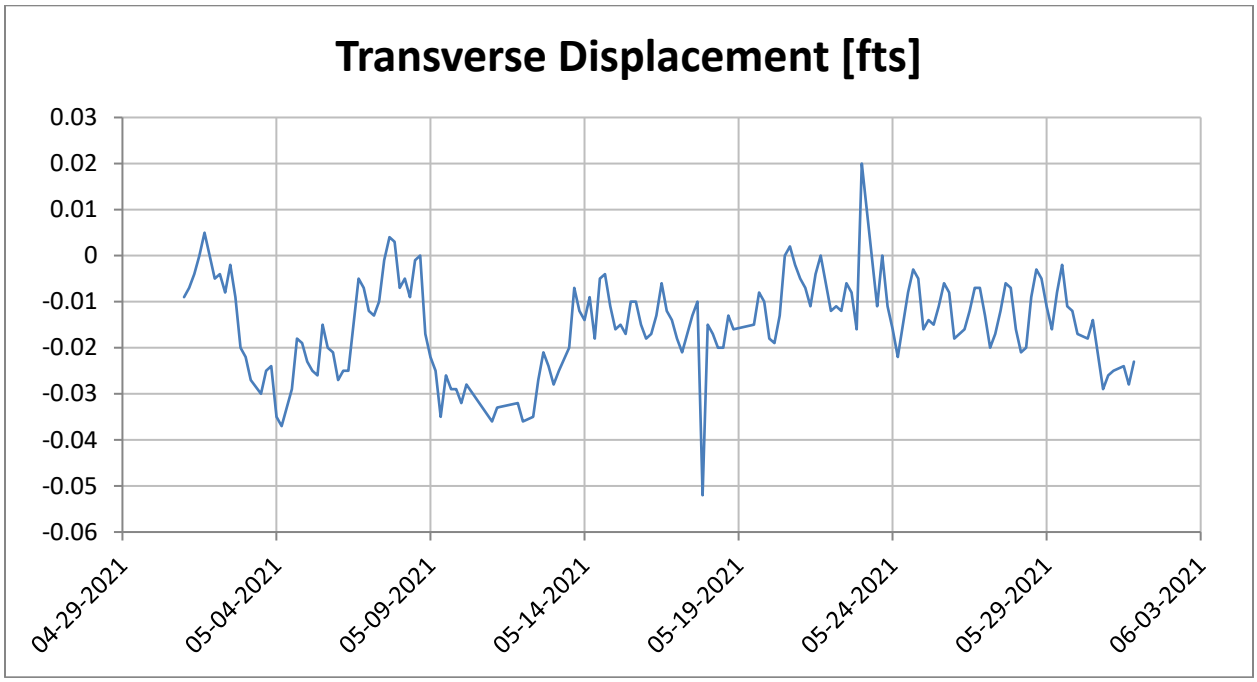
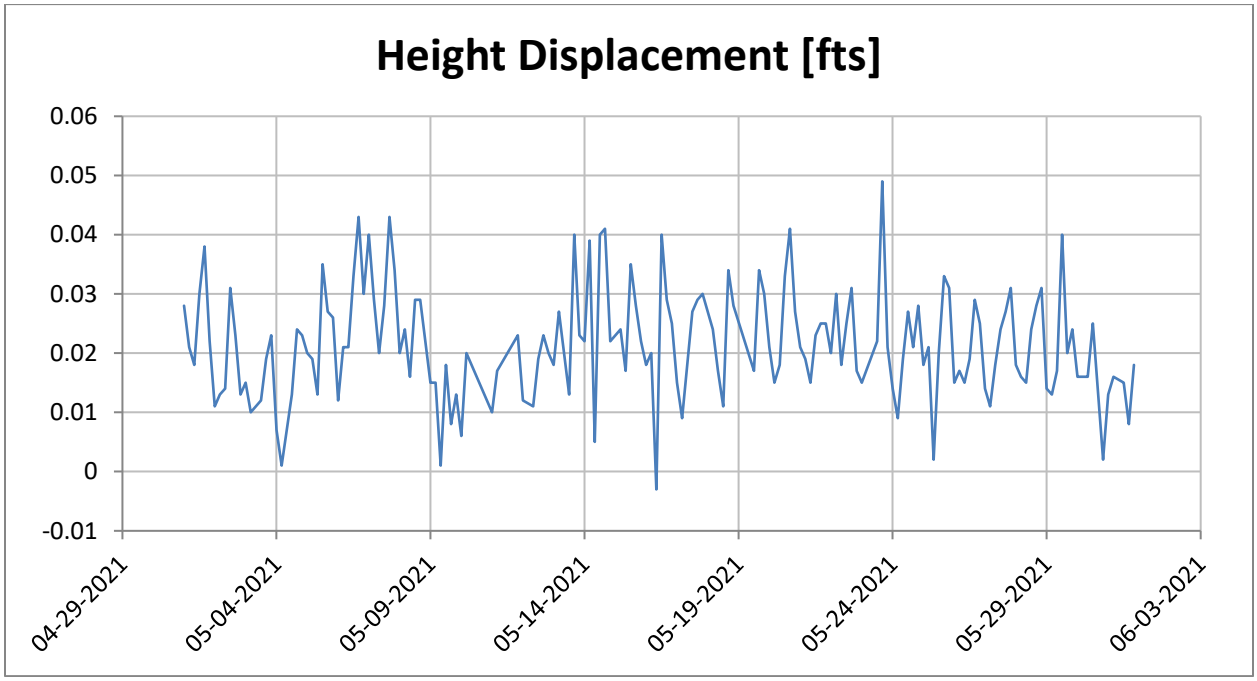
Prism P25

