

**June 2, 2023**

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Dear Mike,

**RE: Q1 2023 – YDTI Quarterly Piezometric and Deformation Monitoring Update**

**1.0 INTRODUCTION**

**1.1 GENERAL**

Montana Resources, LLC (MR) operates an open pit copper and molybdenum mine in Butte, Montana. Tailings produced from ore processing are stored within the Yankee Doodle Tailings Impoundment (YDTI), which is a valley-fill style impoundment contained within rockfill embankments. Knight Piésold Ltd. (KP) supports MR to routinely monitor hydrogeological and geotechnical conditions as part of their operational surveillance plan for the tailings facility, as described in the Tailings Operations, Maintenance and Surveillance (TOMS) Manual (MR/KP, 2022). Monitoring data are comprehensively reviewed on a quarterly basis to evaluate the performance of the YDTI in conjunction with observations made during periodic inspections.

Piezometric conditions within the YDTI embankments, tailings mass, and surrounding areas are an important indicator of facility performance. Real-time piezometric data from instrumentation at select monitoring sites have designated Quantitative Performance Parameters (QPPs) within the TOMS Manual and are regularly evaluated relative to piezometric ‘trigger elevations’ to pre-emptively identify and respond to changing conditions.

MR and KP commenced an embankment deformation monitoring program, with data collection beginning in 2020 to characterize and monitor surface and subsurface deformations using in-situ instrumentation and satellite-based remote sensing. Observed deformation rates, magnitudes and spatial distribution are an important indicator of embankment performance and are regularly reviewed by KP. The TOMS Manual does not yet include deformation based QPPs; however, these will be considered for future revisions. KP evaluated and presented available deformation data on a quarterly or more frequent basis throughout 2021 and 2022 to regularly monitor for changes in deformation behavior and evaluate incorporation of deformation instrumentation for QPP monitoring in the future; a practice that will continue through 2023.

This letter provides a quarterly summary of piezometric and deformation monitoring data collected during the first quarter (Q1) of 2023 for key monitoring sites.

**1.2 SUMMARY OF ACTIVE CONSTRUCTION**

MR is continuing construction of the YDTI embankments up to a crest elevation (El.) of 6,450 ft. Construction of the El. 6,450 ft lift was active during Q1 2023 within the following two areas:

- North-South Embankment construction progressed between approximately Sections 43+00N and 53+00N during February and March 2023 in a northeastward direction, and
- North-South Embankment construction progressed southwestward between approximately Sections 3+00N and 0+00 during January 2023 to complete the tie-in between the East-West and North-South Embankment El. 6,450 ft lifts.

Placement of alluvium facing material along the upstream rockfill surcharge slope (within the Central Pedestal Area) and along the North-South Embankment was also active during Q1 2023 (February and March 2023).

KP and MR have developed and implemented a supplemental construction monitoring program that includes monitoring of the construction related piezometric and deformation response (KP, 2021b). Construction has significantly influenced monitored surface deformations in areas within and localized around active construction, as expected. Only minor construction-related pore water pressure influence has been observed to date. Construction-related monitoring data are comprehensively reviewed on a monthly basis and presented in monthly construction monitoring letters, in addition to the dam safety monitoring program. Selected results are presented herein.

## 2.0 PIEZOMETRIC MONITORING

### 2.1 OVERVIEW OF PIEZOMETRIC MONITORING NETWORK

Piezometric data are available to KP via a Remote Monitoring System (RMS) and data from QPP sites are reviewed weekly by KP and MR. This letter presents trends and conditions based on data collection from the QPP sites during Q1 2023, with select additional data from non-QPP monitoring sites, when useful to support the key findings. Comprehensive analysis of data from the remaining non-QPP monitoring sites is completed annually and will be presented in the 2023 Data Analysis Report. The active piezometric monitoring network and a summary of Q1 2023 piezometric conditions are presented in the following sections.

Pore pressures are monitored at 104 active instrumentation locations at the YDTI, the West Ridge, and Horseshoe Bend (HsB) areas. Locations of the piezometric monitoring sites are shown on Figure 1. These sites include 39 standpipe piezometers/monitoring wells, 77 drillholes with active vibrating wire piezometers (VWPs) and two active Elexon Geo4Sight (Geo4Sight) installations. Most existing standpipe piezometers and monitoring wells have been outfitted for continuous monitoring by suspending a VWP sensor within the PVC riser and connecting the sensor via radiotelemetry to the RMS.

Eighteen (18) standpipe piezometers and drillhole VWP sensors have designated QPPs within the TOMS Manual and are used to routinely assess the performance of the YDTI. The QPPs include a piezometric 'trigger elevation' at or above when the QPP is exceeded, and a Level 1 Unusual Occurrence would be triggered, as specified in Table 5.1 of the TOMS Manual (MR/KP, 2022). Trigger elevations assigned to each QPP site are re-evaluated by KP on an annual basis. A summary of the piezometric QPPs that are currently in use at the YDTI is included in Table 1.

Piezometric data availability via the RMS has typically been highly reliable, except for minor outages including battery depletion, minor hardware problems, and temporary loss of communication with the local network. Minor outages have continued to be regularly identified during weekly monitoring reviews and corrective measures carried out, with minor issues typically remedied within one week of identification.

## 2.2 SUMMARY OF Q1 2023 PIEZOMETRIC CONDITIONS

### 2.2.1 GENERAL

No piezometric trigger elevation exceedances were observed at QPP monitoring sites during Q1 2023. A high-level summary of QPP piezometric data and instrumentation status is provided in Table 1. Piezometric data recorded at QPP sites within the East-West, North-South, and West Embankments are shown relative to the trigger elevations on Figure 2 through 6. Piezometric conditions and quarterly change in piezometric elevation along Section 8+00W of the East-West Embankment are presented graphically on Figure 7.

### 2.2.2 EAST-WEST EMBANKMENT

QPP sites within the East-West Embankment generally exhibited slightly decreasing piezometric elevations during Q1 2023, continuing the previously observed long-term decreasing pore water pressure trend monitored beginning in 2017. Notable piezometric trends observed within the East-West Embankment during Q1 2023 are summarized below.

QPP sensors installed within basal rockfill near the East-West Embankment toe on Section 0+00 and 8+00W generally monitored slightly decreasing piezometric elevations during Q1 2023. Supporting monitoring findings include:

- QPP monitoring sites MW94-8, MW94-11, and DH15-S3 VW1 observed minor pore water pressure decreases (approximately -0.1 ft in magnitude) during Q1 2023.
- QPP sensor DH17-S1 VW2 monitored slightly decreasing pore water pressure (approximately 0.6 ft decrease) during Q1 2023.

Pore water pressures monitored by QPP and non-QPP sensors installed beneath the East-West Embankment crest and surcharge load also decreased slightly during Q1 2023. Some sites observed pore pressure increases following placement of the alluvium facing along the upstream face of the Central Pedestal Area. Relatively minimal pore pressure influence was inferred from the El. 6,450 ft lift construction at the Central Pedestal Area. Key findings include:

- QPP sensor DH19-S7 VW1 (Section 0+00) continued to monitor decreasing pore water pressures (approximately 2.4 ft) within the basal saturated zone during Q1 2023. No discernable influence from recent El. 6,450 ft central embankment lift construction is apparent within the basal system at this site. More significant influence has been observed by sensors DH19-S7 VW5 and VW7, within inferred perched saturated zones higher up within the embankment:
  - Non-QPP sensor DH19-S7 VW7 observed an increasing pore water pressure trend during Q1 2023 (approximately 11 ft), which is inferred to result from placement of the alluvium facing along the upstream face of the central rockfill surcharge during February and March 2023. This sensor has previously observed increasing pore water pressures resulting from nearby El. 6,450 ft lift construction during mid- to late-2022 within the historical 1982 lift-top interval (relatively finer grained, saturated zone). These materials are interpreted to be more susceptible to excess pore water pressure generation from construction.

- Similarly, non-QPP sensor DH19-S7 VW5 observed increasing pore water pressures followed by dissipation during Q1 2023. Pore water pressures increased by approximately 6 ft between January 11 and 27, 2023. Pressures generally decreased by approximately 3 ft during February and March 2023. The sensor is installed within the 1989 lift and the recent trends are thought to be associated with construction of the El. 6,450 ft lift between Sections 3+00N and 0+00 during January 2023.
- QPP sensor DH15-S4 VW2 (Section 8+00W) observed decreasing pore pressures in Q1 2023 (approximately 3 ft).

The continuation of slightly decreasing pore water pressure trends within the East-West Embankment during Q1 2023 continues the long-term decreasing pore water pressure trend observed since the implementation of multiple point tailings discharge in late-2016.

### 2.2.3 NORTH-SOUTH EMBANKMENT

QPP sites within the rockfill of the North-South Embankment generally monitored minor pore water pressure decreases during Q1 2023, as slightly elevated pressures resulting from Q4 2022 construction of the El. 6,450 ft embankment lift dissipated. Key findings include:

- Instruments within the basal saturated zone of drillholes DH18-S1 (VW2) and DH18-S2 (VW2) monitored slightly decreasing pore pressures (approximately 0.3 to 0.5 ft) during Q1 2023. These sites previously monitored 5 to 10 ft of pressure increase during active construction of the El. 6,450 ft lift above the instrumentation sites.
- Monitoring well MW12-05 has historically been unsaturated and remained unsaturated through Q1 2023. This indicates that the piezometric elevation remains below the bottom of the well screen (less than 6,198 ft elevation) and is suggestive of a stable piezometric trend. Site MW12-05 is located at the El. 6,450 ft lift construction area that was active in March 2023. The sensor will be monitored for potential construction influence during Q2 2023.
- Monitoring well MW12-01 was inundated (tailings flowed into the well riser) by the rising tailings beach during September 2022 and subsequent water levels have been notably elevated (by approximately 10 ft) since. Slightly decreasing water levels were observed during Q1 2023 (approximately 0.8 ft decrease), and current elevations remain approximately 15 ft below the QPP threshold elevation.

### 2.2.4 TAILINGS MASS

Pore water pressure instrumentation installed within the tailings mass upstream of the East-West Embankment Central Pedestal Area generally monitored stable or slightly decreasing conditions during Q1 2023. The following are notable findings:

- Pore pressures within the central tailings mass upstream of the rockfill surcharge at non-QPP sites SCPT15-04 VW2 and SCPT15-05 VW3 (the upper most saturated sensors at each site) generally monitored slightly decreasing piezometric elevations (approximately 1 to 3 ft decrease) during Q1 2023.
- Instrumentation beneath the central rockfill surcharge (Section 0+00 to 12+00W, inclusive) at non-QPP sites DH17-S3 VW2 and SCPT15-05 VW2 monitored relatively stable conditions during Q1 2023.
- Non-QPP sensors SCPT21-S5 VW2 and VW3 remained unsaturated during Q1 2023. These sensors previously became saturated during surcharge construction in Q1 2022; however, pore pressures subsequently decreased, and the sensors became unsaturated in Q3 2022.

Instrumentation installed within the tailings beach adjacent to the North-South and East-West Embankments outside the Central Pedestal Area generally exhibited stable pore pressures during Q1 2023. Key findings include:

- Non-QPP sites SCPT21-S3 (VW3), SCPT15-06, SCPT15-07, SCPT15-08, SCPT13-05, and SCPT13-06 observed relatively stable conditions during Q1 2023 (minor mixed pore pressure responses of approximately +/- 0.3 to 2 ft). These fluctuations are inferred to be influence from activity/inactivity of the tailings discharge locations local to each monitoring site.
- Non-QPP sensor DH19-S6 VW6, installed upstream of the North-South Embankment near Section 56+00N, observed decreasing pore water pressures during Q1 2023 (approximately 6.5 ft). This site previously observed a pore pressure increase of approximately 8 ft due to extensive deposition from the nearby tailings discharge points during Q3 2022.
- Slightly decreasing pore water pressures (approximately 1 ft) was observed within the upper tailings mass at SCPT21-S2 VW2 during Q1 2023. This site previously monitored increasing pore water pressures during Q3 2022, resulting from continued discharge at NS-1 (3-2), followed by subsequent dissipation beginning in early-November through December 2022.

There are presently no QPPs designated for pore water pressures within the tailings mass.

### 2.2.5 WEST EMBANKMENT AND DRAIN

Piezometric elevations within the foundation of the West Embankment and West Embankment Drain (WED) remained relatively constant from 2019 through early-Q2 2022 (interpreted to be controlled by drainage to the WED). Minor pore pressure increases were then observed during late-Q2 and early-Q3 2022 (ranging from approximately 0.4 to 2 ft) that were attributed to increased seepage flow to the WED. Relatively stable or slightly decreasing pore water pressures were observed from late-Q3 2022 and through Q1 2023. Key findings include:

- QPP sensors in drillhole DH15-12 (VW1, VW2, and VW3) are installed within the West Embankment foundation and monitored slightly decreasing pore pressures during Q1 2023 (less than approximately 0.5 ft). Data from the nested VW1 through VW3 sensors continue to indicate an upward gradient towards the drain.
- Pore water pressures monitored by QPP sensors installed in WED Drain Pods 1 and 2 (VWP-DP1 and VWP-DP2, respectively) monitored relatively stable pore water pressures during Q1 2023.
- The piezometric elevation monitored by the non-QPP sensor in the WED Extraction Basin (VWP-EB1) monitored relatively stable pore water pressures during Q1 2023.

QPP sensors installed in drillhole DH15-12 are presently more than 20 ft below the TOMS QPP trigger elevations. Sensors installed in Drain Pods 1 and 2 remain more than 25 ft below the trigger elevations. The recent pore pressure increases within the WED are likely attributed to continuous tailings deposition along the West Embankment during 2022, particularly from location RK-1 and the 12-inch discharges. Tailings discharge in this area likely contributed higher seepage flows to the WED and Extraction Pond, via slurry water infiltration into the tailings beach and embankment rockfill when the tailings slurry flows along the beach adjacent to the upstream side of the embankment.

## 3.0 DEFORMATION MONITORING

### 3.1 OVERVIEW OF DEFORMATION MONITORING NETWORK

Surface and subsurface deformation data are regularly reviewed by KP, and a summary of the deformation monitoring programs and key monitoring trends from Q1 2023 are provided in the following sections. Quarterly monitoring generally observed continued constant rate surface deformations within regions of historical rockfill outside of construction influence, with no observation of progressive (accelerating) deformation rates in these areas. Elevated deformation rates continued to be observed within and localized around regions of recent or active construction (East-West and North-South Embankment El. 6,450 ft lift tie-in, and the North-South Embankment El. 6,450 ft crest), as rockfill placement progresses. Deformation rates slowed with time following construction.

Data from instrumentation sites were readily available via the RMS. This letter discusses available deformation data from Q1 2023. More comprehensive analysis of available deformation data will be presented in the 2023 Data Analysis Report in 2024. No deformation related QPPs are presently active; however, KP is evaluating the data and are considering incorporation of deformation related QPPs for future revisions of the TOMS Manual.

Surface and subsurface deformations of the YDTI embankments are actively monitored using in-situ instrumentation and remote sensing techniques. The instrumentation and remote sensing techniques incorporated into the monitoring program are summarized in the Data Analysis Report (KP, 2022b), and within monthly construction monitoring and quarterly monitoring documents during 2022. A list of the available techniques is provided below:

- Global Navigational Satellite System (GNSS) instrumentation at four locations (DH19-S3, DH19-S4, DH19-S5, and DH19-S7) within the Central Pedestal Area of the East-West Embankment
- Differential Global Positioning System (DGPS) survey-monuments at 15 locations along the East-West Embankment and 4 locations along the North-South Embankment.
- Satellite-based interferometric Synthetic Aperture Radar (InSAR) Bulletin and SqueeSAR analyses with coverage throughout the YDTI embankment. Data collection is active from April through October, while snow-free conditions persist. No new data are available from Q1 2023 due to persistent snow coverage.
- In-Place-Inclinometer (IPI) instruments co-located with the GNSS instrumentation within drillholes DH19-S3, DH19-S4, DH19-S5, and DH19-S7 within the Central Pedestal Area of the East-West Embankment.
- Geo4Sight deformation instruments within drillholes DH20-S2 (Section 8+00W) and DH21-S4 (Section 0+00), installed through the rockfill surcharge, tailings and upstream slope of the East-West Embankment in the Central Pedestal Area.

Trends and conditions observed in the monitoring data during Q1 2023 using available instrumentation and remote sensing data are summarized in the following sections.

### 3.2 OVERVIEW OF OBSERVED DEFORMATION TRENDS

#### 3.2.1 GENERAL

North-South Embankment El. 6,450 ft construction continued southwestward between approximately Sections 3+00N and 0+00 (January 2023) and then northeastward between Sections 43+00N and 53+00N (February and March 2023) during Q1 2023. Monitoring data collected during Q1 2023 continue to show

elevated deformation rates localized within and around the footprints of recently placed El. 6,450 ft lift rockfill within the Central Pedestal Area of the East-West and North-South Embankments. The onset of increasing deformation rates continues to correspond with the advancement of construction, and rates slow upon completion of construction in each area. Findings do not indicate development of unexpected deformations within the downstream embankment shell nor evidence of progressive (accelerating) deformation following construction. Key findings are discussed by embankment in the following sections.

### 3.2.2 EAST-WEST EMBANKMENT DEFORMATIONS

East-West Embankment El. 6,450 ft lift construction was completed in August 2022 and deformation monitoring data collected since (including during Q1 2023) have monitored slowing surface and subsurface deformation rates. A high-level summary of monitored Q1 2023 conditions is provided below:

- No InSAR data are available during Q1 2023 due to snow coverage. InSAR bulletins have previously monitored onset of elevated line-of-sight surface deformations, the spatial extent progressing with construction progress and slowing following construction.
- GNSS and DGPS survey-monuments have monitored slowing surface deformation rates within the East-West Embankment since completion of the El. 6,450 ft lift:
  - Survey-monuments (GNSS DH19-S7, DS-1, DS-2, DS-3 and DS-4) installed along the central Tailings Pipeline Ramp have continued to monitor slowing vertical and lateral (predominantly southward) deformations since August 2022.
  - Survey-monuments (MS-1, MS-2, and MS-3) installed along the El. 6,150 ft bench have exhibited relatively minor influence from construction (compared to the tailings pipeline ramp) and displacement rates generally have slowed since completion of El. 6,450 ft lift construction.
  - Survey-monuments (GNSS DH19-S3, GNSS DH19-S4, SB-1, SB-2, and SB-3) installed along the Seep 10 Bench have previously observed slightly elevated surface deformation rates interpreted to signify influence from construction. Monitoring during Q1 2023 continued to indicate slightly slowing deformation rates.
- Seep 10 Bench inclinometers DH19-S3 and DH19-S4 (Sections 0+00 and 8+00W, respectively) have previously observed slightly elevated subsurface deformation rates since June 2022, that are interpreted to be influenced by embankment lift construction upstream. Deformation rates have generally remained consistent or slowed slightly since mid-2022 (following El. 6,400 ft lift construction), with very minor rate and directional fluctuations interpreted to result from continuing settlement.
- Geo4Sight instrumentation within drillholes DH20-S2 and DH21-S1, installed beneath the surcharge, have previously monitored elevated subsurface deformation rates as central embankment lift construction progressed in late-2021 and early-2022. Deformation rates monitored during Q1 2023 remain low following surcharge and embankment lift construction.
- No evidence of progressive (accelerating) deformations has been observed following construction in a given area.

### 3.2.3 NORTH-SOUTH EMBANKMENT DEFORMATIONS

Continued North-South Embankment El. 6,450 ft lift construction is expected to have resulted in elevated deformation rates as rockfill placement progressed between Sections 3+00N and 0+00 (January 2023) and Sections 43+00N and 53+00N (February and March 2023) during Q1 2023. Limited data are available along the North-South Embankment due to snow coverage and construction obstruction. Key Q1 2023 findings include:

- No inSAR data are available during Q1 2023 due to snow coverage. InSAR bulletins have previously monitored onset of elevated line-of-sight surface deformations, the spatial extent progressing with construction progress and slowing following construction.
- DGPS survey-monuments (NS-01, NS-02, NS-03, NS-04, NS-05, and NS-06) are installed along the North-South Embankment to monitor deformations associated with El. 6,450 ft crest construction. Limited data are available from sites outside the Central Pedestal Area (NS-01, NS-02, NS-03, NS-04) due to difficult winter survey-access conditions. Sites NS-05 and NS-06, located near the Central Pedestal Area, monitored slightly increasing surface deformation rates during January 2023, as El. 6,450 ft lift construction progressed towards Section 0+00. Slowing rates were observed following construction (February and March 2023).
- KP expects that North-South Embankment deformation rates between approximately Sections 43+00N and 53+00N increased during February and March 2023, as El. 6,450 ft lift construction progressed northeastward. No data (inSAR or DGPS) are available during this period due to difficult winter survey-access and persistence of snow coverage.

