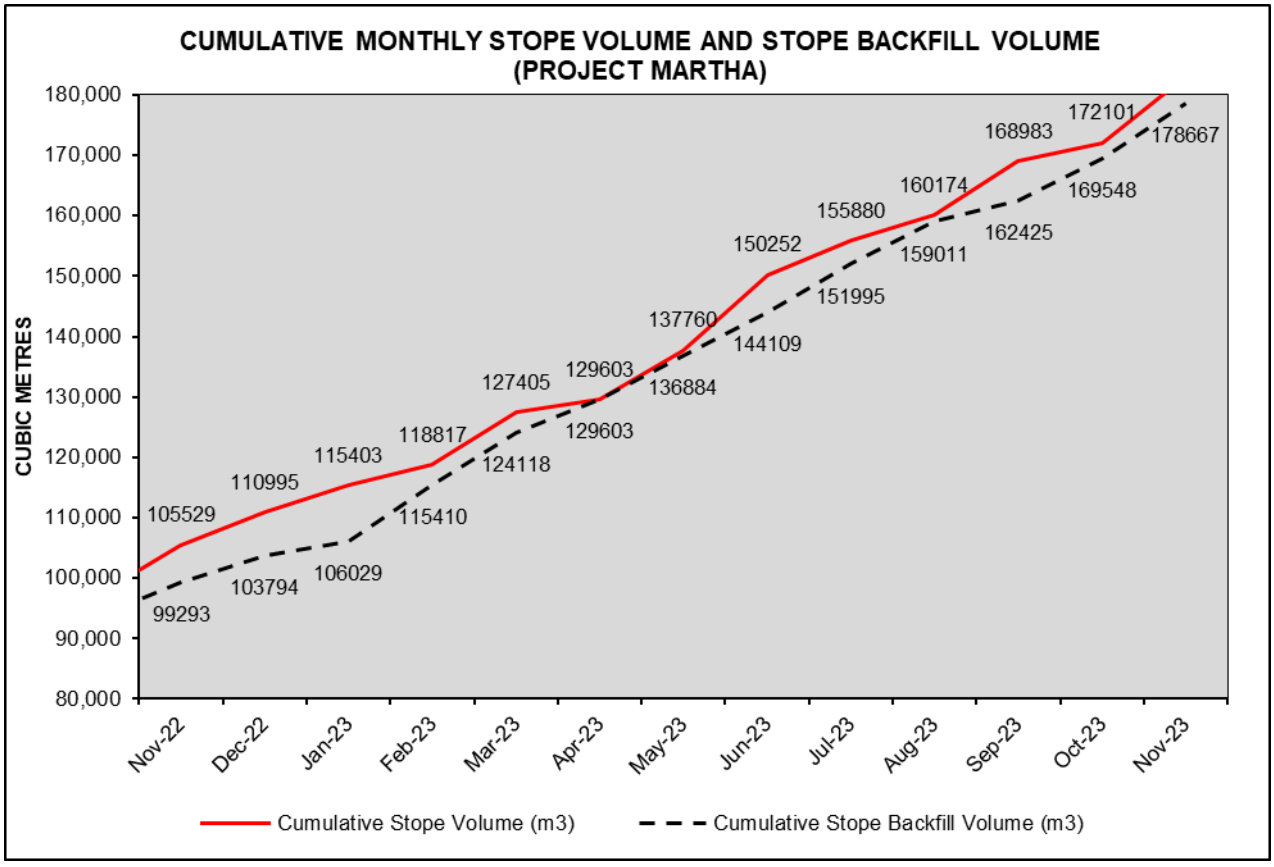
Monthly Report on Filled/Unfilled Stopes and Seismic Monitoring

Hauraki District Council Land Use Consent 202.2018 (Project Martha) requires monthly 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.

Hauraki District Council Land Use Consents 202.2012 (Correnso) and 202.2016 (SUPA) have similar requirements for reporting stope volumes and filled stopes, and for seismic and rock movement monitoring. Stoping and backfilling in Correnso/SUPA was completed in January 2023 and only some backfilling of development drives remains. Refer to previous monthly reports for Correnso/SUPA data.

Refer Appendix for full transcripts.

