



PT. Nusa Halmahera Minerals

**The Gosowong Goldfield;
5 Moz Au and still growing!**

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October 2008**



Objectives of Presentation

- Apa Gosowong???
- Geology and deposits in goldfield
- Terry's contribution in 1998
- Overview of Kencana system
- K1, K2 Bonanza Zones
- Current developments



Gosowong... apa????

- What? Au / Ag epithermal and Cu porphyry district
- Where? East Indonesia on Nusa Halmahera
- Who? 82.5% Newcrest Mining
17.5% PT Aneka Tambang
- When? Production since 1999;
Gosowong, Toguraci, Kencana
- Why? Cumulative Au production over 2Moz
Au Resources +3Moz
Average Head Grade; ~1 Au oz/tonne
400koz pa production plan (next 4 years)
Strong cash generation (ccost ~USD235/oz)

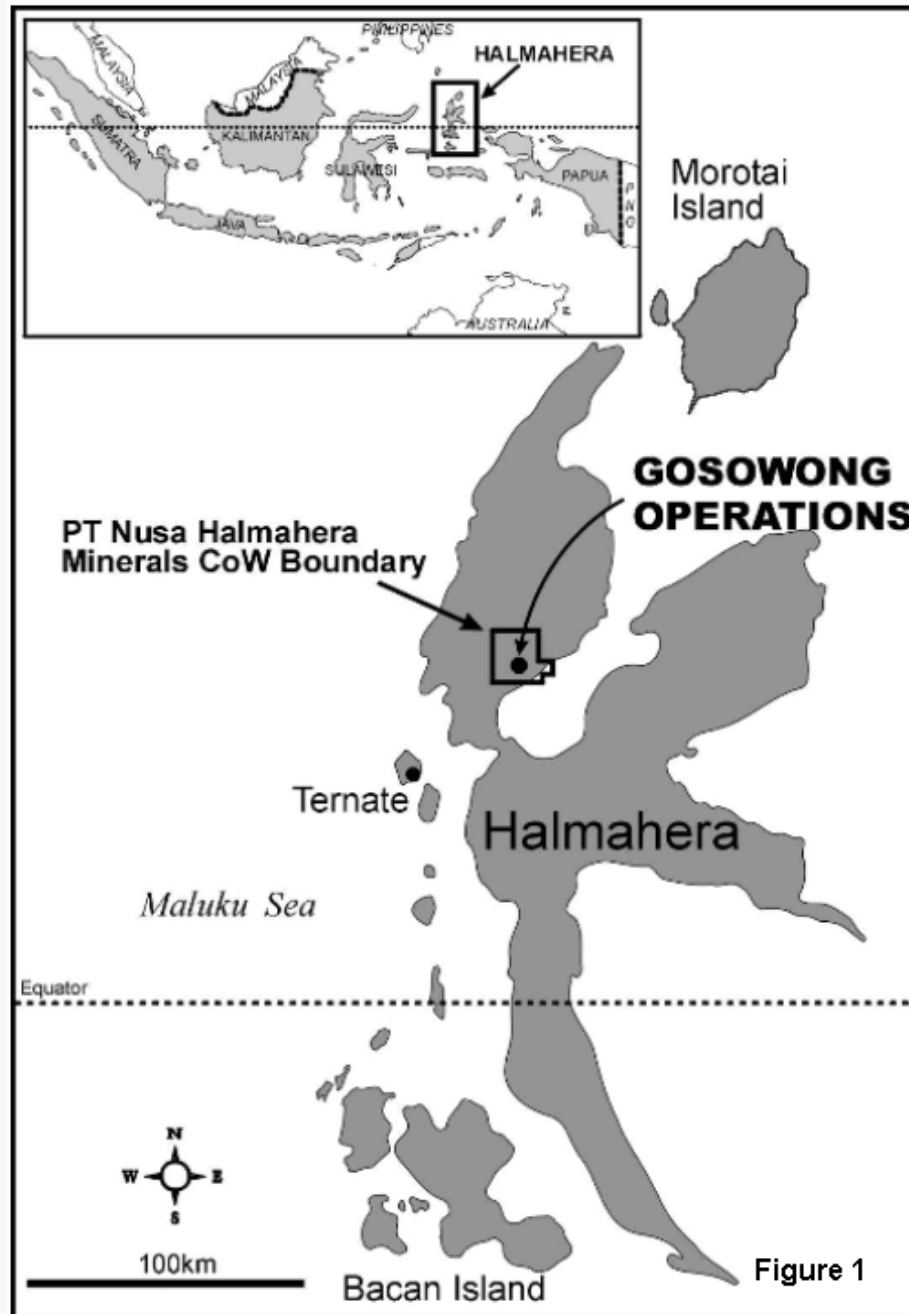
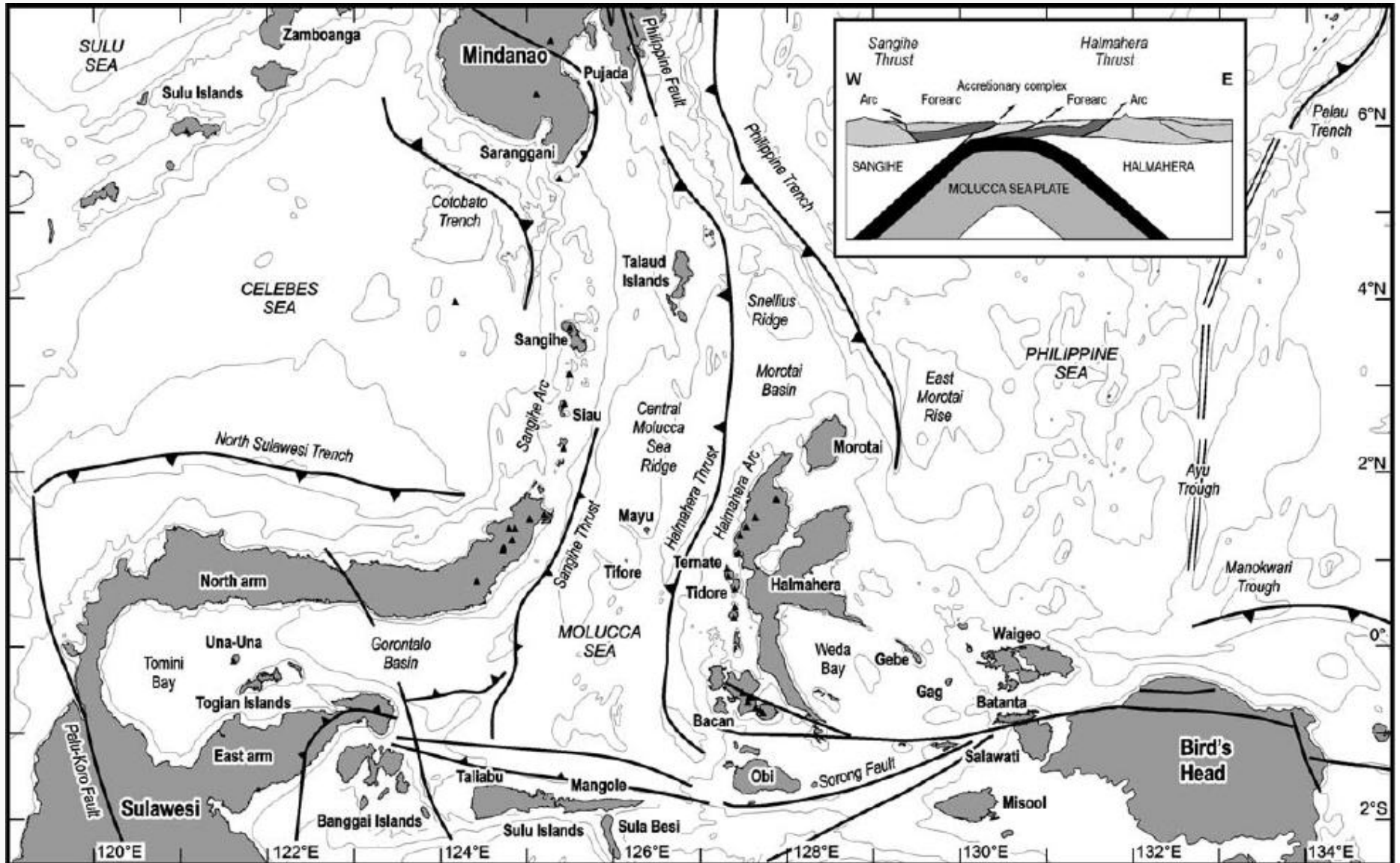