Construction is now largely complete and KP expects slowing deformation rates. This expectation will be confirmed by inSAR and more frequent DGPS survey-monument monitoring during Q2 2023.

## 4.0 CONCLUSION

KP supports MR with routine monitoring of the hydrogeological and geotechnical conditions, as part of their operational surveillance plan for the tailings facility, as described in the TOMS Manual (MR/KP, 2022). Piezometric, surface deformation, and subsurface deformation data are available in near real-time using the RMS. Formal analysis and reporting of monitoring data are completed on a quarterly basis to evaluate the performance of the YDTI. The quarterly evaluations along with an assessment of conditions and trends at all piezometric monitoring sites will be included in a comprehensive annual Data Analysis Report, to be issued in 2024. Additional monthly piezometric and deformation data analyses for conditions associated with active embankment construction have been completed since June 2021 and will continue through the current El. 6,450 ft lift construction phase within the East-West and North-South Embankments. KP anticipates that influence from construction (localized elevated pore water pressures and elevated surface/subsurface deformation rates) will slow with time now that El. 6,450 ft lift construction is largely completed.

Piezometric conditions are monitored within the YDTI embankments, tailings mass, and surrounding areas and are an important indicator of facility performance. A subset of piezometric monitoring sites have designated QPPs within the TOMS Manual and are regularly evaluated relative to piezometric 'trigger elevations' to pre-emptively identify and respond to changing conditions. There were no piezometric QPP exceedances during Q1 2023. Minor, isolated elevated pore pressures associated with construction are anticipated to dissipate with time following completion of El. 6,450 ft lift placement within the Central Pedestal Area.

Construction of the El. 6,450 ft lift along the North-South Embankment continued during Q1 2023 along with placement of alluvial facing along the upstream face of the central rockfill surcharge. East-West Embankment El. 6,450 ft lift construction was completed in August 2022. Monitoring has previously observed increasing surface and subsurface deformation rates, the onset of which corresponded with construction progress. Elevated surface and subsurface deformations continue to be monitored within and localized around areas of recent or active construction. Monitored deformation rates within the Central Pedestal Area remain slightly elevated but generally decreased during Q1 2023. Findings do not indicate

development of unexpected deformation following construction. North-South Embankment deformation rates are expected to have increased due to construction; however, limited data were available during Q1 2023 to provide confirmation due to difficult winter-access and persistent snow coverage. Additional monitoring of the North-South Embankment during Q2 2023 will confirm the status of post-construction deformation rates.

Please do not hesitate to contact the undersigned should you have any questions or if you would like any additional information.

Yours truly,

**Knight Piésold Ltd.**

Prepared:

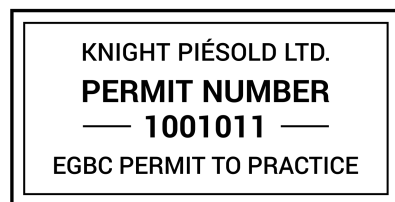
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Approval that this document adheres to the Knight Piésold Quality System:



**Attachments:**

Table 1 Rev 0	Summary of Piezometric Quantitative Performance Parameter (QPP) Monitoring
Figure 1 Rev 0	Active Piezometric and Deformation Monitoring Instrumentation
Figure 2 Rev 0	Summary of Measured Piezometric Elevations vs. QPP Triggers East-West Embankment
Figure 3 Rev 0	Summary of Measured Piezometric Elevations vs. QPP Triggers East-West Embankment

Figure 4 Rev 0	Summary of Measured Piezometric Elevations vs. QPP Triggers North-South Embankment
Figure 5 Rev 0	Summary of Measured Piezometric Elevations vs. QPP Triggers West Embankment
Figure 6 Rev 0	Summary of Measured Piezometric Elevations vs. QPP Triggers West Embankment
Figure 7 Rev 0	Piezometric Conditions Along East-West Embankment Section 8+00W (Looking West)
Figure 8 Rev 0	Comparison of Monitored Surface Deformations at GNSS Instrumentation Sites
Appendix A	GNSS Deformation Plots
Appendix B	Inclinometer Deformation Plots
Appendix C	Geo4Sight Deformation Plots

**References:**

- Knight Piésold Ltd. (KP, 2021a). 2020 Data Analysis Report (KP Reference No. VA101-126/23-5 Rev 0), dated June 30, 2021.
- Knight Piésold Ltd. (KP, 2021b). Monthly EI. 6,450 Construction Progress and Monitoring Summary - MP#1 (Jun 22 to Jul 31, 2021) (KP Reference No. VA21-01362), dated September 30, 2021.
- Knight Piésold Ltd. (KP, 2022a). Approval to Commence East-West and North-South Embankment EI. 6,450 ft Construction (KP Reference No. VA22-00361), dated March 11, 2022.
- Knight Piésold Ltd. (KP, 2022b). 2021 Data Analysis Report (KP Reference No. VA101-126/27-6 Rev 0), dated May 20, 2022.
- Montana Resources and Knight Piésold (MR/KP, 2022). Yankee Doodle Tailings Impoundment – Tailings Operations, Maintenance and Surveillance (TOMS) Manual, Rev 4, dated January 2022.

Copy To: Mark Thompson, Amanda Griffith (Montana Resources)

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TABLE 1

MONTANA RESOURCES, LLC  
YANKEE DOODLE TAILINGS IMPOUNDMENT

Q1 2023 INSTRUMENTATION SUMMARY  
SUMMARY OF PIEZOMETRIC QUANTITATIVE PERFORMANCE PARAMETER (QPP) MONITORING

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Monitoring Region	QPP Instrumentation Site	Monitoring Site Type <sup>1</sup>	Piezometric Trigger Elevation (ft)	Maximum Piezometric Elevation Recorded Q1 2023 (ft)	End of Q1 2023 Piezometric Elevation (ft)	Exceeded Trigger Elevation During Q1 2023 (Yes/No)	Pore Pressure Change Q1 2023 (ft)	Comments
East-West Embankment	MW94-08	VWP Sensor	5,680	5,669	5,668	No	-0.10	
	MW94-11	VWP Sensor	5,693	5,673	5,672	No	-0.12	
	DH15-S3 VW1	VWP Sensor	5,690	5,664	5,664	No	-0.08	
	DH15-S4 VW1	VWP Sensor	5,740	5,712	5,711	No	-0.62	
	DH15-S4 VW2	VWP Sensor	5,800	5,771	5,768	No	-3.27	
	DH15-S5 VW2	VWP Sensor	5,890	5,854	5,853	No	0.29	Activated as a QPP on October 3, 2022 to replace DH15-S5 VW1 <sup>5</sup>
	DH17-S1 VW2	VWP Sensor	5,741	5,714	5,713	No	-0.62	
	DH18-S3 VW3	VWP Sensor	6,044	6,023	6,022	No	-0.58	
	DH19-S7 VW1	VWP Sensor	5,770	5,734	5,732	No	-2.38	Activated as a QPP on March 19, 2021 to replace DH17-S2 VW2 <sup>4</sup>
North-South Embankment	MW12-01	VWP Sensor	5,940	5,925	5,924	No	-0.79	
	MW12-05	VWP Sensor	6,200	5,987	6,198	No	-0.02	
	DH18-S1 VW2	VWP Sensor	6,010	5,987	5,986	No	-0.68	
	DH18-S2 VW2	VWP Sensor	6,029	6,011	6,010	No	-0.34	
West Embankment	VWP-DP1	VWP Sensor	6,374	6,341	6,341	No	-0.10	
	VWP-DP2	VWP Sensor	6,366	6,337	6,337	No	-0.04	
	DH15-12 VW1	VWP Sensor	6,372	6,350	6,349	No	-0.32	
	DH15-12 VW2	VWP Sensor	6,372	6,351	6,351	No	-0.24	
	DH15-12 VW3	VWP Sensor	6,372	6,351	6,351	No	-0.15	

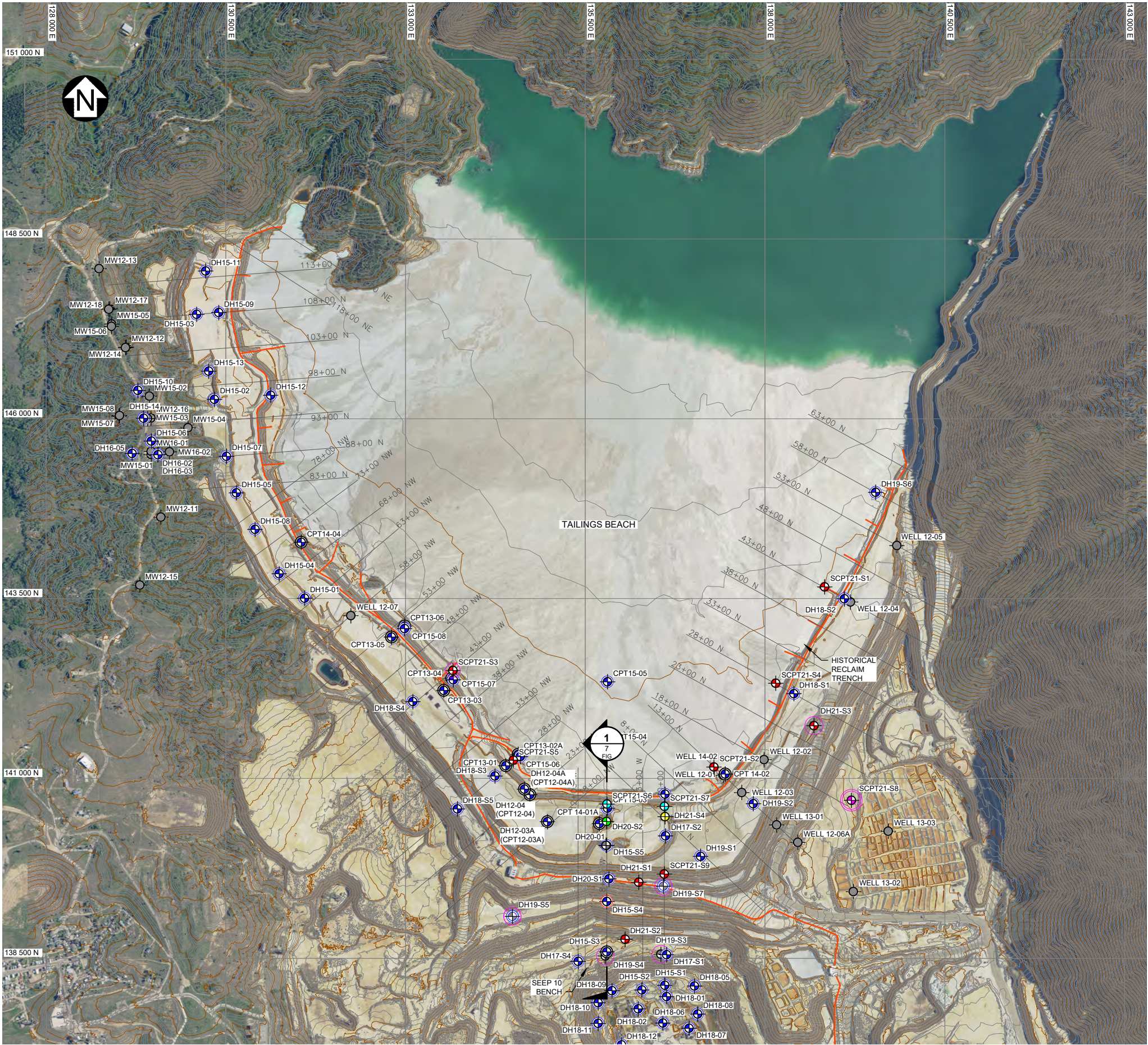
M:\1\01\00126\29A\Correspondence\VA23-00701 - Q1 2023 Piezometric and Deformation Monitoring Summary\Tables\QPP Compliance Figures and Table Q1.xlsm]Table 1 - QPP Evaluation

- NOTES:**
- PIEZOMETRIC DATA FROM VWP SITES ARE COLLECTED HOURLY USING DATA LOGGERS AND A REMOTE MONITORING SYSTEM.
  - THE SPECIFIED QPP TRIGGER ELEVATION FOR MW12-05 WAS UPDATED FROM 6,195 ft. TO 6,200 ft. IN THE 2018 REVISION OF THE TOMS MANUAL (MR/KP, 2018).
  - THE PIEZOMETRIC QPP NETWORK WAS EXPANDED TO INCLUDE ADDITIONAL SENSORS DURING THE 2020 TOMS UPDATE (MR/KP, 2020).
  - DH17-S2 VW2 WAS DAMAGED ON MARCH 19, 2021 AND DATA THEREAFTER ARE INTERPRETED TO BE ERRONEOUS. THIS SENSOR WAS RETIRED FROM THE QPPS AND REPLACED WITH THE NEARBY DH19-S7 VW1.
  - SENSOR DH15-S5 VW1 WAS DAMAGED DURING A COLLAR RAISE AND HAS BEEN ABANDONED. THIS SENSOR WAS RETIRED FROM THE QPPS AND REPLACED WITH DH15-S5 VW2 ON OCTOBER 3, 2022.

0	11MAY'23	ISSUED WITH LETTER VA23-00701	CNN	KTD
REV	DATE	DESCRIPTION	PREP'D	RVW'D

SAVED: M:\101\001\26\29\VA\active\FIGS\B24\_62\2023\_11\16\49 AM\_ELEE\_PRINTED\_6/2/2023 11:17:08 AM.FIG 1, ELEE  
XREF: ELEES\TOPO\_5 - JUL 2022.DWG, 2022-07-18, 12:49 PM, 2022-07-18, 12:49 PM, 2022-07-18, 12:49 PM, 2022-07-18, 12:49 PM

0	02JUN'23	ISSUED WITH LETTER	SY3	RMM	KTD
REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED

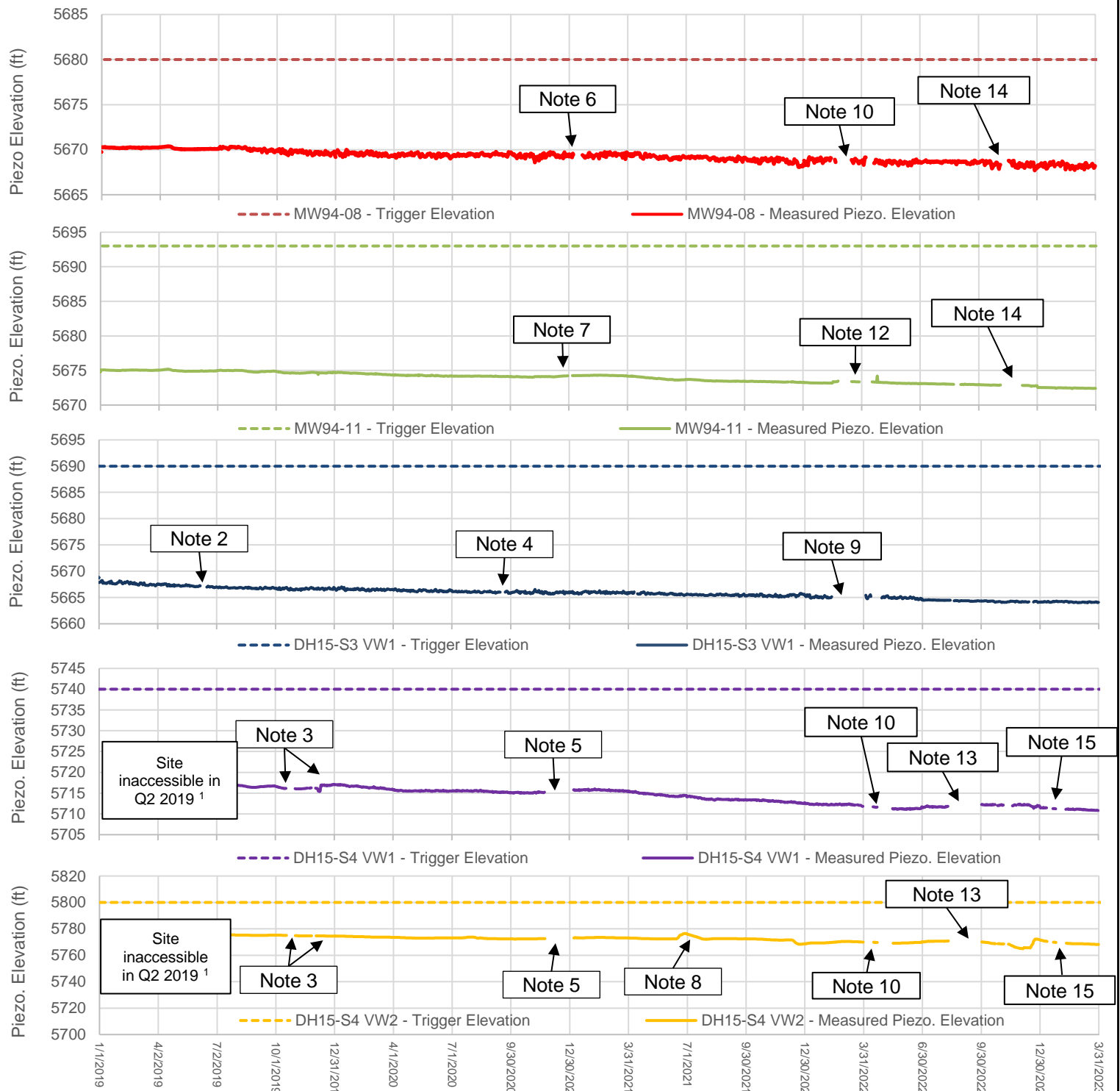


- NOTES:**
- COORDINATE SYSTEM AND ELEVATIONS BASED ON ANACONDA MINE GRID.
  - QPP = QUANTITATIVE PERFORMANCE PARAMETER.
  - RK-3 TAILINGS DISCHARGE POINT WAS RELOCATED NORTH IN OCTOBER 2017.
  - THE AERIAL PHOTO SHOWN IS FROM JULY, 2022.
  - TOPOGRAPHY PROVIDED BY MONTANA RESOURCES, LLC IN JULY, 2022.
  - NO PORE WATER PRESSURE DATA ARE AVAILABLE FROM DH20-S1 AS THE INSTRUMENTATIONS ARE NOT FUNCTIONAL.