Filled/Unfilled Stopes (Martha Underground)



	Cumulative Stope Volume (m^3)	Cumulative Stope Backfill Volume (m^3)	Month End Voids (m^3)	Cumulative Historic Void Backfill Volume (m^3)
December 2022	110995	103794	7201	31928
January 2023	115403	106029	9374	31928
February 2023	118817	115410	3407	31928
March 2023	127405	124118	3287	31928
April 2023	129603	129603	0	32693
May 2023	137760	136884	876	36578

June 2023	150252	144109	6143	36578
July 2023	155880	151995	3885	36578
August 2023	160174	159011	1163	36578
September 2023	168983	162425	6558	37248
October 2023	172101	169548	2553	39226
November 2023	183050	178667	4383	46689

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. 10,949 m^3 of stoping was undertaken in Martha Underground.
3. 4,383 m^3 of stopes were open in Martha Underground at the end of the month.
4. 7,462 m^3 of historic voids were backfilled during the month.
5. 8,759 m^3 of CRF was placed during the month.
6. The main mining method used in Martha Underground is a combination of Modified Avoca Narrow Vein Stoping, Transverse Remnant Stope Mining along with limited floor benching and overhand cut and fill mining.

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 are highlighted in Table 1, Figure 1 and Figure 2.

Table 1: Seismic sensor locations and details.

