GEOLOGICAL SOCIETY OF ZIMBABWE: SUMMER SYMPOSIUM 2019

Structural Footprint of Gold Mineralisation in Zimbabwe Greenstone Belts; A case study of Pickstone Peerless Deposit.

Preamble

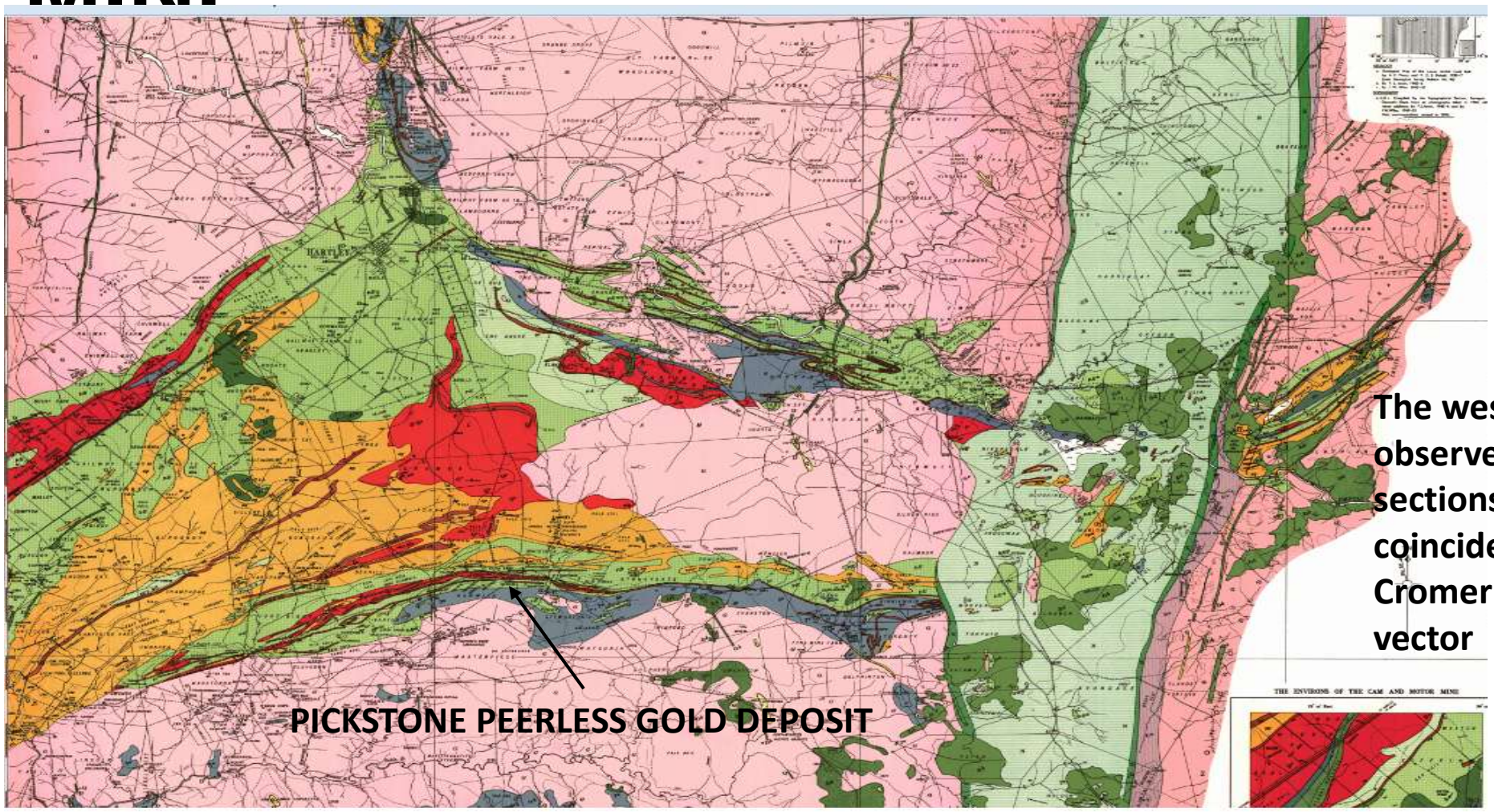
1. Most gold deposits comply with consistent geological and structural controls related to cratonic deformation (Colvine et al, 1984, 1988)
2. Generally late Archean ages for most gold mineralisation
3. Greenschist facies 14 to 19km depth in brittle-ductile transition to ductile deformation regimes, mylomites and cataclastites