- LEGEND:**
- 2021 DRILLHOLE WITH NESTED PIEZOMETERS
  - 2021 DRILLHOLE WITH NESTED PIEZOMETERS AND INCLINOMETER
  - 2021 DRILLHOLE WITH NESTED VIBRATING WIRE PIEZOMETERS AND GEO4SIGHT INSTRUMENTATION
  - 2021 DRILLHOLE WITH INCLINOMETER
  - 2021 GEOTECHNICAL DRILLHOLE
  - EXISTING DRILLHOLE WITH NESTED VIBRATING WIRE PIEZOMETERS AND GEO4SIGHT INSTRUMENTATION
  - EXISTING GEOPHYSICAL CASING
  - EXISTING INCLINOMETER
  - EXISTING INCLINOMETER WITH NESTED VIBRATING WIRE PIEZOMETERS
  - EXISTING NESTED VIBRATING WIRE PIEZOMETERS
  - EXISTING SINGLE VIBRATING WIRE PIEZOMETER
  - EXISTING THERMISTOR WITH VIBRATING WIRE PIEZOMETER
  - EXISTING INSTRUMENTED MONITORING WELL OR STANDPIPE
  - TAILINGS PIPELINE

SCALE A 500 0 500 1000 1500 2000 2500 ft

MONTANA RESOURCES, LLC		
YANKEE DOODLE TAILINGS IMPOUNDMENT		
ACTIVE PIEZOMETRIC INSTRUMENTATION AND MONITORING SITE		
	P/A NO. VA101-126/29	REF NO. VA23-00701
	FIGURE 1	
		REV 0



**NOTES:**

1. NO DATA ARE SHOWN FROM DEC 20, 2017 TO JULY 25, 2019 FOR DH15-S4 VW1 AND VW2 AS MR STAFF WERE UNABLE TO CONNECT THE INSTRUMENTATION WITH THE REMOTE MONITORING SYSTEM DUE TO SITE INACCESSIBILITY.
2. NO DATA WERE COLLECTED BY DH15-S3 VW1 FROM JUNE 7, 2019 TO JUNE 16, 2019 DUE TO INSUFFICIENT BATTERY VOLTAGE
3. NO DATA WERE COLLECTED BY DH15-S4 VW1 AND VW2 DUE TO POWER SUPPLY ISSUES OCTOBER 19 TO 31 AND NOVEMBER 27, 2019 TO DECEMBER 3, 2019. SENSORS MOVED NEW LOGGER.
4. NO DATA WERE COLLECT BY DH15-S3 VW1 FROM SEPTEMBER 15 TO SEPTEMBER 21, 2020 DUE TO DEPLETED GEONET BATTERY WHICH WAS SUBSEQUENTLY REPLACED.
5. NO DATA WERE COLLECTED BY DH15-S4 VW1 AND VW2 DUE TO SUSPECTED LOGGER ISSUE FROM NOVEMBER 22, 2020. FUNCTIONALITY WAS RESTORED USING A REPLACEMENT LOGGER IN Q1 2021.
6. NO DATA WERE COLLECTED BY MW94-08 FROM JANUARY 7 TO 19, 2021 DUE TO A DEPLETED BATTERY WHICH WAS SUBSEQUENTLY REPLACED.
7. NO DATA WERE COLLECTED BY MW94-11 FROM DECEMBER 30, 2020 TO JANUARY 4, 2021 DUE TO A DEPLETED BATTERY WHICH WAS SUBSEQUENTLY REPLACED.
8. PIEZOMETRIC ELEVATION INCREASED IN RESPONSE TO OBSERVED INFILTRATION OF TAILINGS SLURRY WATER INTO THE CENTRAL ROCKFILL SURCHARGE FROM JUNE 14 TO JUNE 28, 2021 AS DESCRIBED IN VA21-01320.
9. SENSOR DH15-S3 VW1 WENT OFFLINE ON FEBRUARY 9, 2022 DUE TO A SUSPECTED RMS CONNECTIVITY ISSUE. CONNECTIVITY WAS RE-ESTABLISHED ON APRIL 20, 2022.
10. SENSORS DH15-S4 VW1 AND VW2 WERE TEMPORARILY DISCONNECTED BETWEEN APRIL 1 AND MAY 17, 2022 DUE TO A SUSPECTED RMS CONNECTIVITY ISSUE.
11. SENSOR MW94-8 WAS TEMPORARILY DISCONNECTED BETWEEN FEBRUARY 19 AND APRIL 21, 2022 DUE TO A SUSPECTED LOGGER VOLTAGE ISSUE.
12. SENSOR MW94-11 WAS TEMPORARILY DISCONNECTED BETWEEN MARCH 6 AND APRIL 18, 2022 DUE TO A SUSPECTED RMS CONNECTIVITY ISSUE.
13. SENSORS DH15-S4 VW1 AND VW2 COLLECTED ERRONEOUS READINGS STARTING ON AUGUST 9, 2022 DUE TO SUSPECTED LOGGER ISSUE. VALUES HAVE BEEN OMITTED FOR CLARITY. TROUBLESHOOTING IS CURRENTLY IN PROGRESS.
14. SENSOR 94-8 AND 94-11 VW1 WAS TEMPORARILY DISCONNECTED BETWEEN NOVEMBER 3 AND DECEMBER 9, 2022 DUE TO A SUSPECTED LOGGER VOLTAGE ISSUE.
15. SENSORS DH15-S4 VW1 AND VW2 COLLECTED MINIMAL DATA BETWEEN JANUARY 11 TO FEBRUARY 8, 2023 DUE TO A SUSPECTED DATA LOGGER ISSUE.

0	11MAY'23	ISSUED WITH LETTER	CNN	KTD
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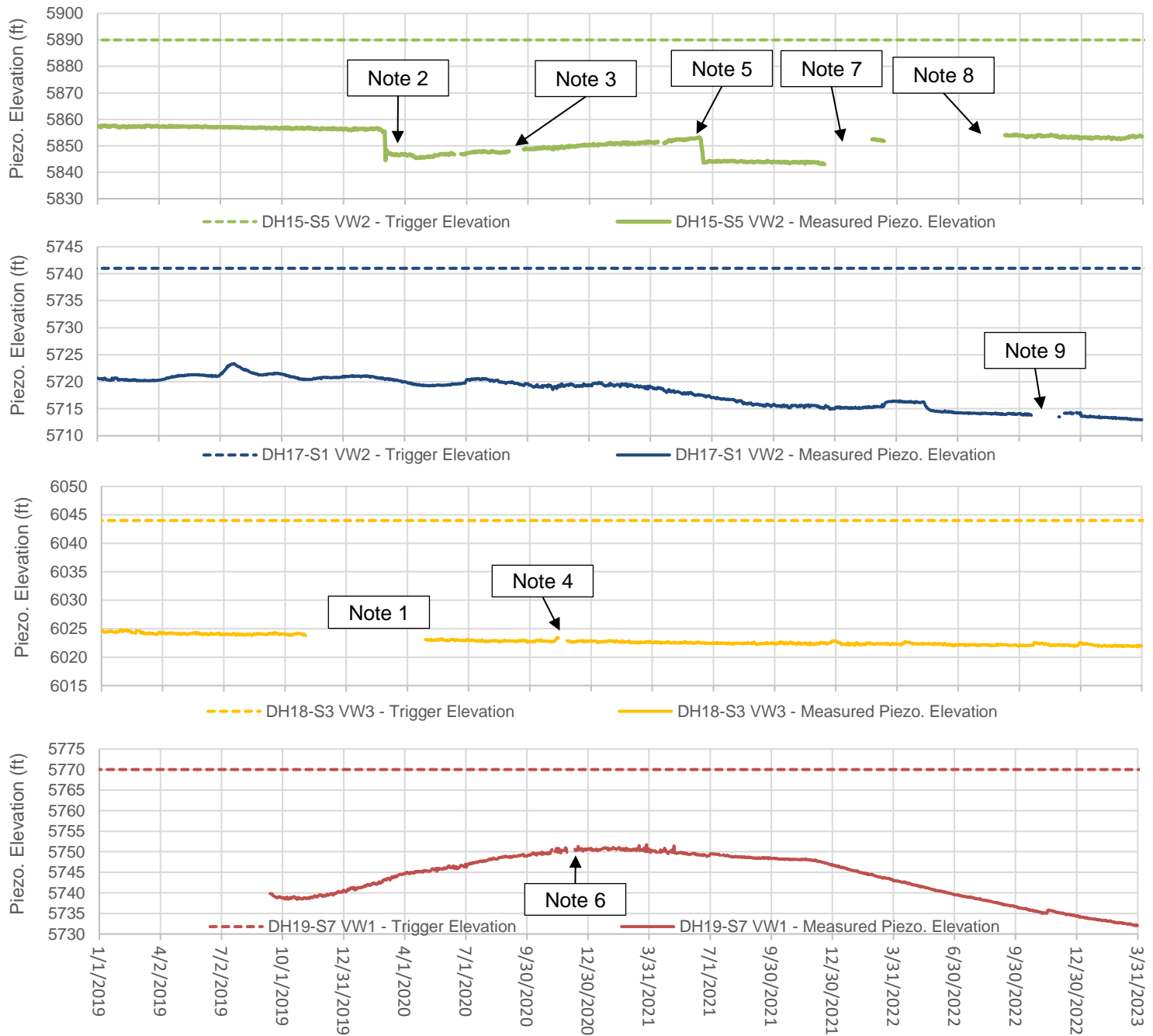
MONTANA RESOURCES, LLC  
YANKEE DOODLE TAILINGS IMPOUNDMENT

**SUMMARY OF MEASURED VS. QPP  
TRIGGER PIEZOMETRIC ELEVATIONS  
EAST-WEST EMBANKMENT**

P/A NO. VA101-126/29  
REF. NO. VA23-00701


**FIGURE 2**

REV 0

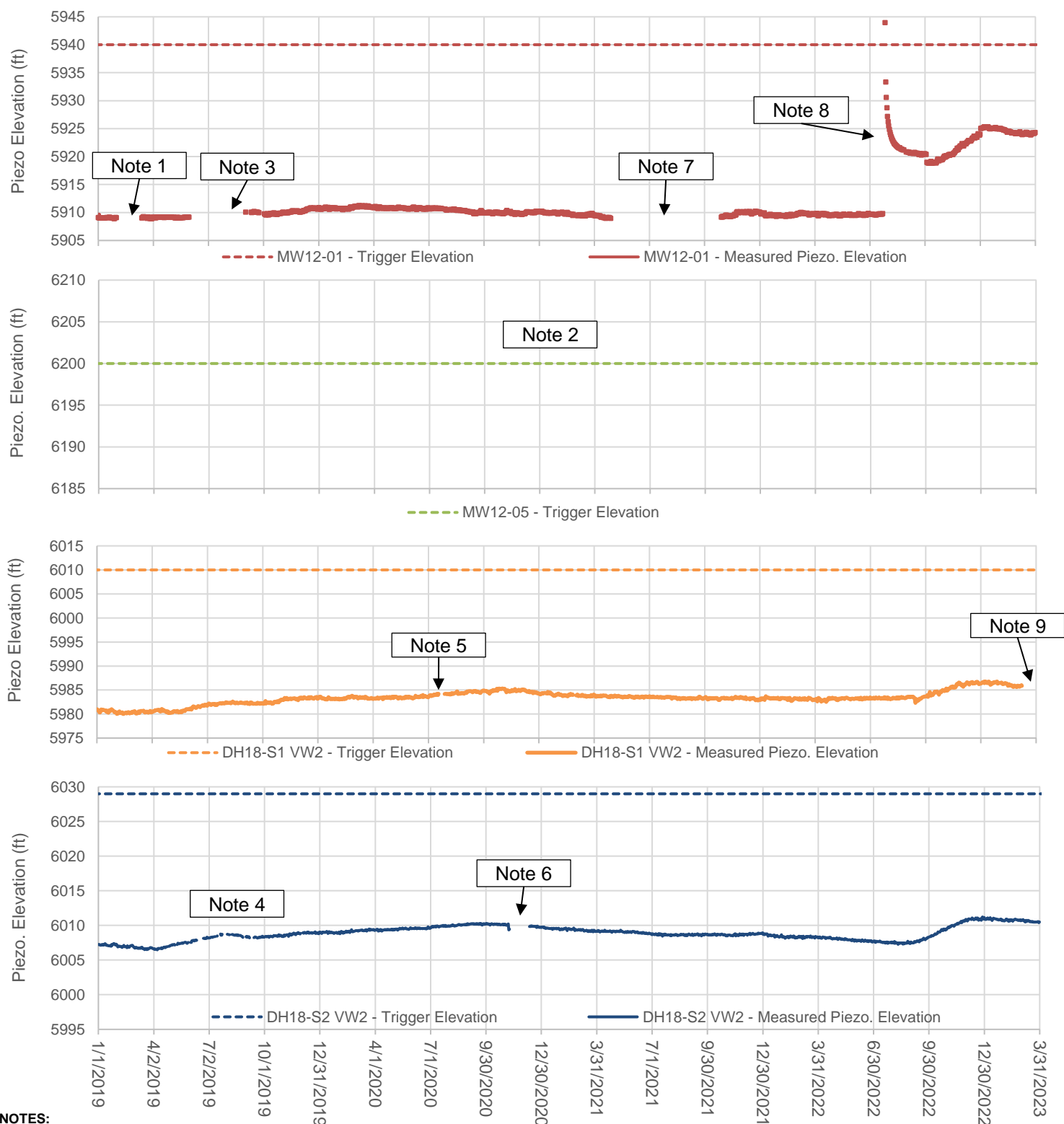


**NOTES:**

- NO DATA WERE COLLECTED BY DH18-S3 VW1 FROM NOVEMBER 1, 2019 TO FEBRUARY 3, 2020 AND FEBRUARY 4 TO APRIL 30, 2020 DUE TO SUSPECTED HARDWARE DAMAGE.
- NO DATA WERE COLLECTED BY DH15-S5 VW2 DUE TO LOGGER POWER SUPPLY ISSUES FROM JUNE 13 TO 23, 2020.
- NO DATA WERE COLLECTED BY DH15-S5 VW2 DUE TO WATER DAMAGED LOGGER FROM SEPTEMBER 2 TO 24, 2020. THE LOGGER WAS SUBSEQUENTLY REPLACED.
- NO DATA WERE COLLECTED BY DH18-S3 DUE TO A DEPLETED DATA LOGGER BATTERY FROM NOVEMBER 12 TO 25, 2020.
- NO DATA WERE COLLECTED BY DH15-S5 VW2 FROM APRIL 11 TO APRIL 20, 2021 DUE TO A DEPLETED DATA LOGGER BATTERY.
- NO DATA WERE COLLECTED BY DH19-S7 VW1 FROM NOVEMBER 30 TO DECEMBER 10, 2020 DUE TO AN UNKNOWN HARDWARE ISSUE.
- SENSORS IN DH15-S5 WERE TEMPORARILY DISCONNECTED BETWEEN DECEMBER 14, 2021 AND FEBRUARY 24, 2022 TO FACILITATE A COLLAR RAISE IN ADVANCE OF THE EL. 6,450 ft CREST CONSTRUCTION. SENSOR WAS TEMPORARILY RECONNECTED AND BECAME DISCONNECTED ON MARCH 12, 2022 DUE TO A SUSPECTED RMS CONNECTIVITY ISSUE. SENSOR BECAME RECONNECTED AND REMAINED OFFLINE UNTIL SEPTEMBER 8, 2022 TO FACILITATE THE PLANNED COLLAR RAISE.
- QPP SENSOR DH15-S5 VW1 WAS DAMAGED DURING EL. 6450 ft LIFT CONSTRUCTION AND HAS BEEN ABANDONED. KP HAVE ELECTED SENSOR DH15-S5 VW2 AS A REPLACEMENT QPP. THE DATA LOGGER AT DH17-S1 WAS DAMAGED AND NO DATA WERE RECORDED BETWEEN OCTOBER 18, 2022 AND DECEMBER 9, 2022. FUNCTIONALITY HAS SUBSEQUENTLY BEEN RESTORED.
- THE DATA LOGGER AT DH17-S1 WAS DAMAGED AND NO DATA WERE RECORDED BETWEEN OCTOBER 18, 2022 AND DECEMBER 9, 2022. FUNCTIONALITY HAS SUBSEQUENTLY BEEN RESTORED.

MONTANA RESOURCES, LLC			
YANKEE DOODLE TAILINGS IMPOUNDMENT			
SUMMARY OF MEASURED VS. QPP TRIGGER PIEZOMETRIC ELEVATIONS EAST-WEST EMBANKMENT			
	P/A NO. VA101-126/29		REF. NO. VA23-00701
	<b>FIGURE 3</b>		REV 0

0	11MAY'23	ISSUED WITH LETTER	CNN	KTD
REV	DATE	DESCRIPTION	PREP'D	RWV'D

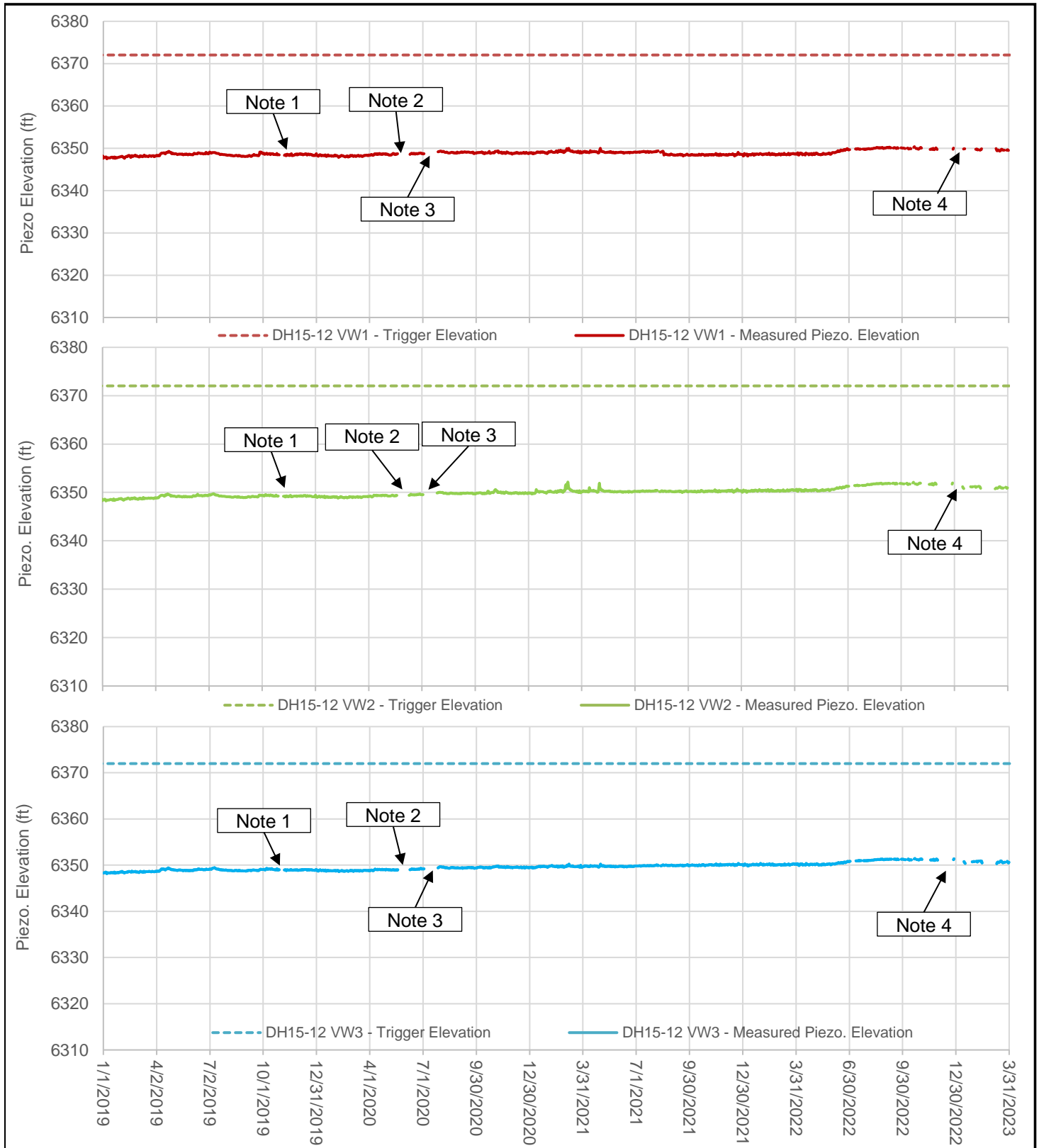


**NOTES:**

- MW12-01 BECAME UNSATURATED FROM FEBRUARY 1 TO MARCH 13, 2019.
- NO DATA WERE COLLECTED BY MW12-05. THE STANDPIPE WAS AND REMAINS UNSATURATED (DRY).
- NO DATA WERE COLLECTED BY MW12-01 FROM MAY 31 TO SEPTEMBER 11, 2019 DUE TO DATA LOGGER FAILURE.
- ERRONEOUS NOISE WAS RECORDED IN THE DATA BY DH18-S2 VW2. THESE DATA HAVE BEEN OMITTED FOR CLARITY.
- NO DATA WERE COLLECTED BY DH18-S1 VW2 FROM JULY 27 TO 29, 2020 DUE TO UNKNOWN SENSOR ISSUE.
- NO DATA WERE COLLECTED BY DH18-S2 VW2 FROM NOVEMBER 8 TO DECEMBER 12, 2020 WHILE THE SENSORS WERE REROUTED TO A NEW MONITORING HUB LOCATION.
- SENSOR MW12-01 VW1 WAS UNSATURATED BETWEEN APRIL 28 AND OCTOBER 28, 2021. DATA HAVE BEEN OMITTED FROM PLOT FOR CLARITY. THE SENSOR RESATURATED ON OCTOBER 18, 2021 AND REMAINED SATURATED THEREAFTER.
- THE MW12-01 STANDPIPE WAS INUNDATED BY THE RISING TAILINGS BEACH ON JULY 22, 2022 AND HAS SUBSEQUENTLY RECORDED HIGHER PIEZOMETRIC ELEVATIONS. RECENT READINGS MAY BE INFLUENCED BY LOCAL TAILINGS DISCHARGE.
- SENSOR DH18-S1 HAS BEEN TEMPORARILY DISCONNECTED SINCE MARCH 8, 2023 IN PREPARATION FOR MATERIAL PLACEMENT AT EL. 6,450 FT EMBANKMENT AND UPSTREAM ALLUVIUM FACING.


