

## Monthly Report on Filled/Unfilled Stopes and Seismic Monitoring

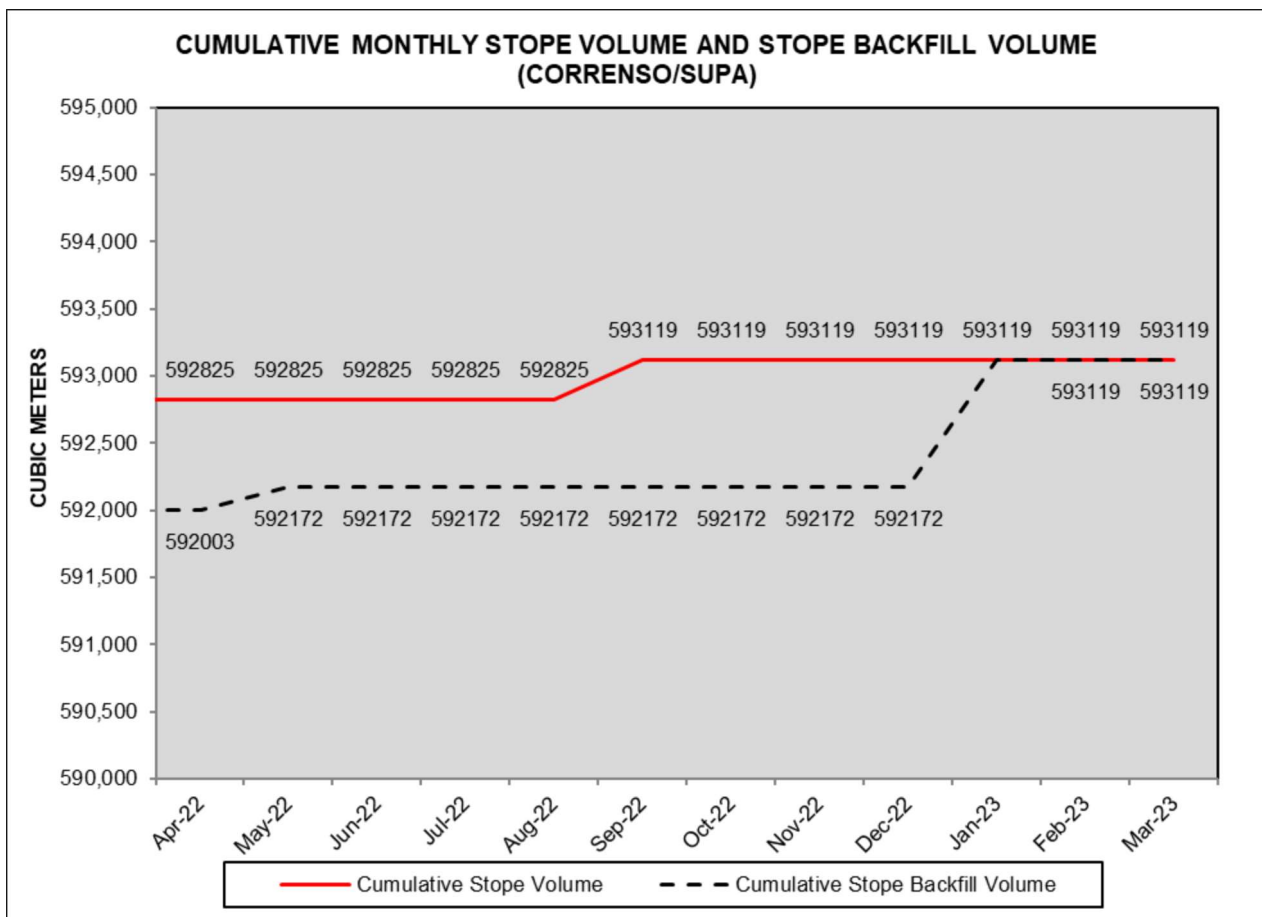
Hauraki District Council Land Use Consent 202.2012 (Correnso) requires monthly reporting of total stope volume and filled stopes for each mining method (Condition 26(a)) and any anomalous results from seismic monitoring and rock movement monitoring (Condition 26(b)).

Hauraki District Council Land Use Consent 202.2016 (SUPA) requires similar reporting of stope volumes and filled stopes (Condition 20(a)) and for seismic monitoring and rock movement monitoring (Condition 20(b)). In addition, Condition 20(a) also requires reporting relating to safeguards around proximities to historic workings.

Hauraki District Council Land Use Consent 202.2018 (Project Martha) similarly requires reporting of void and stope volumes, seismic and rock movement monitoring and reporting relating to safeguards around proximities to historic workings (Condition 75). Additionally, Condition 75 requires reporting of the volume of fill used to fill historic unfilled voids.

Refer Appendix for full transcripts.