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

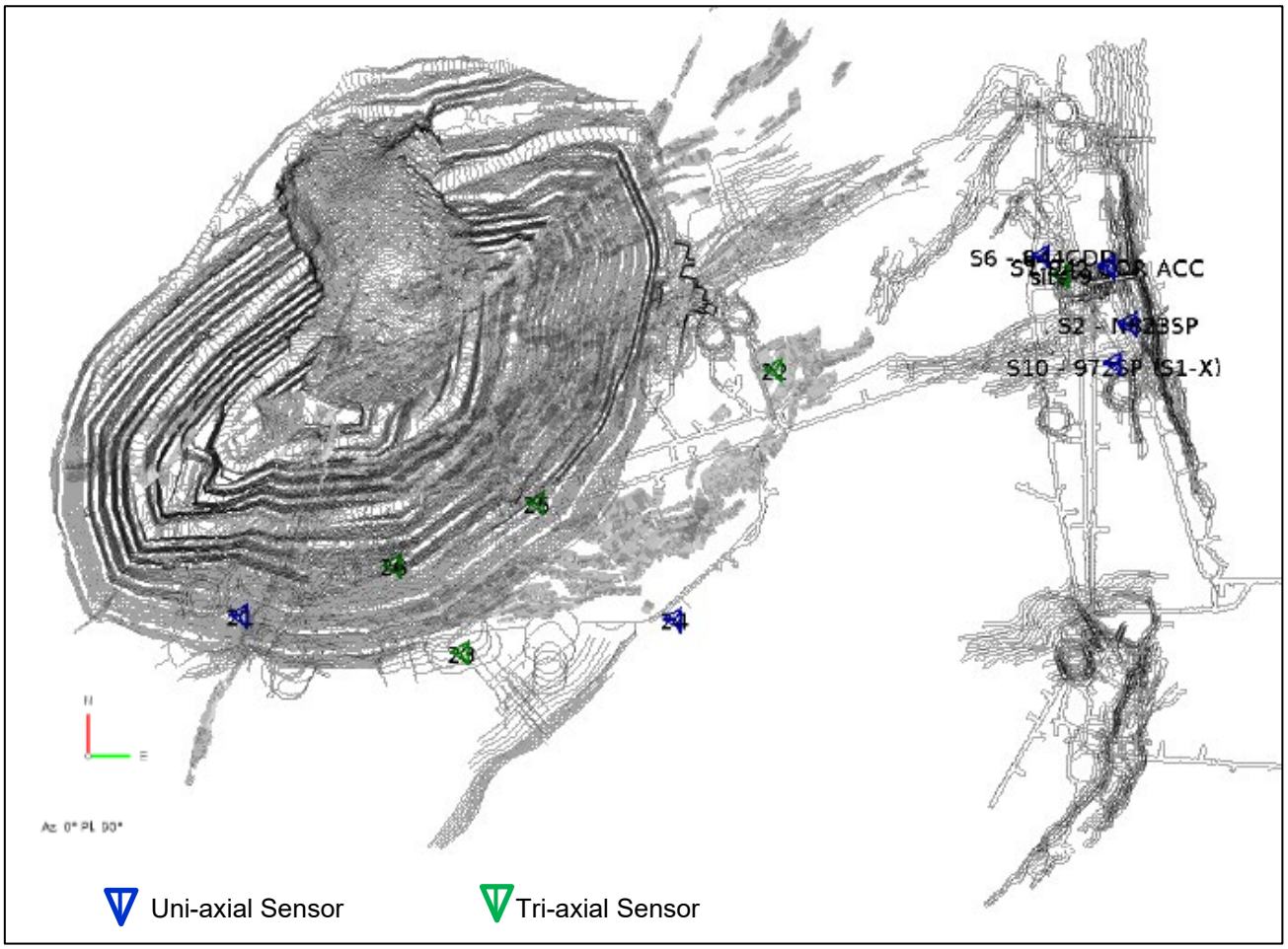


Figure 1: Plan view micro-seismic sensor locations.

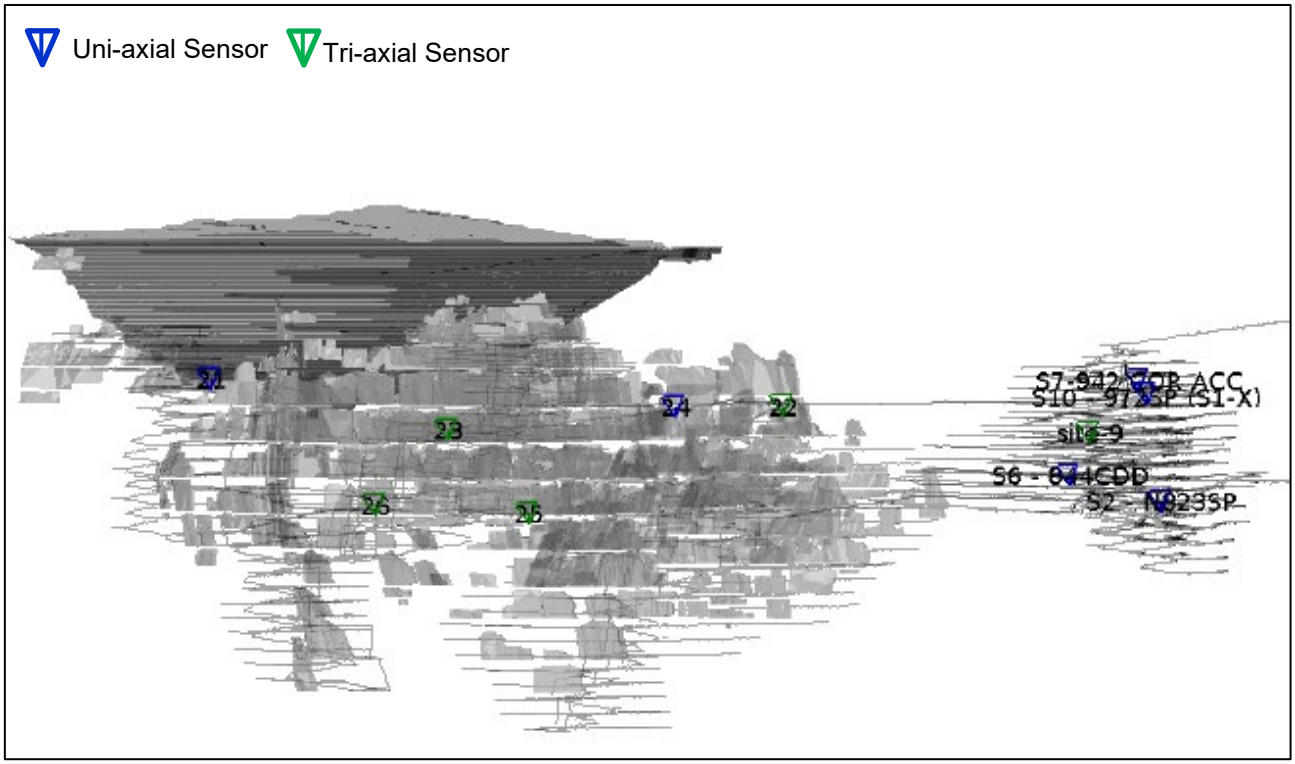


Figure 2: Section view north showing distribution and location of sensors.