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MONTANA RESOURCES, LLC	
YANKEE DOODLE TAILINGS IMPOUNDMENT	
SUMMARY OF MEASURED VS. QPP TRIGGER PIEZOMETRIC ELEVATIONS NORTH-SOUTH EMBANKMENT	
	P/A NO. VA101-126/29
	REF. NO. VA23-00701
FIGURE 4	
REV 0	

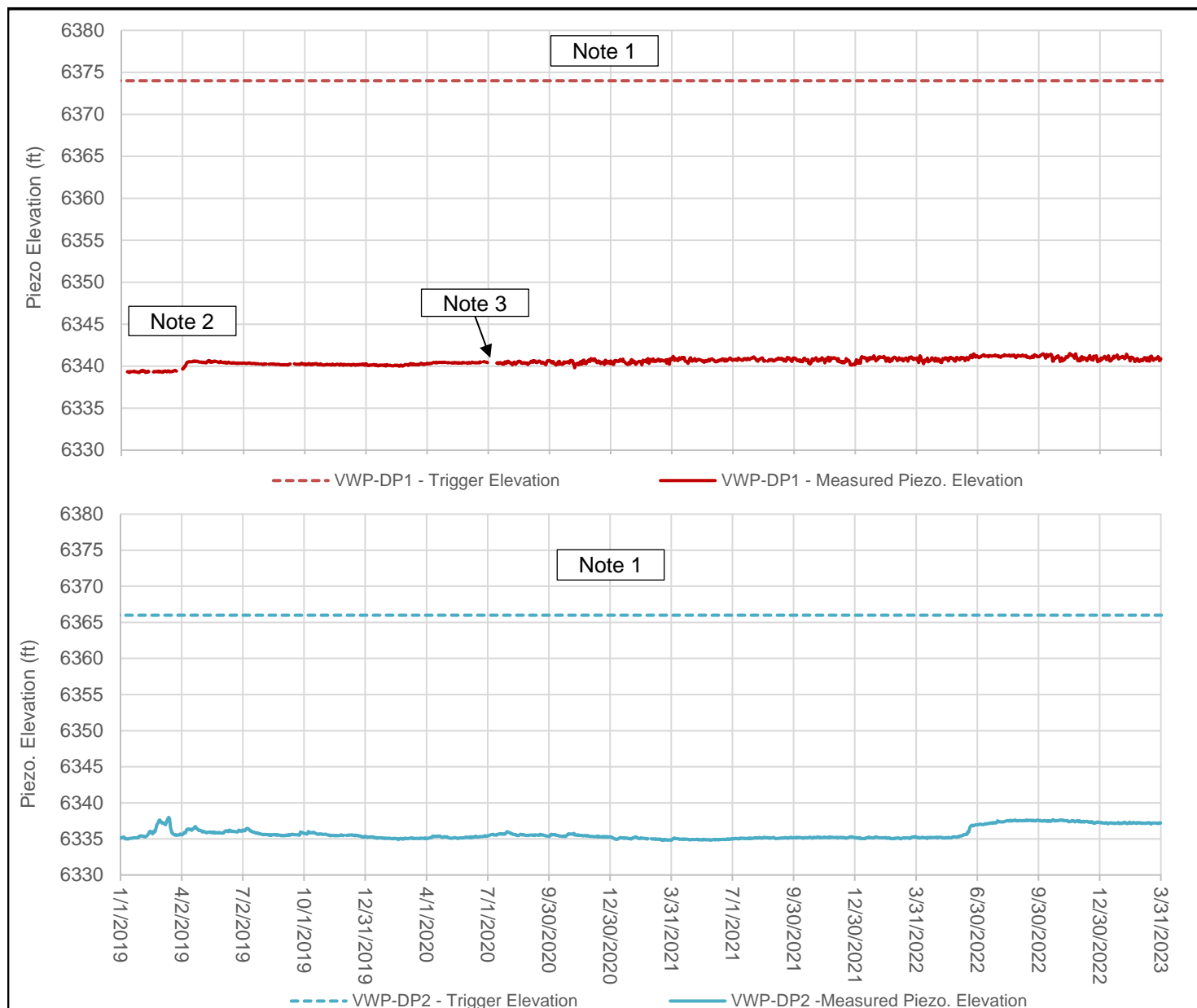


**NOTES:**

1. NO DATA WERE COLLECTED BY DH15-12 VW1, VW2, AND VW3 FROM OCTOBER 30, 2019 TO NOVEMBER 6, 2019 DUE TO A CONNECTIVITY ISSUE.
2. NO DATA WERE COLLECTED BY DH15-12 VW1, VW2, AND VW3 FROM MAY 19 TO JUNE 9, 2020 DUE TO A SUSPECTED LOGGER CONNECTIVITY ISSUE.
3. NO DATA WERE COLLECTED BY DH15-12 VW1, VW2, AND VW3 FROM JULY 3 TO JULY 26, 2020 DUE TO A CONNECTIVITY ISSUE.
4. ALL SENSORS IN DRILLHOLE DH15-12 EXPERIENCED INTERMITTENT DATA COLLECTION ISSUES BETWEEN NOVEMBER 2, 2022 AND MARCH 27, 2023.

MONTANA RESOURCES, LLC			
YANKEE DOODLE TAILINGS IMPOUNDMENT			
SUMMARY OF MEASURED VS. QPP TRIGGER PIEZOMETRIC ELEVATIONS WEST EMBANKMENT			
 <b>Knight Piésold</b> CONSULTING	P/A NO. VA101-126/29		REF. NO. VA23-00701
	<b>FIGURE 5</b>		REV 0

0	11MAY'23	ISSUED WITH LETTER	CNN	KTD
REV	DATE	DESCRIPTION	PREP'D	RVW'D



**NOTES:**

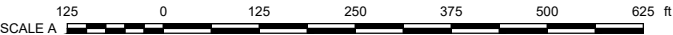
1. TRIGGER ELEVATIONS FOR SENSORS INSTALLED IN THE DRAIN PODS HAVE BEEN SPECIFIED AT THE ALLOWABLE HYDRAULIC GRADE LINE.
2. PERIODIC OUTAGES OCCURED AT VWP-DP1 DUE TO INTERMITTENT BATTERY VOLTAGE ISSUES.
3. NO DATA WERE RECORDED BY VWP-DP1 FROM JULY 1 TO 14, 2020 DUE TO A COMMUNICATION OUTAGE. A REPLACEMENT DATA LOGGER WAS SUBSEQUENTLY INSTALLED TO RESOLVE THE ISSUE.

MONTANA RESOURCES, LLC			
YANKEE DOODLE TAILINGS IMPOUNDMENT			
SUMMARY OF MEASURED VS. QPP TRIGGER PIEZOMETRIC ELEVATIONS WEST EMBANKMENT			
	P/A NO. VA101-126/29		REF. NO. VA23-00701
	<b>FIGURE 6</b>		REV 0

0	11MAY'23	ISSUED WITH LETTER	CNN	KTD
REV	DATE	DESCRIPTION	PREP'D	RW'W'D

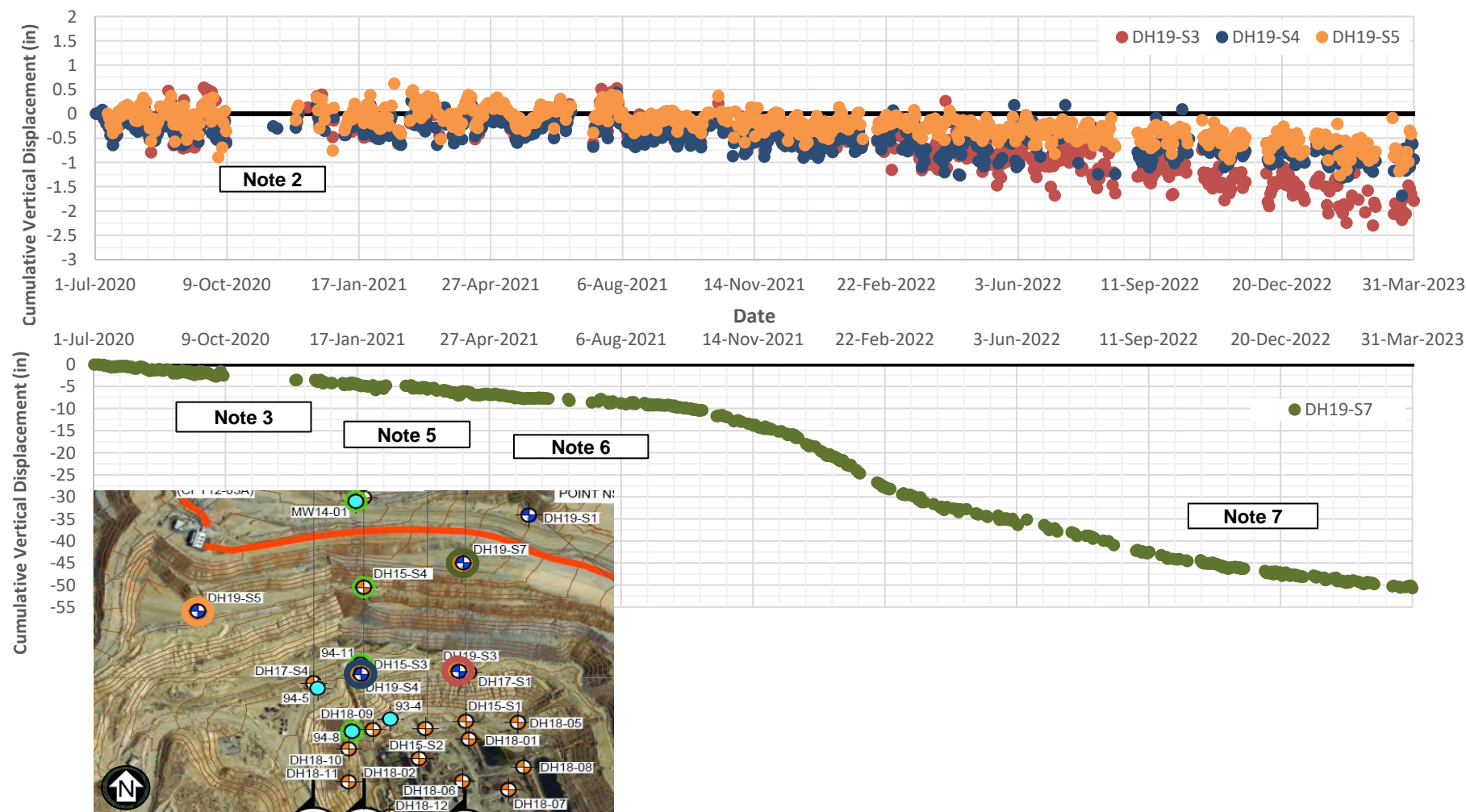


- LEGEND:**



P/A NO. VA101-126/29	REF NO. VA23-00701
<div style="display: flex; justify-content: space-between;"> <div> <p><b>FIGURE 7</b></p> </div> <div> <p>RE 0</p> </div> </div>	

0	02JUN'23	ISSUED WITH LETTER	SY3	RMM	KTD
REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED



#### NOTES:

1. CUMULATIVE VERTICAL DISPLACEMENTS ARE CALCULATED RELATIVE TO JULY 1, 2020.
2. NO DATA WERE COLLECTED FROM DH19-S2 AND DH19-S5 BETWEEN OCTOBER 7 TO DECEMBER 2, 2020 DUE TO A POWER MANAGEMENT SCHEDULE ISSUE AT THE GNSS REFERENCE STATION (DH16-04).
3. NO DATA WERE COLLECTED FROM DH19-S3 AND DH19-S7 BETWEEN OCTOBER 7 TO NOVEMBER 13, 2020 DUE TO A POWER MANAGEMENT SCHEDULE ISSUE AT THE GNSS REFERENCE STATION (DH16-04).
4. NEGATIVE VERTICAL DISPLACEMENTS INDICATE DOWNWARD DISPLACEMENT.
5. NO DATA WERE COLLECTED FROM FEBRUARY 9 TO 21, 2021 DUE TO A DEPLETED DATA LOGGER BATTERY.
6. NO DATA WERE COLLECTED FROM JUNE 12 TO JULY 15, 2021 DUE TO A TELEMETRY HARDWARE OUTAGE.
7. NO DATA WERE COLLECTED FROM AUGUST 16 TO SEPTEMBER 2, 2022, NOVEMBER 23 TO DECEMBER 10, 2022, AND MARCH 2 TO 16, 2023 DUE TO A HARDWARE ISSUE.

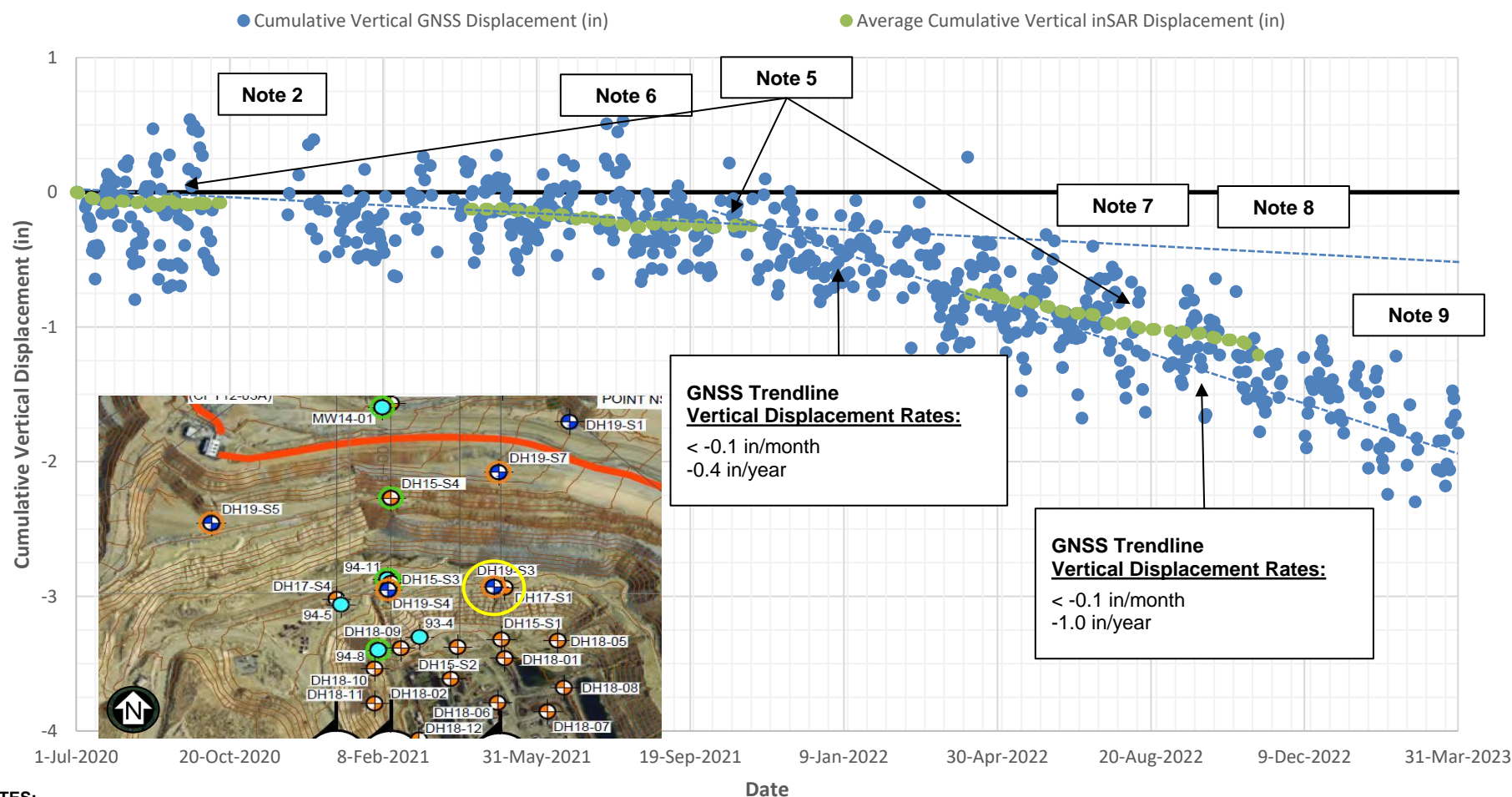
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REV	DATE	DESCRIPTION	PREP'D	RVW'D

MONTANA RESOURCES LLC.		
YANKEE DOODLE TAILINGS IMPOUNDMENT		
COMPARISON OF GNSS CUMULATIVE VERTICAL DISPLACEMENTS AND RATES (JULY 1, 2020 THROUGH MARCH 31, 2022)		
	P/A NO. VA101-00126/29	REF. NO. VA23-00701
	<b>FIGURE 8</b>	
		REV 0

## **APPENDIX A**

### **GNSS Deformation Plots**

(Figures A.1 to A.8)

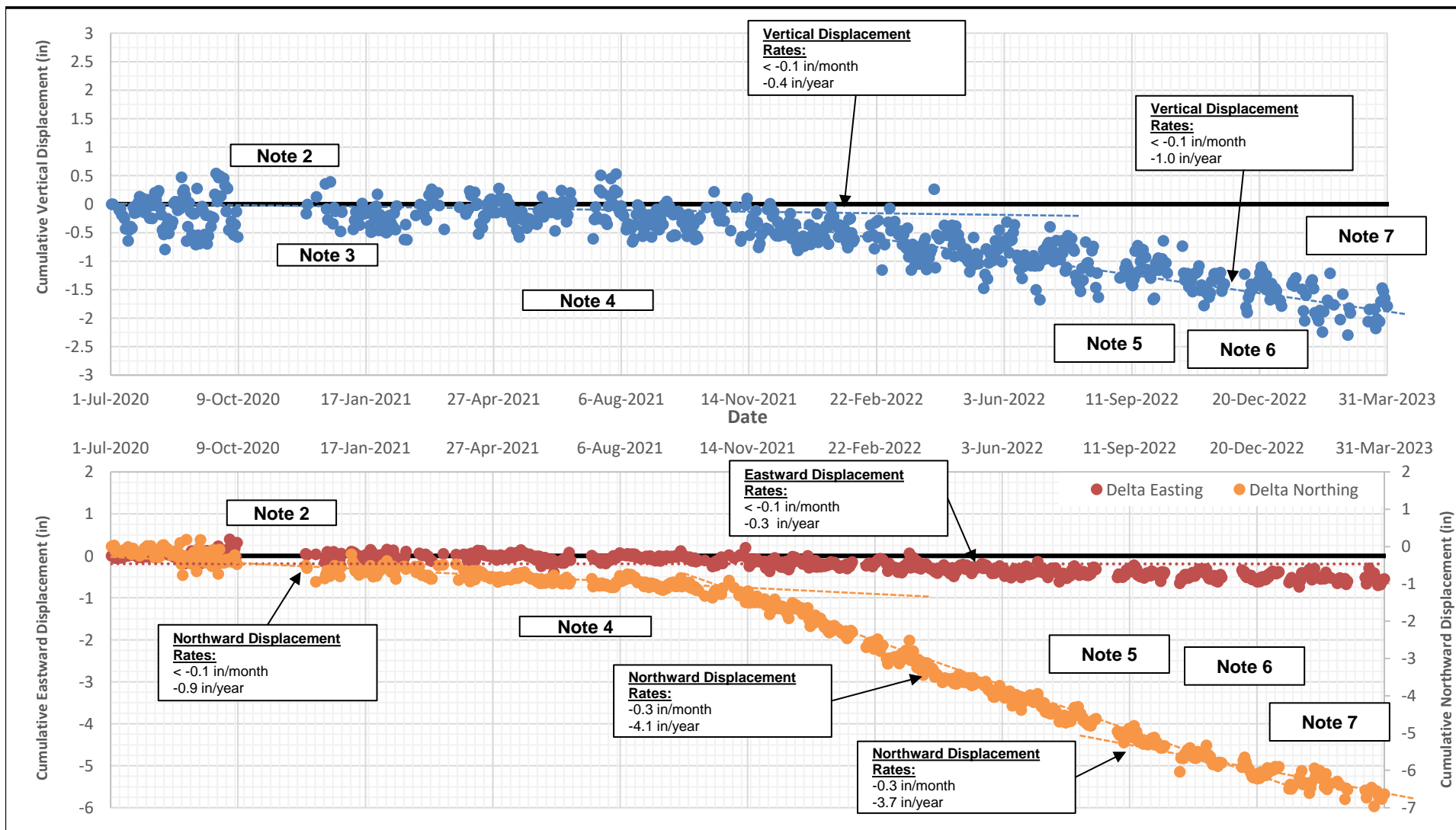


# NOTES:

1. CUMULATIVE VERTICAL DISPLACEMENTS ARE CALCULATED RELATIVE TO JULY 1, 2020.
2. NO DATA WERE COLLECTED FROM OCTOBER 7 TO DECEMBER 2, 2020 DUE TO A POWER MANAGEMENT SCHEDULE ISSUE AT THE GNSS REFERENCE STATION (DH16-04).
3. NEGATIVE VERTICAL DISPLACEMENTS INDICATE DOWNWARD DISPLACEMENT.
4. THE AVERAGE CUMULATIVE VERTICAL INSAR DISPLACEMENT IS CALCULATED BY AVERAGING TIME-SERIES DISPLACEMENTS FROM NINE INSAR DATA POINTS LOCATED ADJACENT TO DH19-S3.
5. NO LONG-TERM (SQUEESAR) INSAR DATA ARE AVAILABLE FROM OCTOBER 2, 2020 TO APRIL 13, 2021, NOVEMBER 3, 2021 TO APRIL 13, 2022, AND NOVEMBER 6 TO MARCH 31, 2023 DUE TO THE ONSET OF WINTER CONDITIONS.
6. NO DATA WERE COLLECTED FROM JUNE 12 TO JULY 15, 2021 DUE TO A TELEMETRY HARDWARE OUTAGE.
7. NO DATA WERE COLLECTED FROM AUGUST 17 TO SEPTEMBER 2, 2022 DUE TO A SATELLITE UPDATE REQUIRING THE SENSORS TO HARD RESET.
8. NO DATA WERE COLLECTED FROM NOVEMBER 24 TO DECEMBER 8, 2022 DUE A PROCESSING SERVER ISSUE.
9. NO DATA WERE COLLECTED FROM MARCH 3 TO MARCH 15, 2023 DUE TO A HARDWARE ISSUE.