Figure 1



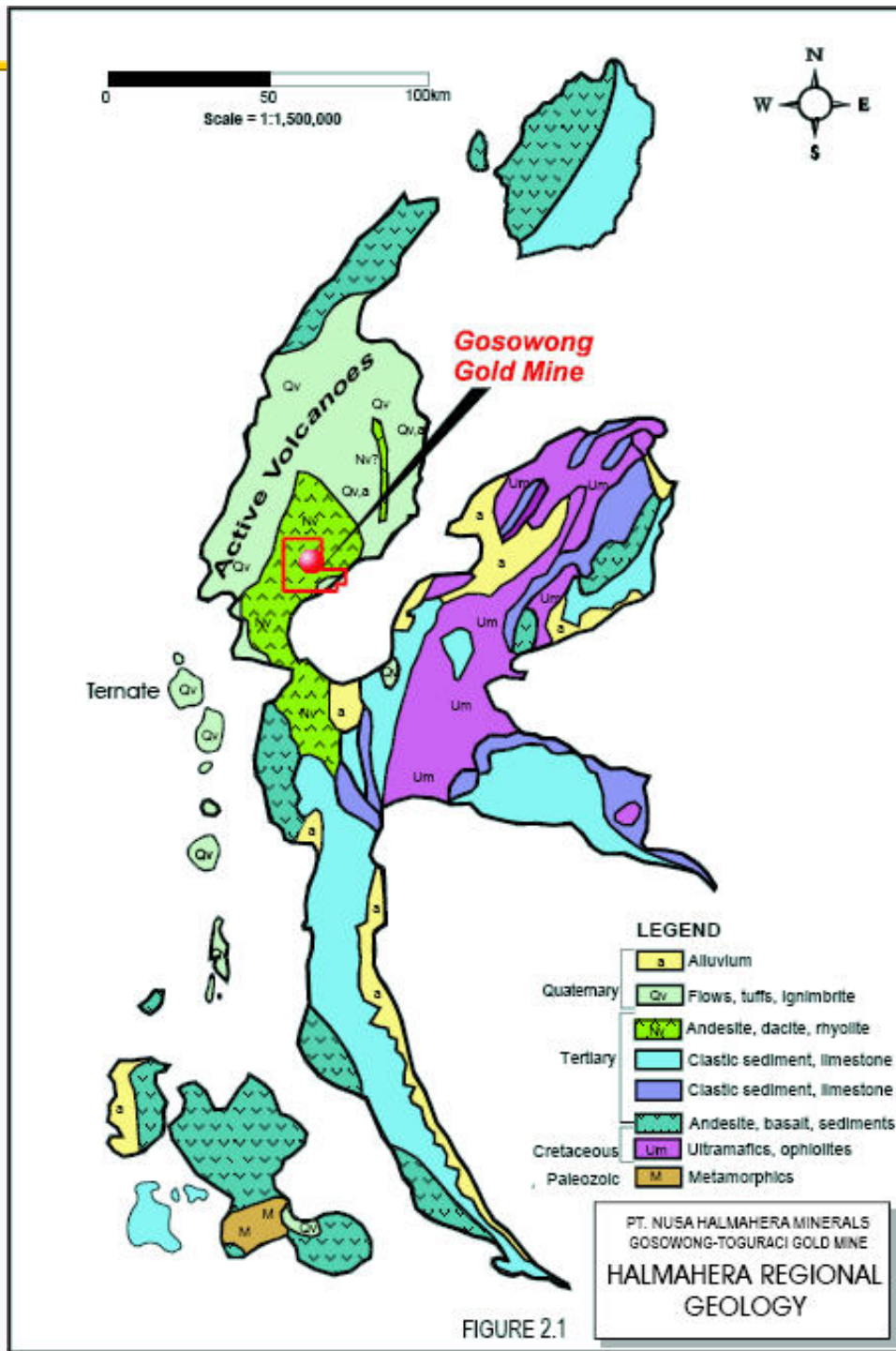
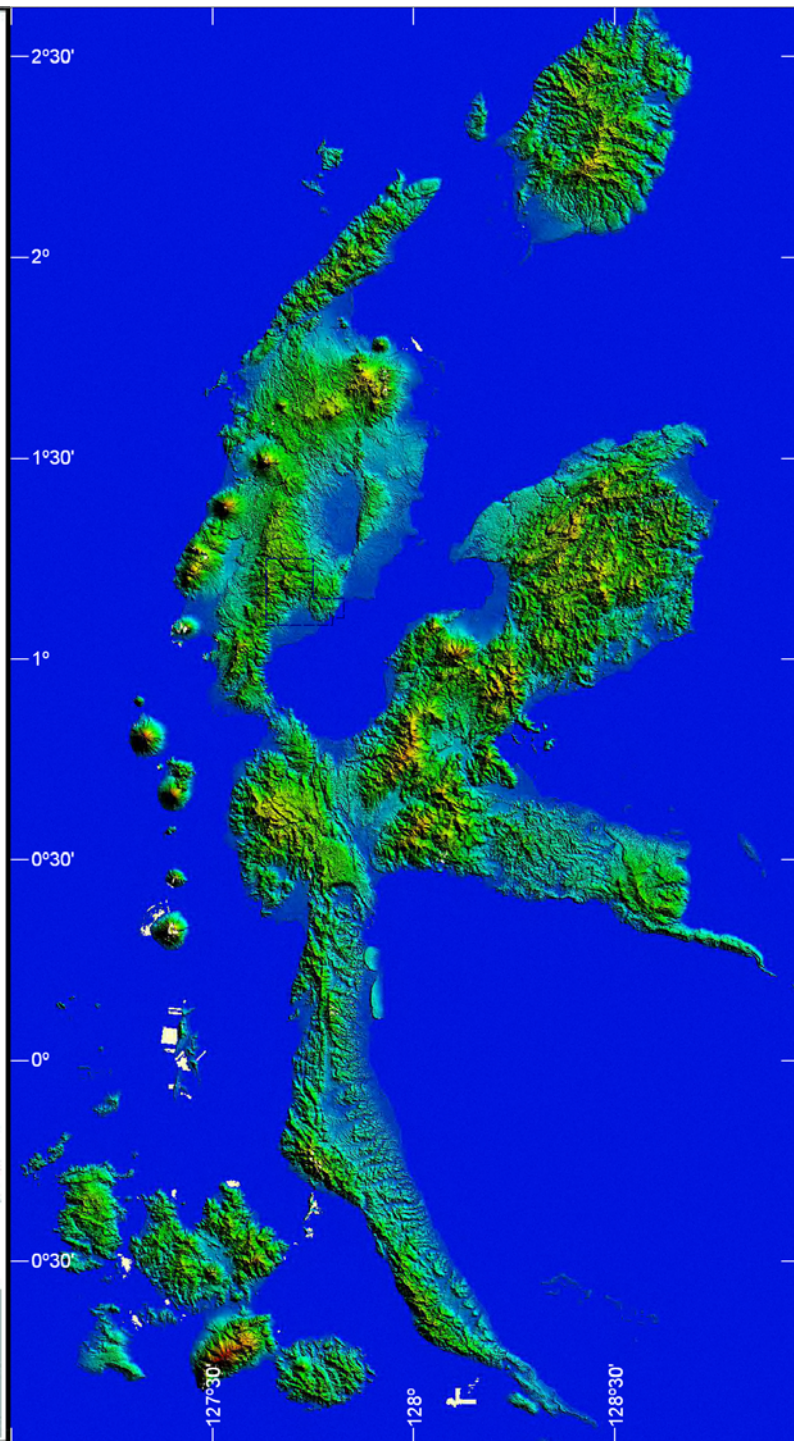
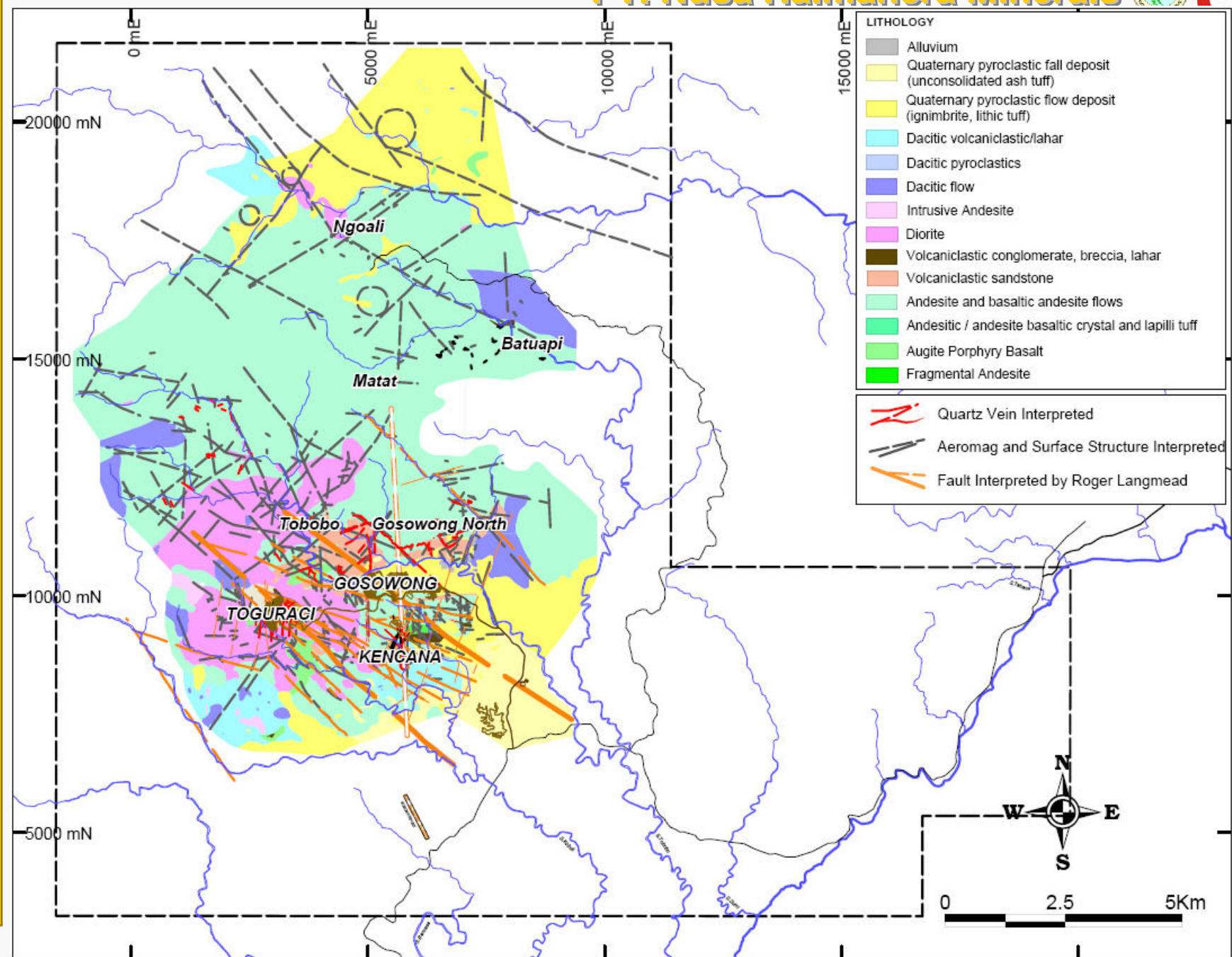
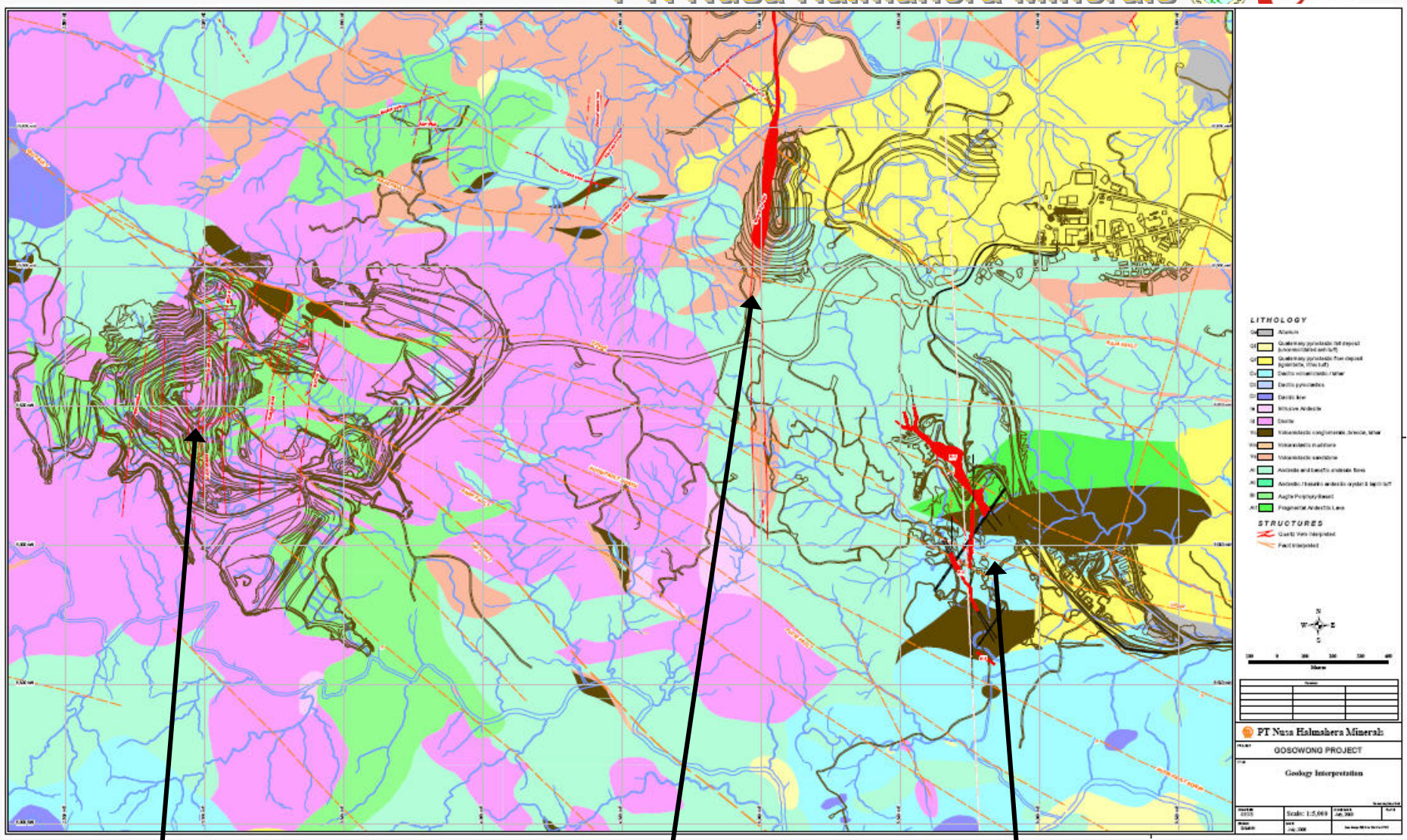


FIGURE 2.1









Toguraci; 0.55Moz

Gosowong; 0.85Moz

Kencana; 3.65Moz



Terry's contribution

- Visited site for 4 days in May 1998 to review prospects and data for Newcrest.
- Focus on two Po Cu-Au projects (Matat and Bora) and reviewed data in Gosowong epithermal deposit recently discovered. The Toguraci epithermal sits above the Bora Po deposit.

