OCEANAGOLD
WAIHI OPERATION

Correnso Stability 2015 Annual Report

OUR VALUES: RESPECT | INTEGRITY | TEAMWORK | INNOVATION | ACTION | ACCOUNTABILITY

Contents

1. PURPOSE

The purpose of the Waihi Gold (WG) Correnso Surface Stability Annual Report is to comply with Condition 25 of Hauraki District Council (HDC) LUC 202.2012.

2. OBJECTIVES

As required by Condition 25 of LUC 202.2012:

25. The consent holder shall provide to the Council on an annual basis (within one month of the agreed anniversary) a report:
- *a) Describing the location, depth height and volume (m^3) of stopes; and a summary of the data required by Condition 26 regarding unfilled stope voids; and*
- *b) Describing the lengths of development that, due to the encountered geotechnical conditions where multiple levels overlap, will require backfilling prior to mine closure; and*
- *c) Describing the backfilling and compaction associated with each stope; and*
- *d) Describing the ground conditions revealed by the mine excavations; and*
- *e) Describing the monitoring and measures adopted to ensure ground surface stability, particularly as provided for in Condition 23 and the outcomes of such measures; and*
- *f) Describing the location and depth of exploratory drives;*
- *g) Confirming that the extent of the mining works is confined to CEPPA, as defined in Figure 1.*

The agreed anniversary for this report was 20 December, the date in 2013 when the first blast was initiated into the Correnso Consent Area. In agreement with HDC, this anniversary was revised to 31 December to coincide with other calendar-year data collation and reporting.

3. LOCATION, DEPTH, HEIGHT AND VOLUME OF STOPES (*c. 25a*)

The stoping methodology for Correnso is Modified Avoca (refer to Appendix A for a graphical representation). This method requires a ‘bottom-up’ mining technique, whereby each successively higher stope is mined out by driving on the surface of the previously laid backfill of underlying stopes. This technique also requires the development to the extremities of the ore body, then mining back towards the access points. Schematics of Correnso mining operations for the period are presented in Figures 2 and 3.

Minor stope extraction began in April 2015 during the development of the lowest drive at the 795 level (in the form of floor, wall and roof strips), with production stope blasting commencing in June 2015. Initially the smaller voids created were all backfilled during the same month. As the mine moved into full production, the production cycle meant some stopes are now in various states of backfill at the end of the month. By the end of the reporting period, 56,362m^3 of stope volume had been extracted, with 49,977m^3 backfilled (Figure 1) and mining had reached the 855 level.

Stope design during 2015 consisted of 5m drives with up to 10m stope panels between the drives. The 10m stope height was the maximum during the year; no stopes were greater, a few were less. This results in an effective maximum void height of 20m; made up of the 10m stope and two 5m drives (one above and one below the stope).

While most of the mine development is along the main vein, mining of minor offshoot ‘splay’ veins occurs when viable. The larger of these (the No 5 and No 7 veins) are in the process of extraction (Figure 3) and are annotated in Figure 4.

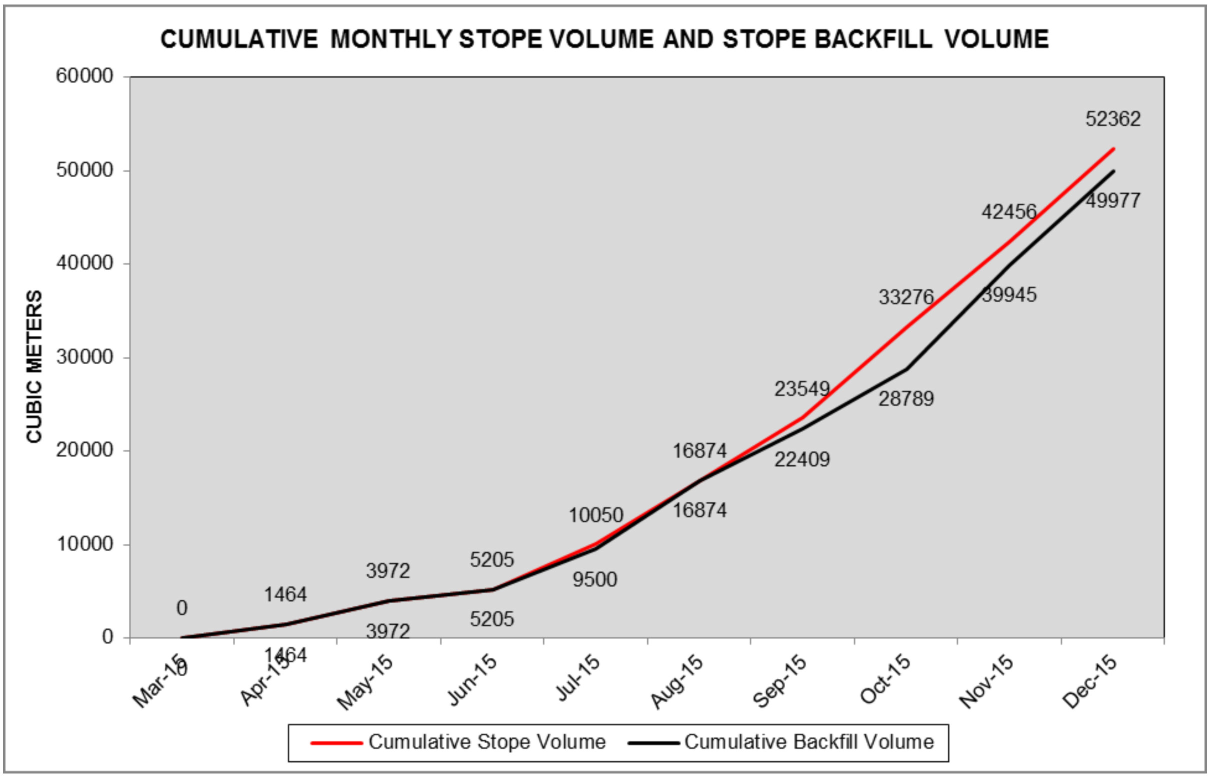


Figure 1: Cumulative monthly stope voids and backfill volumes

4. DEVELOPMENT & EXPLORATION DRIVES (*c. 25b & f*)

Figures 4 and 5 indicate development progress in Correnso as at January 2016.