4. Approximately 60% of Zimbabwe's surface outcrop is composed of Archean rocks, about the Archaean-Proterozoic boundary
5. Greenstone belts affected by a dominant regional cleavage and foliation forming event
6. Shear zones have moderate to steep dips with complex kinematic profiles
7. Pickstone Peerless mine lies in the middle of a major indentational flexure which apparently coincides with the regional foliation trajectory of the northern fringes of the Mombi intrusive.
8. Granitic plutons apparently acted as the heat engines that mobilized gold bearing fluids along the margins.

Pre-requisites for a gold deposit

1. Genesis of a large volume of Au bearing hydrothermal fluid-magmatic, metamorphic, mantle components (Perring et al.,1989;1990)
2. Genesis of fluid pathways to focus the fluid flow as a result of regional deformation. Must be sufficient scale, deep-seated, ductile shear zones, passing up into brittle-ductile shears and faults
3. Induced flow of Au bearing fluid into, along and up the major structural conduits. E.g seismic pumping, fluid activated valves, transport along pressure gradients, and convection
4. Transport of fluid through a conduit, and precipitation due to pressure-temperature drop (3500C; 1-3kbars)

REGIONAL GEOLOGY OF THE AREA AROUND PICKSTONE PEERLESS MINE

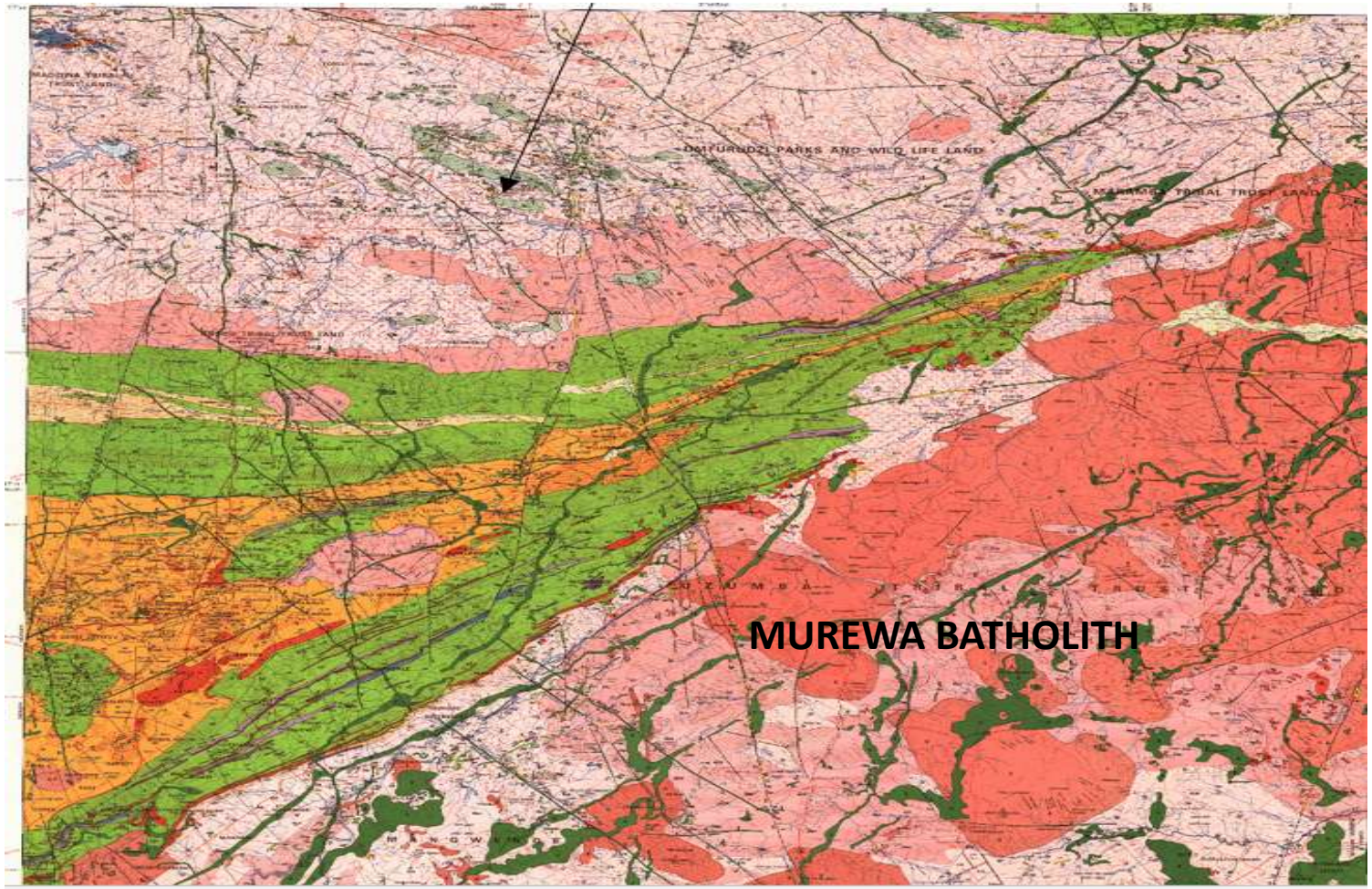


The westerly plunge observed on longitudinal sections is likely to be coincident with the Cromer Porphyry thrust vector