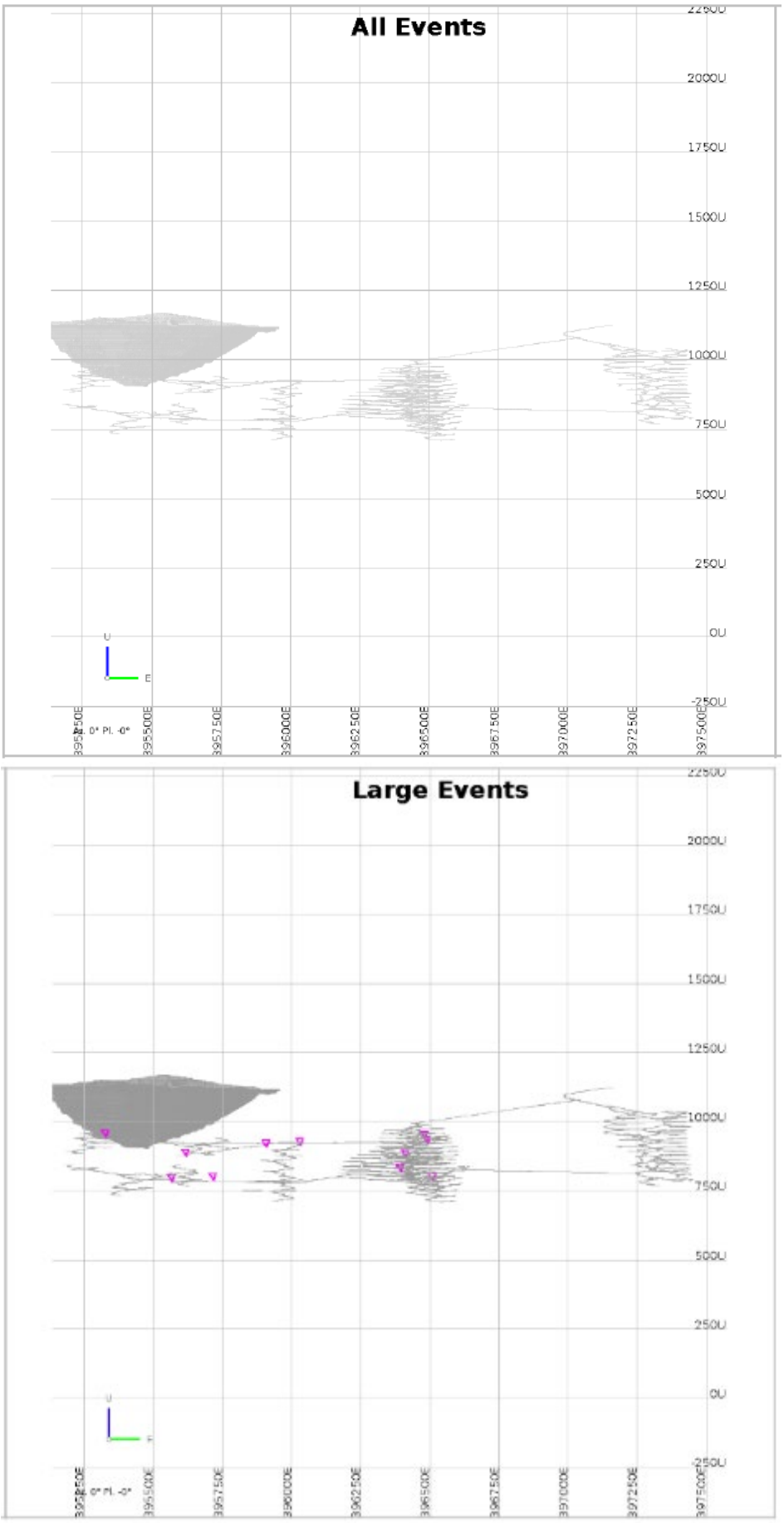


Figure 3: Section View North highlighting locations of triggered events & reportable large events. (> M-0.5 - None) during **November 2023.**