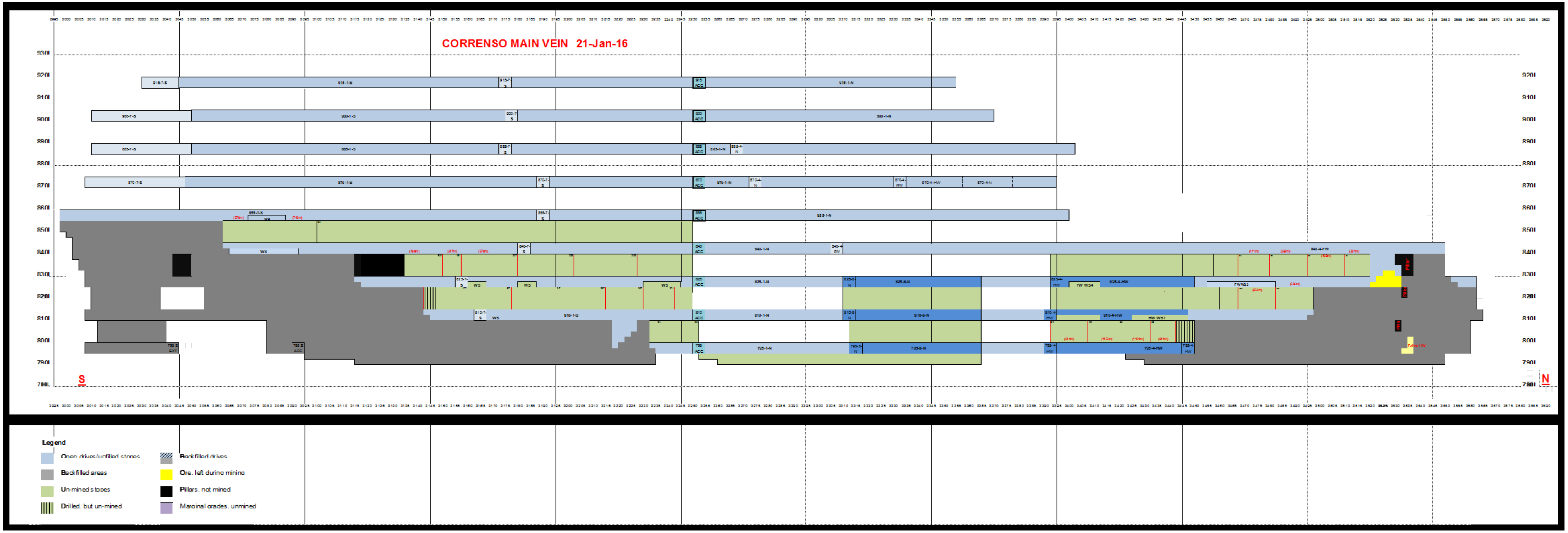


Figure 2: Schematic Long Section of Correnso Main (No 1) Vein

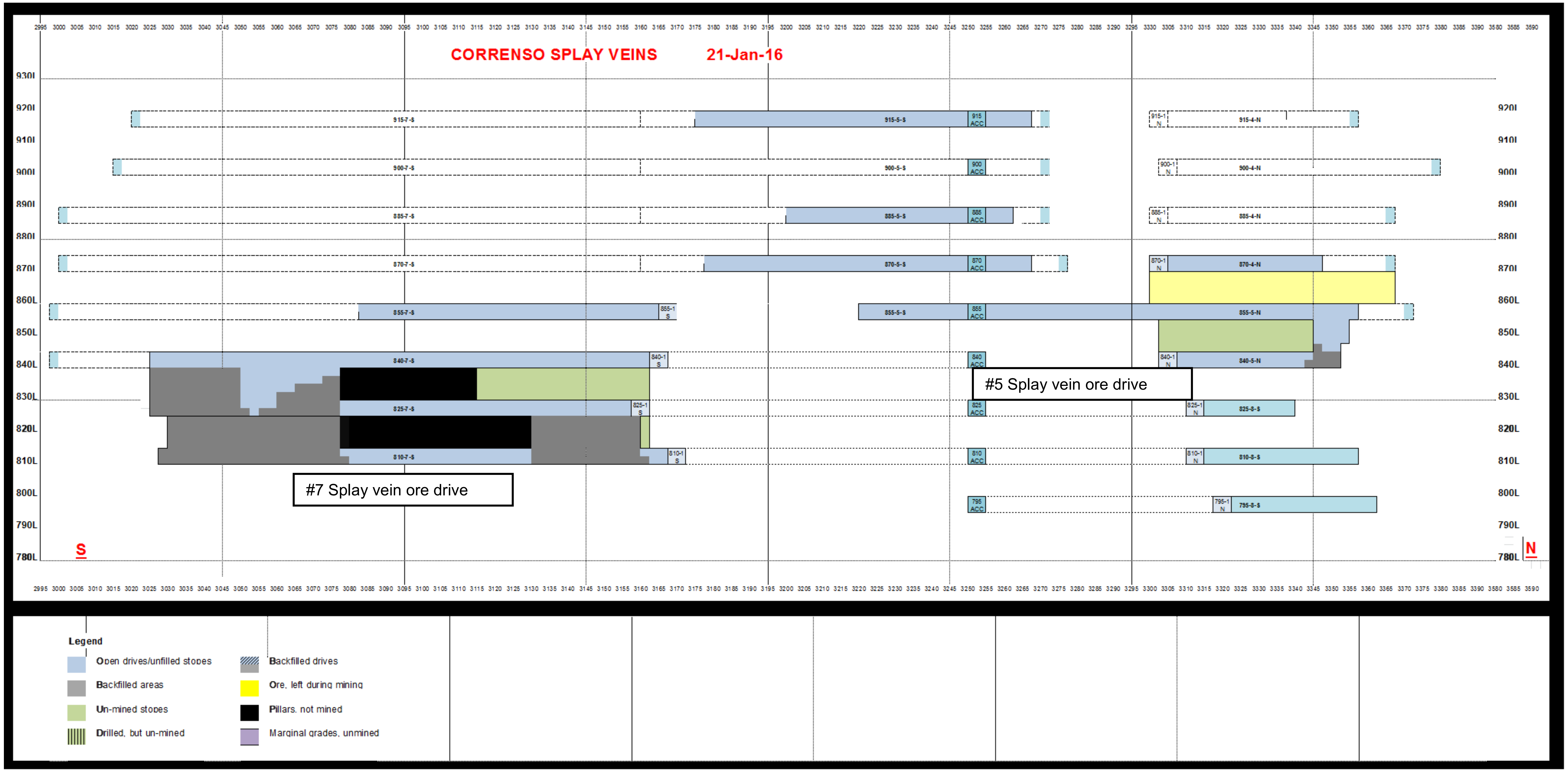