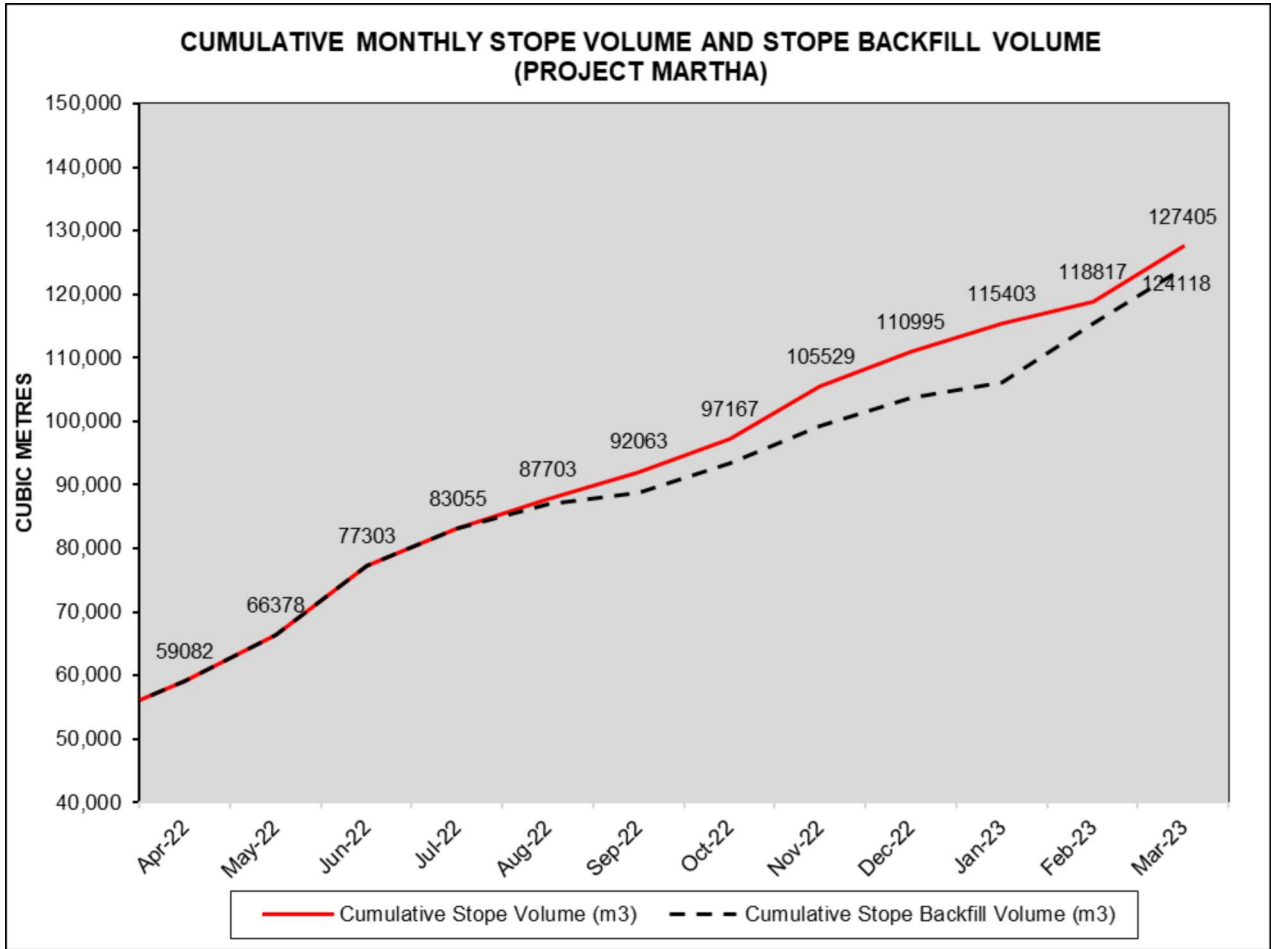
### Filled/Unfilled Stopes (Correnso/SUPA)



	Cumulative Stope Volume (m <sup>3</sup> )	Cumulative Backfill Volume (m <sup>3</sup> )	Month End Voids (m <sup>3</sup> )
April 2022	592825	592003	821
May 2022	592825	592172	652
June 2022	592825	592825	652
July 2022	592825	592825	652

August 2022	592825	592825	652
September 2022	593119	592172	946
October 2022	593119	592172	946
November 2022	593119	592172	946
December 2022	593119	592172	946
January 2023	593119	593119	0
February 2023	593119	593119	0
March 2023	593119	593119	0

**Filled/Unfilled Stopes (Martha Underground)**



	Cumulative Stope Volume (m <sup>3</sup> )	Cumulative Stope Backfill Volume (m <sup>3</sup> )	Month End Voids (m <sup>3</sup> )	Cumulative Historic Void Backfill Volume (m <sup>3</sup> )
April 2022	59082	59082	0	13311
May 2022	66378	66378	0	13311
June 2022	77303	77303	0	13311
July 2022	83055	83055	0	13311
August 2022	87703	87043	660	13311
September 2022	92063	88689	3374	22849
October 2022	97167	93477	3690	30049
November 2022	105529	99293	6236	31928
December 2022	110995	103794	7201	31928
January 2023	115403	106029	9374	31928
February 2023	118817	115410	3407	31928
March 2023	127405	124118	3287	31928

#### Explanatory notes:

1. At the end of each month, cumulative void volumes will vary per the production cycle and the remaining open stopes at that time.
2. No stoping was completed in Correnso/SUPA during the month. 8,588 m<sup>3</sup> was undertaken in Martha Underground.
3. No stopes were open at the end of the month in Correnso. 3,287 m<sup>3</sup> of stopes were open in Martha Underground.
4. No historic voids were backfilled during the month.
5. Mining in Correnso is nearing completion.
6. The main mining method used to date in Correnso, SUPA and Martha Underground has been Modified Avoca. A limited amount of material has been extracted using an Overhand Cut and Fill method in Correnso. As the volumes associated with this method are comparatively small, reporting of cumulative totals for both methods has been combined in this report.

## **Seismic & Geotechnical Monitoring**

### **Underground Seismic Monitoring System**

The purpose of the seismic system is to monitor seismic rock mass response to mining activity in and around active mining areas. The current seismic system is able to record events at least as small as ML = -3.0 in the identified critical areas. The agreed critical magnitude is ML = -0.5.

Anomalous seismic behaviour of the closure pillar that must be reported to the HDC is defined as:

- Event magnitudes exceeding ML = -0.5.
- An increase in released seismic energy that does not subside after two weeks.

Underground seismic sensor locations, coordinates and sensor details highlighted in Table 1, Figure 1 and Figure 2:

**Table 1: Seismic Sensor locations and details**

Name	East	North	RL	Type	Location
<b>S2</b>	396513.4	643183.4	798.9	Uni-axial	823 COR SP1
<b>S6</b>	396397.3	643275.1	831.2	Uni-axial	844 SP
<b>S7</b>	396484.8	643260.4	940.7	Uni-axial	942 COR ACC
<b>S9</b>	396422.8	643249.3	883.9	Tri-axial	882 COR DEC
<b>S10</b>	396494.3	643130.9	932.7	Uni-axial	972 RAD
<b>S21</b>	395321.9	642792.6	951.3	Uni-axial	EDW 007 SAC
<b>S22</b>	396039.3	643121.9	917.7	Tri-axial	920 EMP DEC ACC
<b>S23</b>	395618.9	642743.9	887.5	Tri-axial	ROW 11 DEC/INC
<b>S24</b>	395903.4	642787.0	917.3	Uni-axial	REX ACC SP3
<b>S25</b>	395721.0	642944.2	782.5	Tri-axial	800 SP5
<b>S26</b>	395528.3	642859.5	792.8	Tri-axial	EDW 800 - RB DOWN