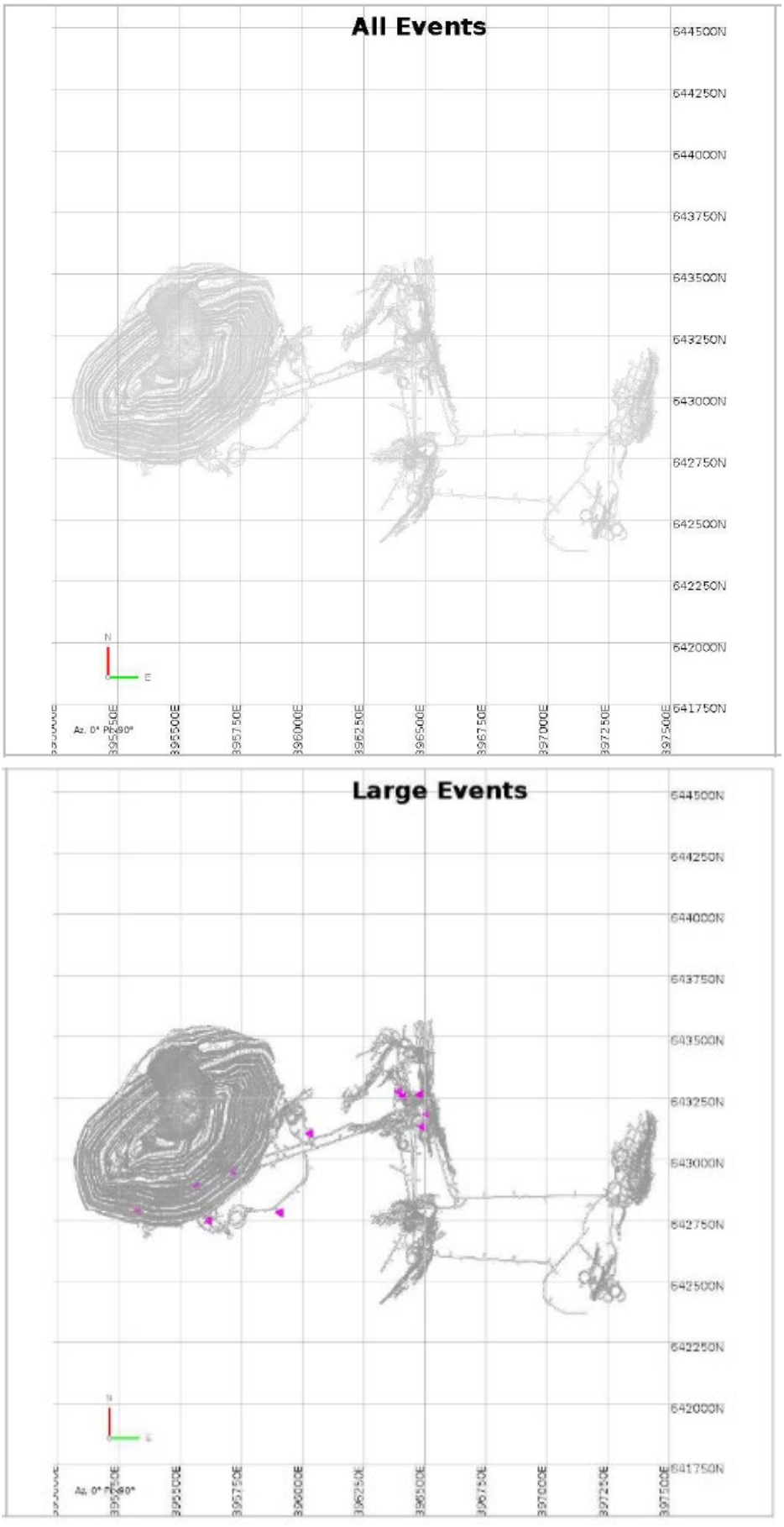


Figure 4: Plan View showing location of triggered events & reportable large events. (> M-0.5 - None) during **November 2023.**

Results:
The majority of recorded events were due to mechanical/machinery impacts. No genuine events were recorded in November. All event locations are highlighted above in Figure 3 & Figure 4.

The system is currently at 100% and functioning as expected.

Number of expert processed events: total (3), normal (0), rejected (3), blasts (0), other (0).

Seismologist Comments:
The system health was good this month. No issues were recorded at any stations.

Interpretation and/or mitigation required:
None. 180 Day Event History vs Cumulative Potency is summarised below in Figure 5.