Gosowong

- Observations of potential fluid pathways being more horizontal than vertical.
- Arsenic anomalism in soil above southern end of Gosowong

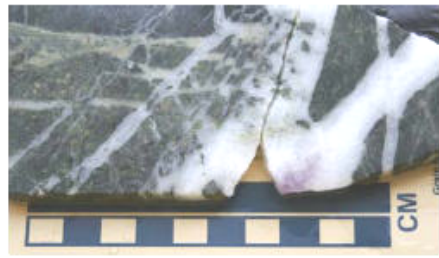
Overview of Kencana System

- ‘Narrow vein’ style – low sulphidation epithermal.
- Four stages of mineralisation
- Intersecting network of structures; K1, K2, K Link...
- Bonanza Zones, Main Zones and Stockworks
- Generally low orebody dip $\sim 45^\circ$ K1 to $\sim 35^\circ$ K2
- Poor to Very Poor ground conditions – altered andesites, clays and mudstones! Undercut and fill mining method – high cost.
- Irregular plan geometry and lateral offsets occur - complex in detail.

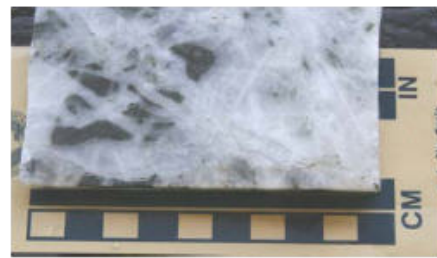
Mineralisation stages

- **Crystalline Veins:** precursor epithermal event, distinct silver bias, massive to banded quartz \pm chalcedonic banding \pm adularia, and includes vughy, dog toothed quartz. Mineralisation is as electrum with some base metal sulphides. Gold grades are generally <5 g/t. **'Stockwork' mineralisation.**
- **Quartz-Adularia event:** layered quartz and quartz adularia episode, veins are crustiform to colloform banded with fine interlayers of dark chlorite. Grades range from **5 - 50 g/t Au**, mostly as electrum, with visible gold regularly reported in the dark bands. **'Main Zone' mineralisation.**
- **Quartz-Chlorite event:** This is a vein and breccia overprint with a common texture being Quartz Adularia veins as clasts encrusted by Quartz Chlorite veining. volumetrically less significant than the Quartz Adularia event, the high gold grades **50 - 200++ g/t** with a Au bias) This mineralisation event is commonly referred to as **'Bonanza Zone' mineralisation.**
- **Silica-Sulphide event:** Late stage, dark grey /black molybdenite/pyrite veins crosscutting structure trends, with a chemical signature of Mo, As, Tl, Sb, Ag, Au. Suggests a closer affiliation with a magmatic fluid source.