0	01MAY23	ISSUED WITH LETTER	SY3	KTD
REV	DATE	DESCRIPTION	PREP'D	RVW'D

MONTANA RESOURCES LLC.			
YANKEE DOODLE TAILINGS IMPOUNDMENT			
CUMULATIVE VERTICAL DISPLACEMENTS MONITORED AT DH19-S3 (JULY 1, 2020 THROUGH MARCH 31, 2023)			
	P/A NO. VA101-00126/29		REF. NO. VA23-00701
	FIGURE A.1		REV 0



# NOTES:

1. CUMULATIVE VERTICAL AND LATERAL DISPLACEMENTS ARE CALCULATED RELATIVE TO JULY 1, 2020.
2. NO DATA WERE COLLECTED FROM OCTOBER 7 TO DECEMBER 2, 2020 DUE TO A POWER MANAGEMENT SCHEDULE ISSUE AT THE GNSS REFERENCE STATION (DH16-04).
3. NEGATIVE VERTICAL DISPLACEMENTS INDICATE DOWNWARD DISPLACEMENT.
4. NO DATA WERE COLLECTED FROM JUNE 12 TO JULY 15, 2021 DUE TO A TELEMETRY HARDWARE OUTAGE.
5. NO DATA WERE COLLECTED FROM AUGUST 17 TO SEPTEMBER 2, 2022 DUE TO A SATELLITE UPDATE REQUIRING THE SENSORS TO HARD RESET.
6. NO DATA WERE COLLECTED FROM NOVEMBER 24 TO DECEMBER 8, 2022 DUE A PROCESSING SERVER ISSUE.
7. NO DATA WERE COLLECTED FROM MARCH 3 TO MARCH 15, 2023 DUE TO A HARDWARE ISSUE.

0	01MAY23	ISSUED WITH LETTER	SY3	KTD
REV	DATE	DESCRIPTION	PREP'D	RVW'D

MONTANA RESOURCES LLC.

YANKEE DOODLE TAILINGS IMPOUNDMENT

**CUMULATIVE VERTICAL & LATERAL DISPLACEMENTS  
 MONITORED AT DH19-S3  
 (JULY 1, 2020 THROUGH MARCH 31, 2023)**

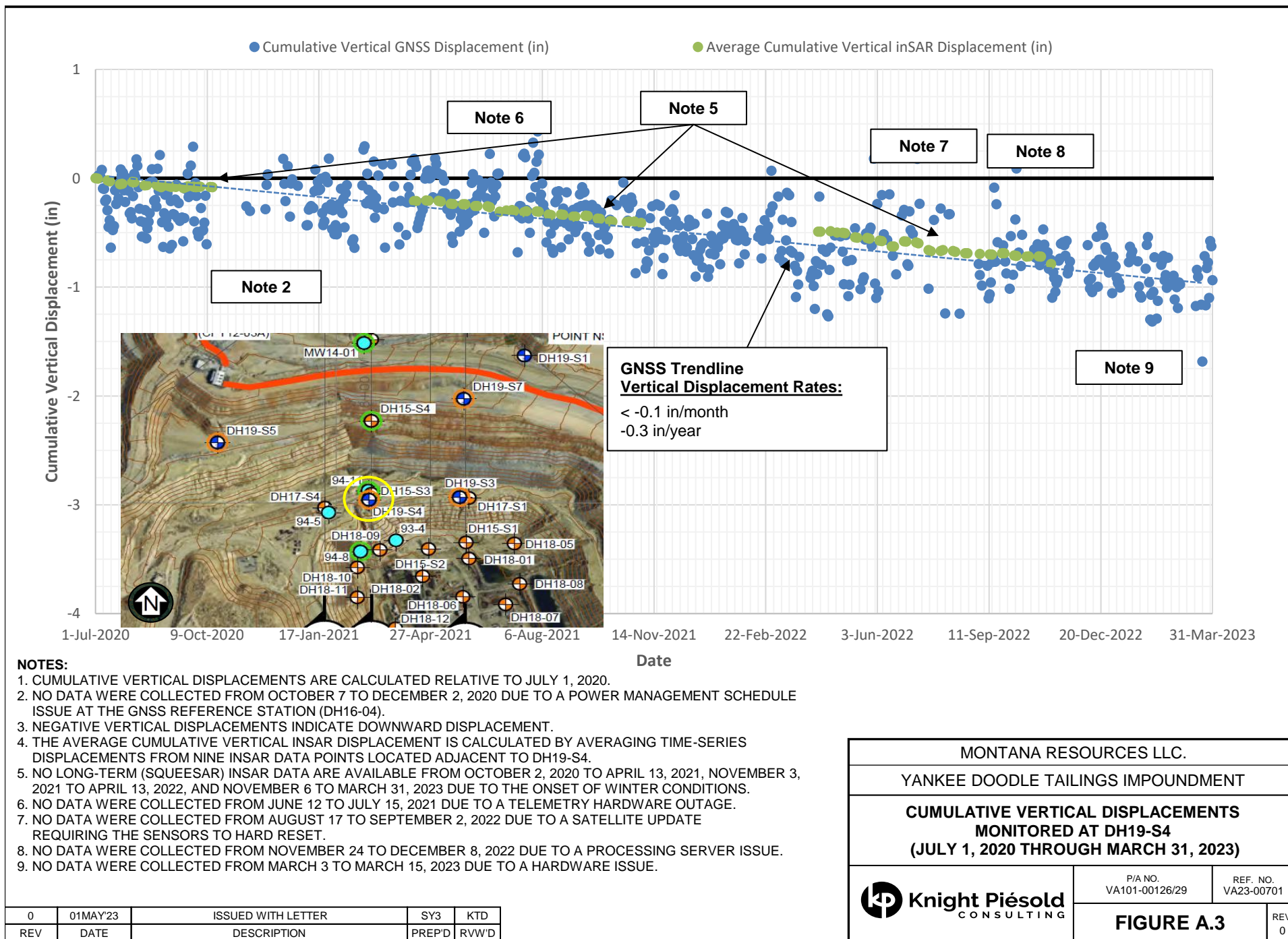
**Knight Piésold  
 CONSULTING**

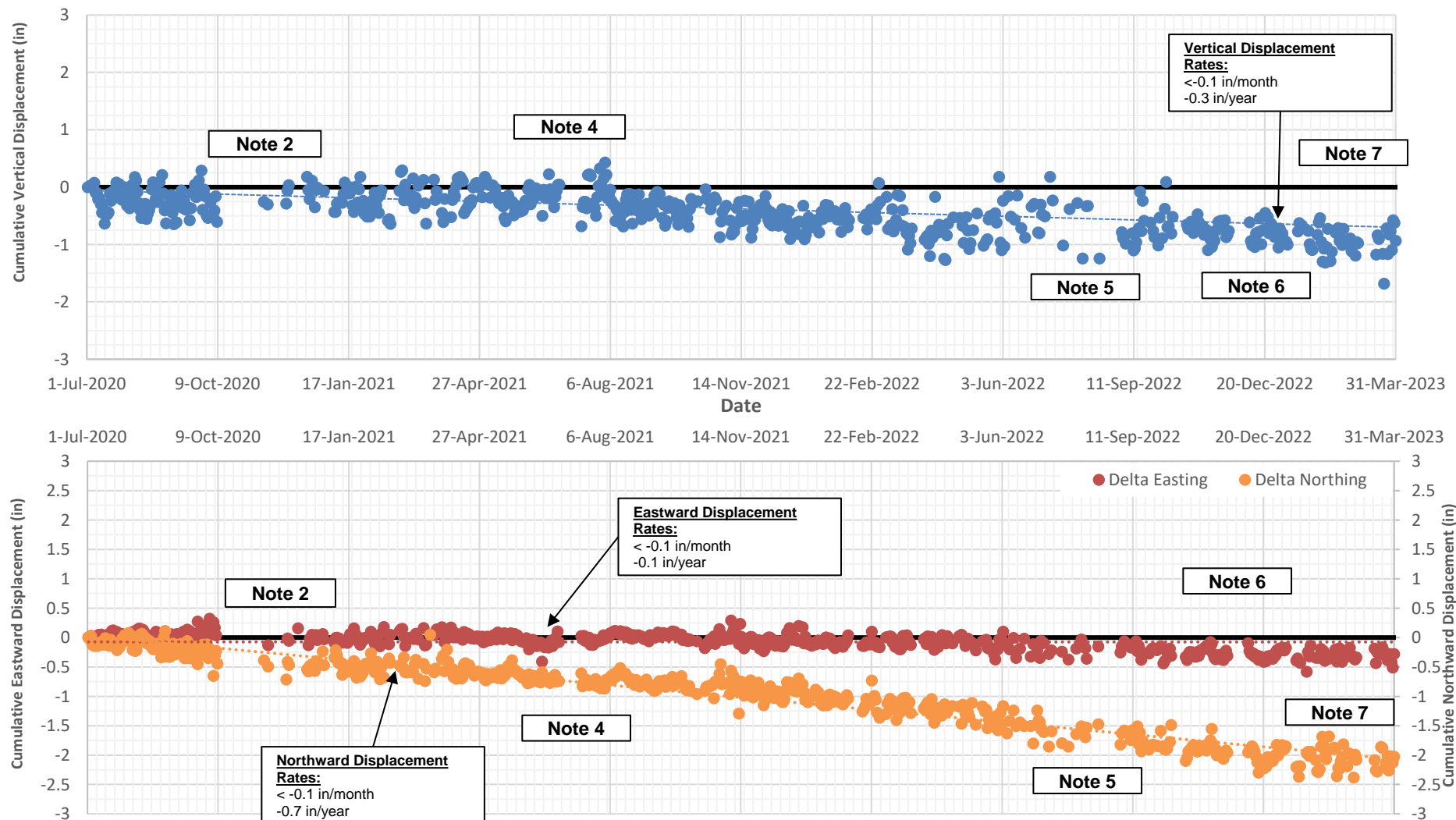
P/A NO.  
VA101-00126/29

REF. NO.  
VA23-00701

**FIGURE A.2**

REV  
0



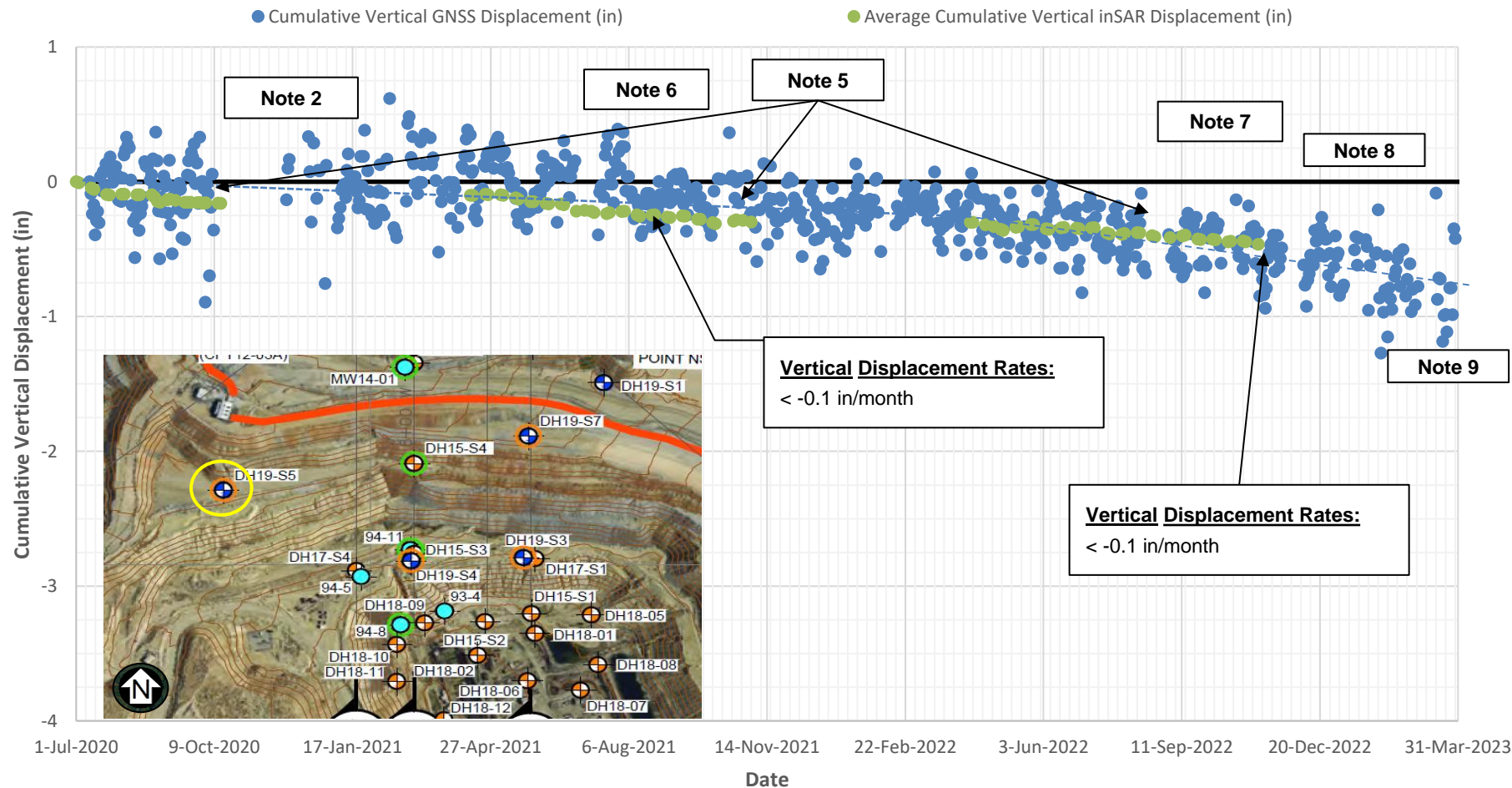


#### NOTES:

1. CUMULATIVE VERTICAL AND LATERAL DISPLACEMENTS ARE CALCULATED RELATIVE TO JULY 1, 2020.
2. NO DATA WERE COLLECTED FROM OCTOBER 7 TO DECEMBER 2, 2020 DUE TO A POWER MANAGEMENT SCHEDULE ISSUE AT THE GNSS REFERENCE STATION (DH16-04).
3. NEGATIVE VERTICAL DISPLACEMENTS INDICATE DOWNWARD DISPLACEMENT.
4. NO DATA WERE COLLECTED FROM JUNE 12 TO JULY 15, 2021 DUE TO A TELEMETRY HARDWARE OUTAGE.
5. NO DATA WERE COLLECTED FROM AUGUST 17 TO SEPTEMBER 2, 2022 DUE TO A SATELLITE UPDATE REQUIRING THE SENSORS TO HARD RESET.
6. NO DATA WERE COLLECTED FROM NOVEMBER 24 TO DECEMBER 8, 2022 DUE TO A PROCESSING SERVER ISSUE.
7. NO DATA WERE COLLECTED FROM MARCH 3 TO MARCH 15, 2023 DUE TO A HARDWARE ISSUE.

0	01MAY23	ISSUED WITH LETTER	SY3	KTD
REV	DATE	DESCRIPTION	PREP'D	RVW'D

MONTANA RESOURCES LLC.	
YANKEE DOODLE TAILINGS IMPOUNDMENT	
CUMULATIVE VERTICAL & LATERAL DISPLACEMENTS MONITORED AT DH19-S4 (JULY 1, 2020 THROUGH MARCH 31, 2023)	
	P/A NO. VA101-00126/29
	REF. NO. VA23-00701
FIGURE A.4	
REV 0	

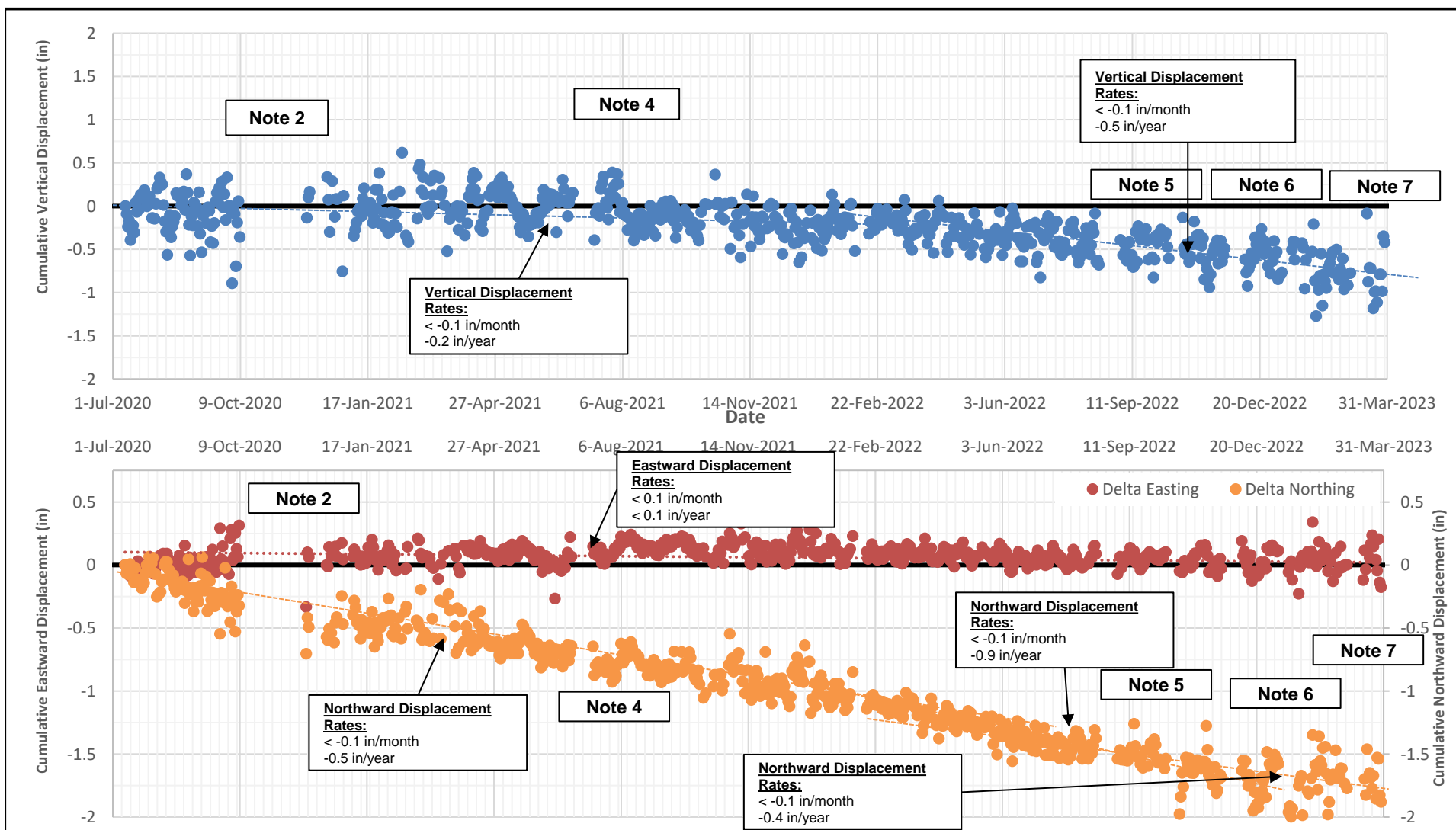


#### NOTES:

1. CUMULATIVE VERTICAL DISPLACEMENTS ARE CALCULATED RELATIVE TO JULY 1, 2020.
2. NO DATA WERE COLLECTED FROM OCTOBER 7 TO DECEMBER 2, 2020 DUE TO A POWER MANAGEMENT SCHEDULE ISSUE AT THE GNSS REFERENCE STATION (DH16-04).
3. NEGATIVE VERTICAL DISPLACEMENTS INDICATE DOWNWARD DISPLACEMENT.
4. THE AVERAGE CUMULATIVE VERTICAL INSAR DISPLACEMENT IS CALCULATED BY AVERAGING TIME-SERIES DISPLACEMENTS FROM NINE INSAR DATA POINTS LOCATED ADJACENT TO DH19-S5.
5. NO LONG-TERM (SQUEESAR) INSAR DATA ARE AVAILABLE FROM OCTOBER 2, 2020 TO APRIL 13, 2021, NOVEMBER 3, 2021 TO APRIL 13, 2022, AND NOVEMBER 6 TO MARCH 31, 2023 DUE TO THE ONSET OF WINTER CONDITIONS.
6. NO DATA WERE COLLECTED FROM JUNE 12 TO JULY 15, 2021 DUE TO A TELEMETRY HARDWARE OUTAGE.
7. NO DATA WERE COLLECTED FROM AUGUST 17 TO SEPTEMBER 2, 2022 DUE TO A SATELLITE UPDATE REQUIRING THE SENSORS TO HARD RESET.
8. NO DATA WERE COLLECTED FROM NOVEMBER 24 TO DECEMBER 8 DUE A PROCESSING SERVER ISSUE.
9. NO DATA WERE COLLECTED FROM MARCH 3 TO MARCH 15, 2023 DUE TO A HARDWARE ISSUE.