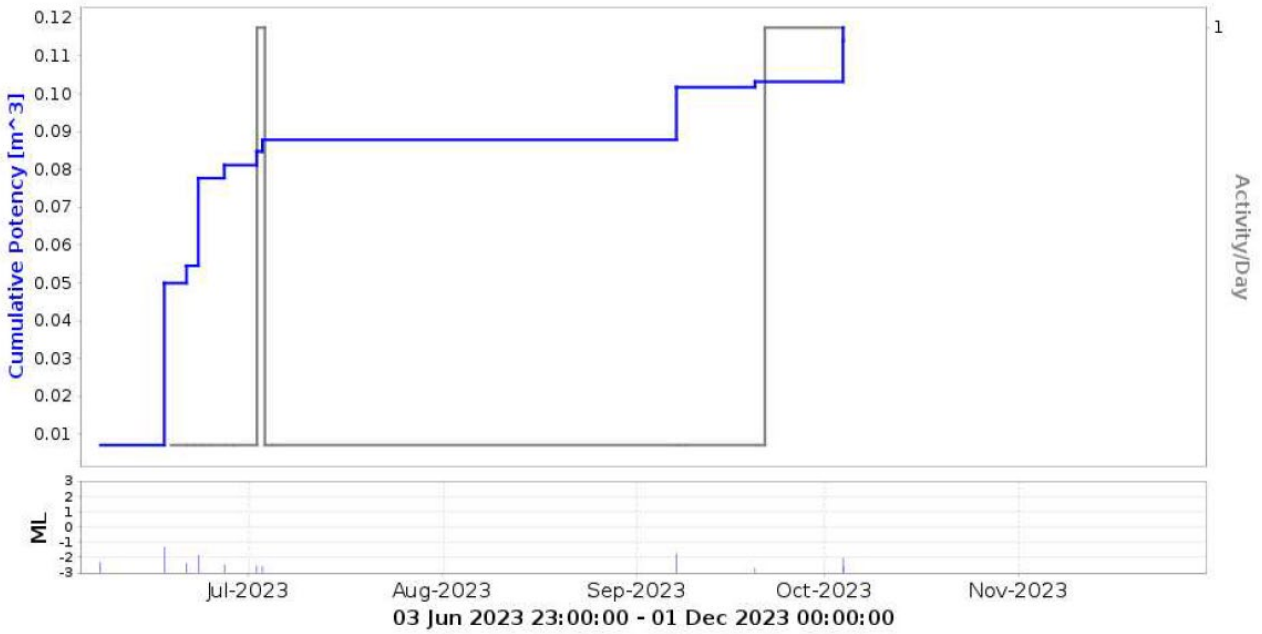


Figure 5: 180 Day Event History vs Cumulative Potency.

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.