KENCANA MAIN ZONE QUARTZ VEIN TEXTURE



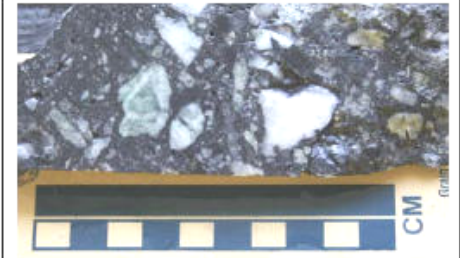
QUARTZ CRYSTALLINE STOCKWORK



QUARTZ CRYSTALLINE BRECCIA



BLACK SULFIDE WITH FRACTURE FILL TEXTURE ON QUARTZ CRYSTALLINE VEIN



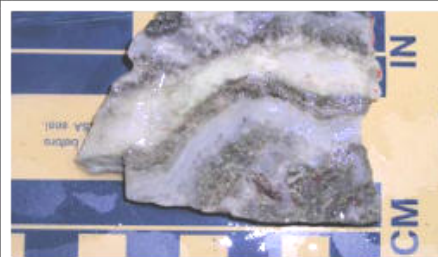
BLACK SULFIDE BRECCIA



BANDED CHALCEDONY



COLLOFORM-CRUSTIFORM OF BLACK SULFIDE BANDS



COLLOFORM OF CHLORITE BANDS



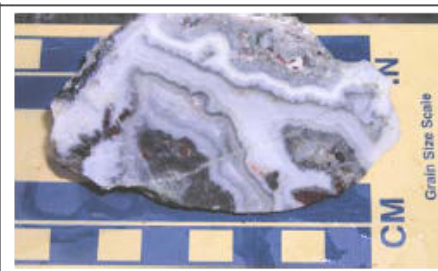
COLLOFORM-CRUSTIFORM OF ADULARIA BANDS



SUGARY/SACCHAROIDAL QUARTZ-ADULARIA



MOSS TEXTURE OF QUARTZ ADULARIA



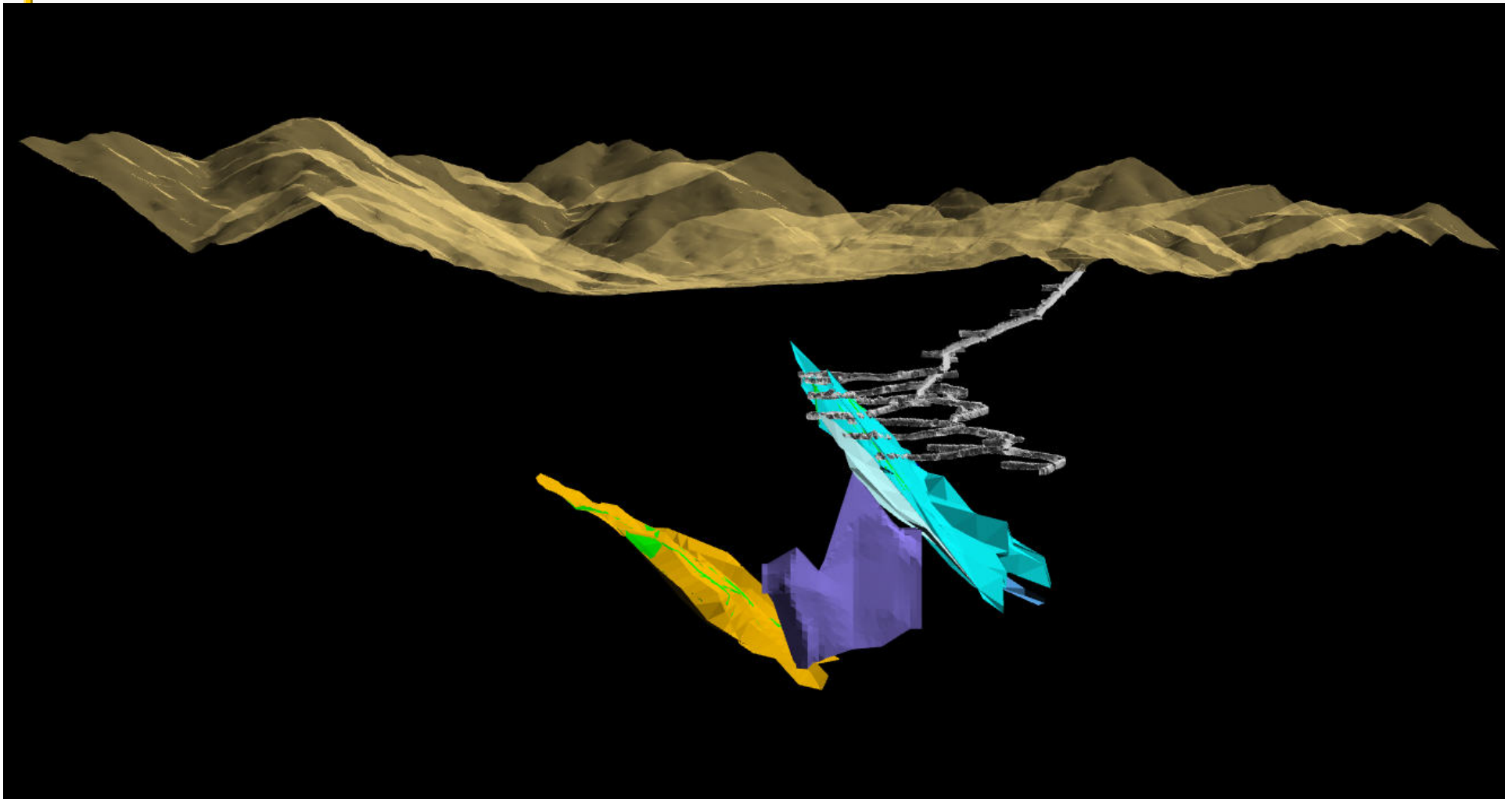
COCKADE BRECCIA



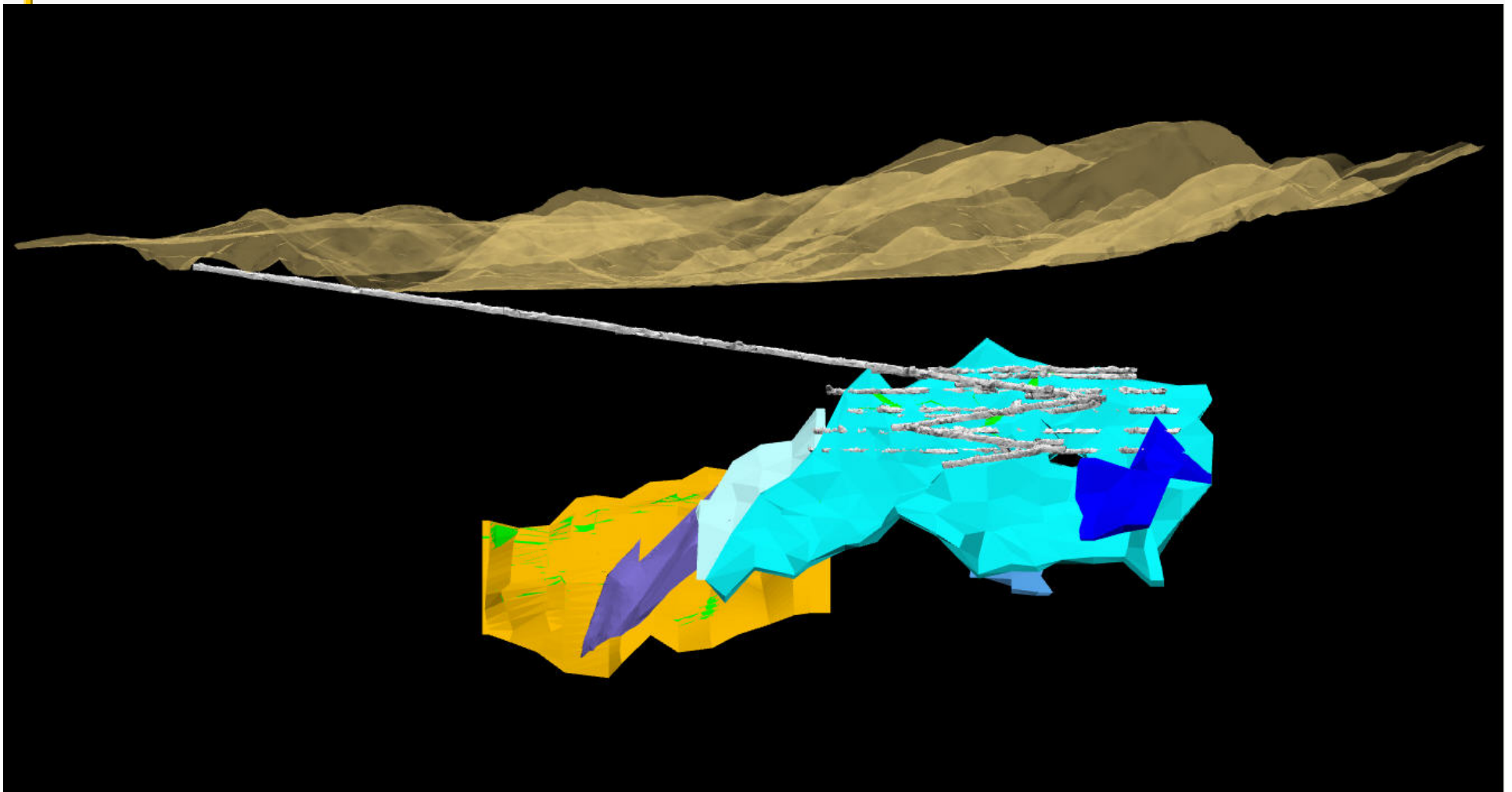