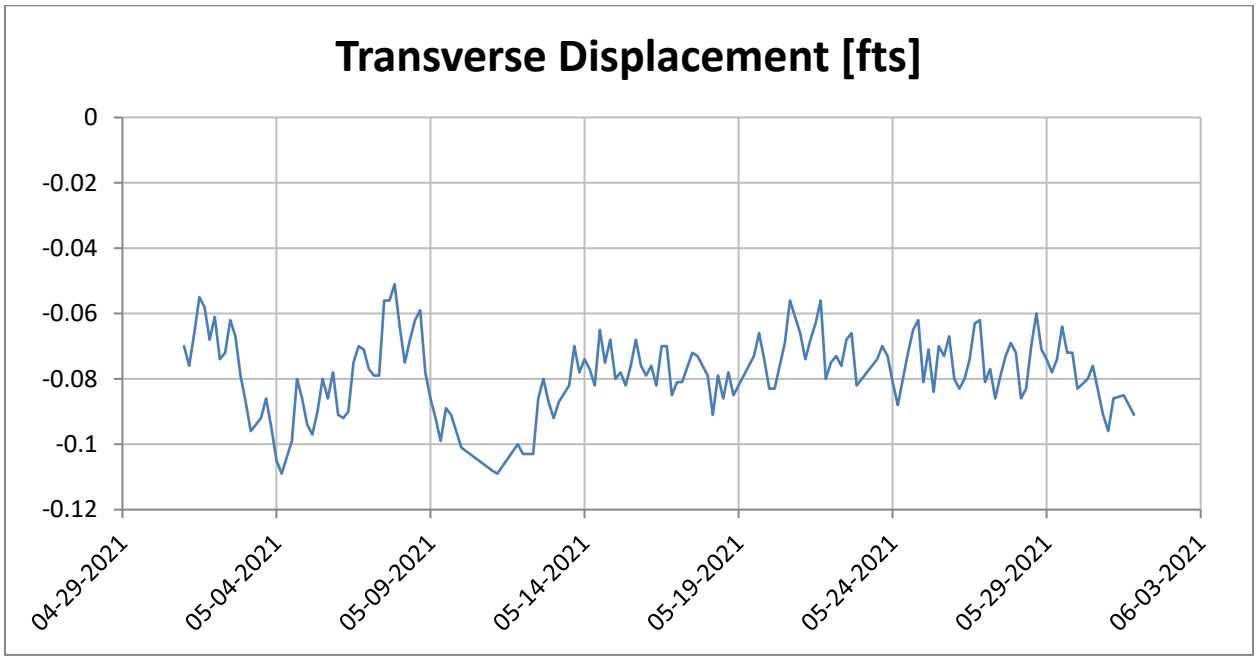


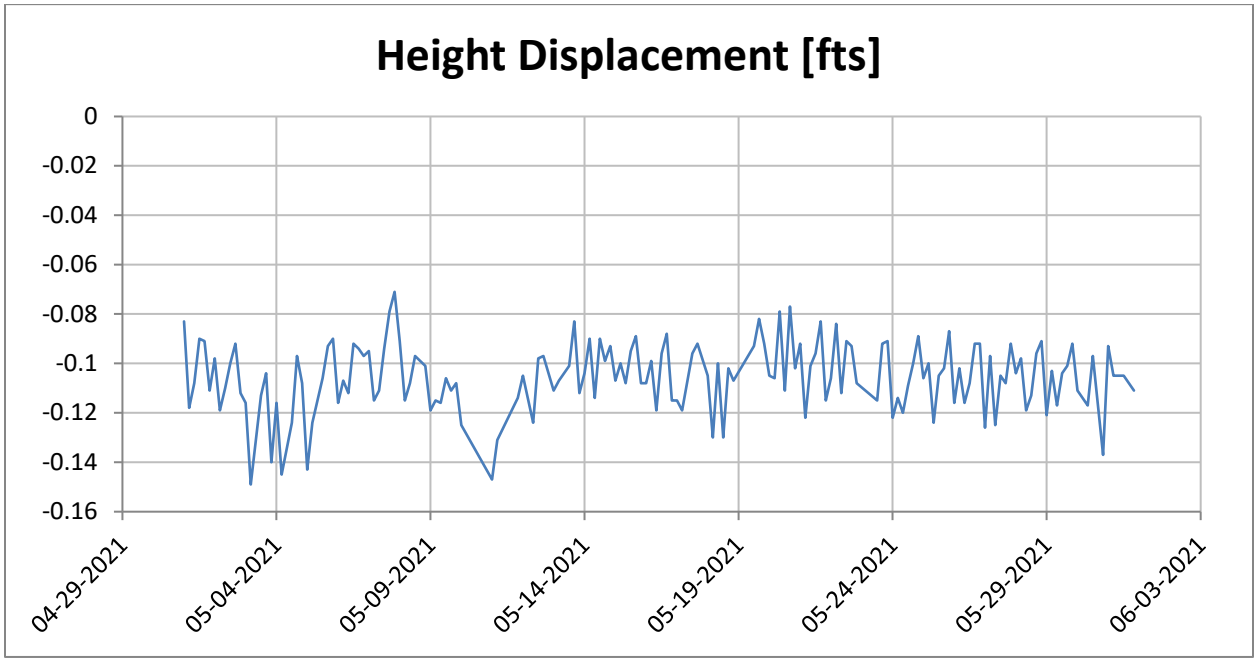


Notes:

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.

Prism P32





Notes:

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3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
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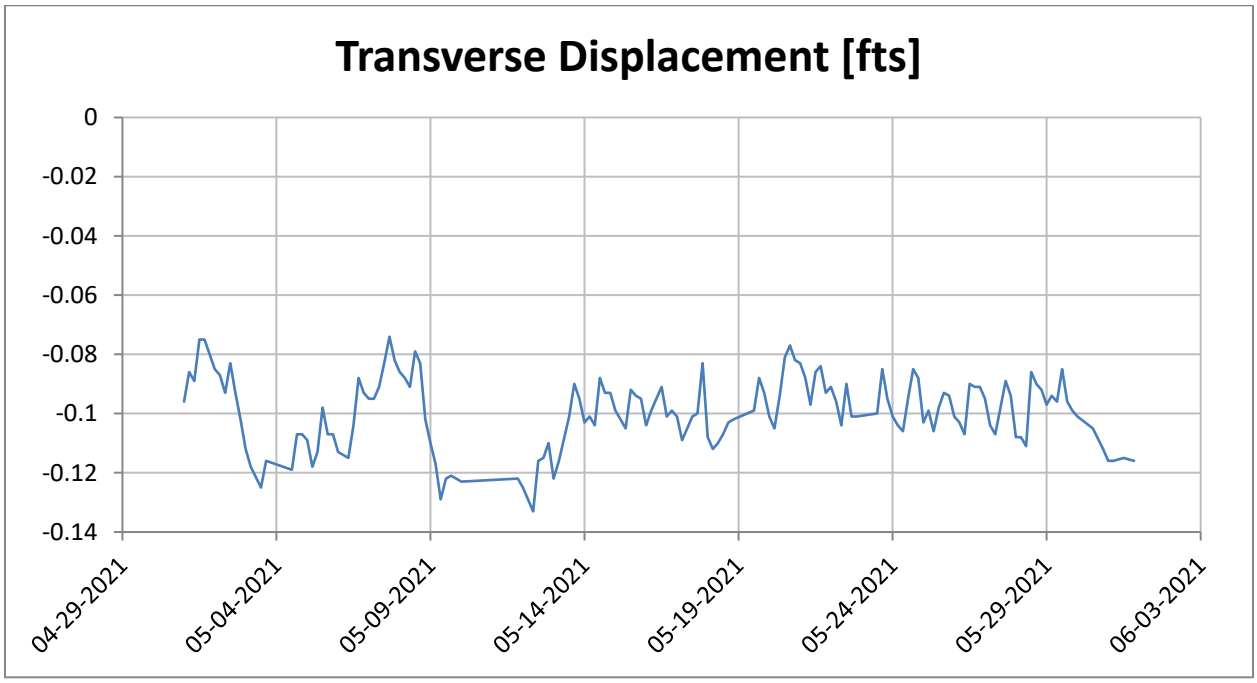
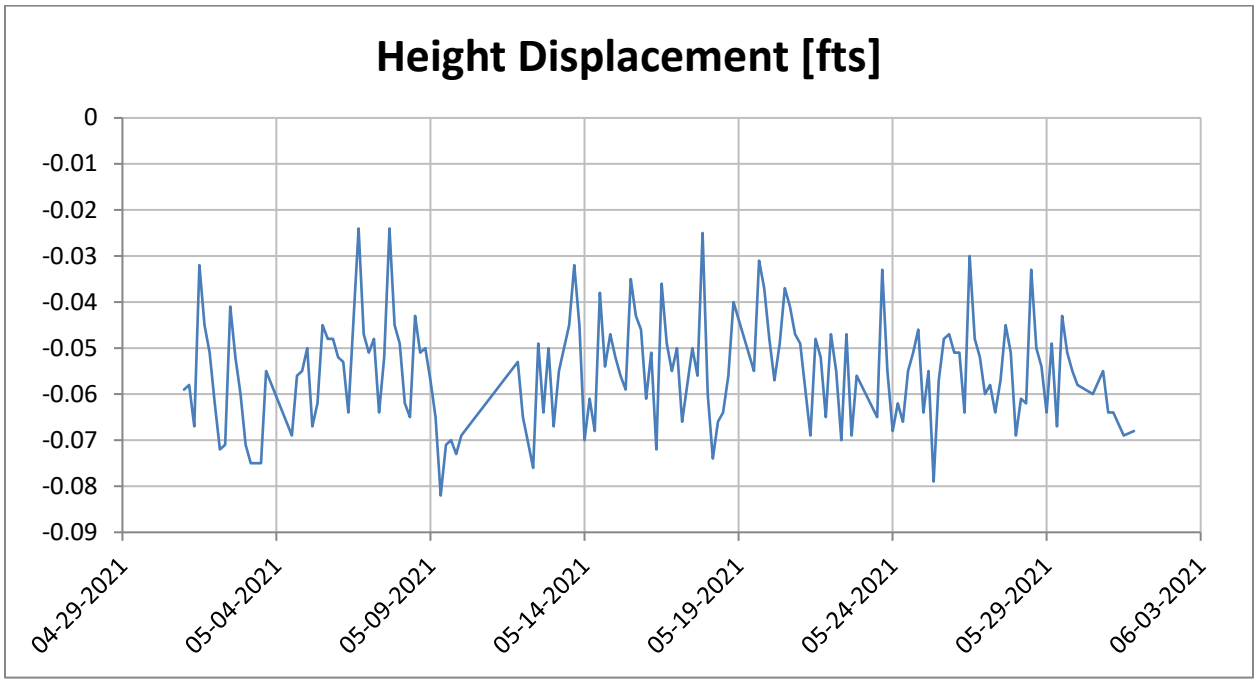
Prism P33





Notes:

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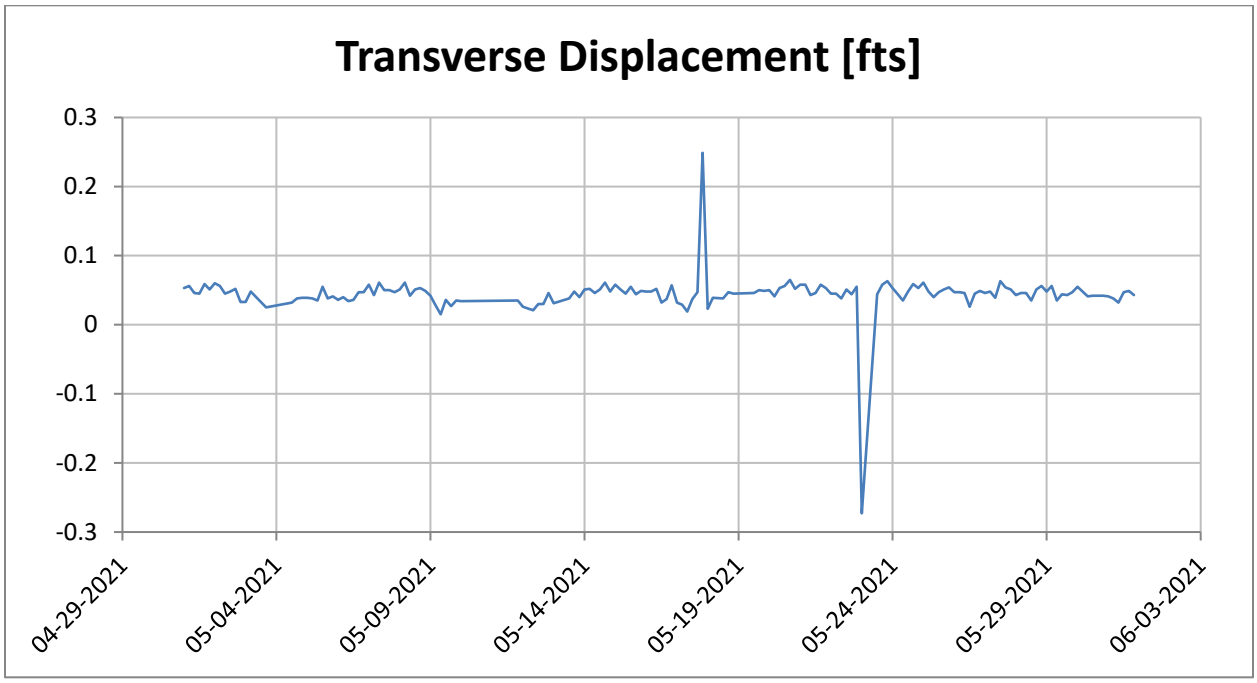
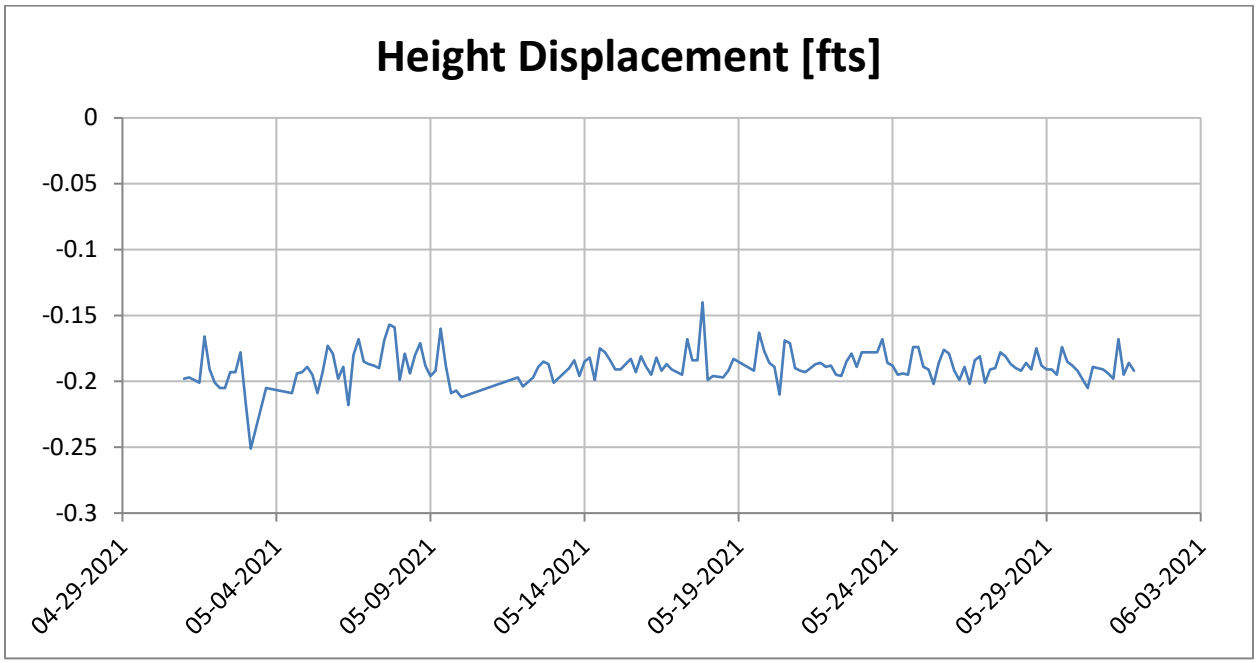
Prism P35





Notes:

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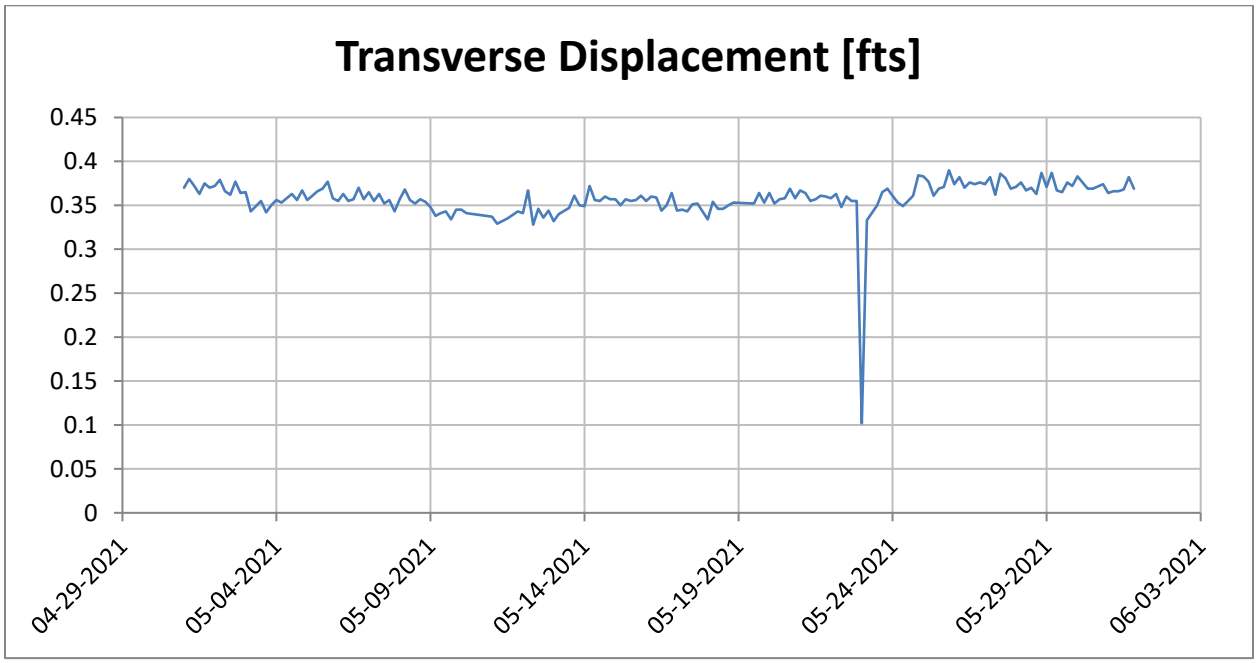
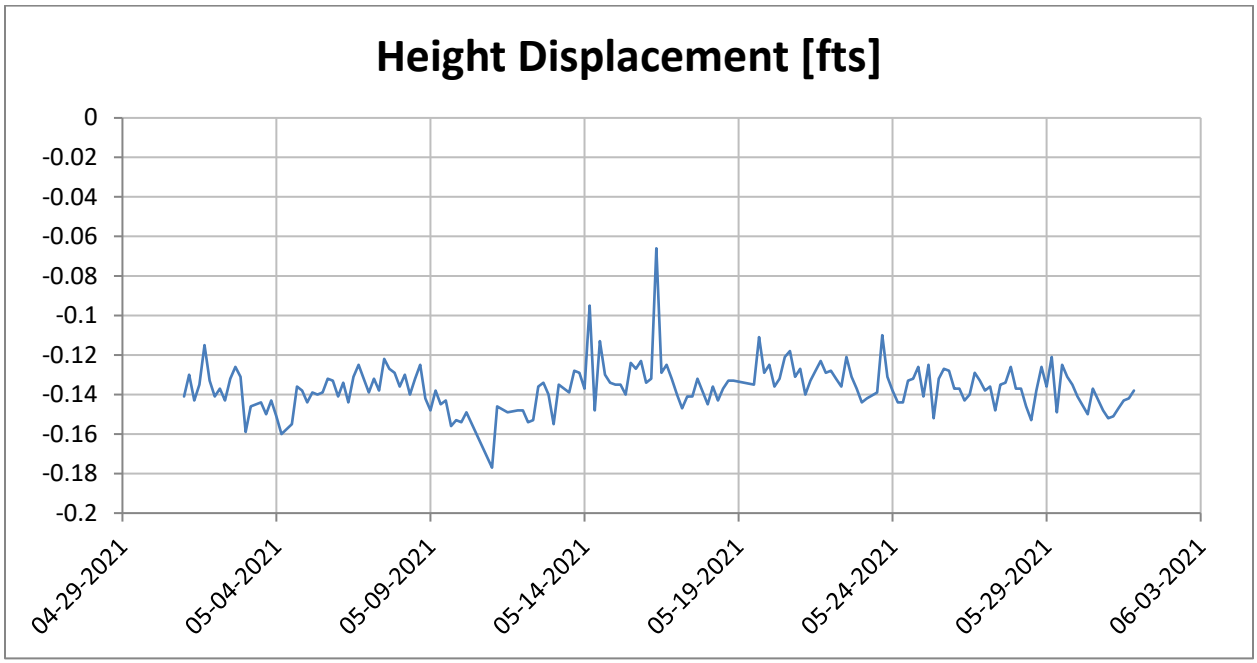
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.