0	01MAY'23	ISSUED WITH LETTER	SY3	KTD
REV	DATE	DESCRIPTION	PREP'D	RVW'D


MONTANA RESOURCES LLC.			
YANKEE DOODLE TAILINGS IMPOUNDMENT			
CUMULATIVE VERTICAL DISPLACEMENTS MONITORED AT DH19-S5 (JULY 1, 2020 THROUGH MARCH 31, 2023)			
	P/A NO. VA101-00126/29		REF. NO. VA23-00701
	FIGURE A.5		REV 0

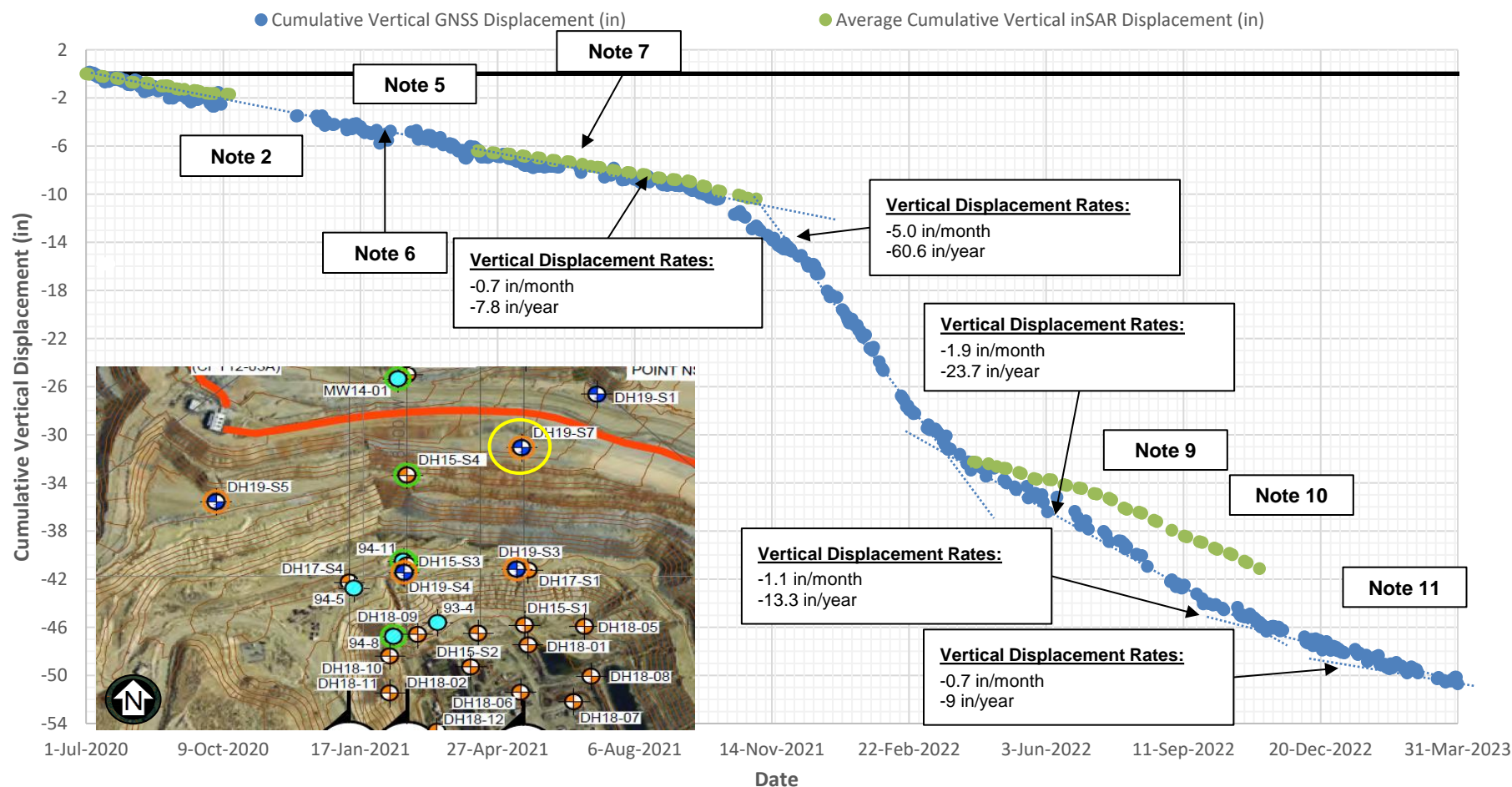


# NOTES:

1. CUMULATIVE VERTICAL AND LATERAL DISPLACEMENTS ARE CALCULATED RELATIVE TO JULY 1, 2020.
2. NO DATA WERE COLLECTED FROM OCTOBER 7 TO DECEMBER 2, 2020 DUE TO A POWER MANAGEMENT SCHEDULE ISSUE AT THE GNSS REFERENCE STATION (DH16-04).
3. NEGATIVE VERTICAL DISPLACEMENTS INDICATE DOWNWARD DISPLACEMENT.
4. NO DATA WERE COLLECTED FROM JUNE 12 TO JULY 15, 2021 DUE TO A TELEMETRY HARDWARE OUTAGE.
5. NO DATA WERE COLLECTED FROM AUGUST 17 TO SEPTEMBER 2, 2022 DUE TO A SATELLITE UPDATE REQUIRING THE SENSORS TO HARD RESET.
6. NO DATA WERE COLLECTED FROM NOVEMBER 24 TO DECEMBER 8, 2022 DUE TO A PROCESSING SERVE ISSUE.
7. NO DATA WERE COLLECTED FROM MARCH 3 TO MARCH 15, 2023 DUE TO A HARDWARE ISSUE.

0	01MAY23	ISSUED WITH LETTER	SY3	KTD
REV	DATE	DESCRIPTION	PREP'D	RVW'D

MONTANA RESOURCES LLC.			
YANKEE DOODLE TAILINGS IMPOUNDMENT			
CUMULATIVE VERTICAL & LATERAL DISPLACEMENTS MONITORED AT DH19-S5 (JULY 1, 2020 THROUGH MARCH 31, 2023)			
 <b>Knight Piésold</b> CONSULTING	P/A NO. VA101-00126/29		REF. NO. VA23-00701
	FIGURE A.6		REV. 0

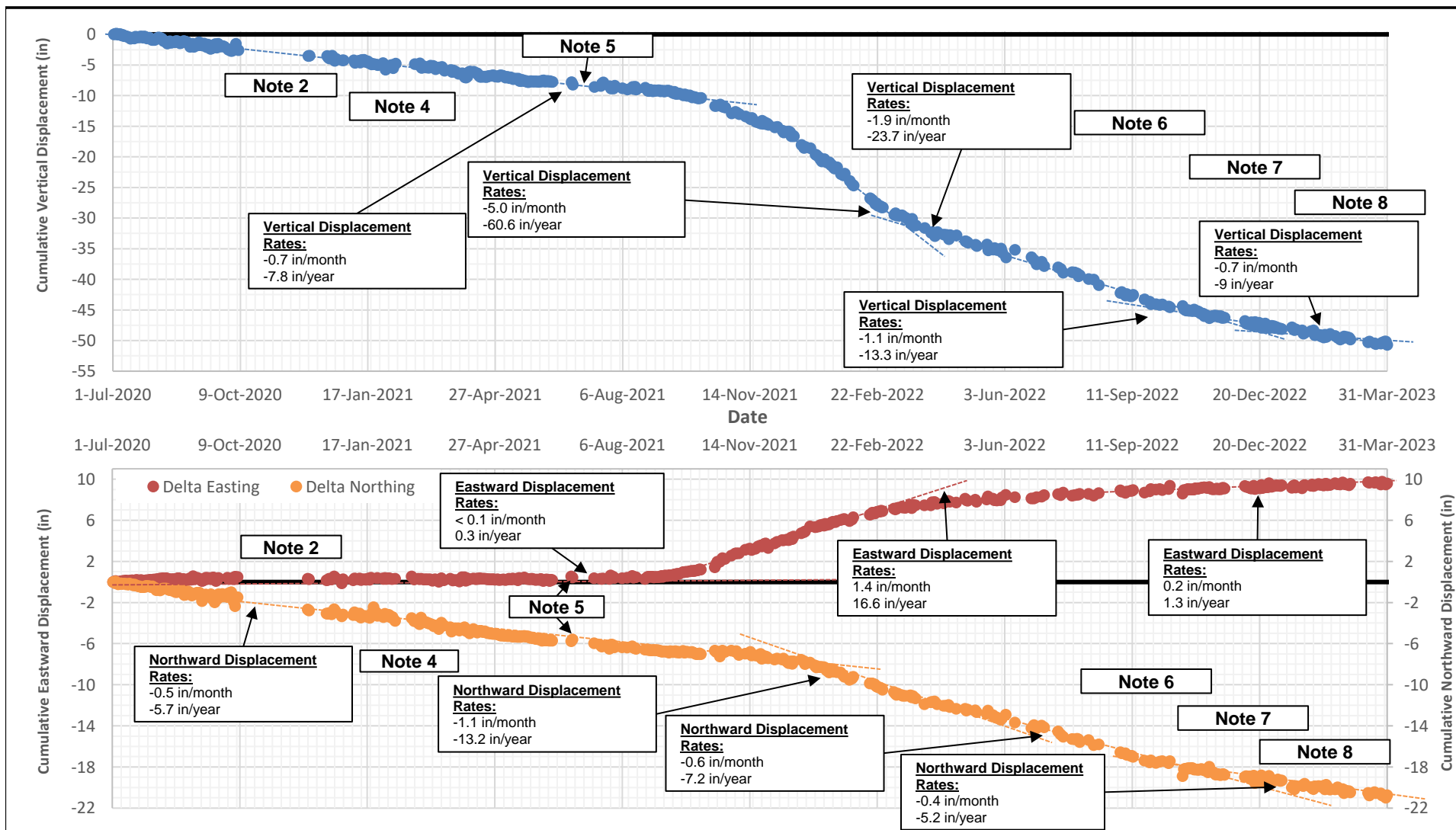


**NOTES:**

1. CUMULATIVE VERTICAL DISPLACEMENTS ARE CALCULATED RELATIVE TO JULY 1, 2020.
2. NO DATA WERE COLLECTED FROM OCTOBER 7 TO DECEMBER 2, 2020 DUE TO A POWER MANAGEMENT SCHEDULE ISSUE AT THE GNSS REFERENCE STATION (DH16-04).
3. NEGATIVE VERTICAL DISPLACEMENTS INDICATE DOWNWARD DISPLACEMENT.
4. THE AVERAGE CUMULATIVE VERTICAL INSAR DISPLACEMENT IS CALCULATED BY AVERAGING TIME-SERIES DISPLACEMENTS FROM NINE INSAR DATA POINTS LOCATED ADJACENT TO DH19-S7.
5. NO LONG-TERM (SQUEESAR) INSAR DATA ARE AVAILABLE FROM OCTOBER 2, 2020 TO APRIL 13, 2021, NOVEMBER 3, 2021 TO APRIL 13, 2022, AND NOVEMBER 6 TO MARCH 31, 2023 DUE TO THE ONSET OF WINTER CONDITIONS.
6. NO DATA WERE COLLECTED FROM FEBRUARY 9 TO 21, 2021 DUE TO A DEPLETED DATA LOGGER BATTERY.
7. NO DATA WERE COLLECTED FROM JUNE 12 TO JULY 15, 2021 DUE TO A TELEMETRY HARDWARE OUTAGE.
8. THE -1 STD. DEV. SERIES IS THE AVERAGE INSAR DEFORMATION RATE MINUS THE STANDARD DEVIATION OF DATA POINTS LOCAL TO THE INSTRUMENTATION SITE.
9. NO DATA WERE COLLECTED FROM AUGUST 17 TO SEPTEMBER 2, 2022 DUE TO A SATELLITE UPDATE REQUIRING THE SENSORS TO HARD RESET.
10. NO DATA WERE COLLECTED FROM NOVEMBER 24 TO DECEMBER 8, 2022 DUE TO A PROCESSING SERVER ISSUE.
11. NO DATA WERE COLLECTED FROM MARCH 3 TO MARCH 15, 2023 DUE TO A HARDWARE ISSUE.

0	01MAY23	ISSUED WITH LETTER	SY3	KTD
REV	DATE	DESCRIPTION	PREP'D	RVW'D


MONTANA RESOURCES LLC.			
YANKEE DOODLE TAILINGS IMPOUNDMENT			
CUMULATIVE VERTICAL DISPLACEMENTS MONITORED AT DH19-S7 (JULY 1, 2020 THROUGH MARCH 31, 2023)			
	P/A NO. VA101-00126/29		REF. NO. VA23-00701
	FIGURE A.7		REV 0



# NOTES:

1. CUMULATIVE VERTICAL AND LATERAL DISPLACEMENTS ARE CALCULATED RELATIVE TO JULY 1, 2020.
2. NO DATA WERE COLLECTED FROM OCTOBER 7 TO DECEMBER 2, 2020 DUE TO A POWER MANAGEMENT SCHEDULE ISSUE AT THE GNSS REFERENCE STATION (DH16-04).
3. NEGATIVE VERTICAL DISPLACEMENTS INDICATE DOWNWARD DISPLACEMENT.
4. NO DATA WERE COLLECTED FROM FEBRUARY 9 TO 21, 2021 DUE TO A DEPLETED DATA LOGGER BATTERY.
5. NO DATA WERE COLLECTED FROM JUNE 12 TO JULY 15, 2021 DUE TO A TELEMETRY HARDWARE OUTAGE.
6. NO DATA WERE COLLECTED FROM AUGUST 17 TO SEPTEMBER 2, 2022 DUE TO A SATELLITE UPDATE REQUIRING THE SENSORS TO HARD RESET.
7. NO DATA WERE COLLECTED FROM NOVEMBER 24 TO DECEMBER 8, 2022 DUE TO A PROCESSING SERVER ISSUE.
8. NO DATA WERE COLLECTED FROM MARCH 3 TO MARCH 15, 2023 DUE TO A HARDWARE ISSUE.