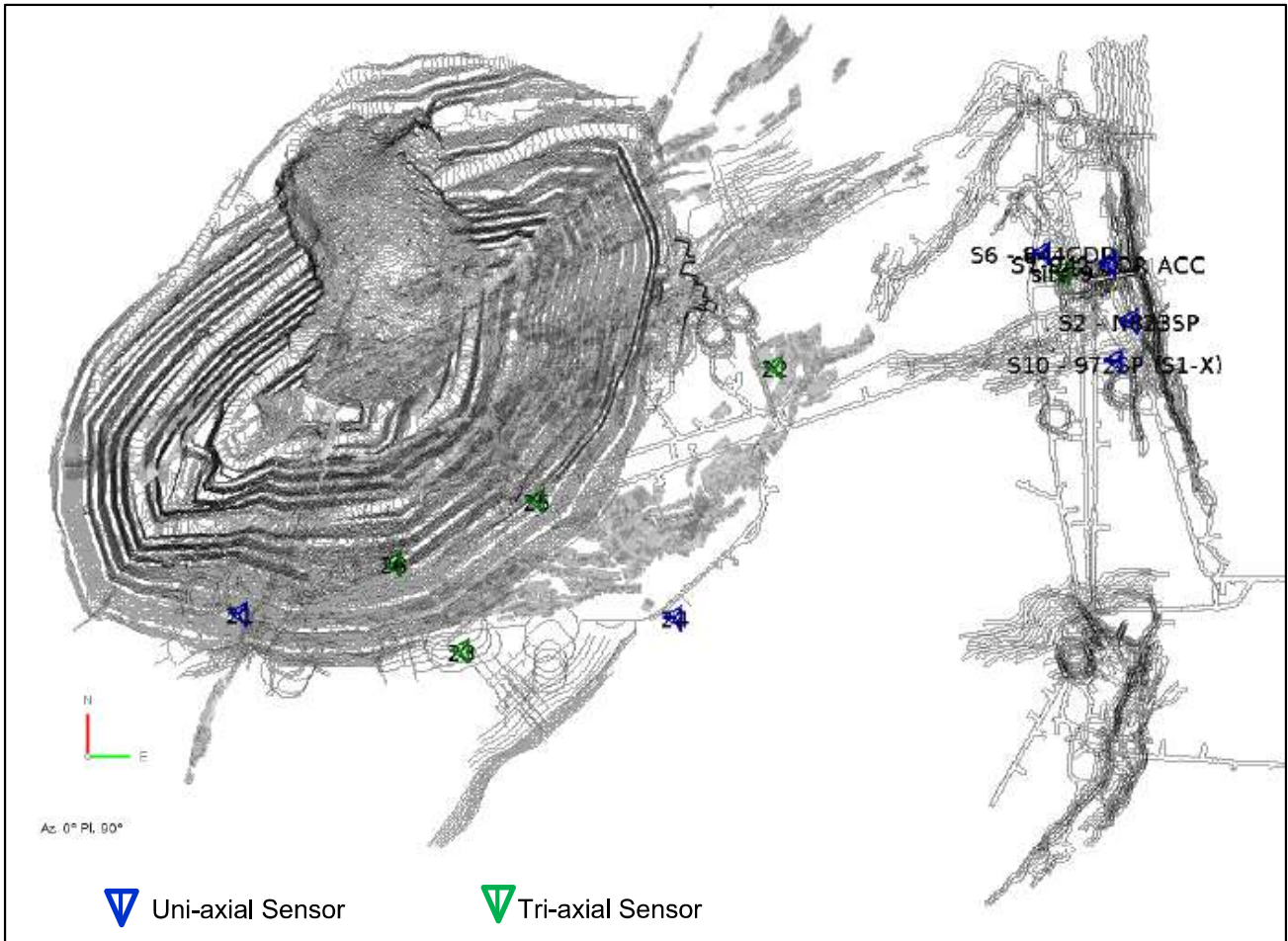


Figure 1: Plan view micro-seismic sensor locations

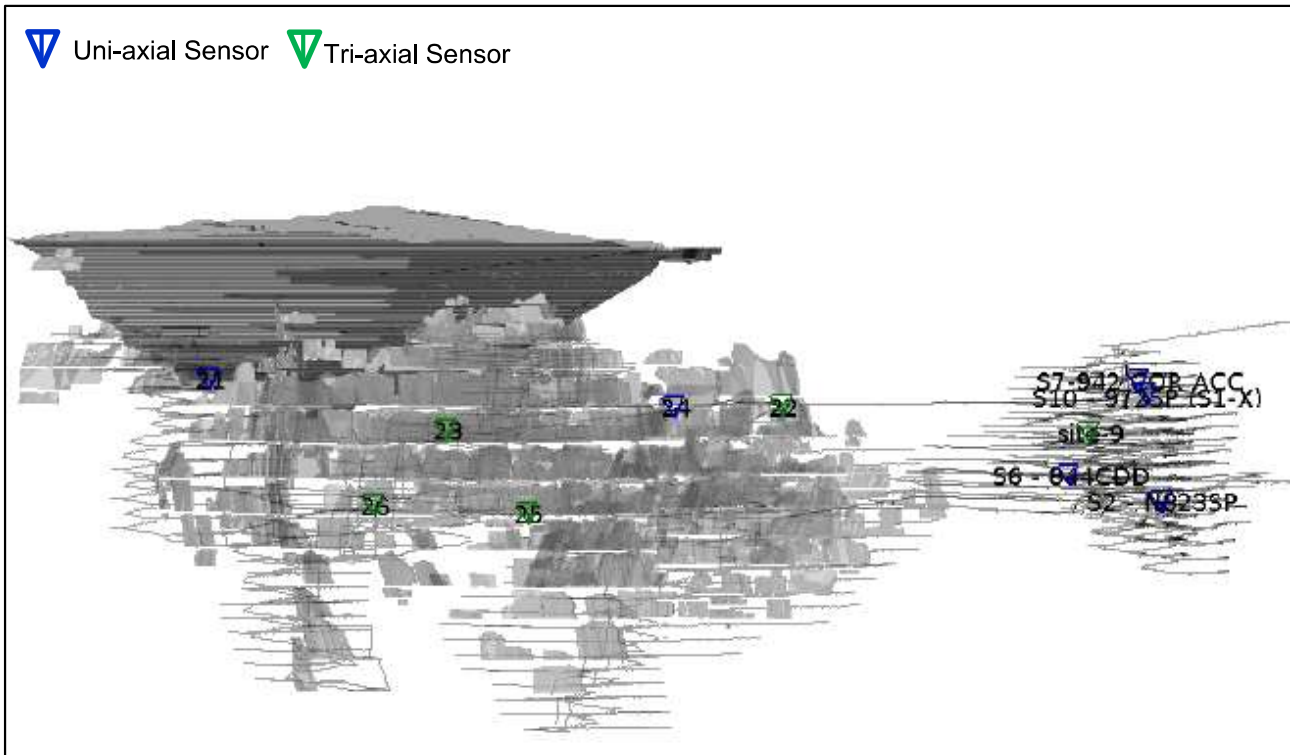