Figure 3: Schematic Long Section of Correnso Splay Veins

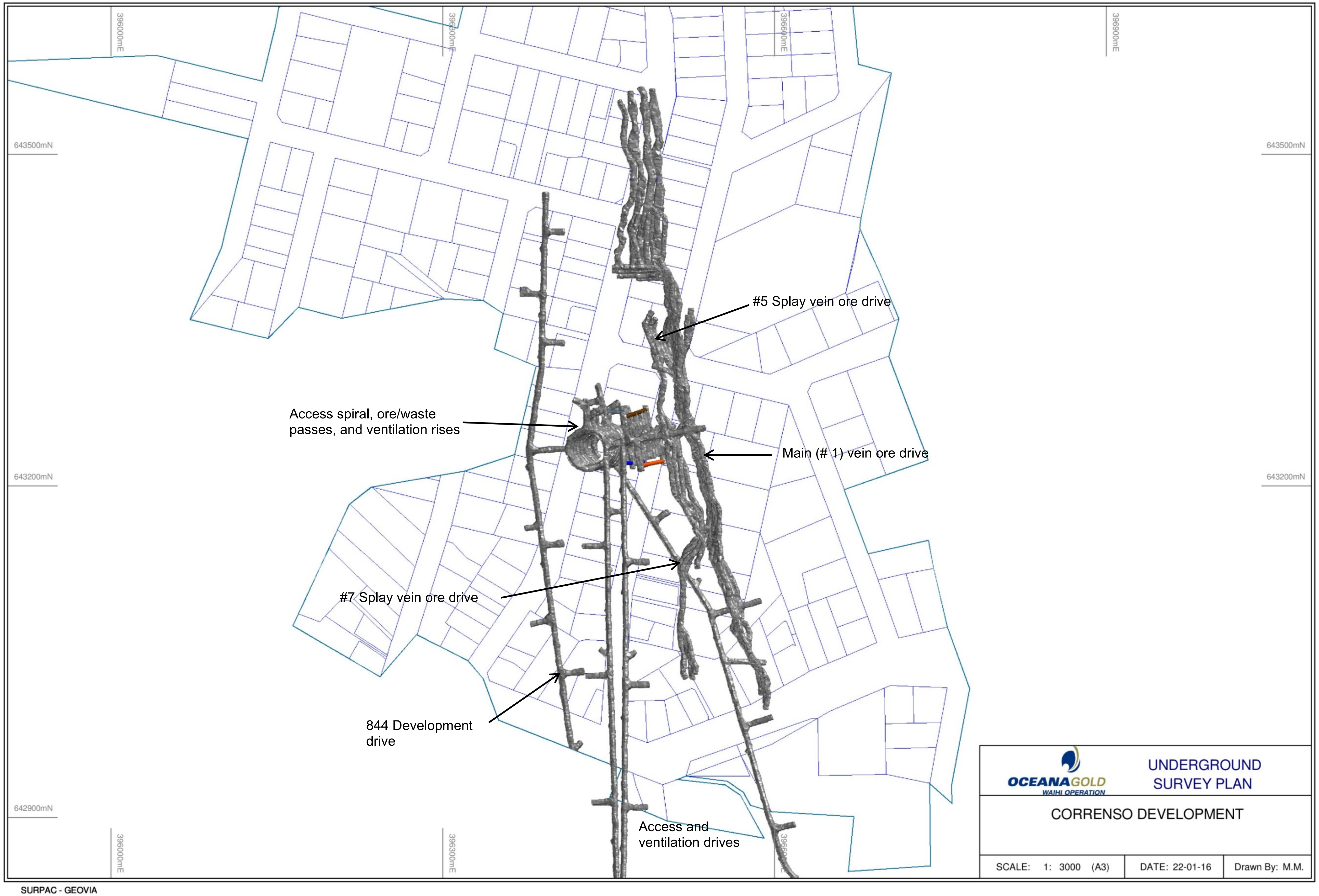


Figure 4: Correnso Development – Plan View (overlaying property boundaries)