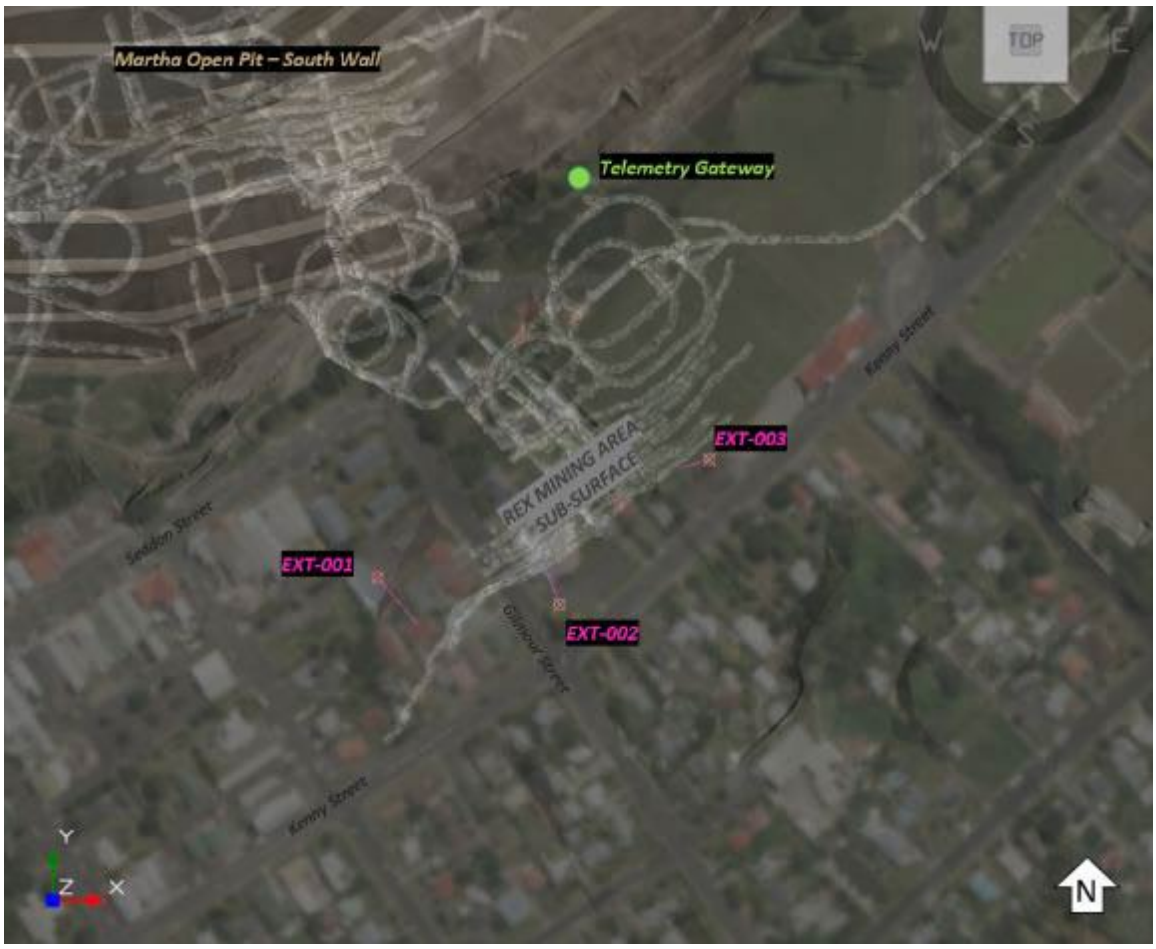


Figure 7: Extensometer Location Plan – spatial relationship to REX underground mining area.

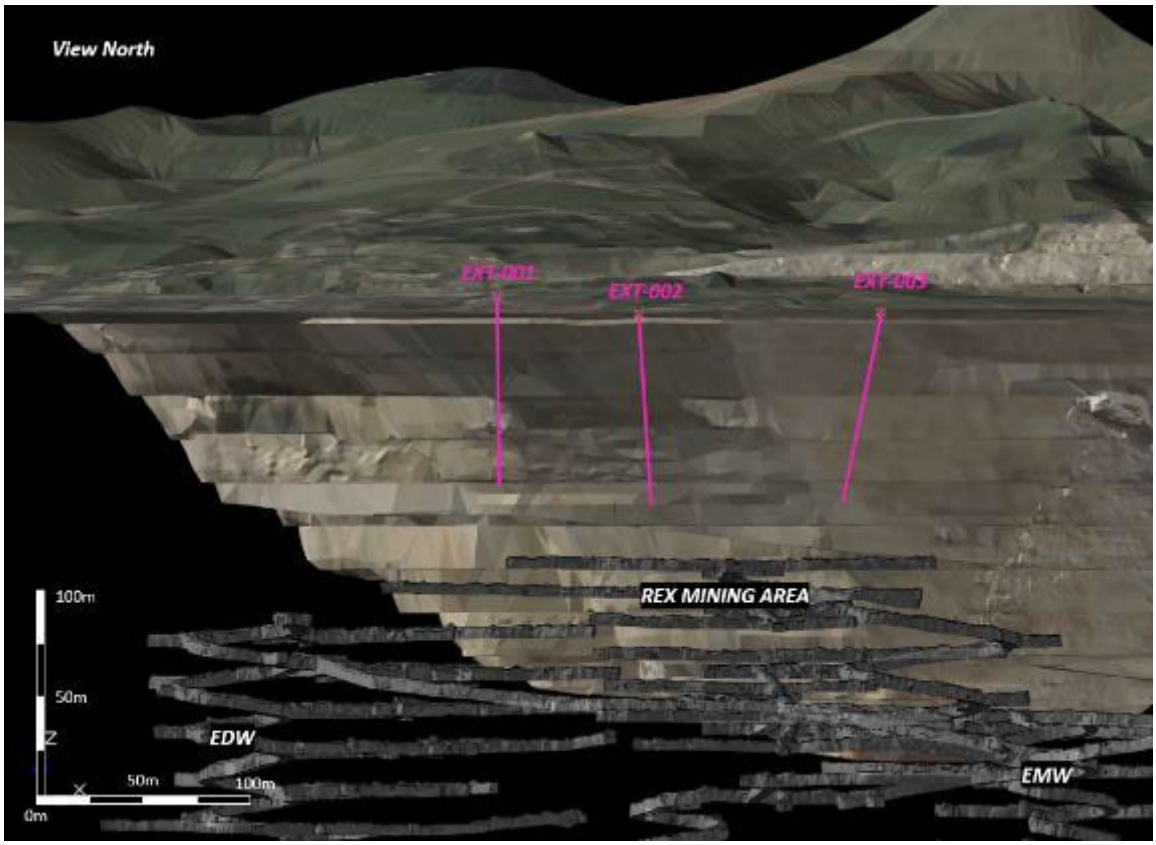


Figure 8: Cross-Section View North – highlighting REX extensometers.