Figure 2: Section view north showing distribution and location of sensors

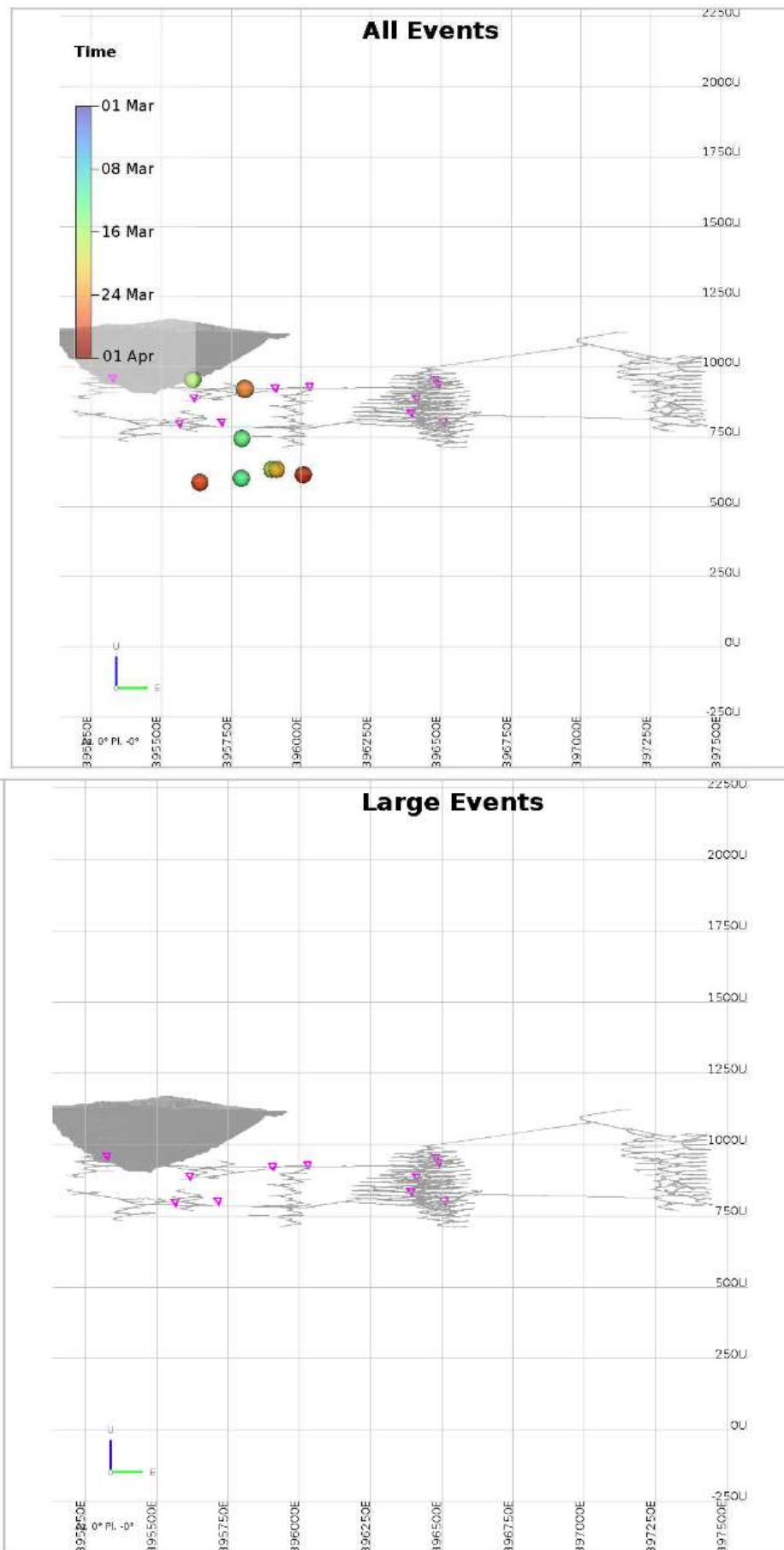
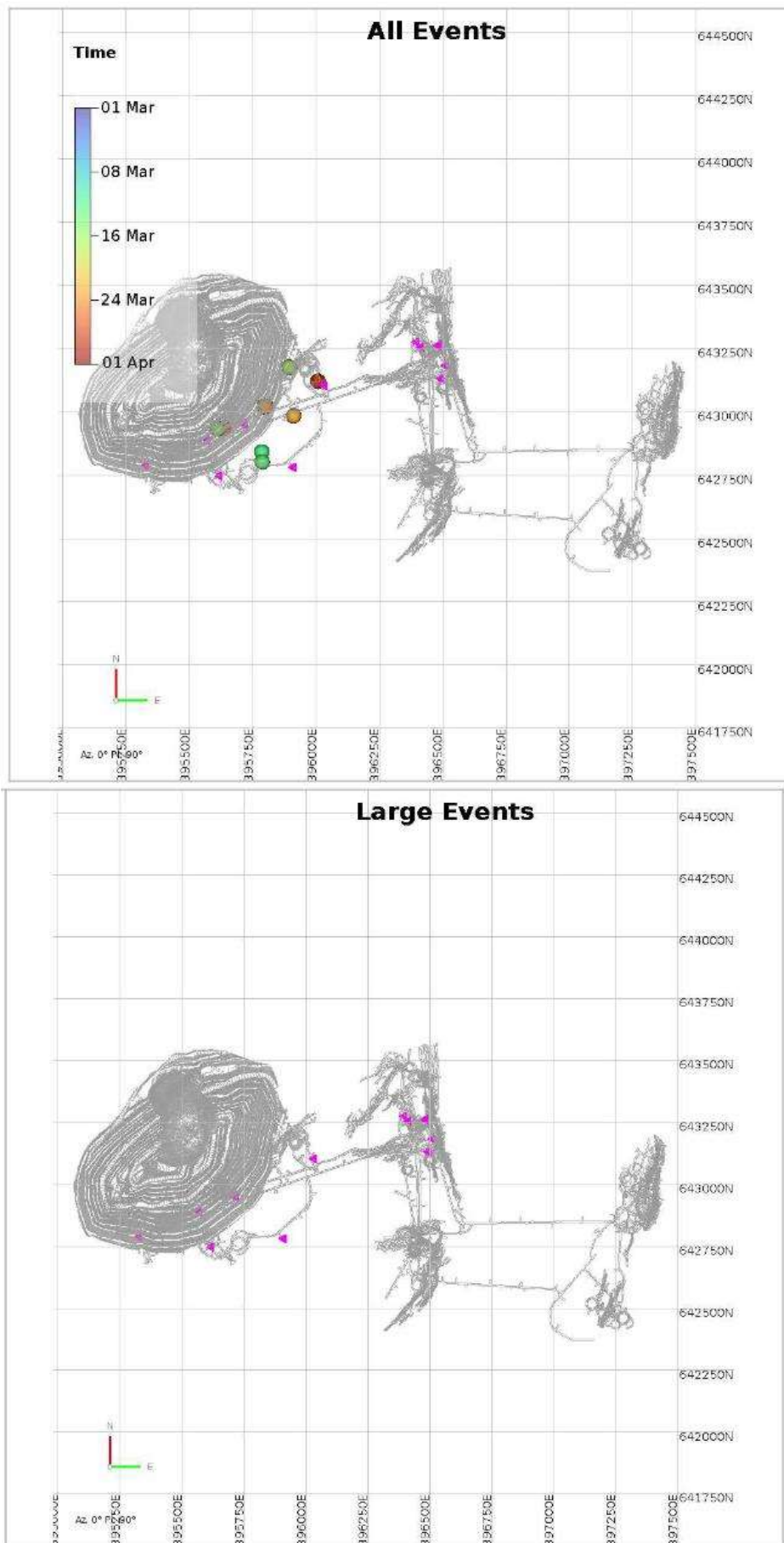