MOSS TEXTURE QUARTZ-ADULARIA BANDED WITH COLLOFORM-CRUSTIFORM SULFIDE BANDS



Kencana Geometry - XS



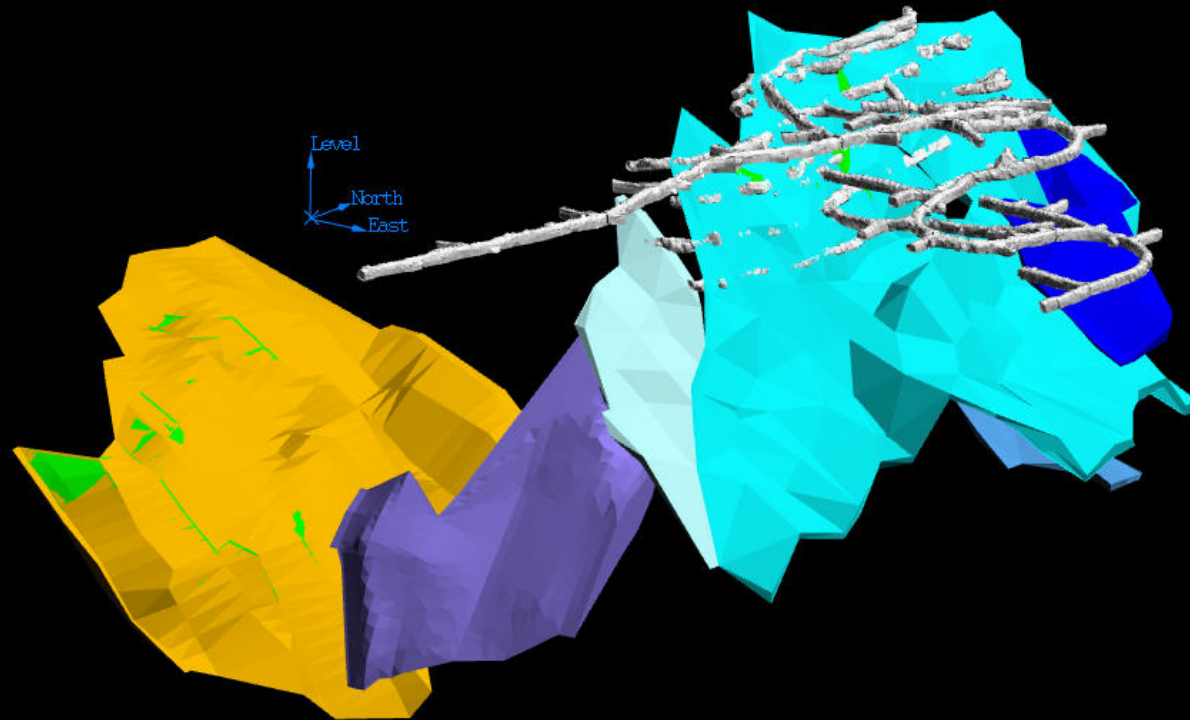
Kencana Geometry - LS

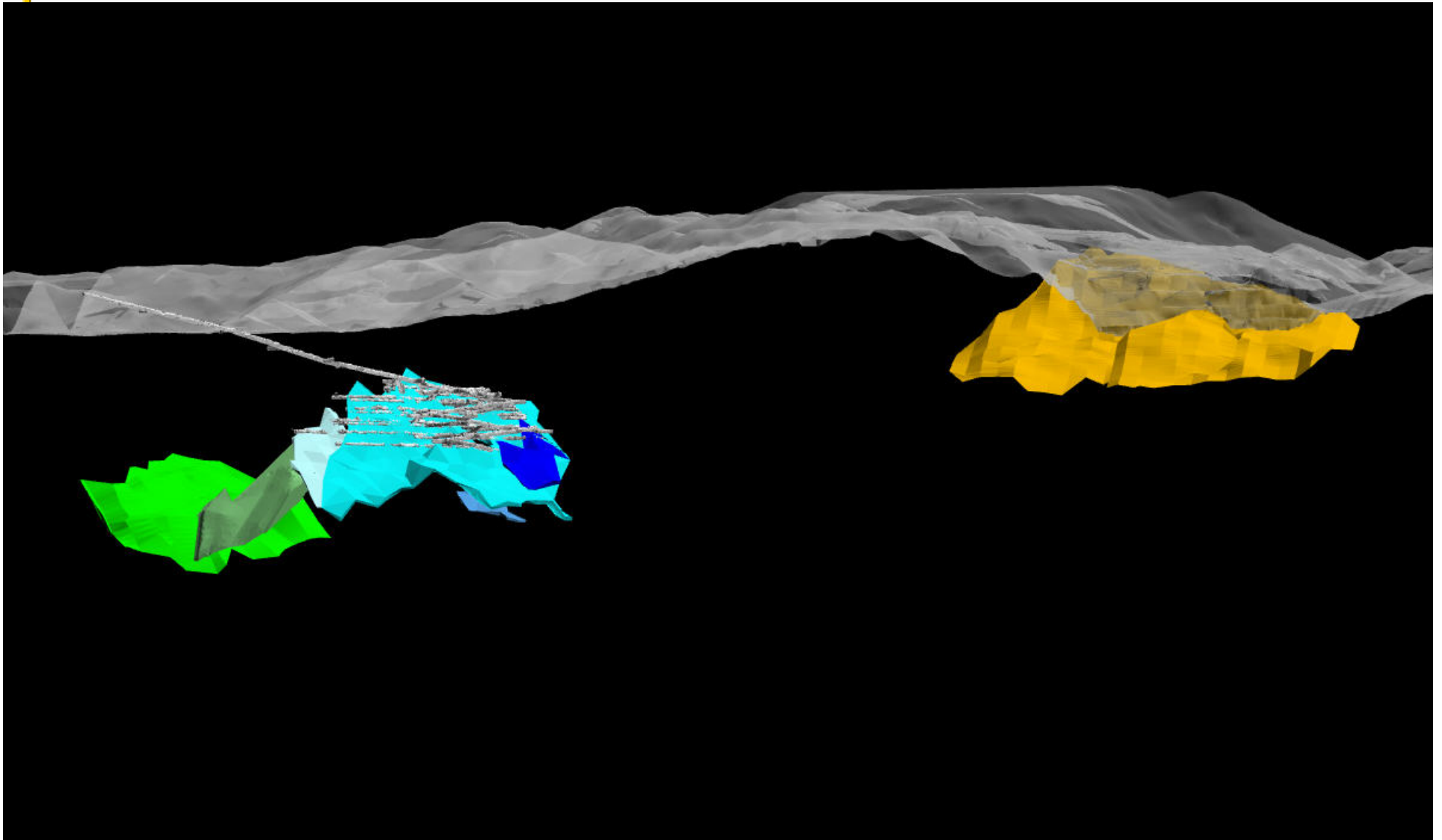


Kencana Geometry - Plan



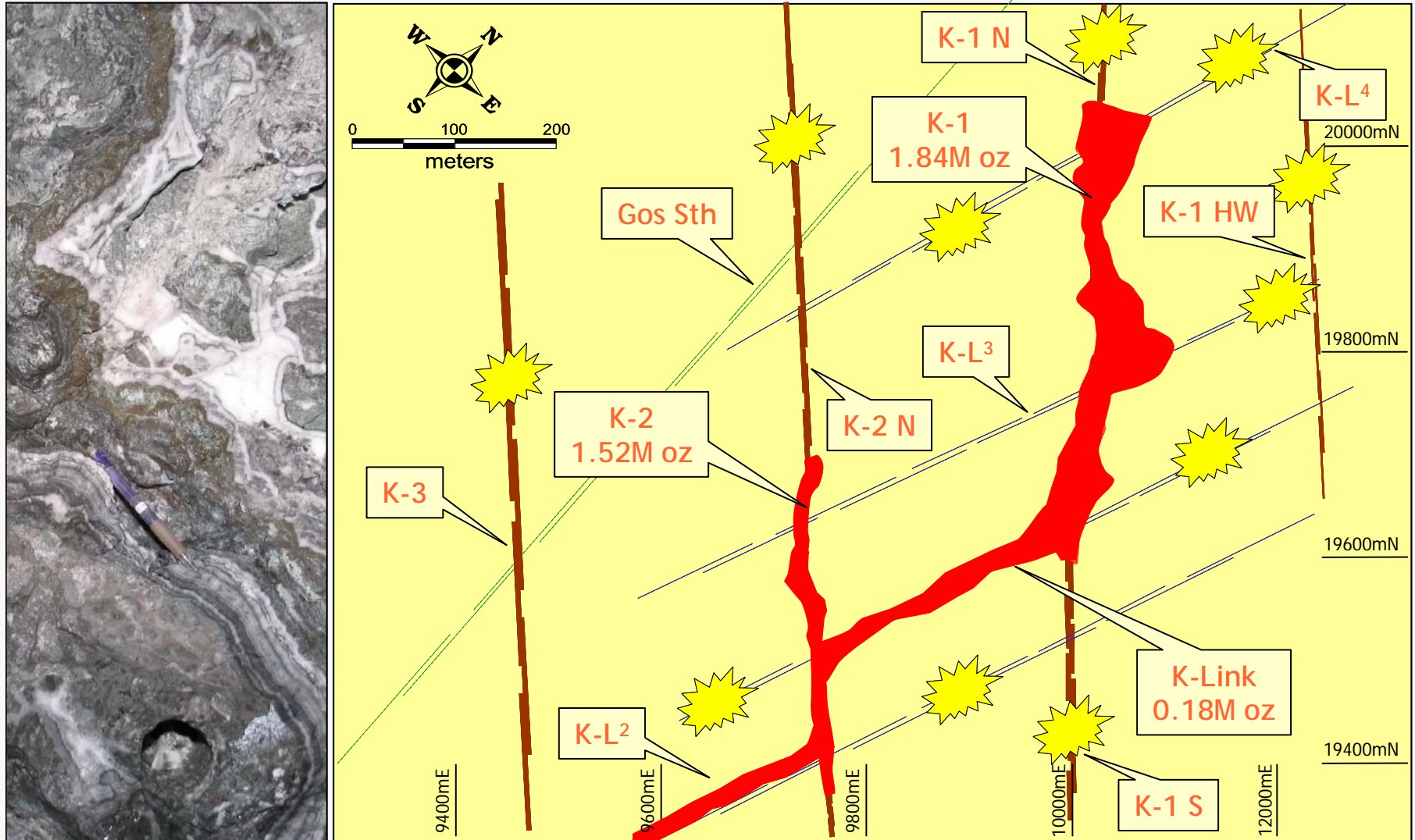
Kencana Geometry - Iso

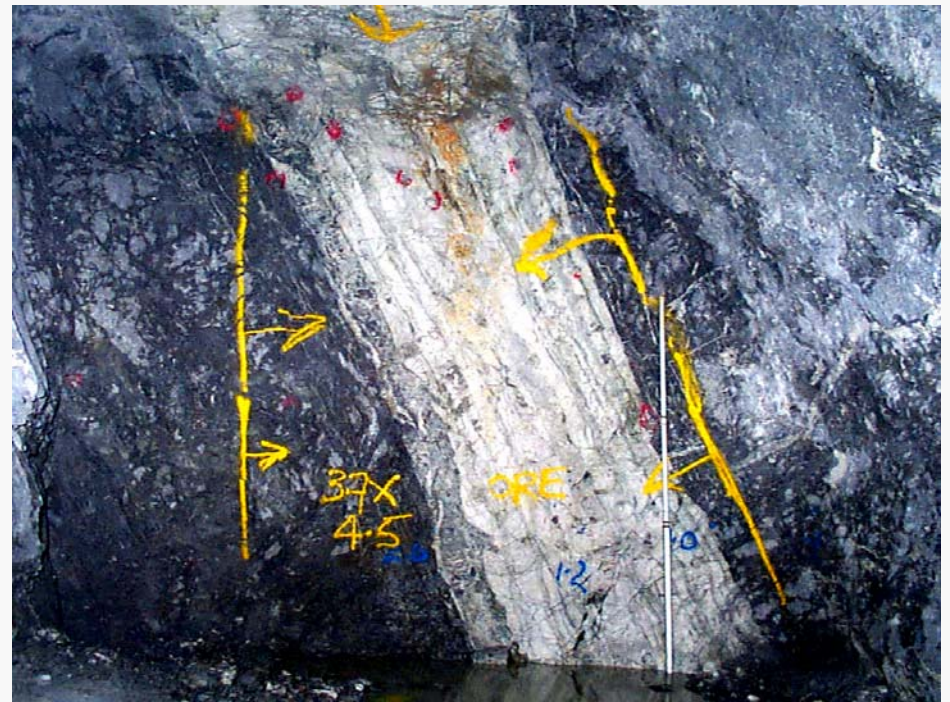






Too Many Ks ??



















Sirovision



Bonanza Zone

- Present in K1 and K2, lacking in K Link.
- “10% of Volume contains 40% of Metal”
- Irregular yet predictable
- Internally very low CV (~0.9); valid domain
- Proving to be more widespread in K1
- Estimation of Bonanza Zone has major impacts on Resource.