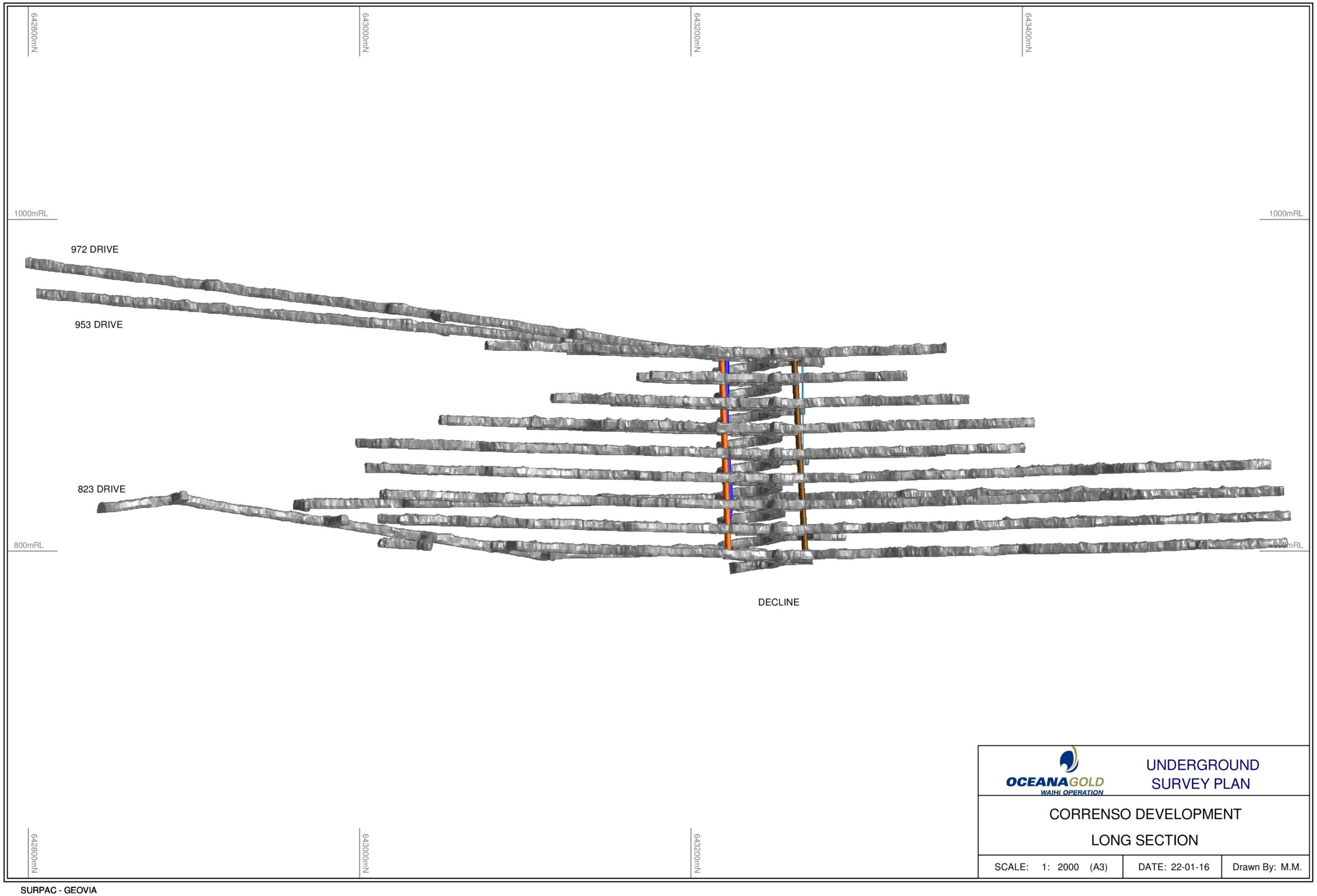


Figure 5: Correnso Development – Long Section View (left to right: south to north)

The Decline configuration is a tight spiral with vertical separation between each spiral of between 7.5 to 10m. All of the decline spiral will be backfilled prior to mine closure. The accesses to the ore-body off the Correnso incline/decline also overlie each other in a stacked arrangement and will similarly be backfilled as will the ore/waste passes and ventilation drives and rises on all levels.

There is only one area encountered to date where geotechnical conditions alone would determine backfilling would be required. This is at the northern end of the Correnso ore body where the ore zone has been terminated in an intensely sheared zone. This is part of a scheduled stoping panel and will be backfilled upon completion.

5. BACKFILLING AND COMPACTION OF STOPES (*c. 25c*)

All stopes extracted to date are backfilled as is dictated by the mining method and conditions. Compaction occurs during backfilling by the machine placing the fill in the stope, then continues with subsequent operations of heavy machinery on top of the backfill. Historically this gives good compaction and the high clay-content of the fill provides a good binding medium.

6. GROUND CONDITION REVEALED BY EXCAVATIONS (*c. 25d*)

Ground conditions are mostly as expected. Q-value estimates are from 1 to 80 representing rock mass categories Poor to Very Good according to Barton's (1974) ground support guidelines. This is slightly poorer than suggested by Dunn's (2014) Correnso Geotechnical Review.

Although most ground conditions are good or better, several areas of localised poorer ground have been encountered during development of drives along the main Correnso Vein as is common in epithermal ore-bodies of this nature. These areas of poor ground conditions are relatively restricted in extent and do not extend for more than 25 – 30 m along strike. Additional ground support has been installed in accordance with site standards and sound mining procedures. These areas encountered to date are all part of scheduled stope panels and will be extracted and backfilled and would not be expected to have significant stability issues associated.