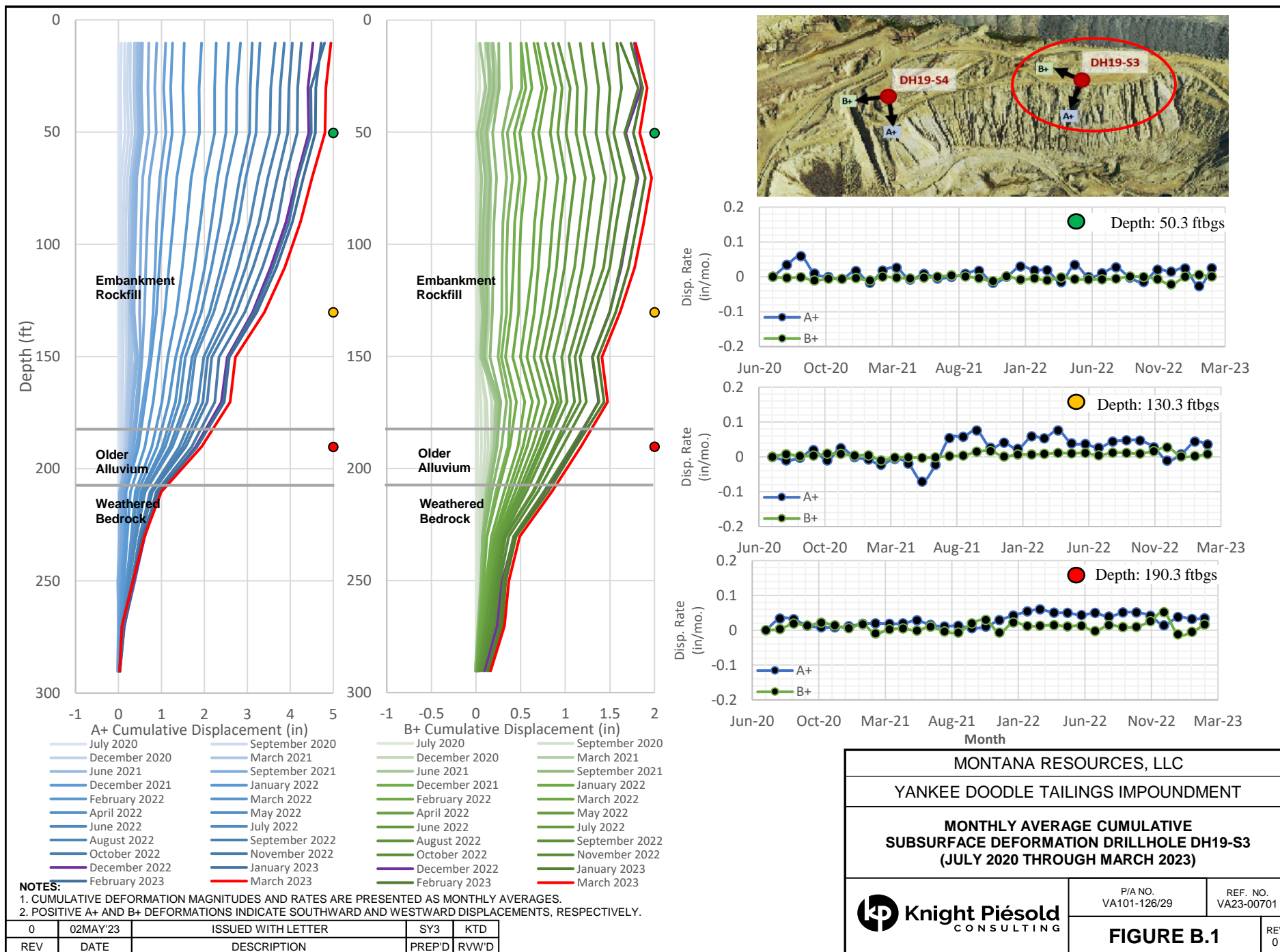
0	01MAY23	ISSUED WITH LETTER	SY3	KTD
REV	DATE	DESCRIPTION	PREP'D	RVW'D

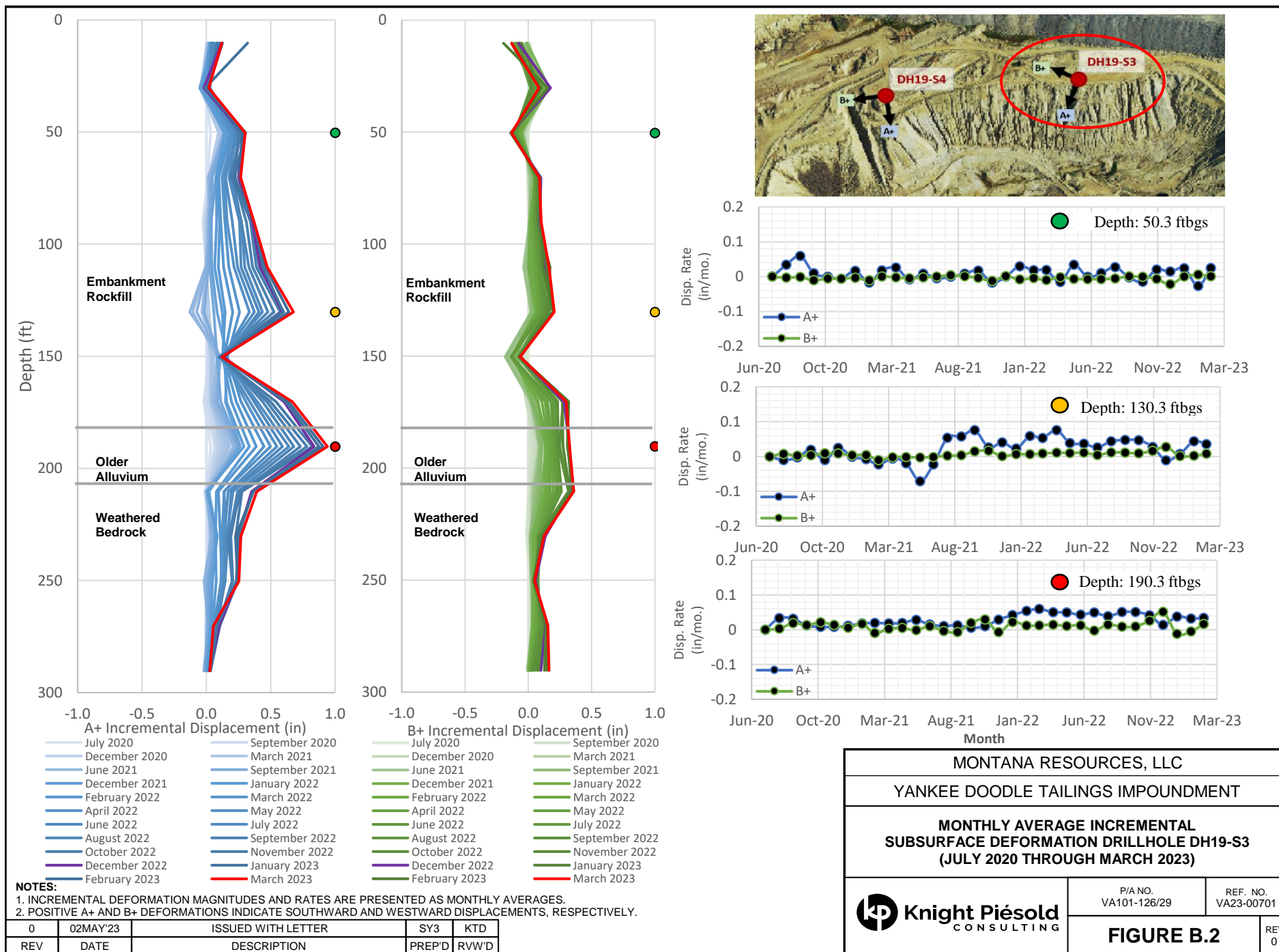
MONTANA RESOURCES LLC.			
YANKEE DOODLE TAILINGS IMPOUNDMENT			
CUMULATIVE VERTICAL & LATERAL DISPLACEMENTS MONITORED AT DH19-S7 (JULY 1, 2020 MARCH 31, 2023)			
 <b>Knight Piésold</b> CONSULTING	P/A NO. VA101-00126/29		REF. NO. VA23-00701
	FIGURE A.8		REV 0

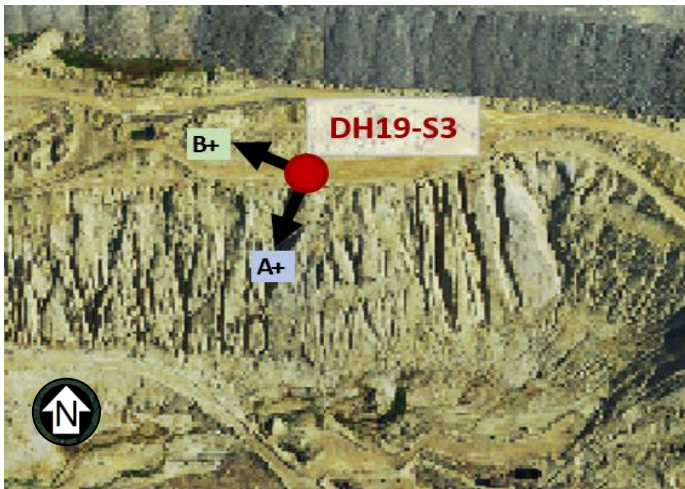
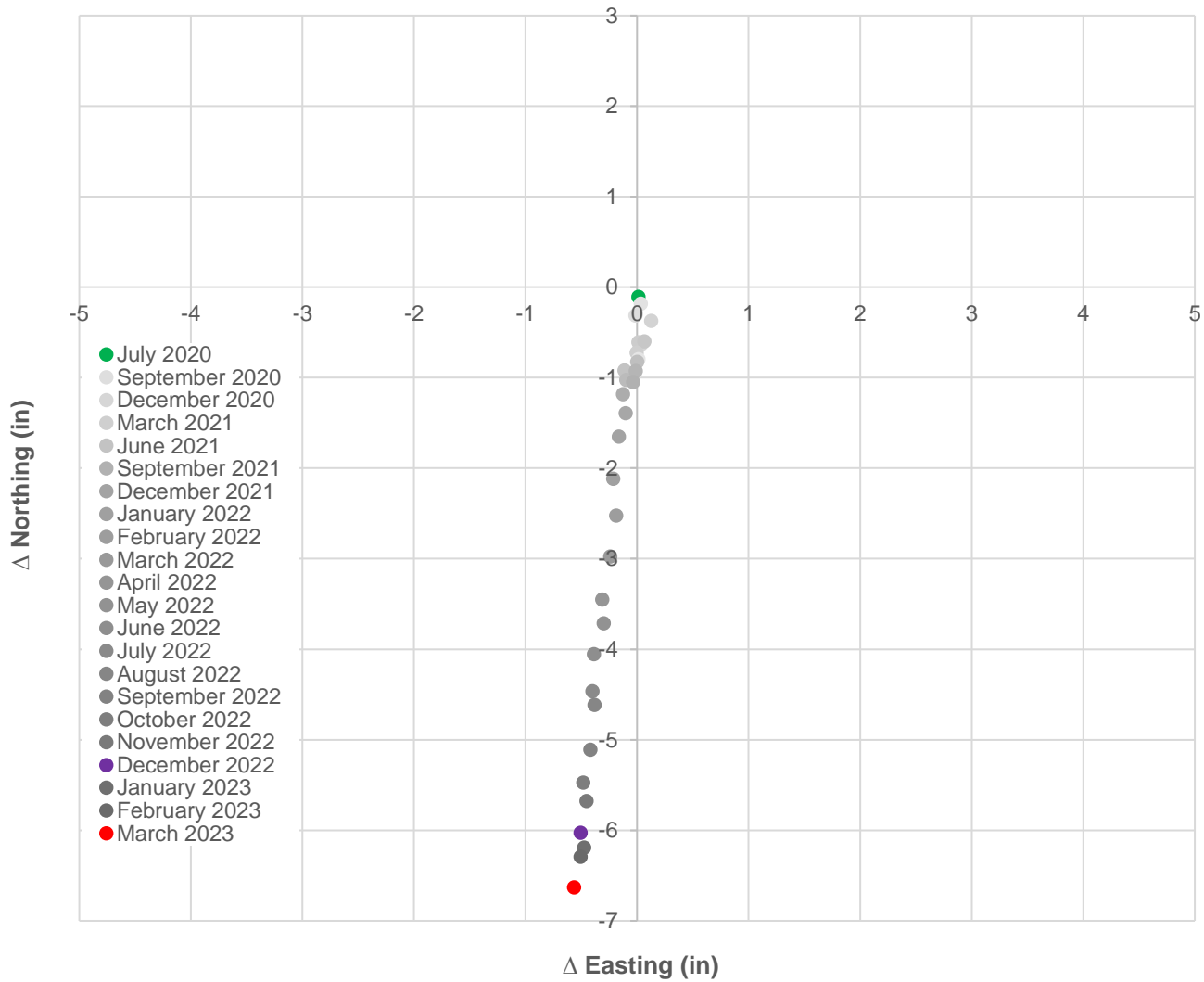
## **APPENDIX B**

### **Inclinometer Deformation Plots**

(Figures B.1 to B.10)







#### NOTES:

1. COLLAR WANDER IS MONITORED USING GNSS INSTRUMENTATION INSTALLED AT THE INCLINOMETER COLLAR LOCATION.
2. THE PLOT ABOVE PRESENTS COLLAR POSITION BASED ON NORTH AND EAST CHANGE RELATIVE TO A JULY 1, 2020 BASELINE GNSS SURVEY.
3. NO DATA ARE AVAILABLE FOR NOVEMBER, 2020 WHILE THE INSTRUMENTATION WAS OFFLINE DUE TO A POWER MANAGEMENT ISSUE.

MONTANA RESOURCES, LLC

YANKEE DOODLE TAILINGS IMPOUNDMENT

**DH19-S3 GNSS-BASED INCLINOMETER  
COLLAR WANDER  
(JULY 1, 2021 THROUGH MARCH 31, 2023)**



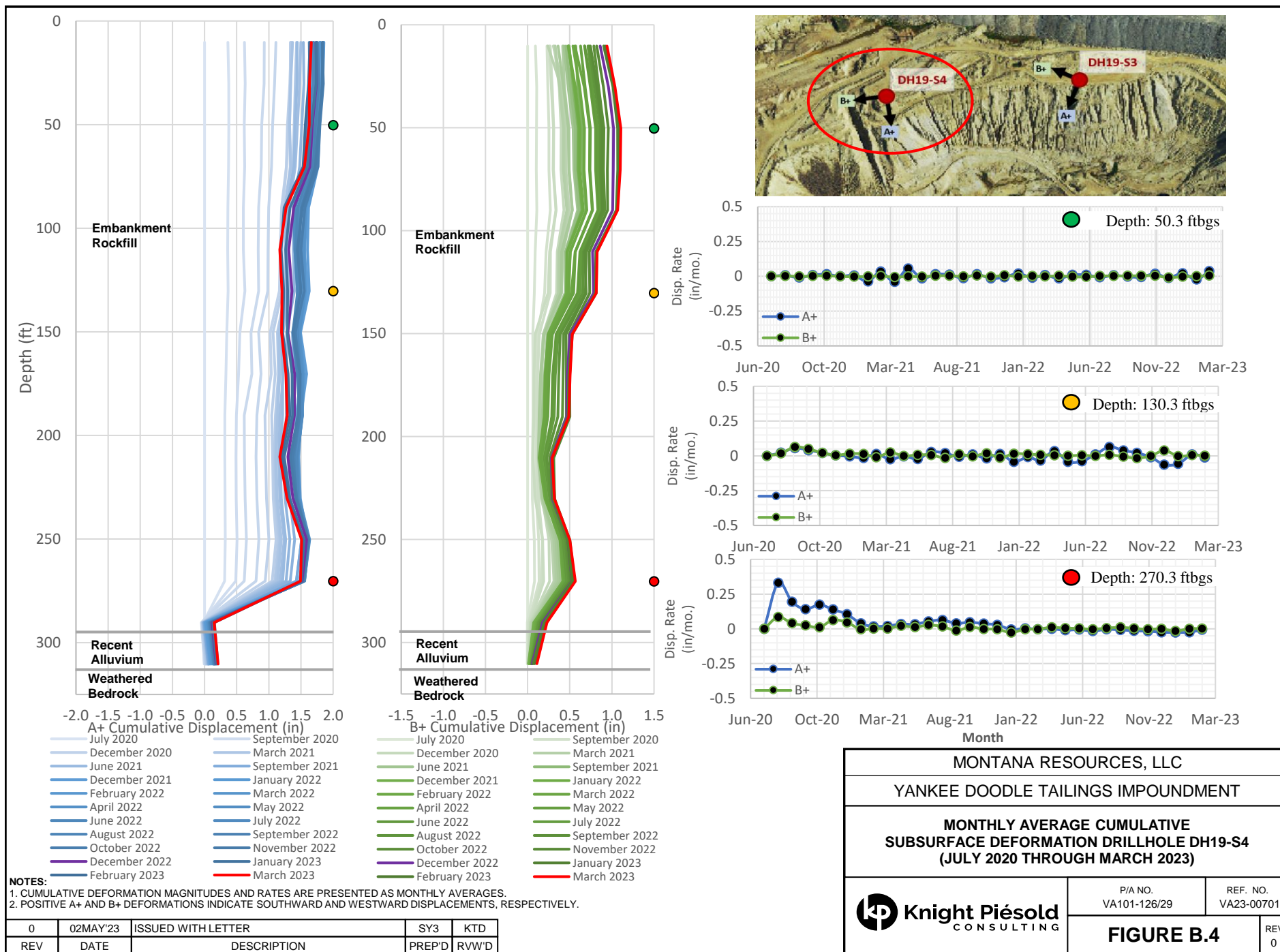
P/A NO.  
VA101-126/29

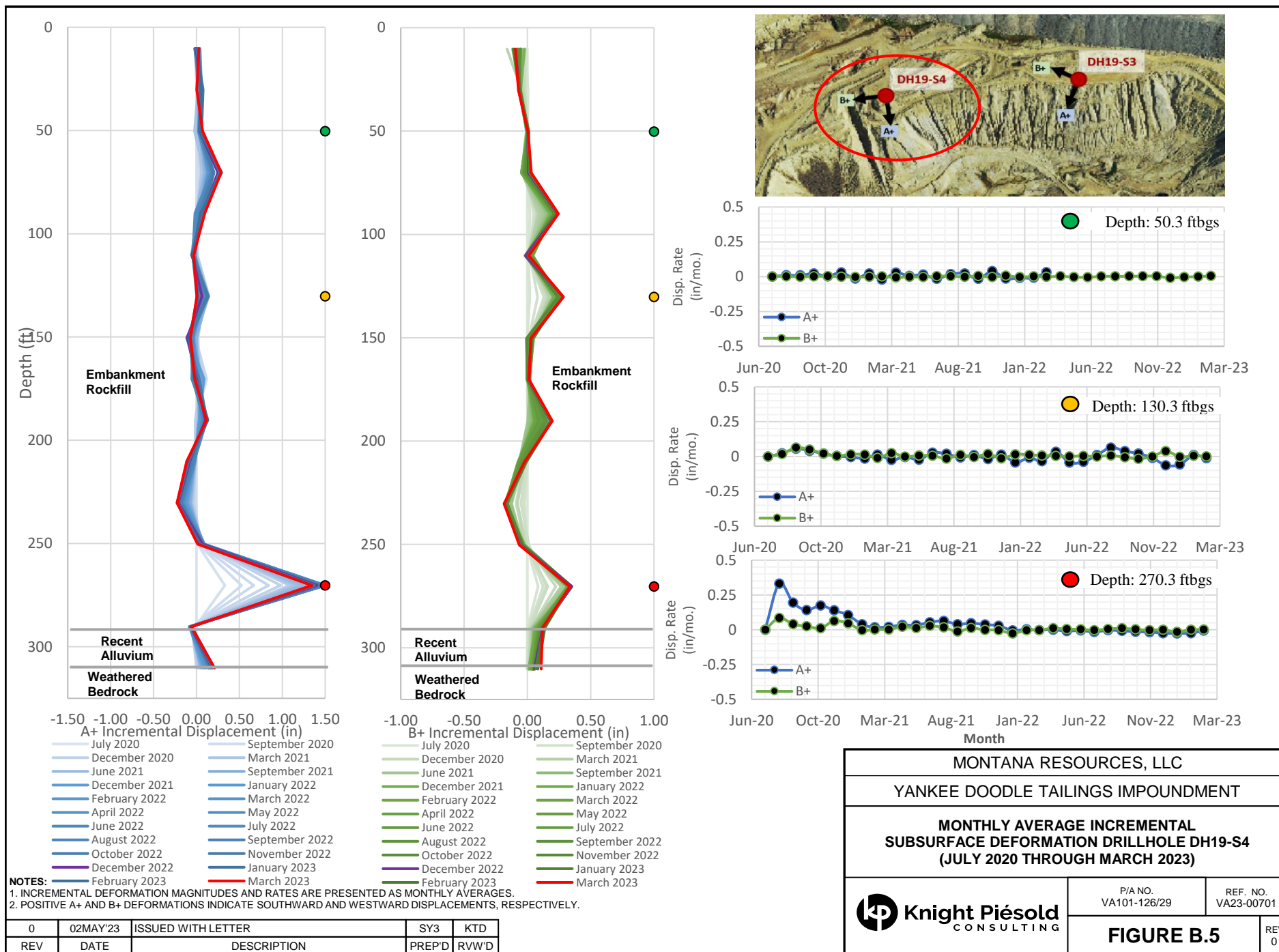
REF. NO.  
VA23-00701

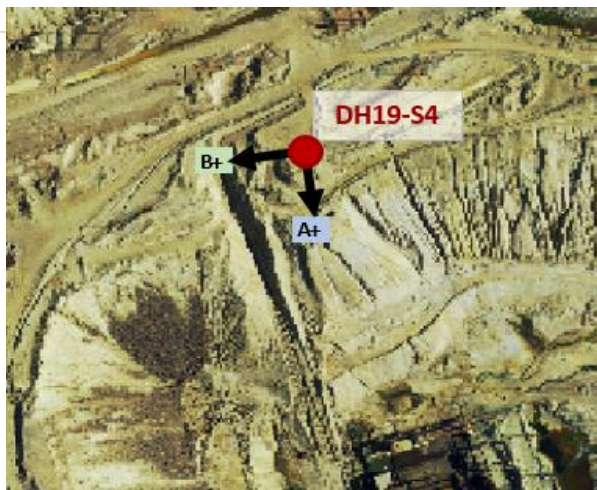
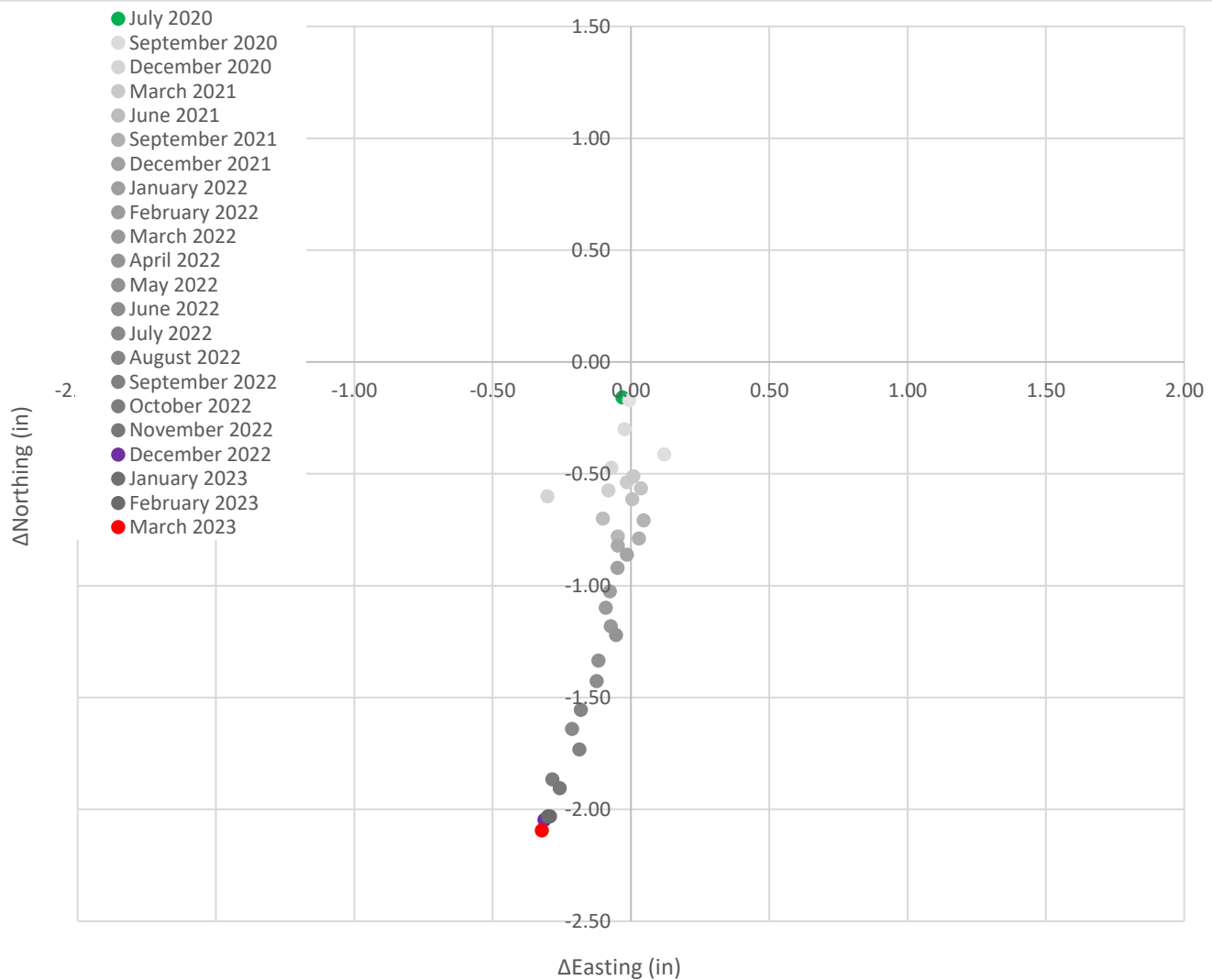
**FIGURE B.3**

REV  
0

0	02MAY'23	ISSUED WITH LETTER	SY3	KTD
REV	DATE	DESCRIPTION	PREP'D	RVW'D





**NOTES:**

1. COLLAR WANDER IS MONITORED USING GNSS INSTRUMENTATION INSTALLED AT THE INCLINOMETER COLLAR LOCATION.
2. THE PLOT ABOVE PRESENTS COLLAR POSITION BASED ON NORTH AND EAST CHANGE RELATIVE TO A JULY 1, 2020 BASELINE GNSS SURVEY.
3. NO DATA ARE AVAILABLE FOR NOVEMBER, 2020 WHILE THE INSTRUMENTATION WAS OFFLINE DUE TO A POWER MANAGEMENT ISSUE.