Prism P4





Notes:

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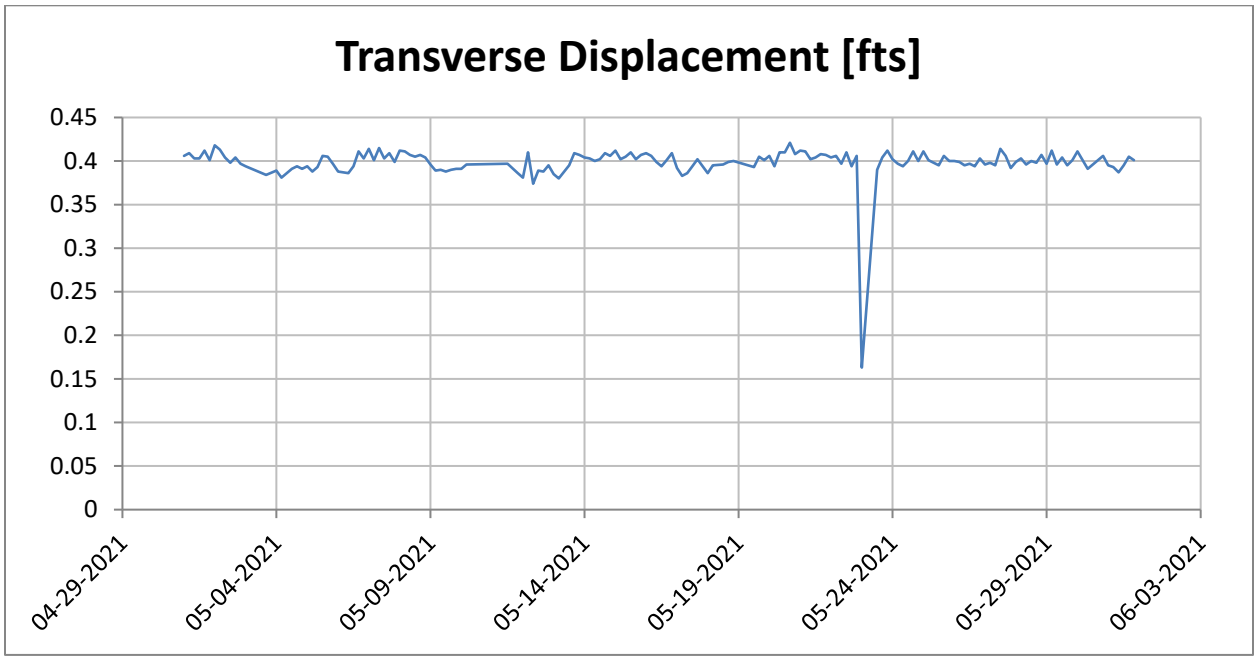
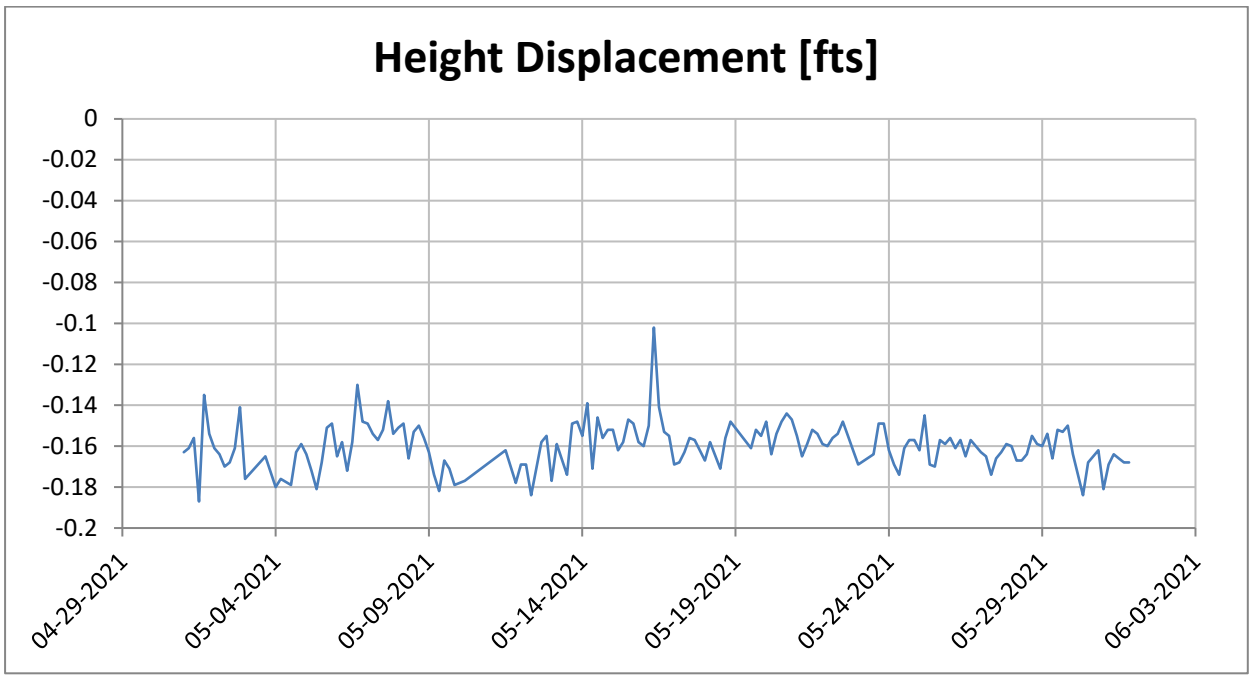
Prism P5





Notes:

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3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
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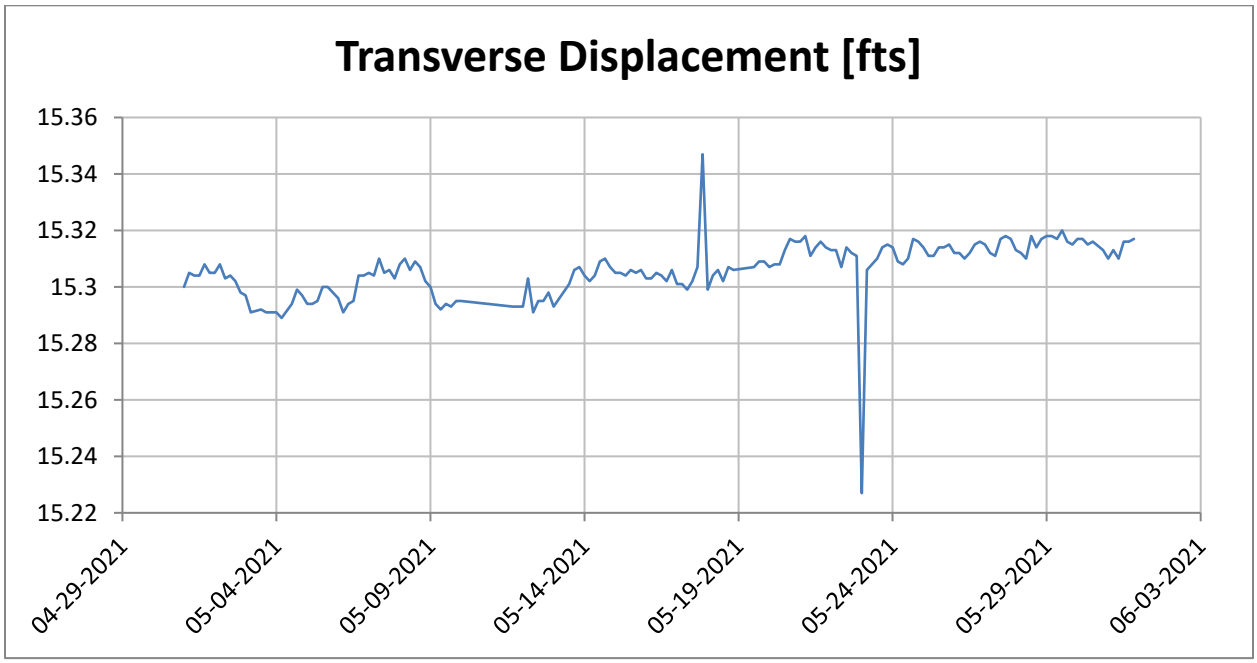
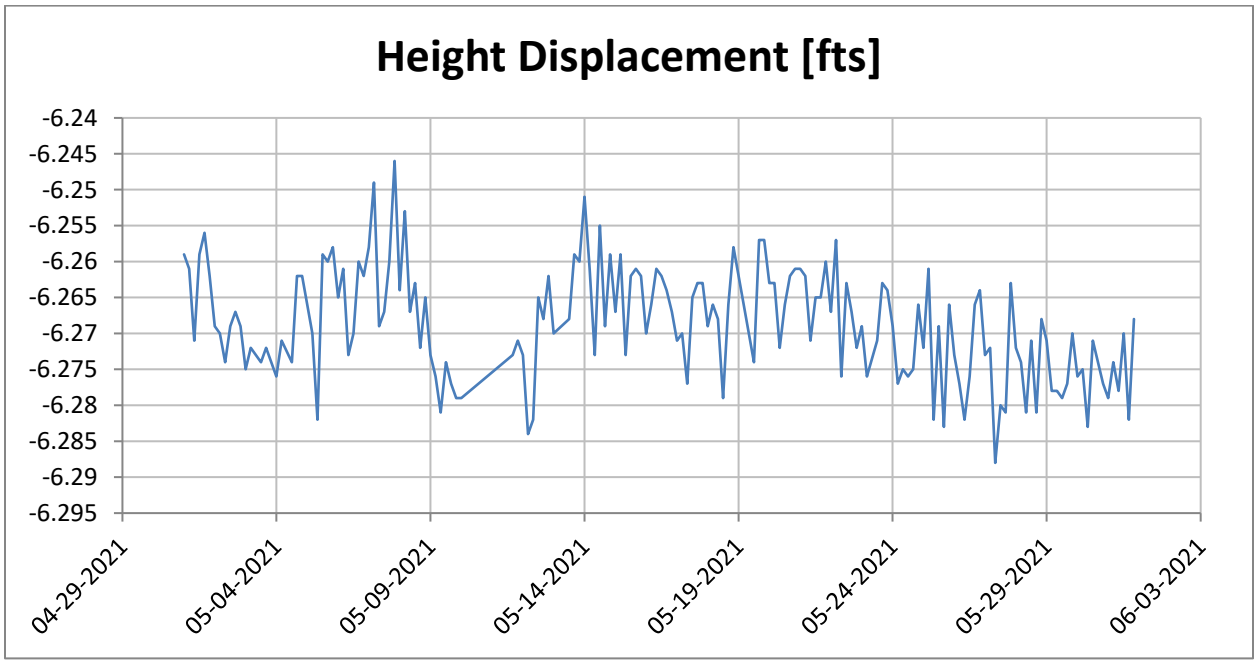
Prism P63





Notes:

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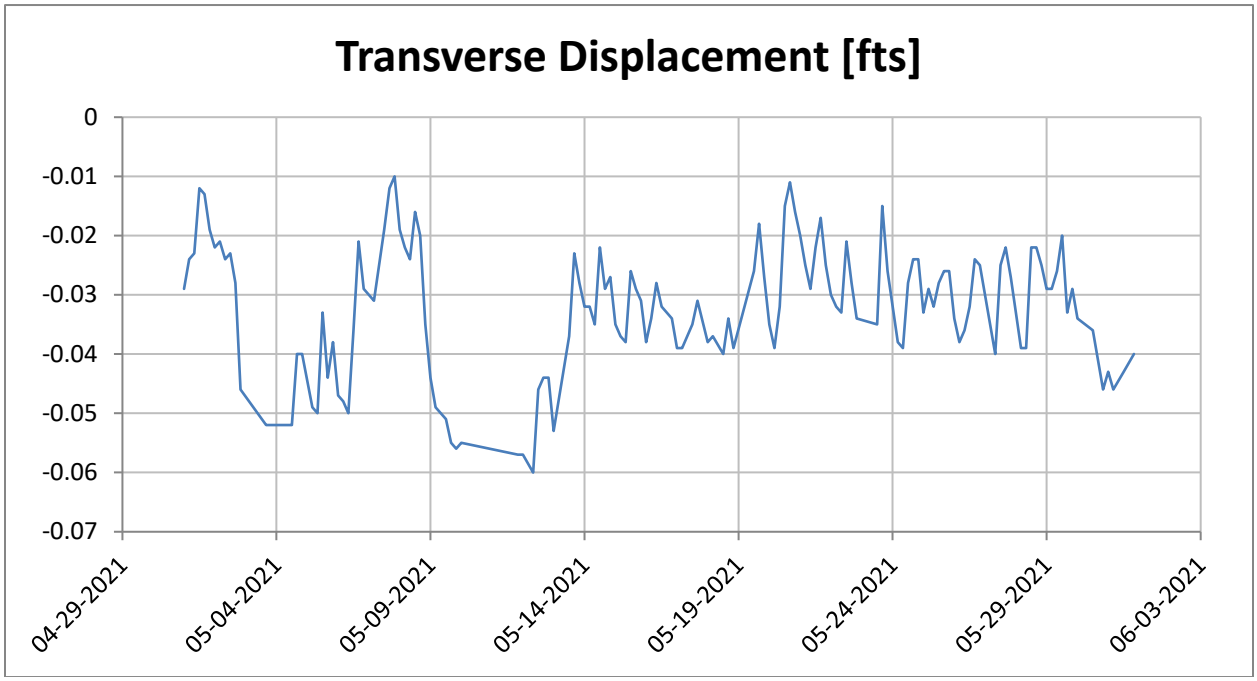
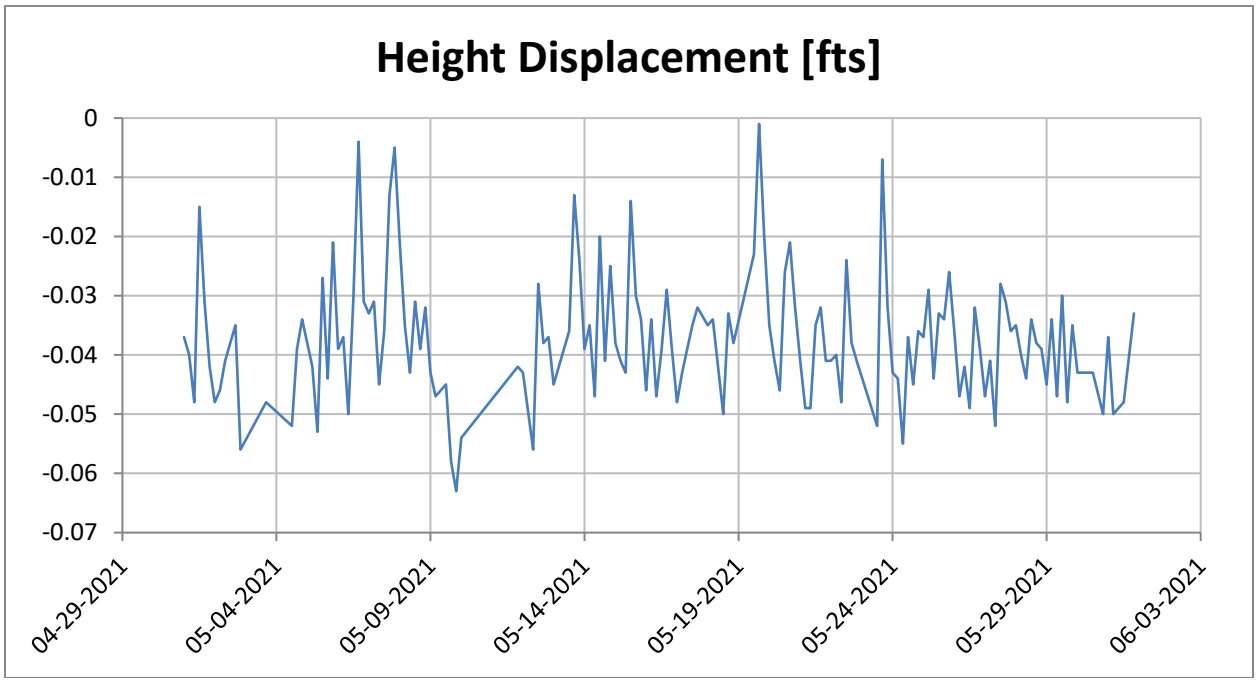
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.