A zone of very broken quartz-calcite veining termed the quartz-calcite fault trends approximately northeast and intersects the main Correnso vein zone. There is little economic mineralisation immediately north or south of the intersection and the zone appears to constitute an internal waste panel on the lower levels, and a termination of the main Correnso Vein on upper levels.

Where the Correnso veining continues north of the quartz-calcite fault (between the 795 and 840 levels) it dips at a relatively shallow angle (45 – 55 degrees) to the east, in contrast with the rest of the ore-body which is more-or-less sub-vertical in aspect.

Although this quartz-calcite zone will not be stoped it will still be backfilled.

The backs (roof) of the 870, 855, 840 and 810 turnouts[1] off the Correnso decline / incline have been shotcreted due to the necessity to raise the back heights for truck loading meaning slightly less separation between these particular sections of the decline / incline.

Additional cable bolts have been installed as determined by the geotechnical engineer where there are intersecting discontinuities with wedge potential. This is in accordance with standard practices.

[1] The term 'turnouts' refers to the intersection of the decline with the accesses for each level.

The Daybreak Vein is intersected by development drives on all levels but there is no obvious adverse impact on ground conditions.

7. MONITORING AND MEASURES FOR STABILITY (*c. 25e*)

Multipoint Borehole Extensometers (MPBX) have been installed around the central part of Correnso through the central closure pillar, on the 795, 810, 825 and 855 levels. The instruments are all installed in the intersections between the access and the ore-drives as representing the widest openings on the vein, as well as being the areas expected to see the most induced stresses as mining retreats towards the accesses. The MPBXs are inserted and grouted into drillholes and measure micro-displacements as low as 0.1 mm between “anchors”. The MPBXs utilised at Correnso have anchors at 1, 2, 3, 4, 6 and 8 m in the drillholes.

MPBXs are also installed at the start of the Correnso 844 Drill Drive.

Additionally a 2-anchor “clock-it” extensometer has been installed at the intersection of the decline and 840 level.

Anomalous movement relating to the closure and / or crown pillar that has to be reported to the HDC, is an increase in the rate of movement from multiple extensometers which does not subside after two weeks. Readings from extensometers within a 30m radius from active stoping operations are excluded.

None of the above monitoring instruments have given any results that would suggest developing stability issues.

A micro-seismic monitoring system was installed and commissioned during the year (as per consent condition 23d) to provide additional reassurance that mining activity would not be causing instability. Microseismicity can be basically described as micro-earthquakes less than 0 magnitude, too small to be felt on surface but detectable by sensitive equipment located underground.

The purpose of the seismic system is to monitor regional stability and the rock mass response to mining activities in the critical areas. Given the shallow depth of stoping and a relatively benign stress regime, the seismic system is not expected to record many non-blasting related seismic events. The maximum horizontal stresses pre-mining at 300 m depth are measured at 22 MPa; maximum vertical stresses (from the weight of the overlying rock) are around 15 MPa. These stresses are well below the 60 to 120 MPa average range of measured strengths of the rock mass that hosts the Correnso ore body.

It is generally accepted in industry that event magnitudes of:

Magnitude	Potential impact
$ML \leq 0.0$	does not impact on operations
$0.0 < ML \leq 0.5$	could potentially impact on operations, but typically marginally.
$0.5 < ML \leq 1.0$	could impact on operations and even cause damage if sufficiently close to workings.
$1.0 < ML \leq 2.0$	could require special energy absorbent support systems
$ML > 2$	definitely requires special energy absorbent support systems.

The agreed critical magnitude for Correnso is a conservative ML = -0.5. Any seismic event of ML = -0.5 and above are thus defined as an "anomalous result", and has to be reported to the HDC on a monthly basis and the following details are required:

- Event magnitude and location coordinates.
- Image plot of the seismic events that includes existing openings and significant geological structures.
- Explanation of the probable cause of the seismic events.

There were two reportable seismic events during the time the system has been commissioned. Both were well away from active working areas and there was no evidence of on-going activity.

7.1 REVIEW OF CONDITION 23 REQUIREMENTS

a) Mining methods used require stope voids to be backfilled

All stopes are backfilled as is required for the Avoca mining method (pictorial representation in Appendix A).

b) Limits to upper levels of stoping

The uppermost level on which stoping has been carried out by the end of 2015 was the 855 (840 – 855). Most of the stoping activity has been concentrated on the lower levels, below the 840.

c) Backfilling where required by geotechnical conditions

Refer Section 4.

d) Seismic monitoring and rock movement monitoring

Refer Section 7 above for monitoring systems.

e) Grouting of surface-drilled holes

No surface-drilled exploration has been undertaken over Correnso during the reporting period.

f) Interception of surface-drilled holes with water flows, and their treatment

Nine surface drilled holes have been intersected by Correnso development, with one hole (UW402) being intersected twice in different locations. All holes were managed conservatively in accordance with Standard Operating Procedures ("Management of Intersecting Surface Diamond Drillholes"), with any drillhole producing water being plugged and grouted with a minimum of 30 meters grout within 36 hours of the hole being intersected. Refer Appendix C for details.

8. MINING CONFINED TO CEPA BOUNDARY (*c. 25g*)

Figure 6 displays the current mine development overlying an aerial projection, with the CEPA boundary superimposed. Underground access to Correnso from Trio can be seen entering the south end of the CEPA boundary, with all subsequent Correnso works entirely within the consent boundary.