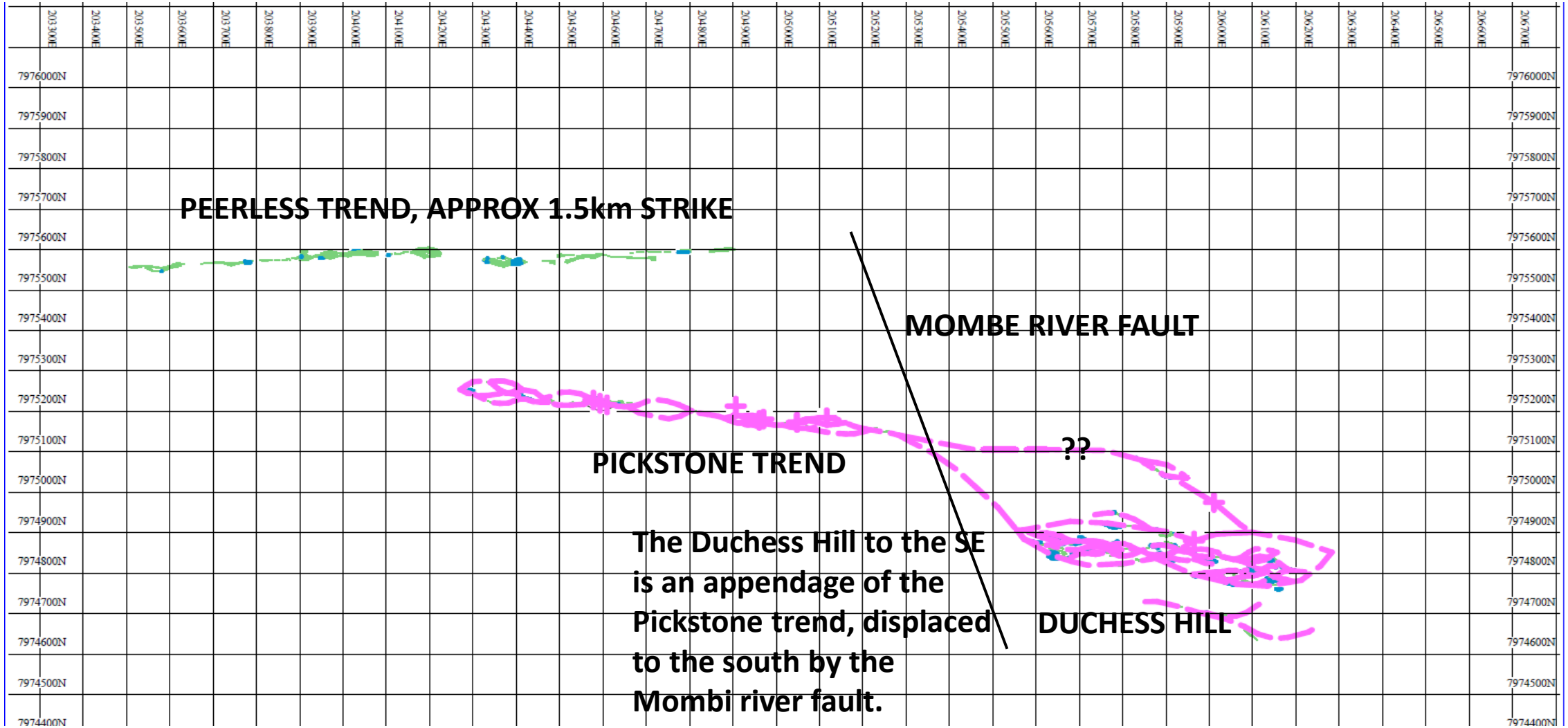
Geology of the Mine

- The Pickstone Peerless system locates within a narrow corridor of carbonated greenstones and pillowed basalts of basic composition.
- Gold bearing structures impress, from a bird's eye view, lozenge shaped complexes bound to the foot- and hanging wall by steeply dipping metapelitic 'black shales'.
- Pickstone Peerless mine lies in the middle of a major indentational flexure which apparently coincides with the regional foliation trajectory of the northern fringes of the Mombi intrusive.
- A weakly mineralized halo of sheared dolomites that are bound to the foot- and hanging wall by a thin layer of impevious metapelitic 'black shales' (mine parlance)
- The Pickstone trend strikes NW-SE and coalesces with the Peerless trend to the west.
- The Pickstone trend reef is a banded ironstone bound by Fe-rich and talcose-chlorite schists to the north and south.
- The Duchess Hill to the SE is an appendage of the Pickstone trend, displaced to the south by the Mombi river fault.
- The Pickstone Peerless shear zone was initiated by truncation of greenstone crustal mass (paleo basin) possibly due to synchronous diapiritic upwelling of the granites which resulted in E-W elongation of the volcanic and sedimentary successions, which further deformed by translational forces, causing formation of lenticular slivers.
- These lenticular 'duplexes' exhibit **predictable dimensions** and can be used to infer recurrence of structural traps along strike, where gold mineralization is high and the reef widths are as generous as 20 to 25m for +/-20m of strike
- This observation has afforded Geologists to predictively model the pay shoot and save on exploration expenditure by zooming in on structural flexures that are likely to result in formation of wide pods of highly mineralized stretches.