Prism P69





Notes:

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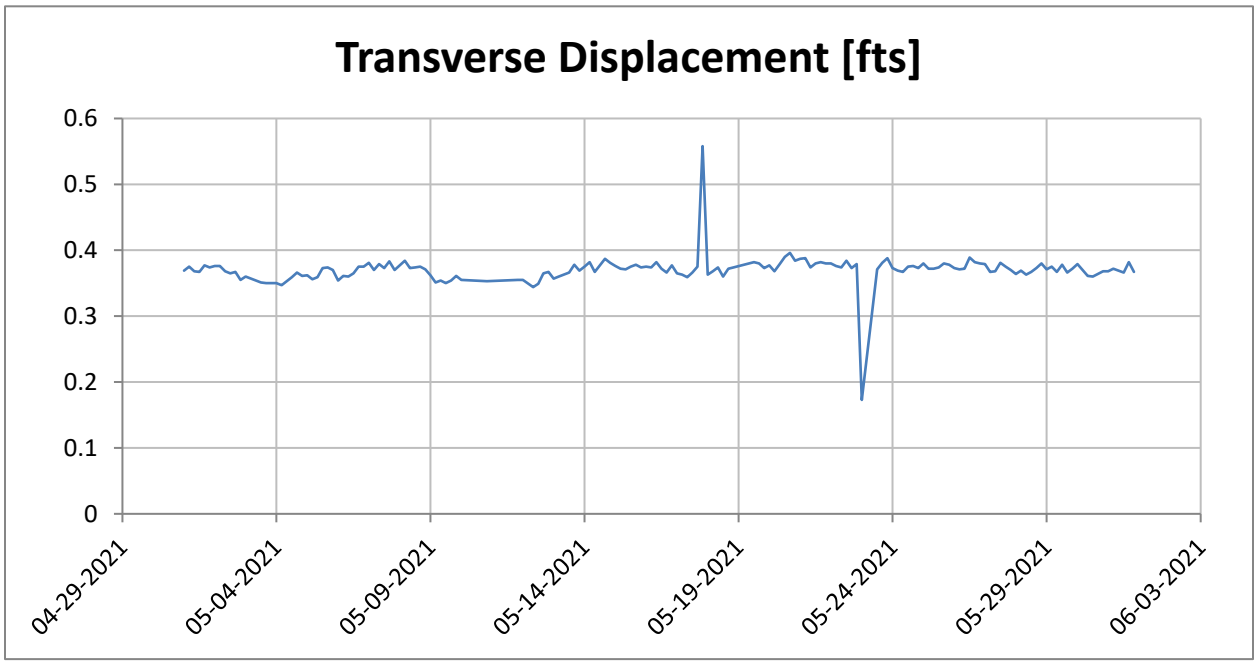
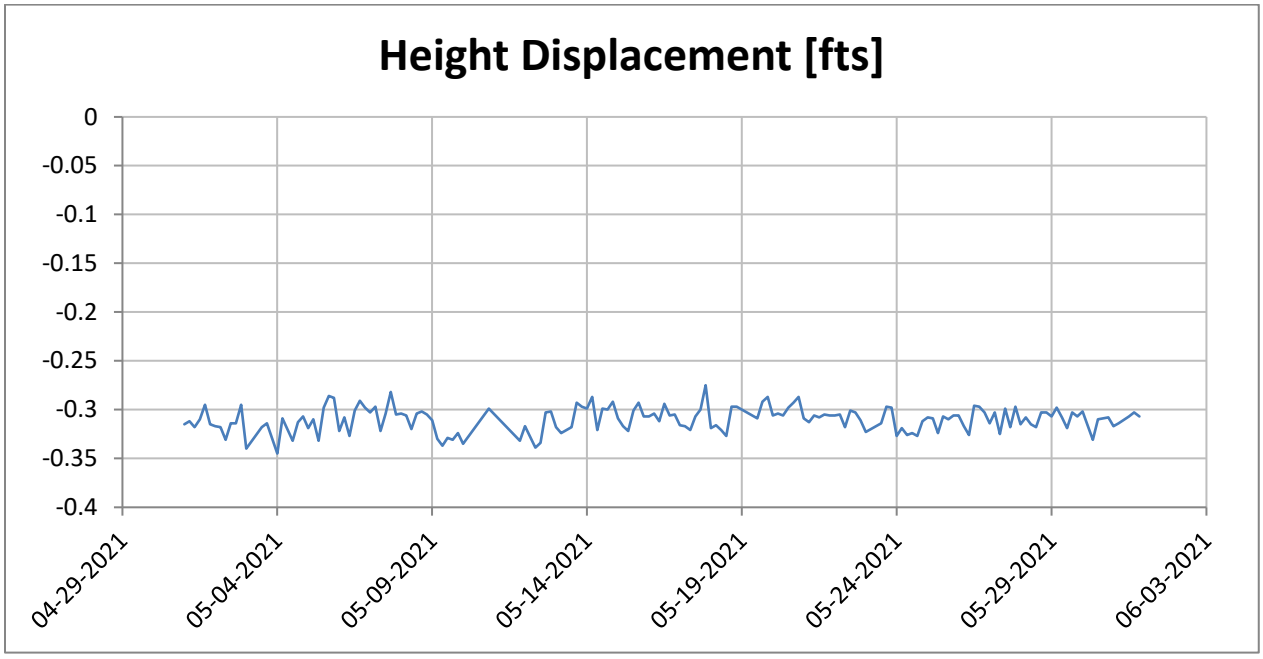
Prism P70





Notes:

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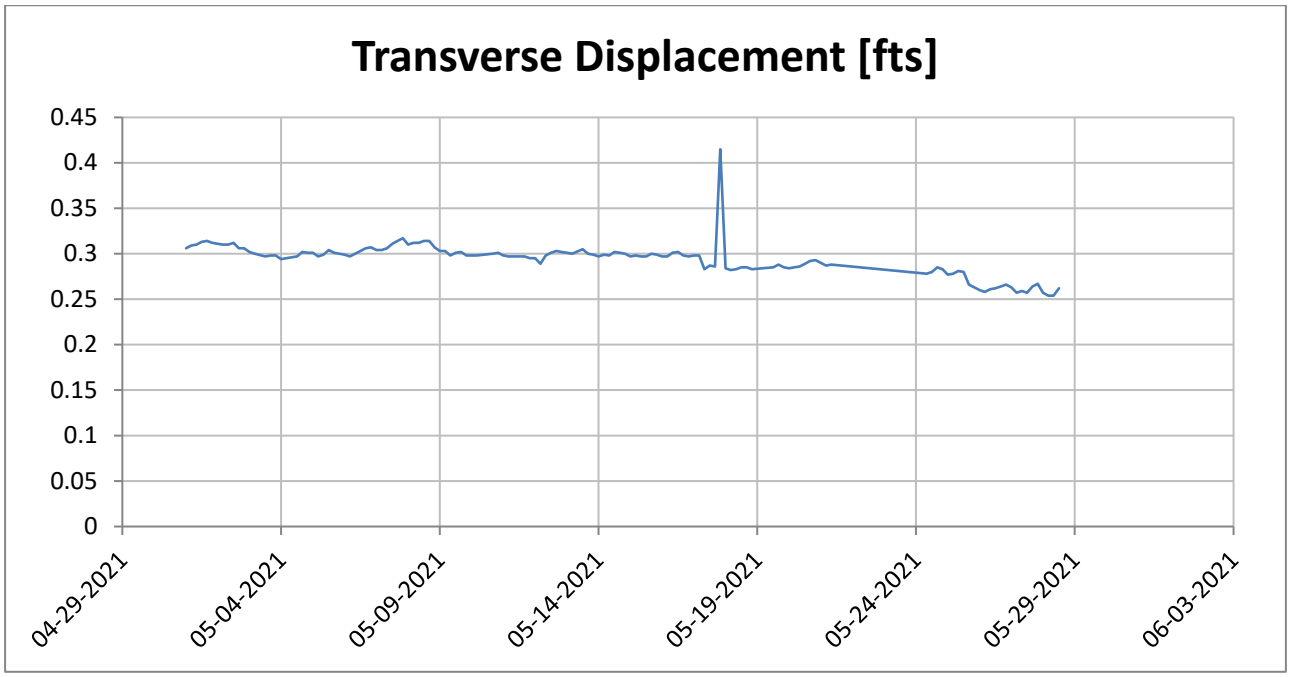
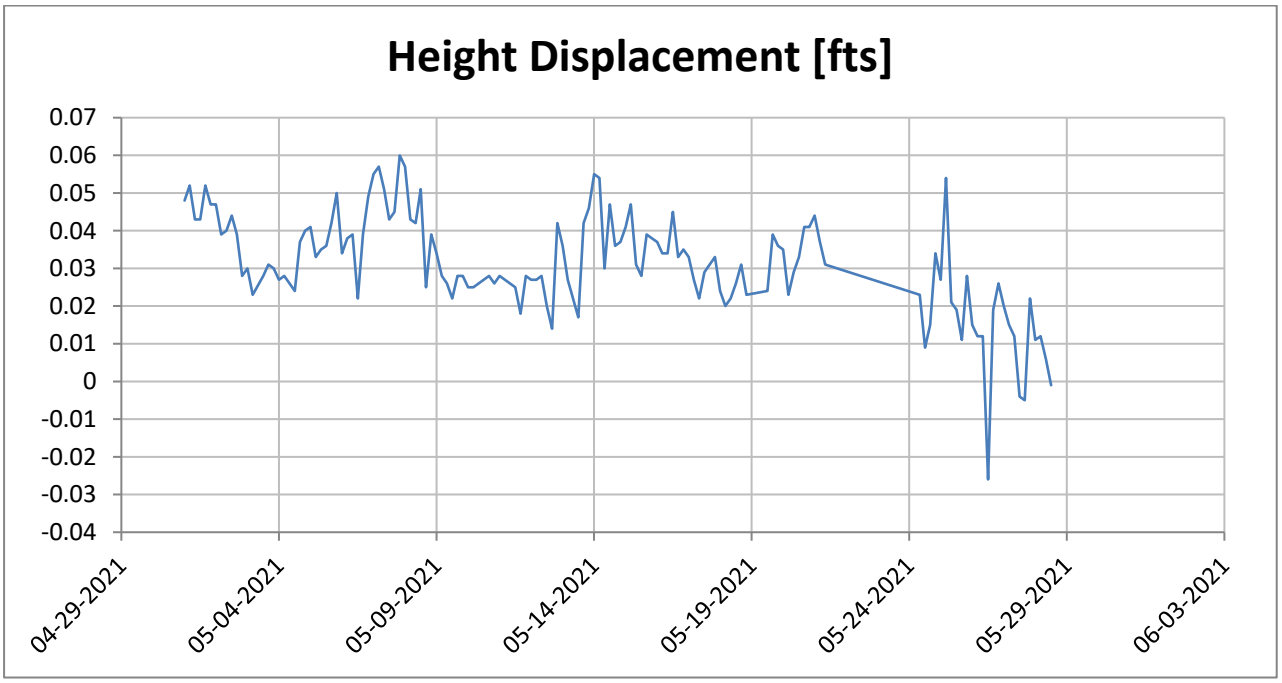
Prism TOE1