Extensometer Results & Data:

Extensometer data for **November 2023** has been summarised in Figure 9 below.

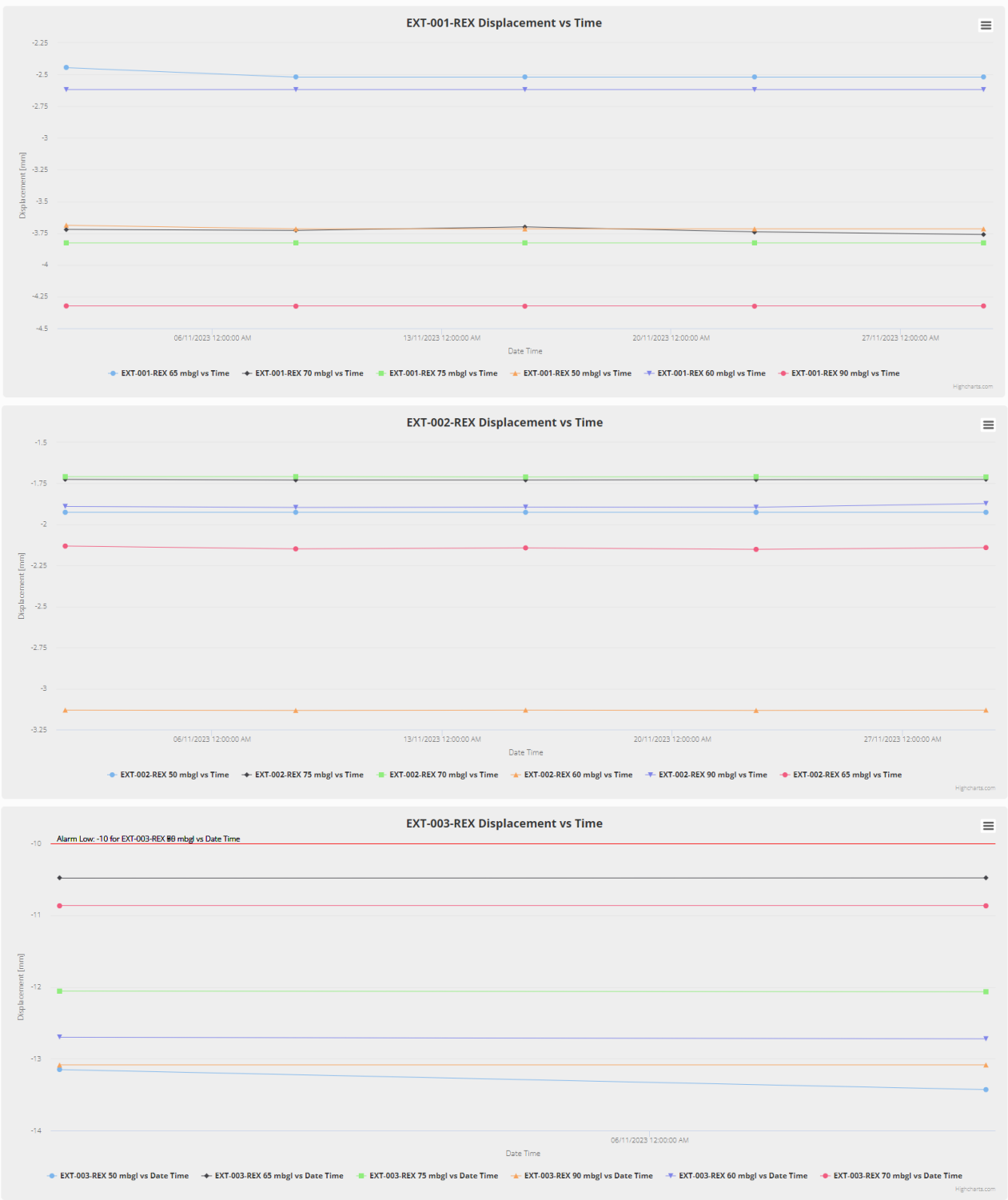


Figure 9: Displacement vs Time for REX Extensometers – November 2023.

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 November 2023: 1,672 m

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.