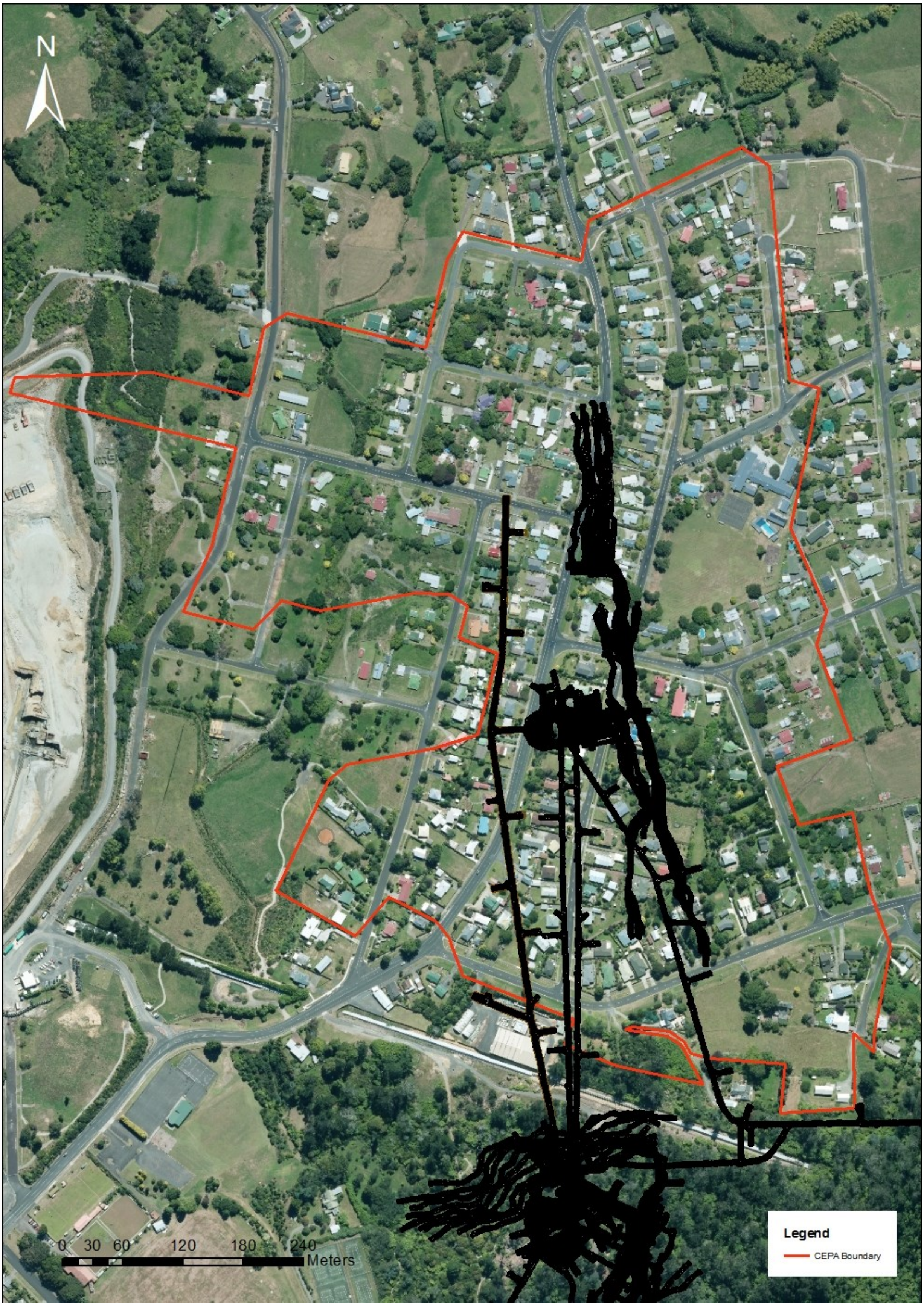


Figure 6: Correnso Development – Plan View (with CEPA boundary)

Note:
During the reporting period, CKL (a Hamilton survey firm) undertook an independent check of the site's survey methodology used for transforming mining coordinates onto plans with legal boundary positions sourced from Landonline. The determination of this survey, combined with the assessed survey error derived from underground surveying, indicates a maximum survey error of 66cm. When designing mining operations, this potential error is incorporated into mine design to ensure boundaries are not transgressed.

9. CONCLUSION

Waihi Gold believes it has fully complied with Conditions 25 of HDC LUC 202.2012 and that the risk of ground surface instability is extremely low due to the geology of the area and best practice underground mining methodologies which have been employed.

10. REFERENCES

Dunn, M. 2014. Correnso Stage 2B Geotechnical Study. NEM013. Internal Newmont Report prepared by SRK Consulting (Australasia).

Barton et al (1974). Barton, N., Lien, R. and Lunde, J. 1974. Engineering classification of rock masses for the design of tunnel support. Rock Mech., May. 189-236.

CKL (Pagan M), June 2015. Correnso Mine Waihi Report. Survey Verification Report for Hauraki District Council.

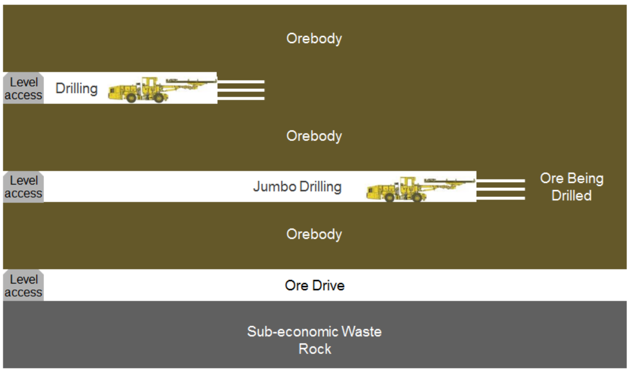
Mining One (Fuller, P), February 2015. Verification of CEPA underground mine workings relative to cadastral boundaries on the surface. Report for Hauraki District Council.