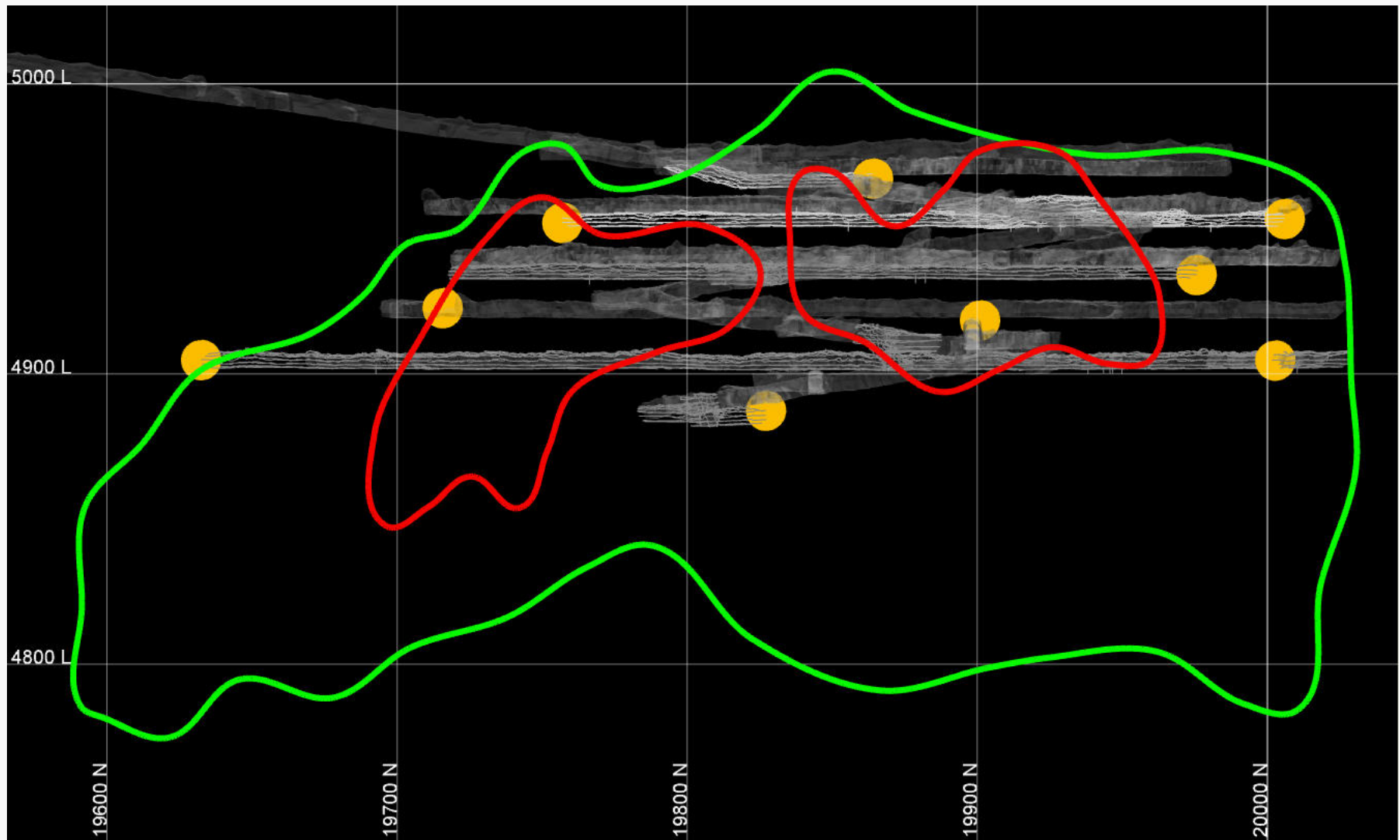




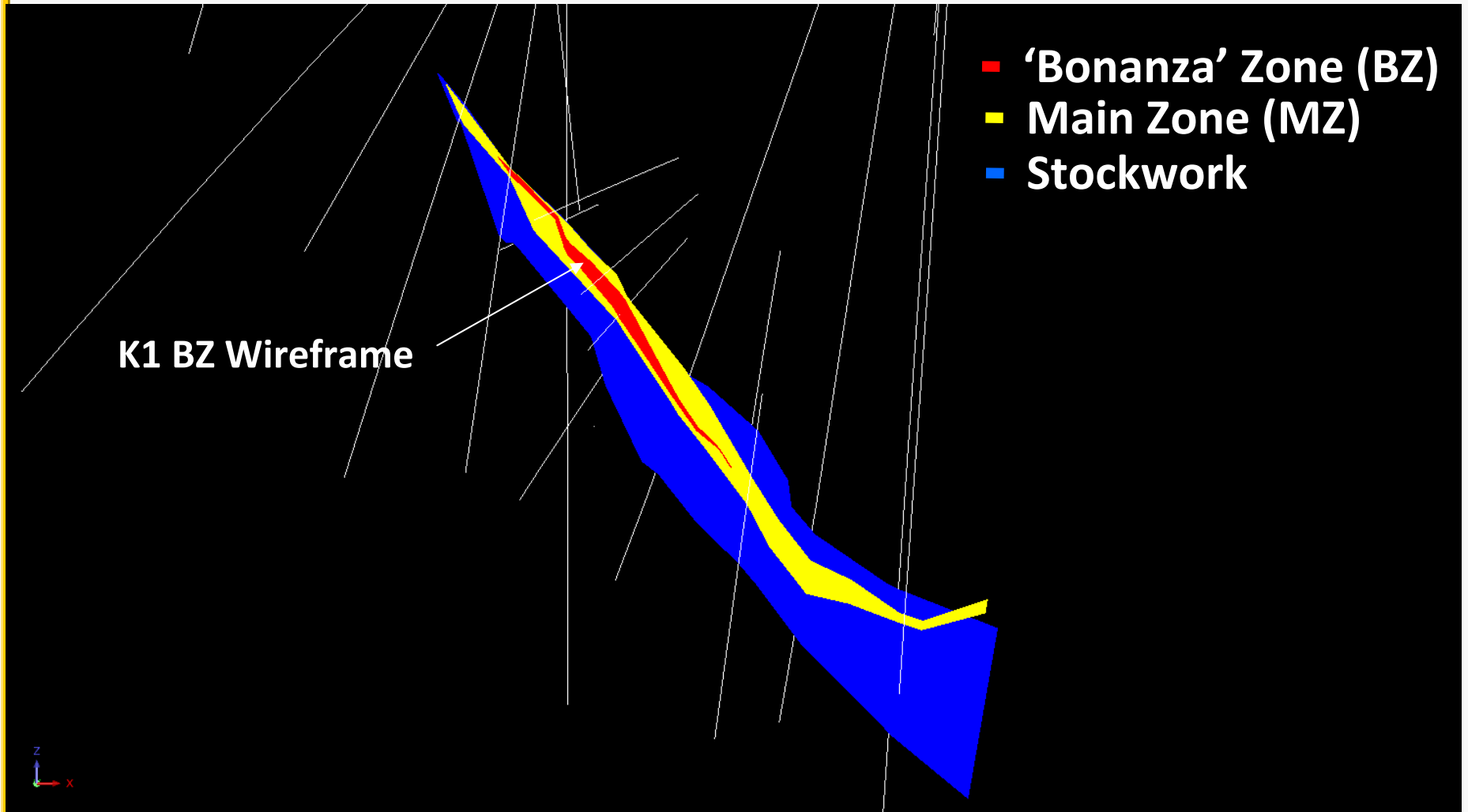


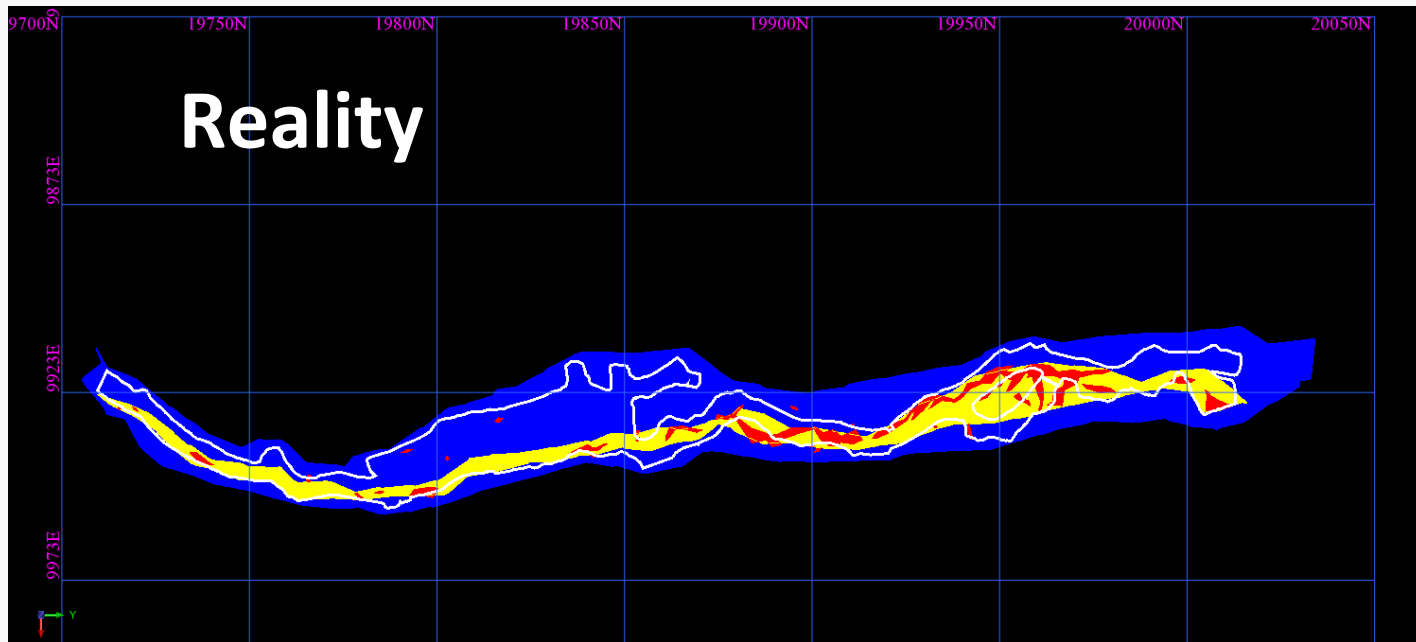
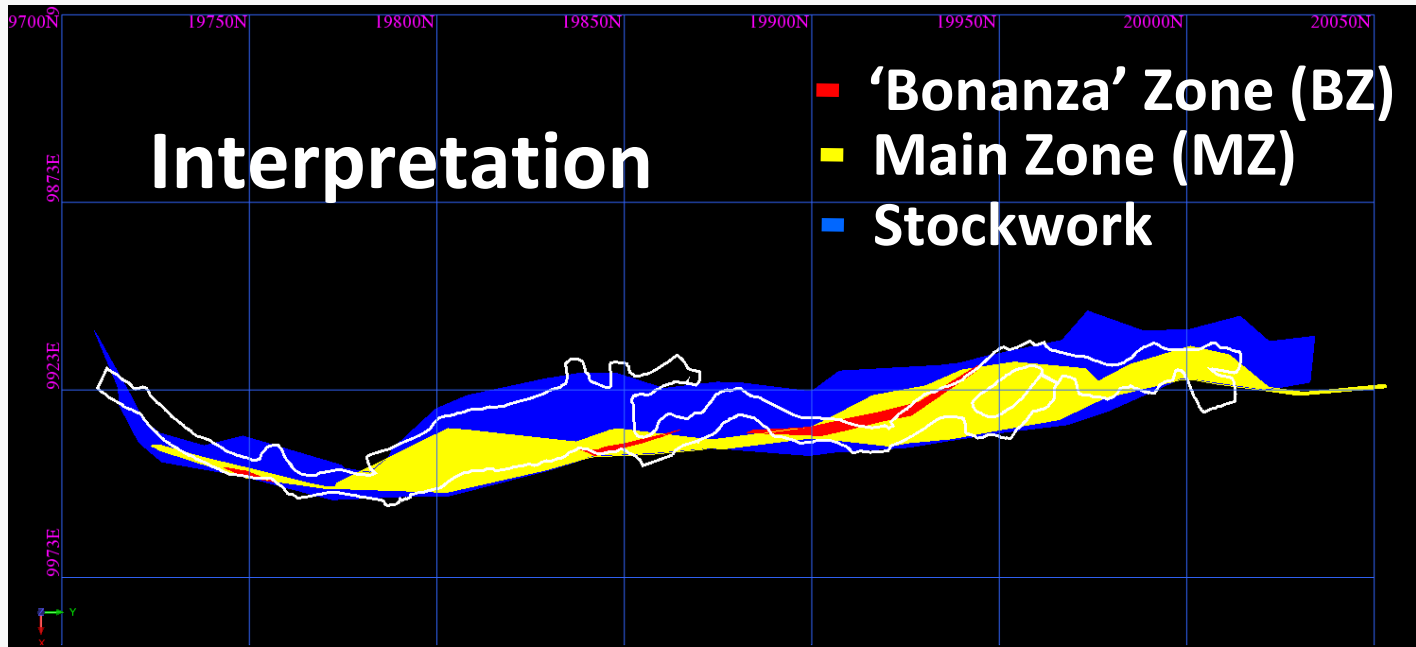


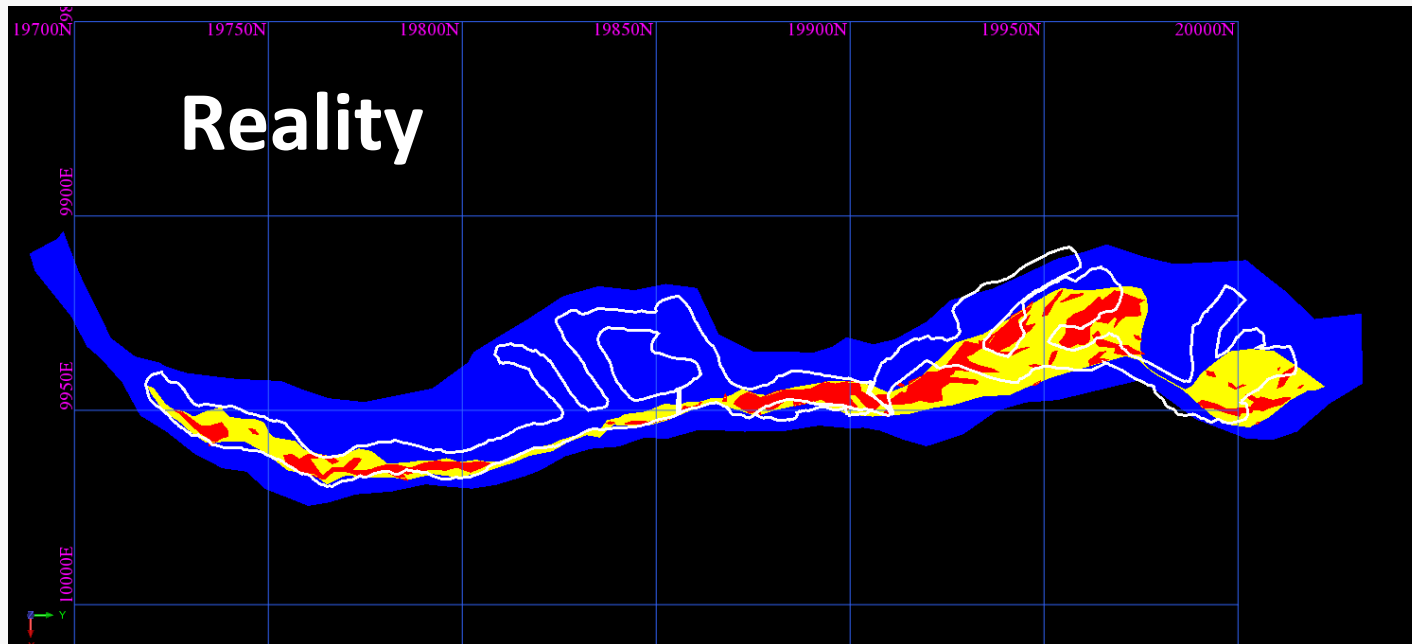
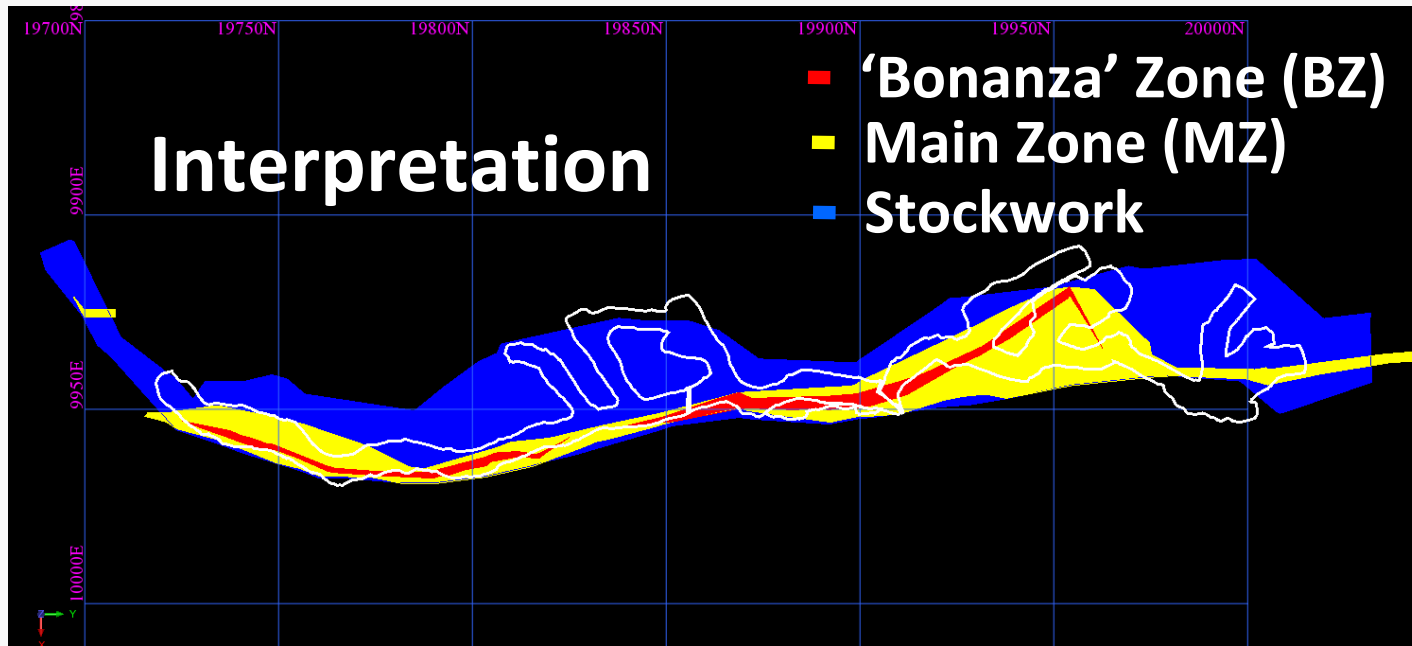
**K1 Longsection with decline and mined areas.
Current mining locations as orange dots, reserve outline in green,
bonanza zone in red**