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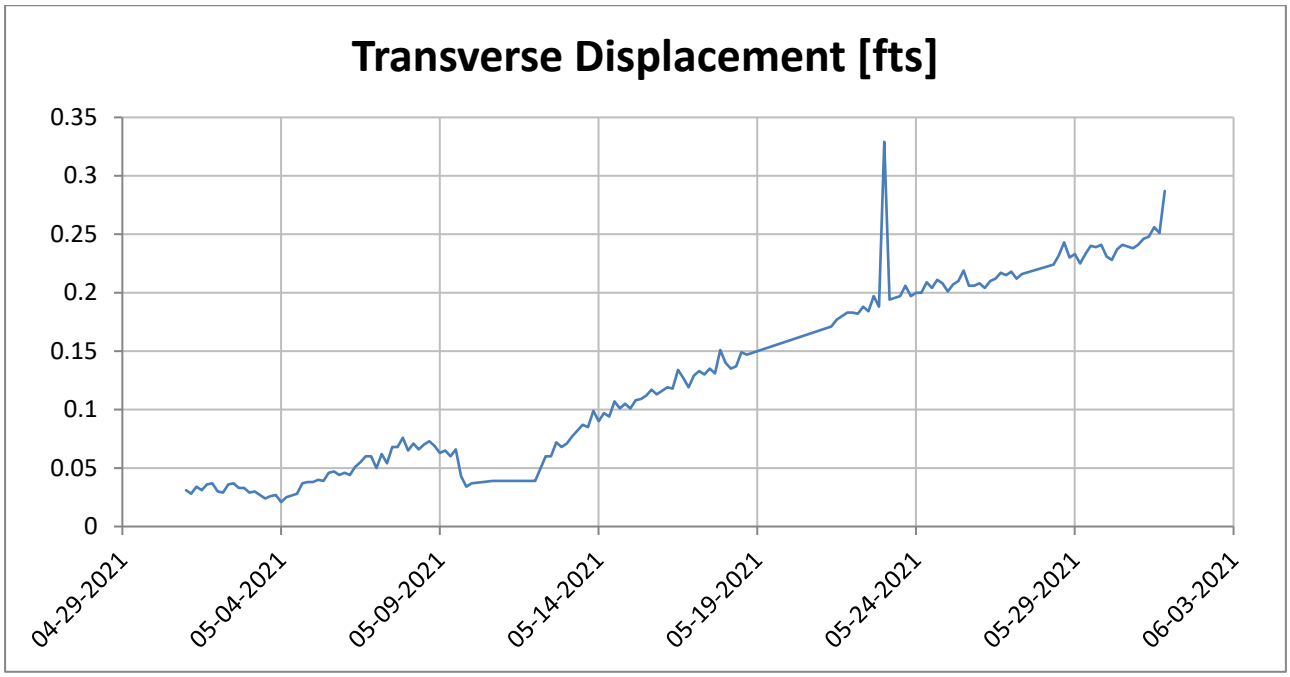
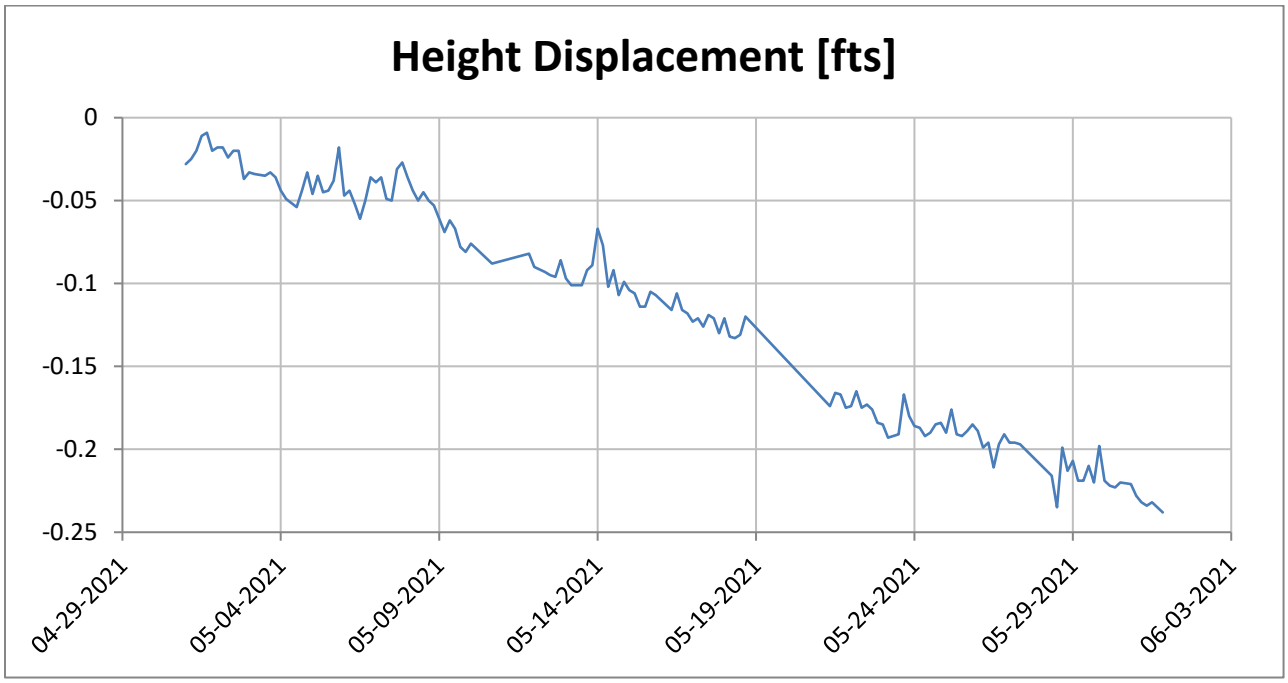
Prism TOE2