REGIONAL GEOLOGY SHOWING PART OF THE HARARE-BINDURA GREENSTONE BELT



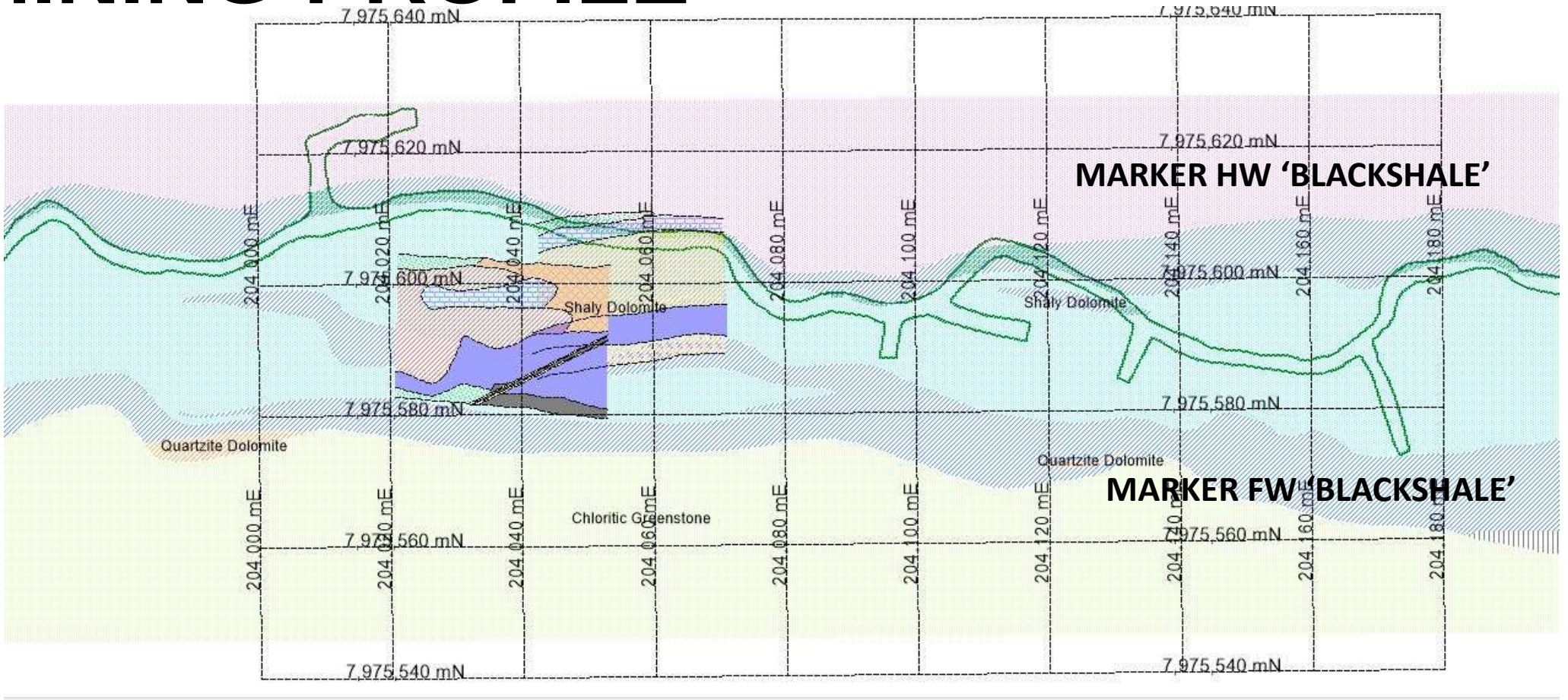
1180L PLAN SHOWING THE ORE FOOTPRINT OF PICKSTONE PEERLESS PAYSHOOTS



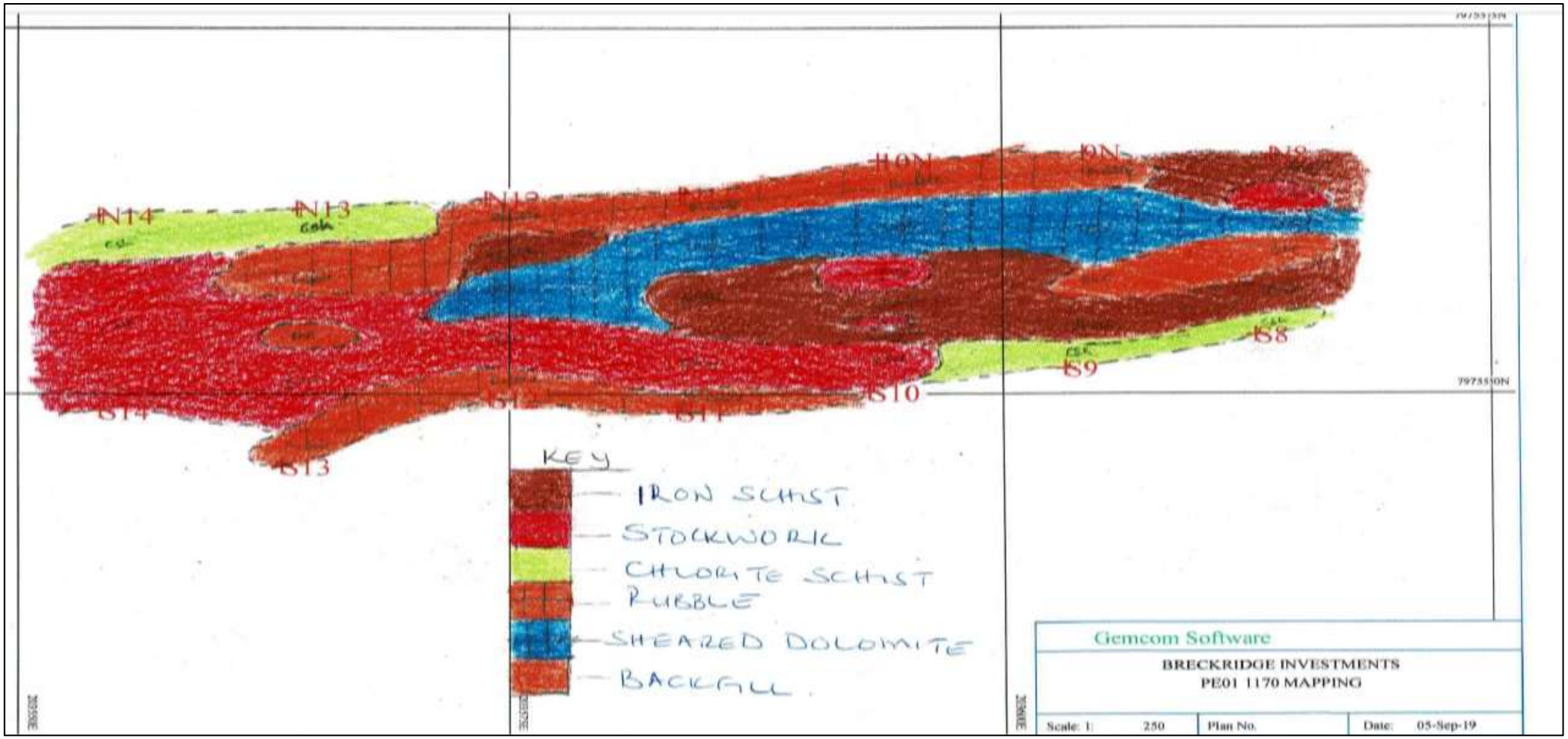
ORE EVALUATION SEQUENCE AT PICKSTONE PEERLESS MINE

1. BLOCK MODEL ORE PROFILE DELINEATED FROM 20m SPACED DRILL HOLES
2. INFILL DRILLING TO DEVELOP FULLY DEVELOPED/DRILLED RESERVES (FDR)
3. COMPARISON OF FDR vs BLOCK MODEL
4. CLEANING OF SURFACE TO EXPOSE LITHOTYPES
5. GEOLOGICAL MAPPING OF LITHOTYPES
6. CHANNEL SAMPLING OF PLANNED ORE POLYGON
7. ORE EVALUATION COMPARISON OF BLOCK MODEL vs CHANNEL MODEL
8. BLAST HOLE DRILLING AND EVALUATION
9. COMPARE BM vs FDR vs CHANNEL vs BLASTHOLE
10. MINING AND ORE RECONCILIATION