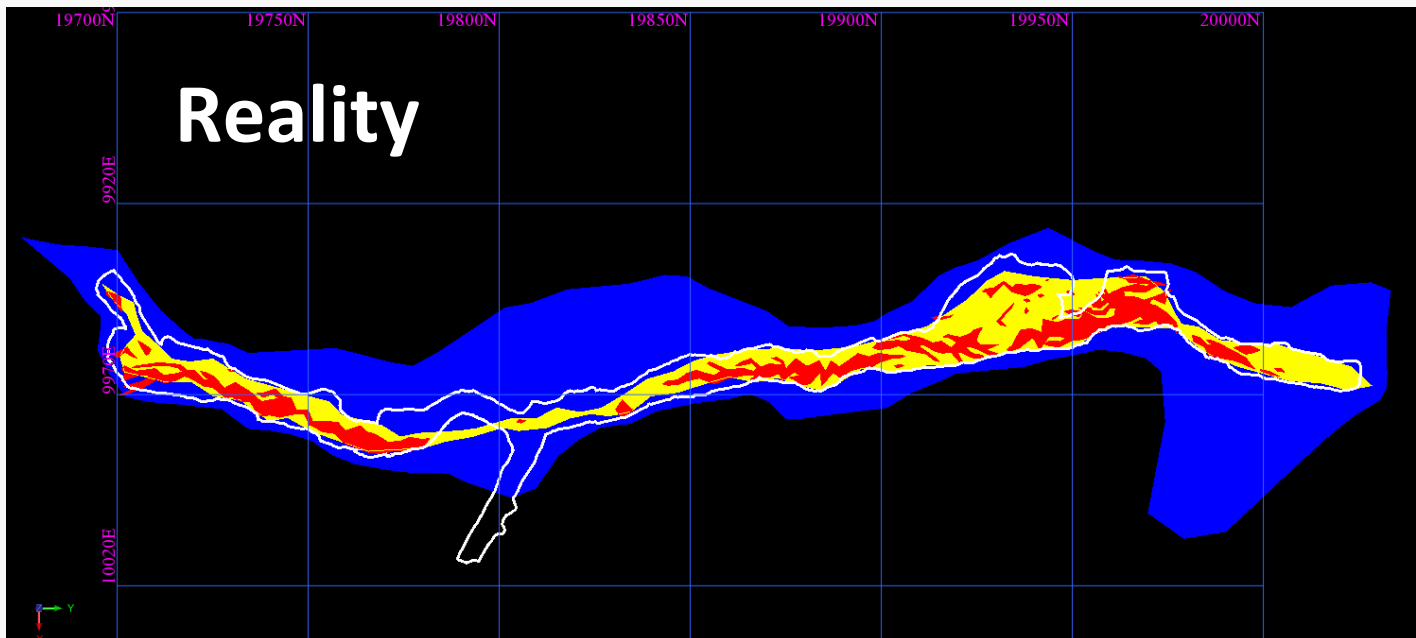
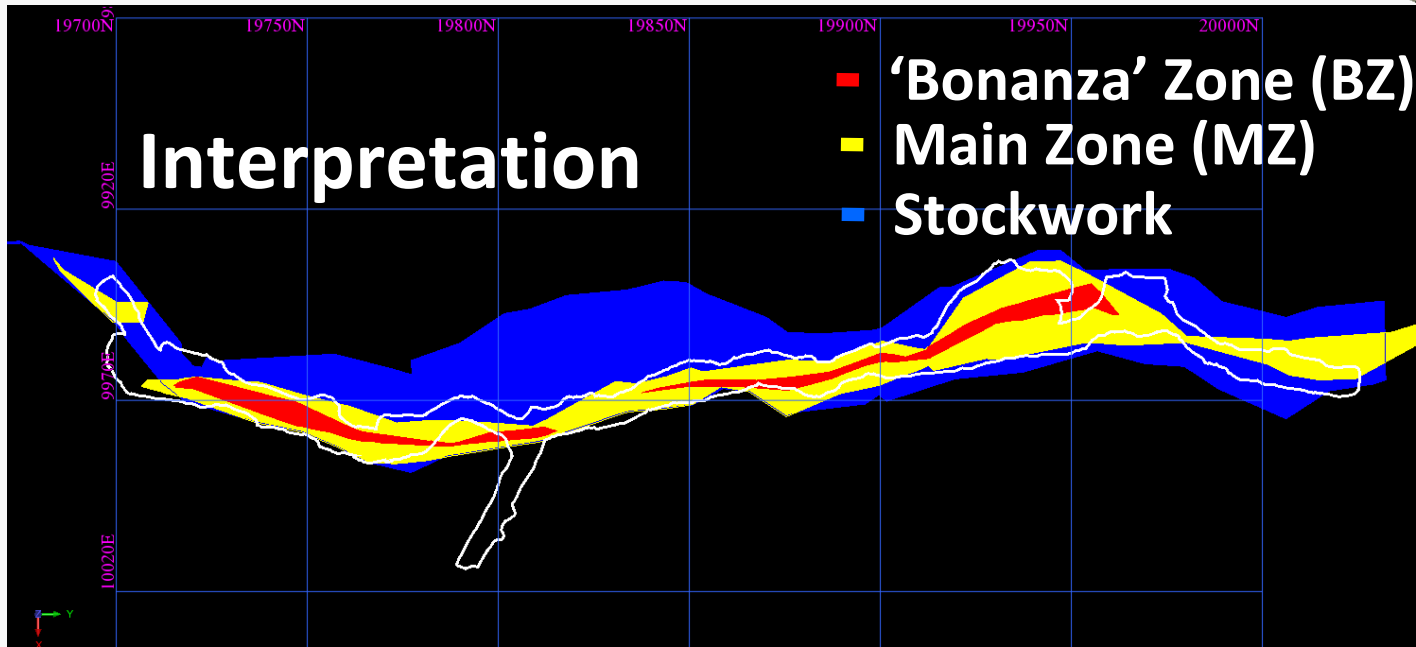


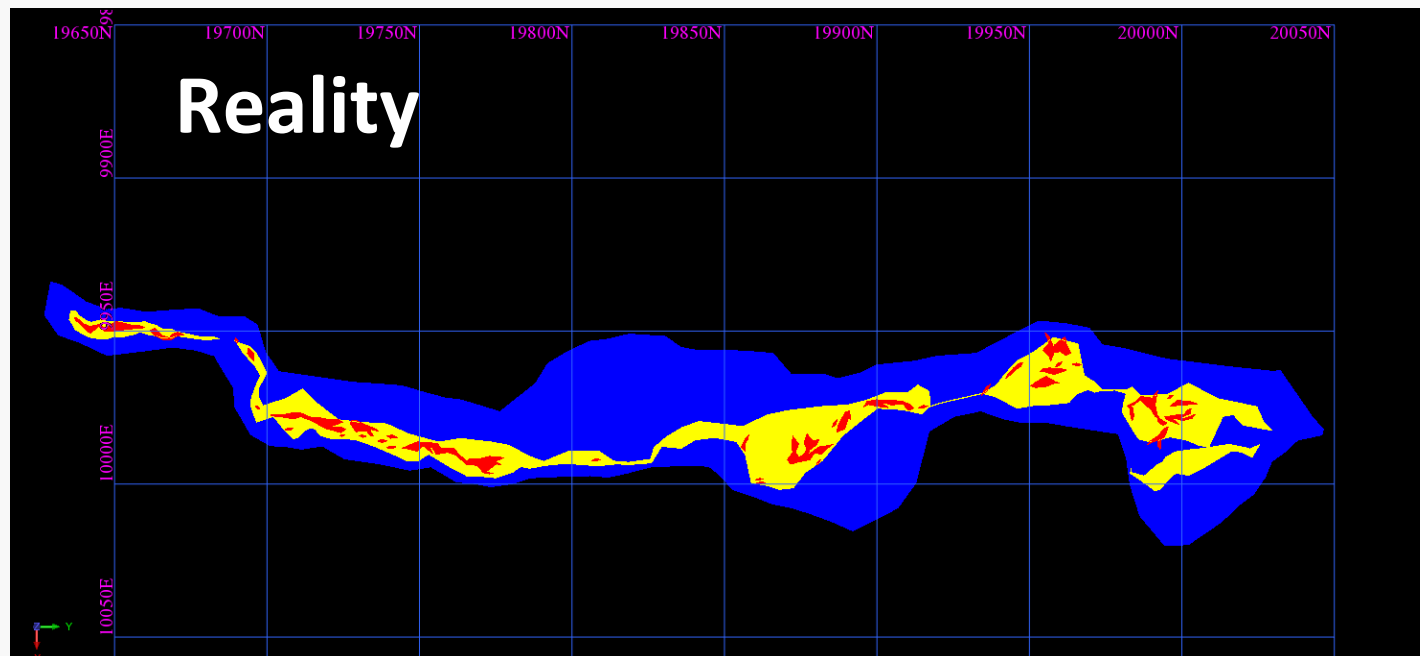
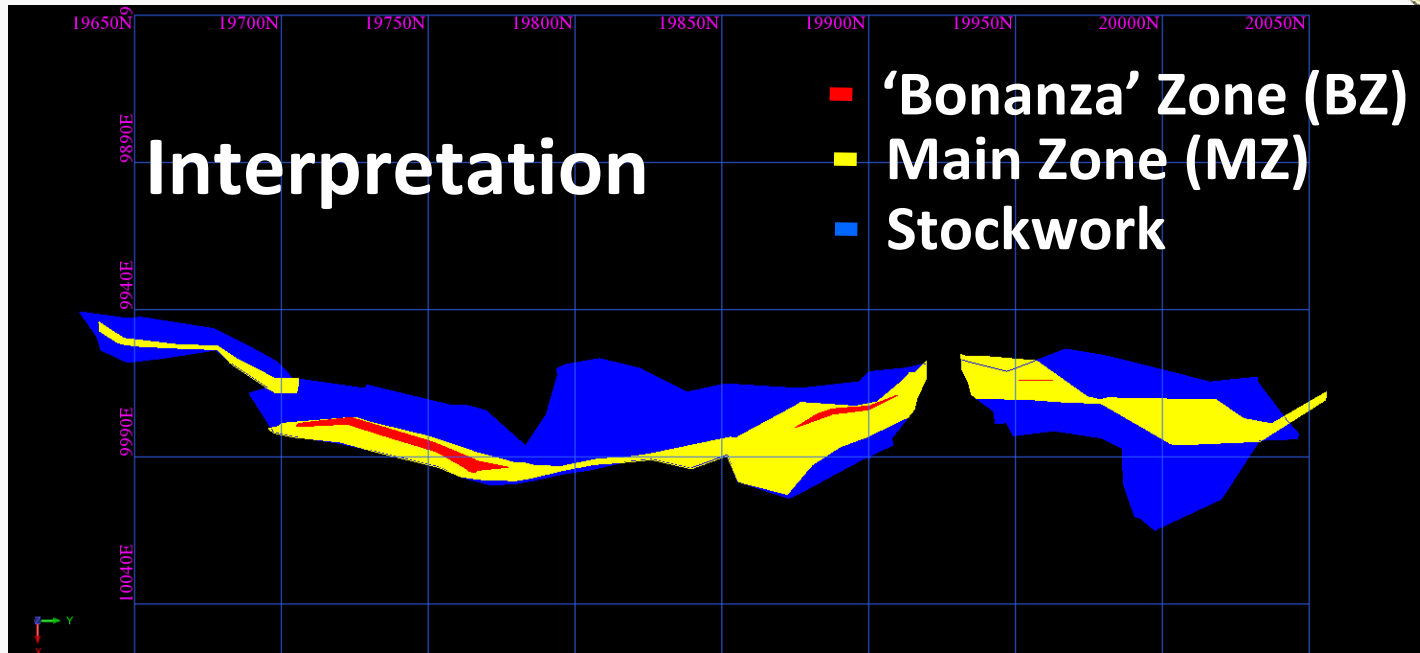
Cross-Section 19750 N