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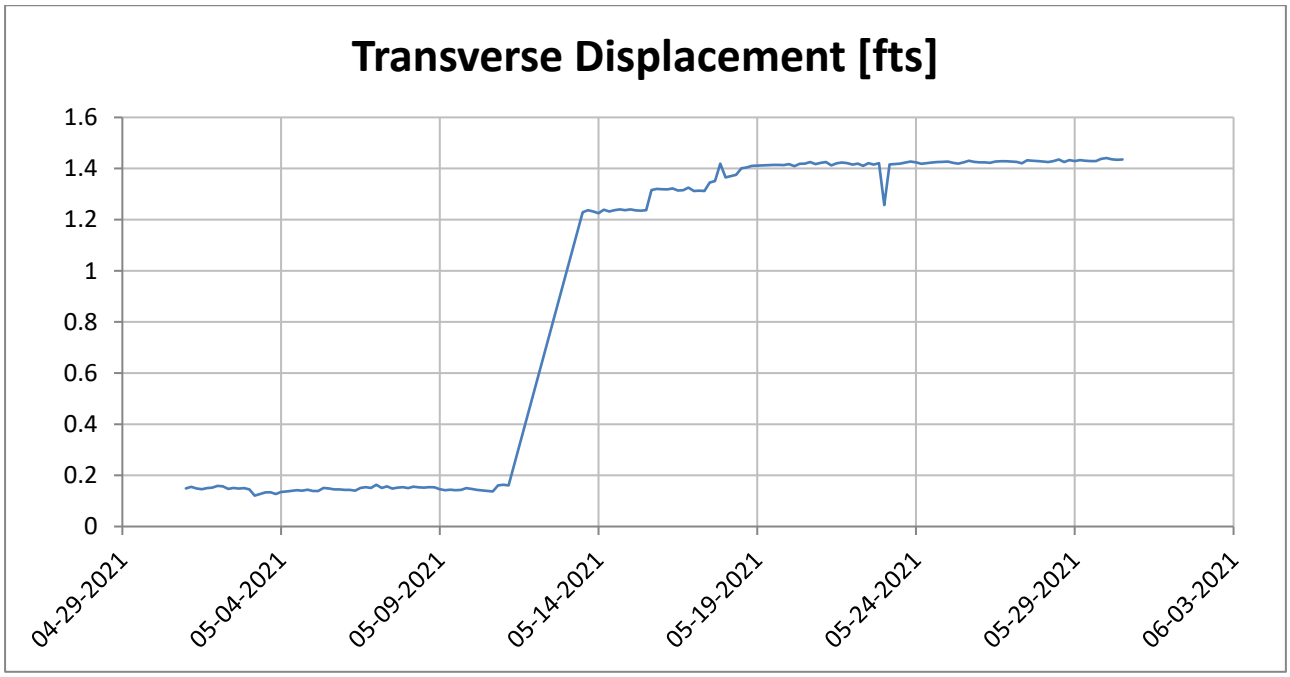
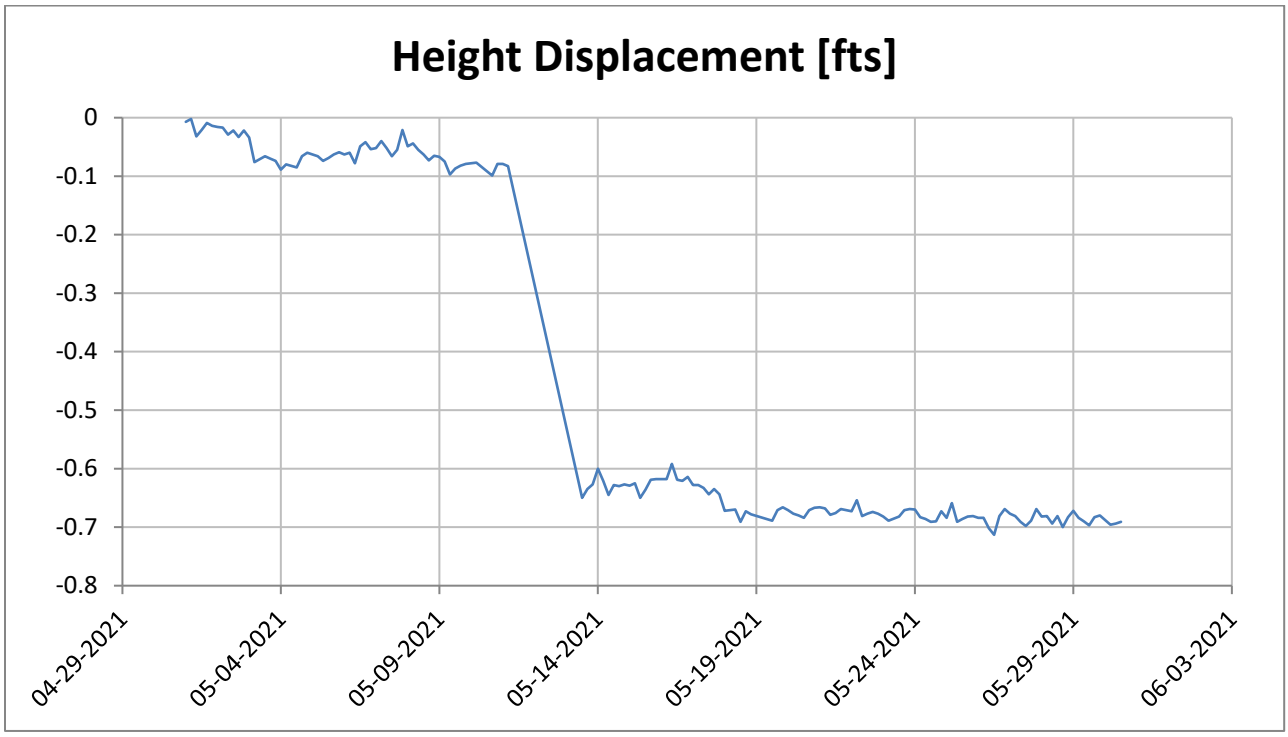
Prism TOE3





Notes:

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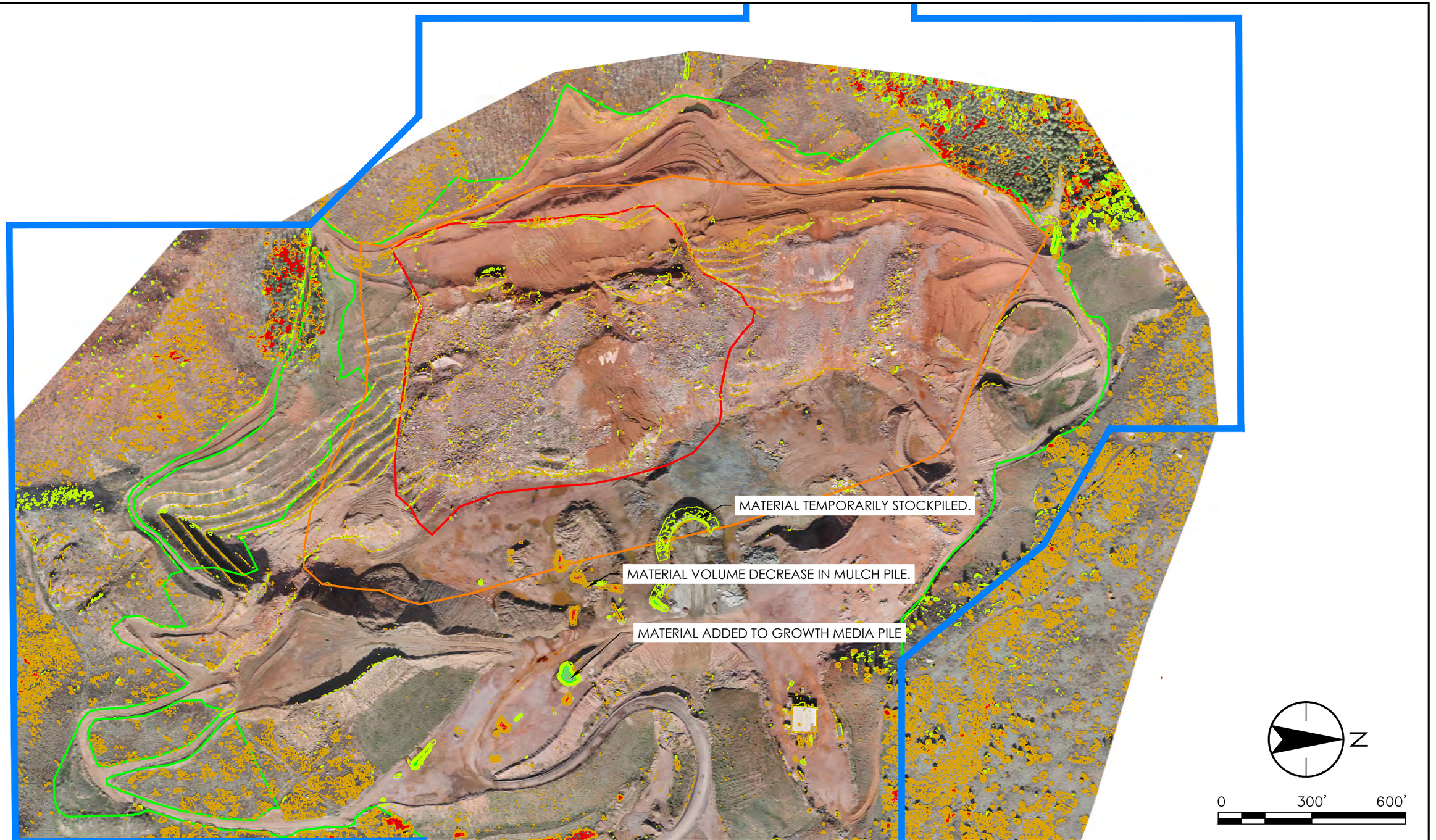
Appendix C

Drone Survey



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Stantec

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

LEGEND

- Permit/Affected Lands 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 04/22/21 and 05/14/2021.

Client/Project
CONTINENTAL MATERIALS CORP.
PIKEVIEW QUARRY SLOPE MONITORING

Project No.
227419041

Title
EXISTING PRISMS WITH CURRENT SURFACE

Revision
#

Date
2021.06.30

Drawn By
PK

Figure No.
5