MONTANA RESOURCES, LLC

YANKEE DOODLE TAILINGS IMPOUNDMENT

**DH19-S4 GNSS-BASED INCLINOMETER  
COLLAR WANDER  
(JULY 1, 2020 THROUGH MARCH 31, 2023)**



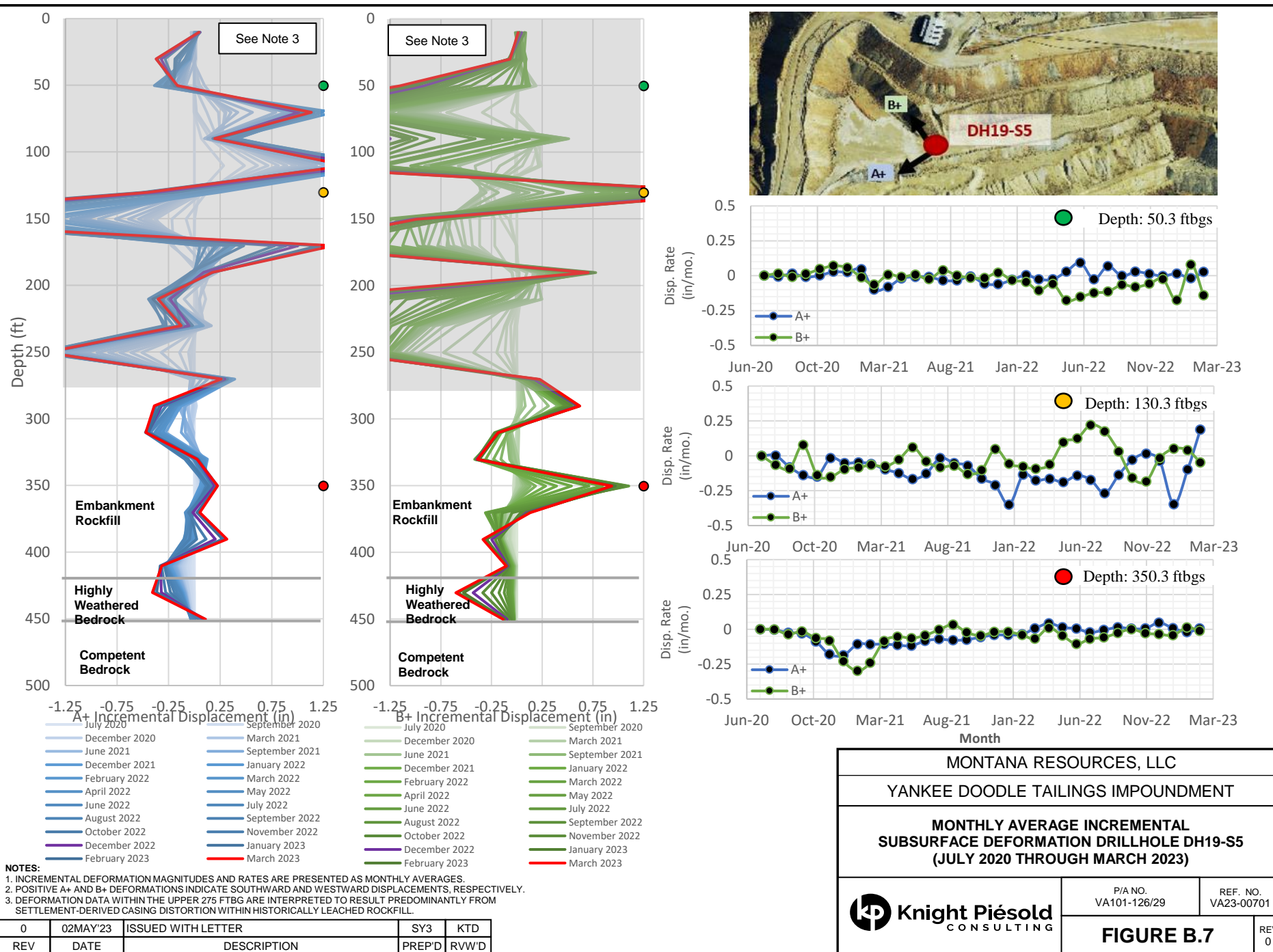
**Knight Piésold  
CONSULTING**

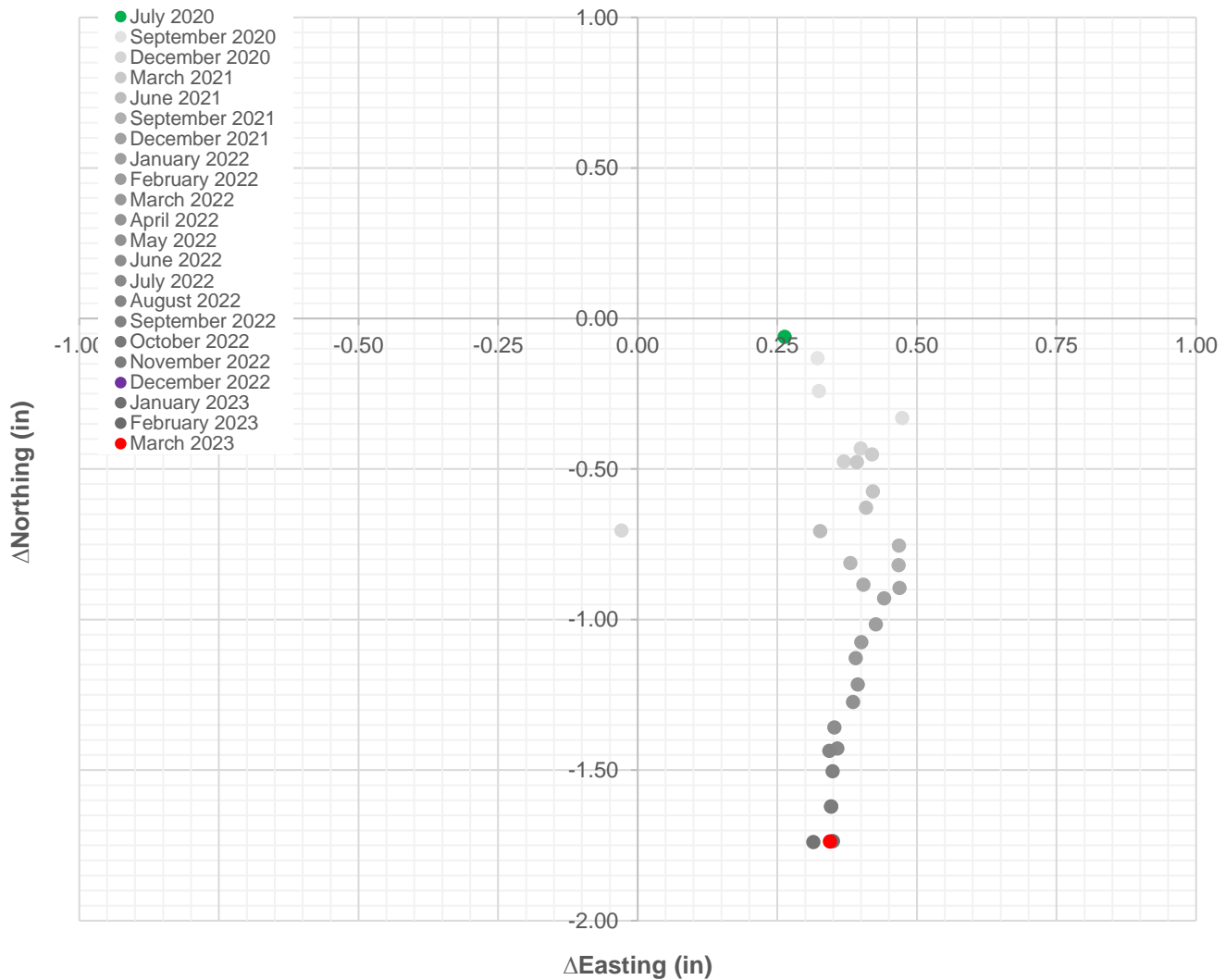
P/A NO.  
VA101-126/29

REF. NO.  
VA23-00701

**FIGURE B.6**REV  
0

0	02MAY'23	ISSUED WITH LETTER	SY3	KTD
REV	DATE	DESCRIPTION	PREP'D	RVW'D





#### NOTES:

1. COLLAR WANDER IS MONITORED USING GNSS INSTRUMENTATION INSTALLED AT THE INCLINOMETER COLLAR LOCATION.
2. THE PLOT ABOVE PRESENTS COLLAR POSITION BASED ON NORTH AND EAST CHANGE RELATIVE TO A JULY 1, 2020 BASELINE GNSS SURVEY.
3. NO DATA ARE AVAILABLE FOR NOVEMBER, 2020 WHILE THE INSTRUMENTATION WAS OFFLINE DUE TO A POWER

MONTANA RESOURCES, LLC

YANKEE DOODLE TAILINGS IMPOUNDMENT

**DH19-S5 GNSS-BASED INCLINOMETER  
COLLAR WANDER  
(JULY 1, 2020 THROUGH MARCH 31, 2022)**



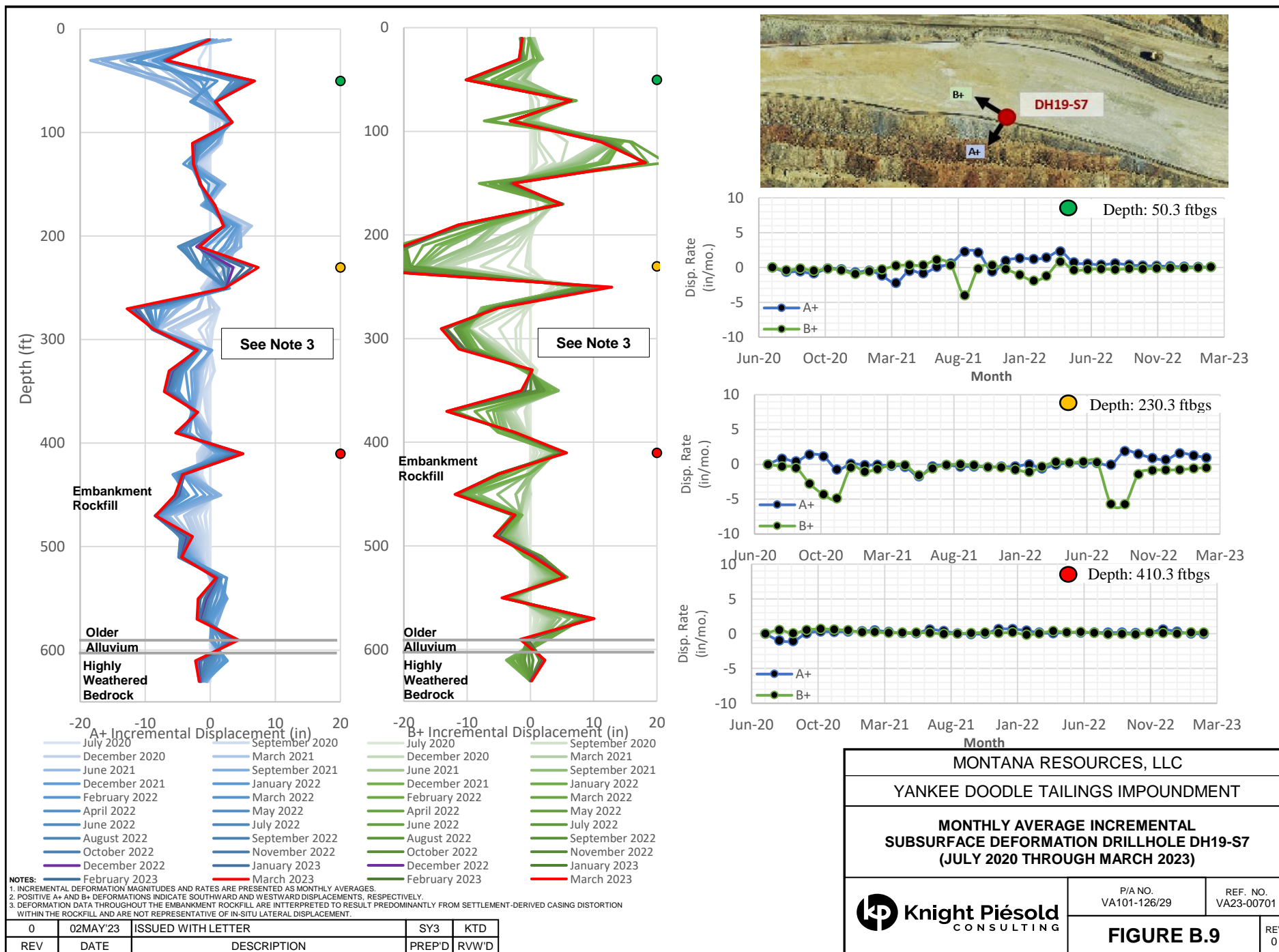
P/A NO.  
VA101-126/29

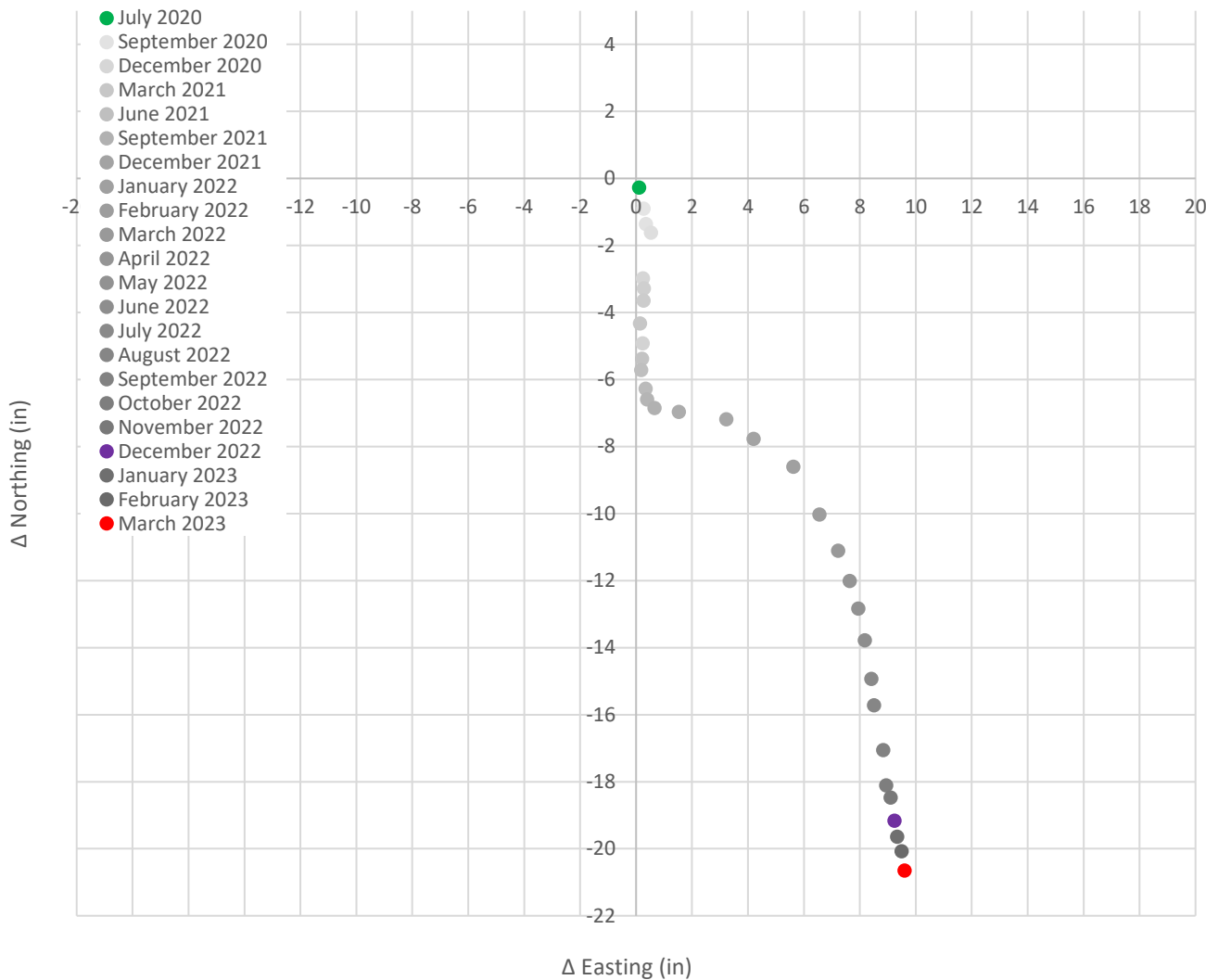
REF. NO.  
VA23-00701

**FIGURE B.8**

REV  
0

0	02MAY'23	ISSUED WITH LETTER	SY3	KTD
REV	DATE	DESCRIPTION	PREP'D	RVW'D





#### NOTES:

1. COLLAR WANDER IS MONITORED USING GNSS INSTRUMENTATION INSTALLED AT THE INCLINOMETER COLLAR LOCATION.
2. THE PLOT ABOVE PRESENTS COLLAR POSITION BASED ON NORTH AND EAST CHANGE RELATIVE TO A JULY 1, 2020 BASELINE GNSS SURVEY.
3. NO DATA ARE AVAILABLE FOR NOVEMBER, 2020 WHILE THE INSTRUMENTATION WAS OFFLINE DUE TO A POWER MANAGEMENT ISSUE.

MONTANA RESOURCES, LLC

YANKEE DOODLE TAILINGS IMPOUNDMENT

**DH19-S7 GNSS-BASED INCLINOMETER  
COLLAR WANDER  
(JULY 1, 2020 THROUGH MARCH 31, 2023)**



P/A NO.  
VA101-126/29

REF. NO.  
VA23-00701

**FIGURE B.10**

REV  
0

0	02MAY'23	ISSUED WITH LETTER	SY3	KTD
REV	DATE	DESCRIPTION	PREP'D	RW'D

## APPENDIX C

### **Geo4Sight Deformation Plots**

(Figures C.1 to C.2)