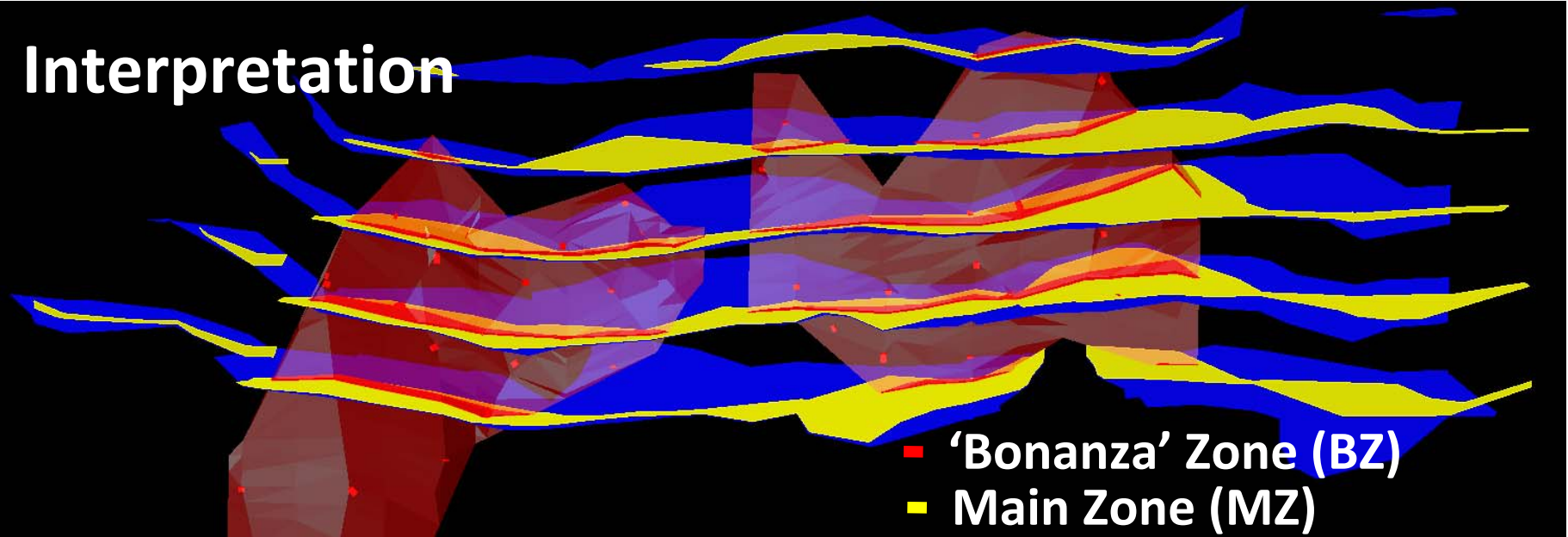




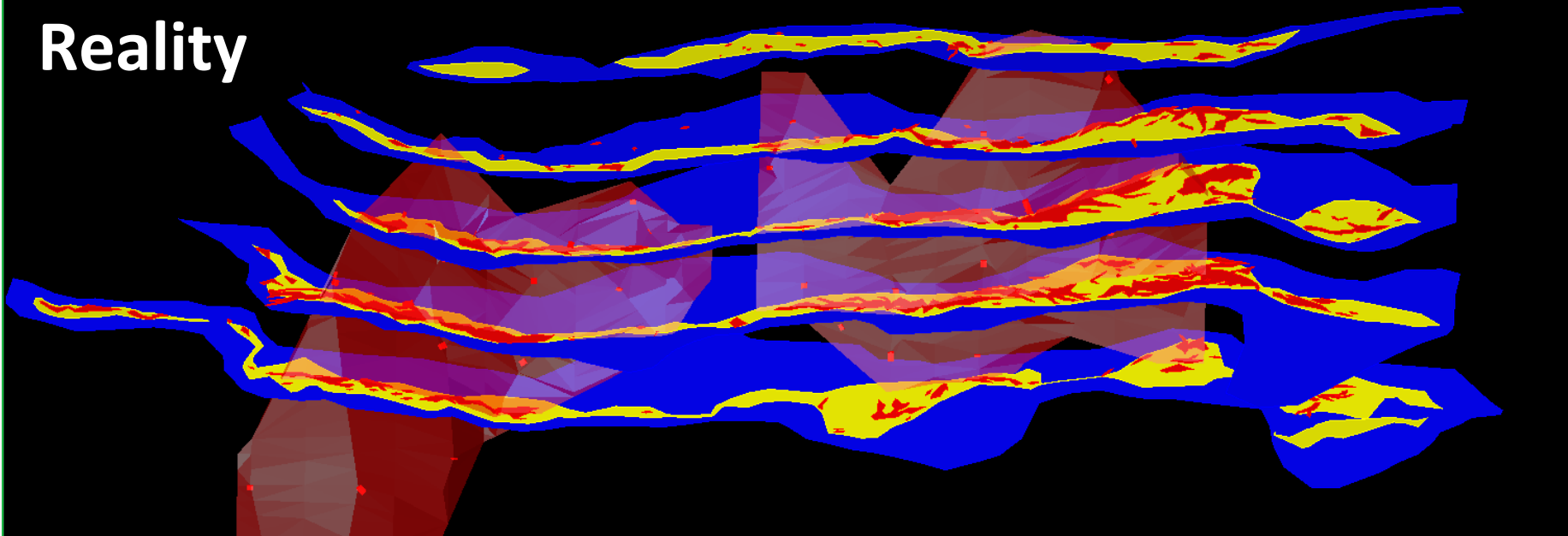




Interpretation



Reality





**K2 Plane of Vein Longsection (inclined @45 degrees)
reserve outline green, bonanza zone red with internal hole
filled by non-bonanza ore**





Current Developments

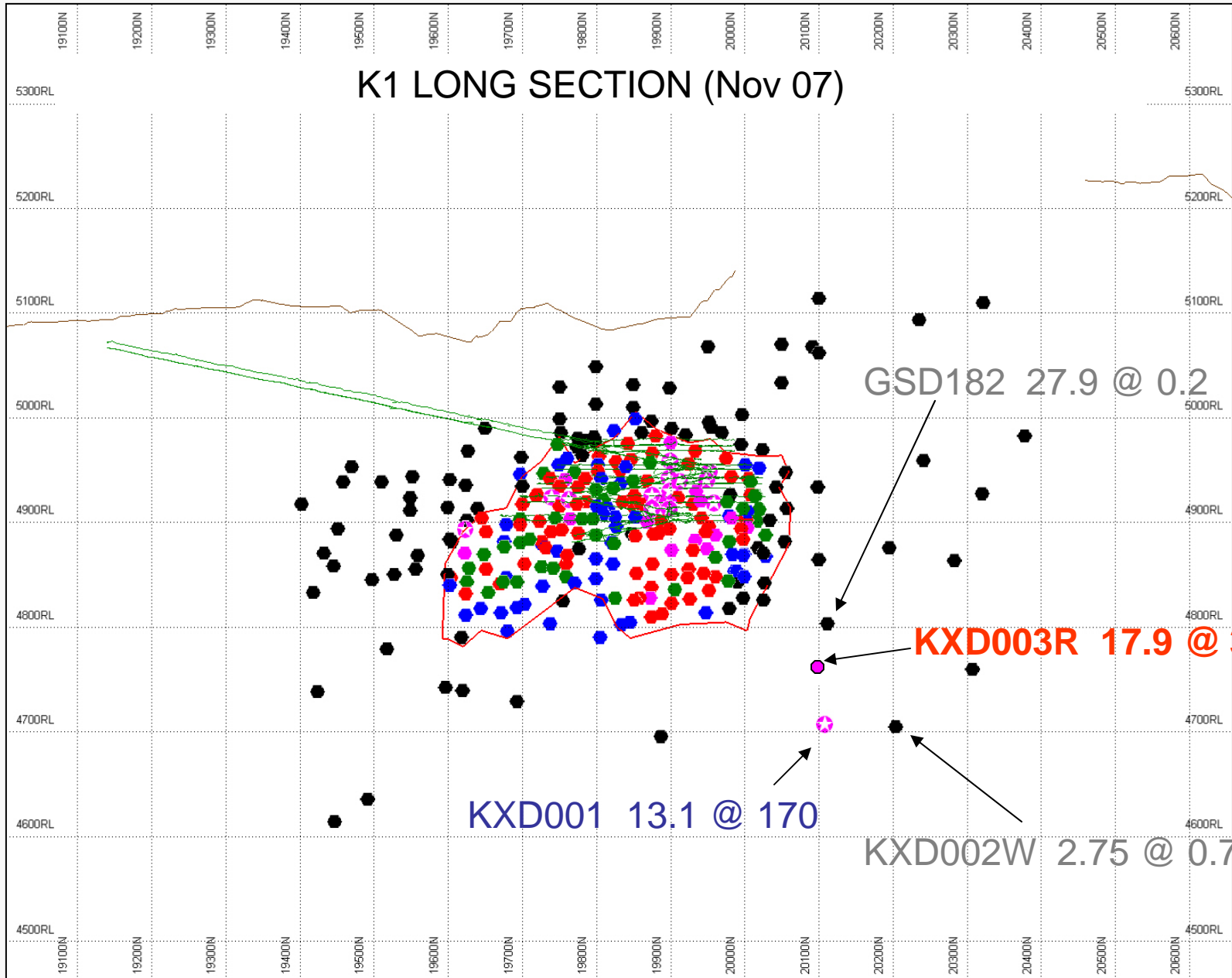
- K1 North
 - Additional shoot north of K1 but along the same structural trend
- K1 Deeps
 - Remake of the main K1 shoot at depth below previously 'closed off' mineralisation



K1 North

- Initial Intercept KXD001;
13mdh @ 170g/t Au
- Follow-up intercept in KXD003R;
18mdh @ 34 g/t Au
(including 1.1m at 165g/t)
- KXD003R located 80m updip of KXD001.
- Further drilling has shown the extension to be tightly constrained.

K1 LONG SECTION (Nov 07)





Conclusions

- Kencana has made a step-change to Gosowong. Upside remains on the structures with additional resources becoming evident.
- Bonanza Zone material has a big impact on the resource in both K1 and K2.
- BZ is both variable and consistent.
- Expectations are high for further discovery in the district.



Terima Kasih!