Figure 3: Section View North highlighting locations of triggered events & reportable Large events (> M-0.5 None) during **March 2023**



**Figure 4: Plan View** showing location of triggered events & reportable large events (> M-0.5 - None) during **March 2023**

**Results:**

There were no reportable mining induced seismic events during March 2023. All event locations are highlighted above in Figure 3 & 4.

System health was 100% for the month with no outages and the system continues to function as expected.

**Seismologist Comments:**

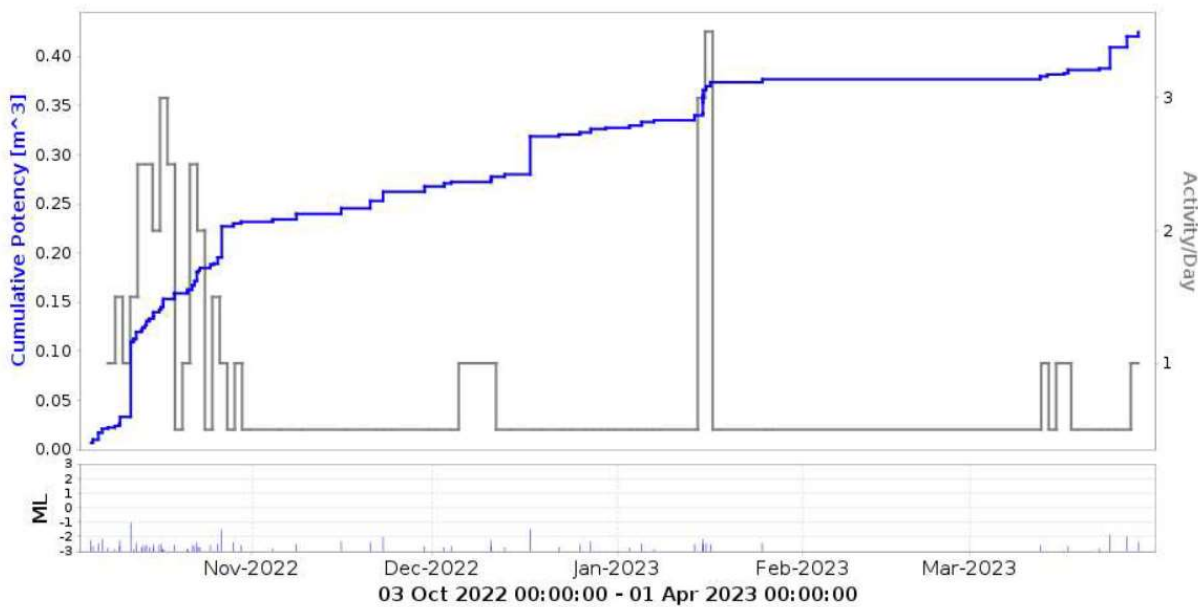
The 3 largest events were all blast and were now corrected during this review. There is some scatter of the smaller events.

System health is good.

Number of expert processed events: total (10), normal (5), rejected (0), blasts (5), other(0).

**Interpretation and or mitigation required:**

None. 180 Day event History vs Cumulative Potency is summarised below in Figure 5



**Figure 5: 180 Day Event History vs Cumulative Potency**

## Extensometer Monitoring

Three extensometers installed from the surface above the REX mining area monitor crown stability and deformation. Extensometer collar locations and monthly results are highlighted in Figure 6, 7, & 8 below:



Figure 6: Extensometer Collar Location Plan



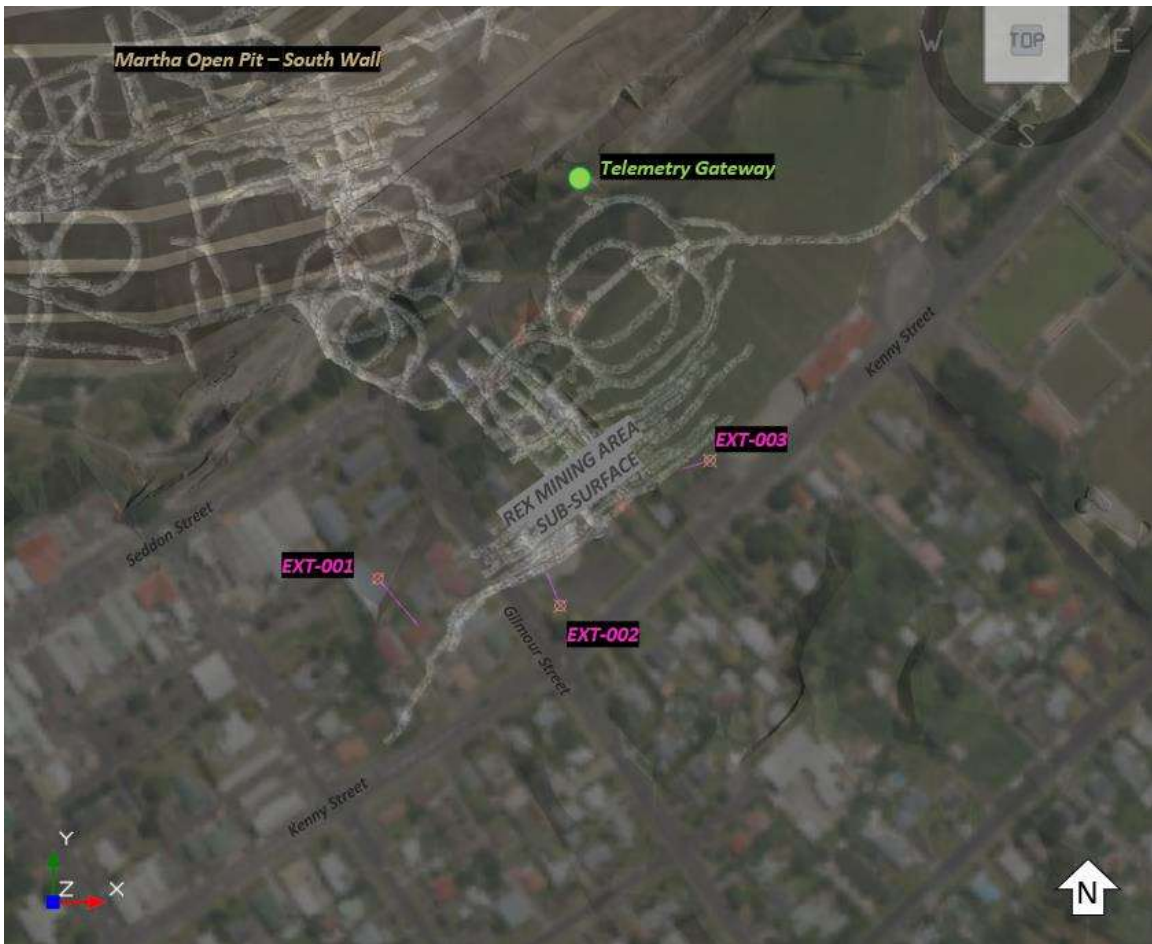


Figure 7: Extensometer Location Plan – spatial relationship to REX underground mining area