Appendix A

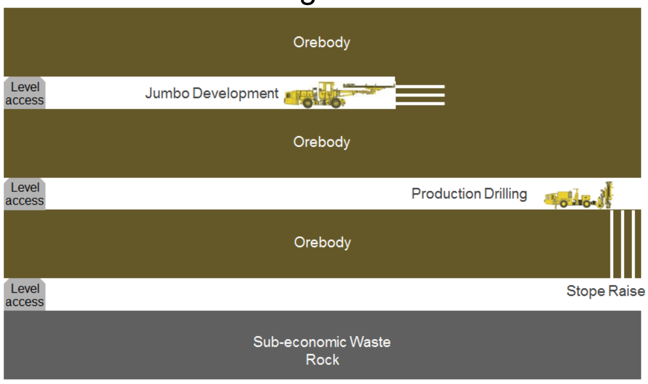
Modified Avoca Technique

Schematic of Modified Avoca Technique

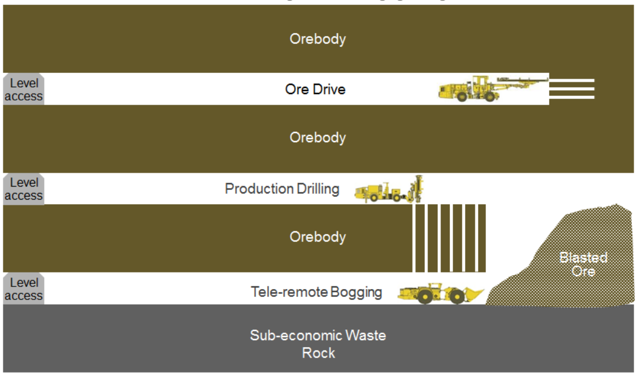
1 Drill drive access



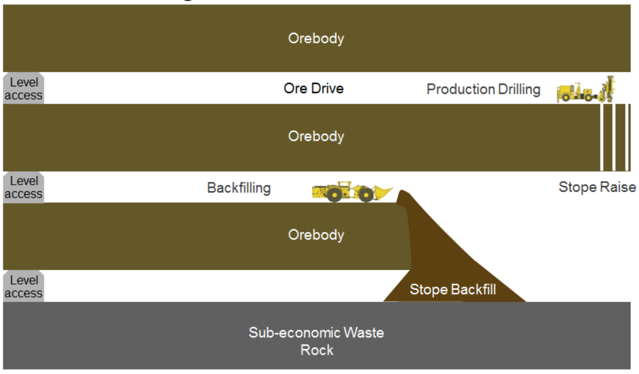
2 Production drilling



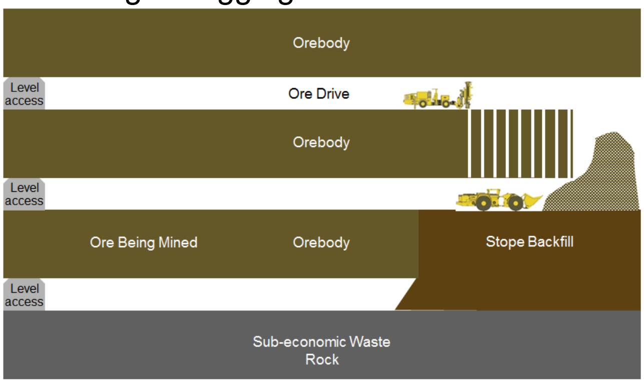
3 Production blasting & bogging



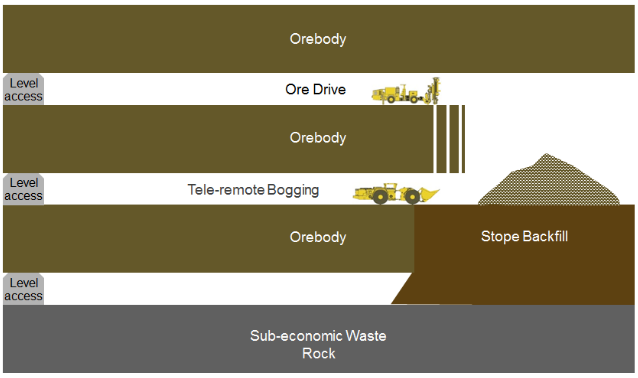
4 Backfilling



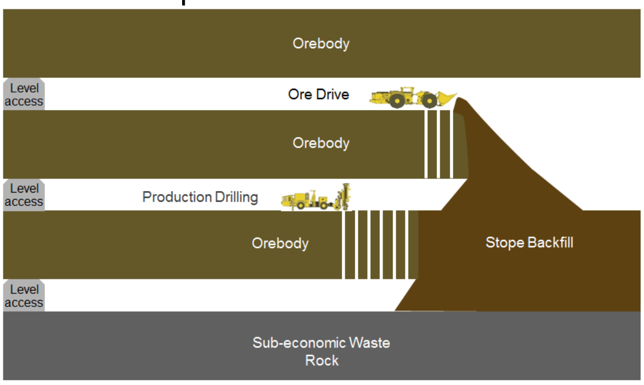
5 Blasting & bogging over backfill



6 Progressive blasting/bogging



7 Multi-level production/backfill

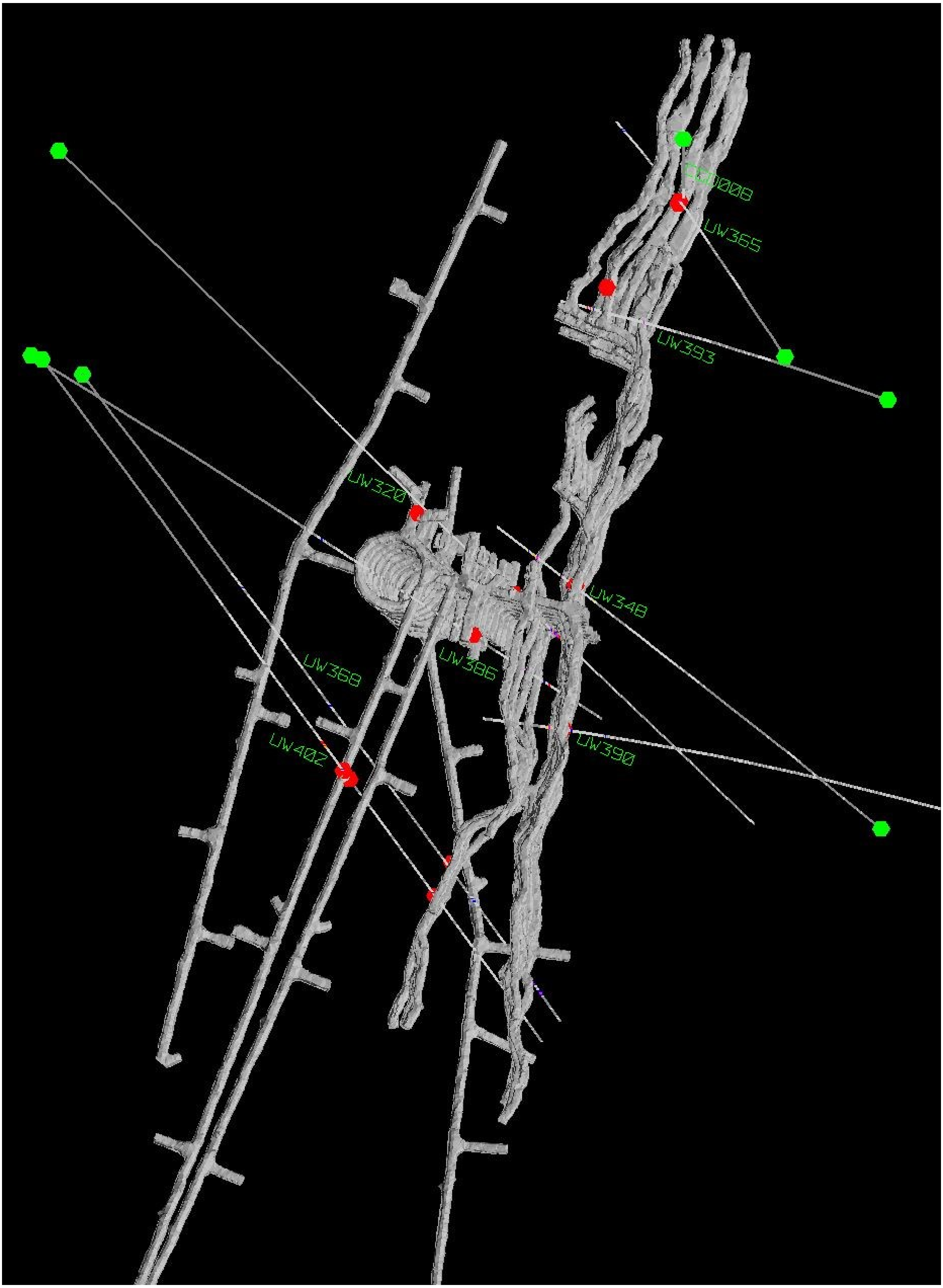


Appendix B

Surface Drillholes Intersecting Workings

Hole ID	Level	Drive	E	N	mRL	Date intersected	Pickup	Grouting status	Comments
CGD008	810	C4-FW	396488.5	643473.4	821.4	13/06/2015	Estimated	Not grouted	Hole dry - no evidence of being a water conduit at this level: no Fe staining
UW320	912	ACC	396432.0	643265.1	917.8	13/04/2015	Surveyed	Not grouted	Hole dry
UW348	900	C1-N	396520.5	643263.4	907.6	14/12/2015	Estimated	Grouted	Trickling water which ceased within a day - grouted 16/12/2015
UW365	810	C4-FW	396488.4	643474.8	821.4	9/06/2015	Estimated	Not grouted	Hole dry
UW368	825	C7-S	396515.3	643114.2	833.1	26/08/2015	Surveyed	Grouted	Minor flow - hole re-grouted 16/12/2015
UW386	915	ORE PASS	396482.3	643218.5	914.9	4/02/2015	Surveyed	Not grouted	Hole dry - now in ore pass
UW390	840	C1-S	396541.4	643199.0	844.1	25/03/2015	Surveyed	Not grouted	Hole dry - no evidence of being a water conduit at this level: no Fe staining
UW393	840	C4-HW	396472.9	643416.3	851.4	16/08/2015	Estimated	Not grouted	Hole dry
UW402	953	CDD	396449.3	643126.9	930.5	17/12/2014	Surveyed	Grouted	Hole was producing minimal water for only a few hours
UW402	855	C7-S	396515.0	643092.4	864.6	18/10/2015	Surveyed	Not grouted	Dry - second time intersecting hole with development - was grouted on the 953

Overleaf is an oblique view looking north-west of Correnso development with surface drillholes intersected and their pierce points.
(Green points are the drillhole collars in view while the red points are where the drillholes intersect development.)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