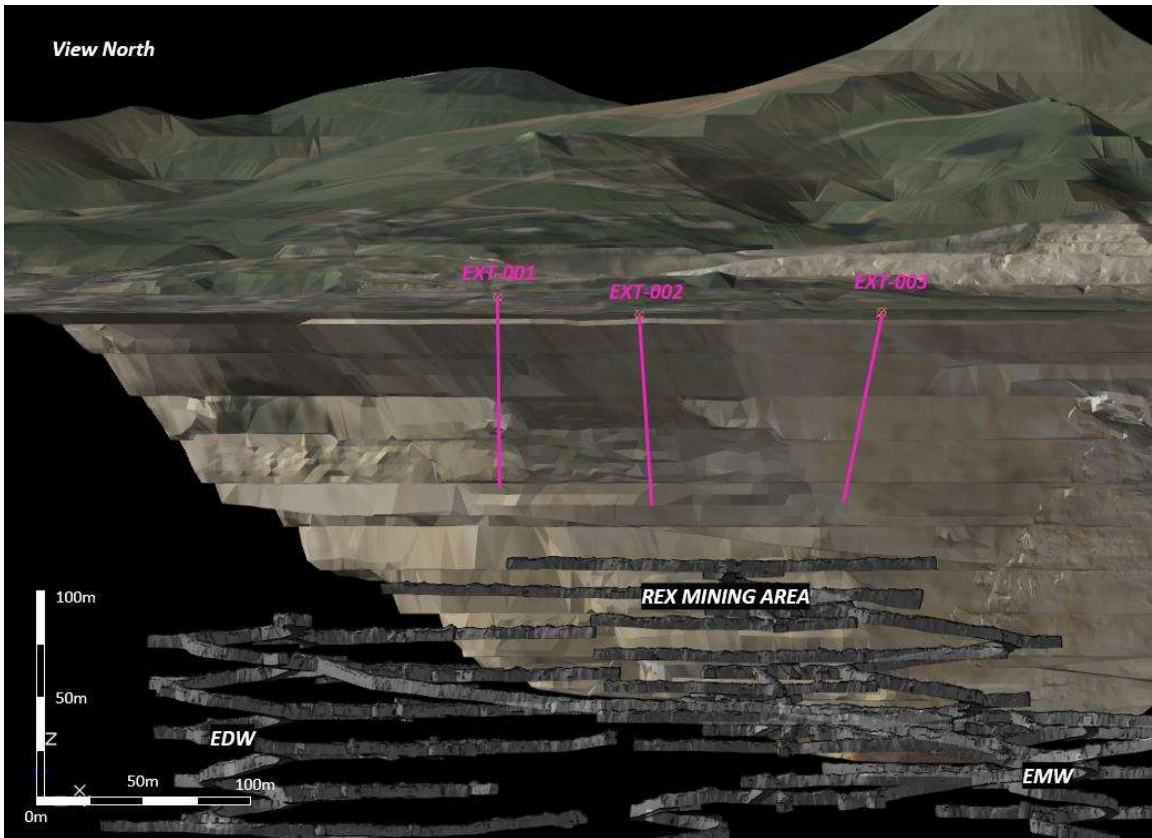
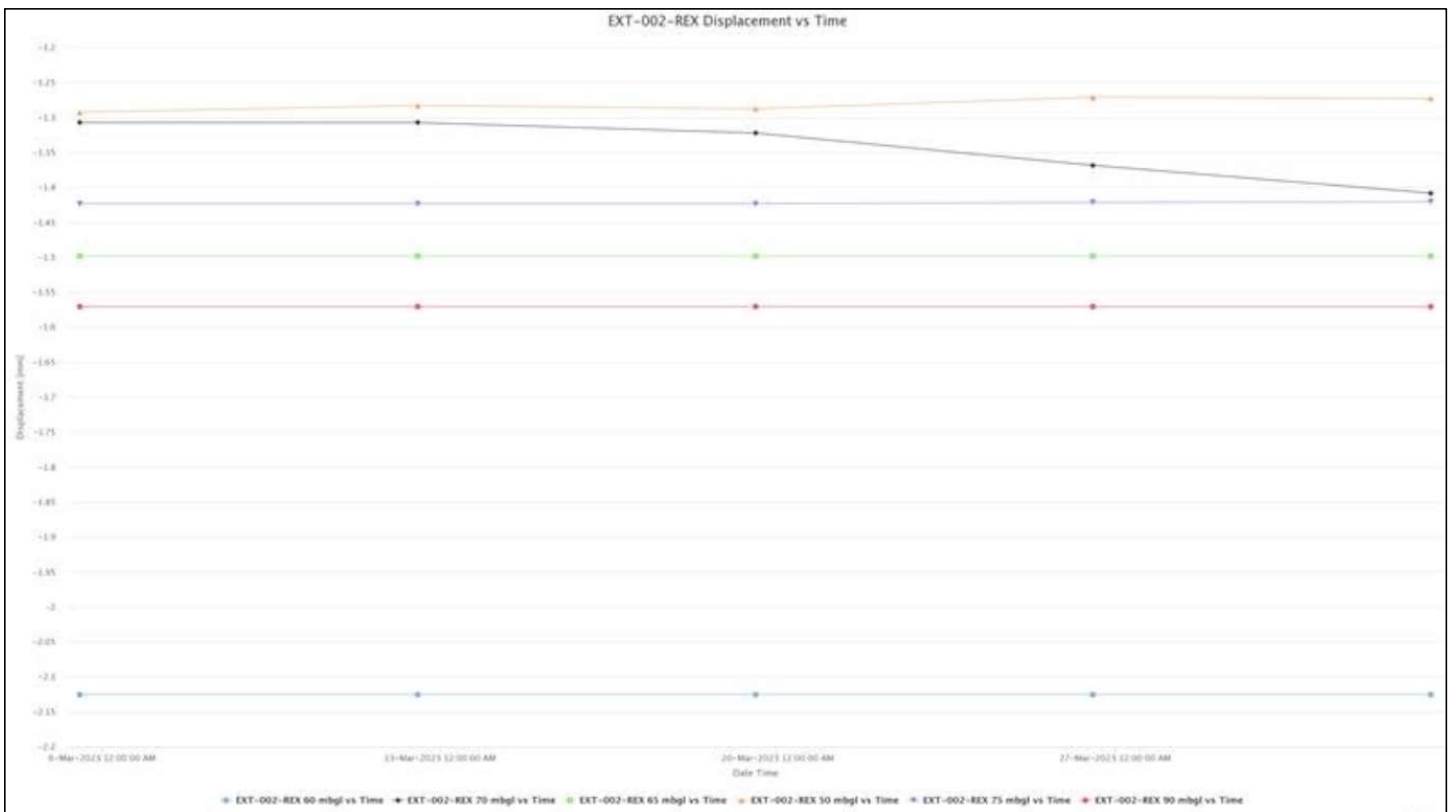
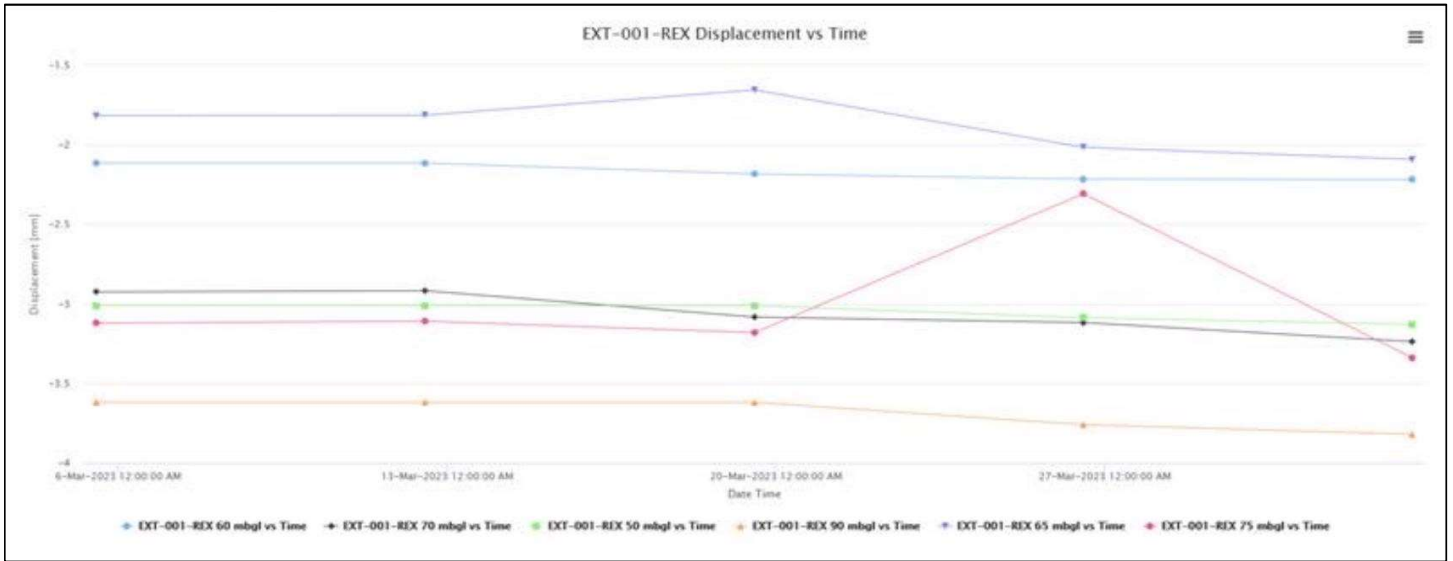
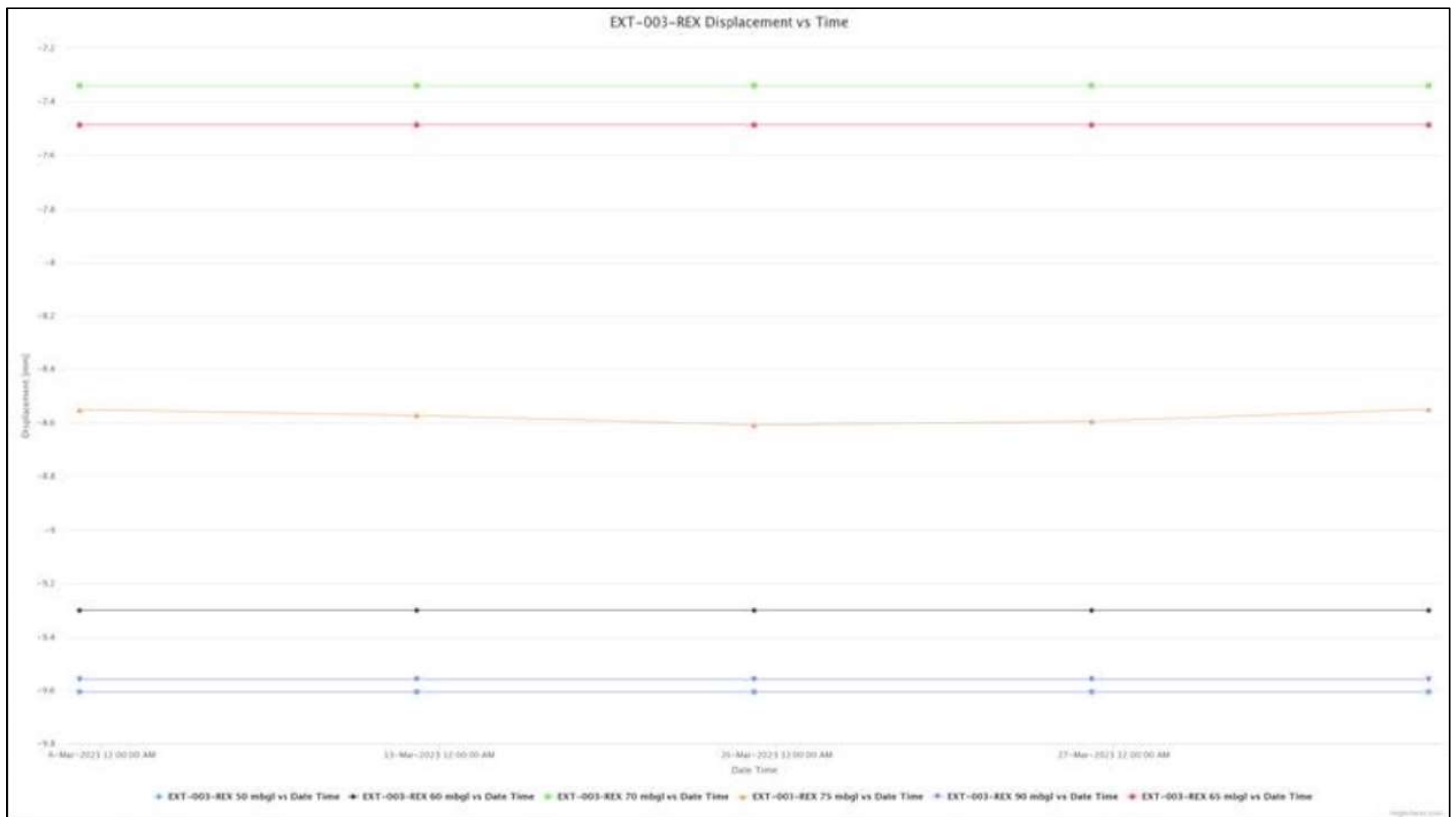


Figure 8: Cross-Section View North – Highlighting REX Extensometers

Extensometer data for **March 2023** has been summarised in **Error! Reference source not found.** below.





**Figure 9 – Displacement vs Time for REX Extensometers – March 2023**

### Slough Meter Monitoring

Slough meters have been installed to monitor historic voids/pillars in the REX Access which traverses over previously mined historic Royal stopes.

Slough meters are configured to monitor the full horizontal extent of the modern development over the north-dipping Historic stopes.

All Slough anchors indicate no change to historic void cavity or pillar currently being monitored in the REX Access.

### Short Term Operational Monitoring

Various visual indicator type monitoring devices are installed as and when required to monitor short term mining scenarios. These indicator devices include but are not limited to 'Clock-its', 'Rock-its', 'Bucket' indicator instruments.

Short term devices are primarily installed where modern development traverses historical drives and voids to allow monitoring of pillars and void crowns for short term operational safety in relation to potential void propagation prior to production being completed.

Two clock-its and bucket-monitor are currently installed in the 800 Edward Incline to monitor the pillar above a historical drive and Stopes located approximately 10 m below the current Incline. There has been no change in these visual indicator devices.

### Probe Drilling (SUPA Consent RC-202.2016 c.20a)

Probe drilling for Correnso/SUPA is now complete. Reporting of probe drilling meters is not required by Project Martha Consent RC-202.2018 but is reported here for continuity.

### Probe Drilling for the Month (Project Martha)

Total probe drilling for March 2023: 2,483m

## **APPENDIX A – CONSENT CONDITIONS**

### **HDC LAND USE CONSENT No. RC-202.2012 (Correnso)**

#### 26 Reporting on Filled/Unfilled Stopes and Seismic Monitoring

- a) The consent holder shall report to the Council on a monthly basis on the total stope volume and volume of fill stopes for that month for each mining method employed namely: cut and fill area, transverse stope area: and all Avoca areas combined. The report shall be in a form acceptable to the Council and the data shall be for the situation at the 20th day of the reporting month. The report shall be delivered on or before the end of the calendar month covered.
- b) The consent holder shall report to the Council on a monthly basis detailing any anomalous results from the seismic monitoring and rock movement monitoring required by Condition 23. The report shall be delivered on or before the end of the calendar month covered.

### **HDC LAND USE CONSENT No. RC-202.2016 (SUPA)**

#### 20 Reporting on Filled/Unfilled Stopes and Seismic Monitoring

- a) The consent holder shall report to the Council on a monthly basis on the total stope volume and volume of filled stopes for that month for each mining method employed. This shall include volume of voids created, the volume of fill in voids that have been created and the volume of fill in surveyed unfilled historic voids. each stope mined during the month where adjacent to an unfilled historic stope void. The report shall be delivered on or before no later than 10 working days after the end of the calendar month covered.
- b) The consent holder shall report to the Council on a monthly basis detailing any anomalous results from the seismic monitoring and rock movement monitoring required by Condition 23. The report shall be delivered on or before the end of the calendar month covered.

## **HDC LAND USE CONSENT No. RC-202.2018 (Project Martha)**

75. The consent holder shall report to the Council on a monthly basis on the total stope volume and volume of filled stopes for that month for each mining method employed. This shall include the volume of voids created, the volume of fill in voids that have been created and the volume of fill in surveyed unfilled historic voids (including the volume of fill up to 30 m below the toe of the Phase 4 Cutback). The report shall be in a form acceptable to the Council and the data shall be for the situation as at the 20th day of the reporting month. The report shall be delivered no later than 10 working days after the end of the calendar month covered.

The consent holder shall report to the Council on a monthly basis detailing any anomalous results from the seismic monitoring and rock movement monitoring required by Condition 71. The report shall also report against the stand-off distances specified within the Void Management Plan required by Condition 72 (where applicable). The report shall be delivered no later than 10 working days after the end of the calendar month covered.

*Note: Mining statistics are already recorded on a calendar month basis. For practicality and consistency, it was agreed that the reporting above would be for monitoring during the calendar months and the situation at the end of the month, with the report to be delivered on or before the 10th of the following month.*