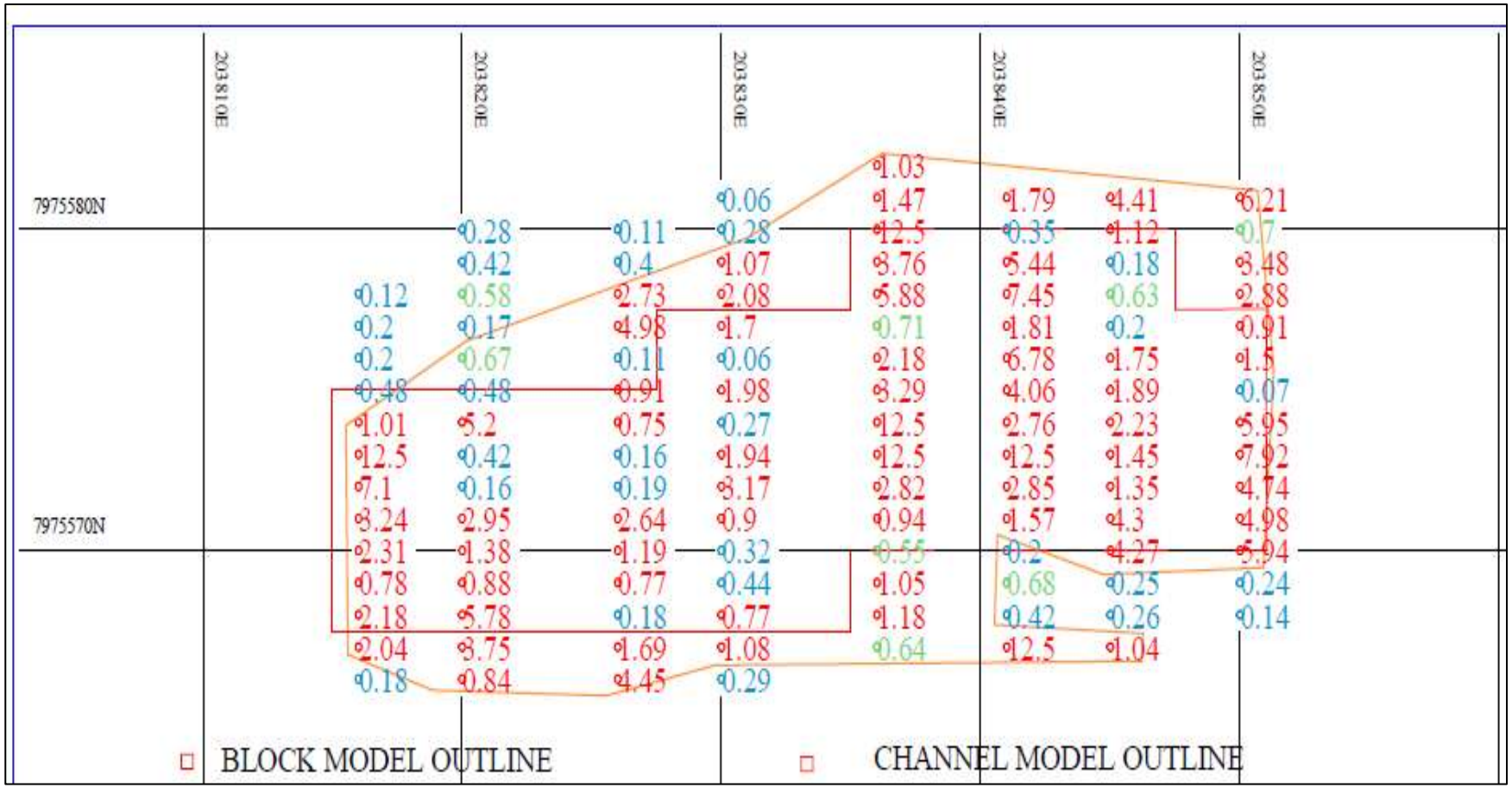
LEVEL 3 UG PLAN SHOWING WAVY INFLECTIONS OF HISTORICAL MINING PROFILE



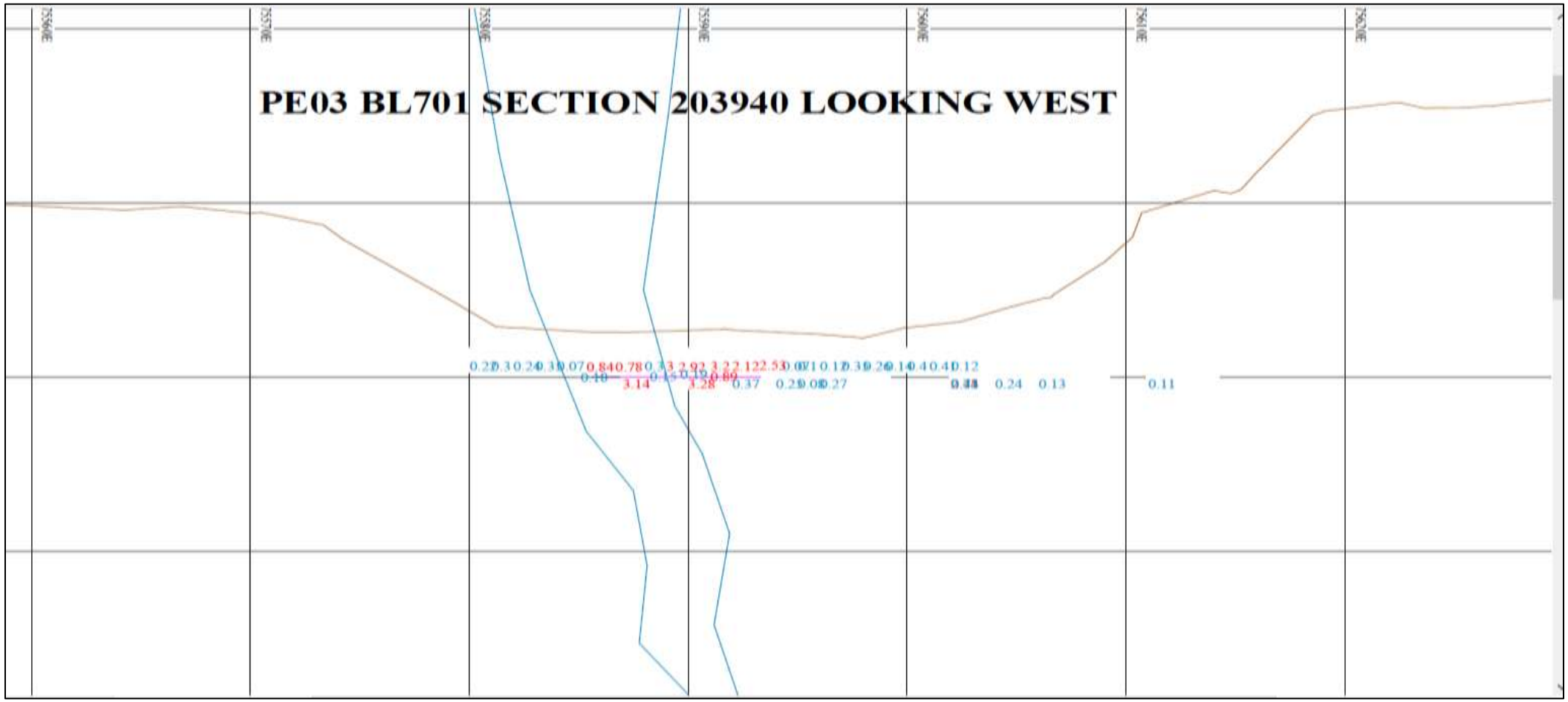
PEERLESS TREND MAPPING ON 1170L SHOWING DEVELOPMENT OF A STRUCTRURAL TRAP/BLOWOUT ON THE WESTERN FRINGES OF A 20m STRIKE POD



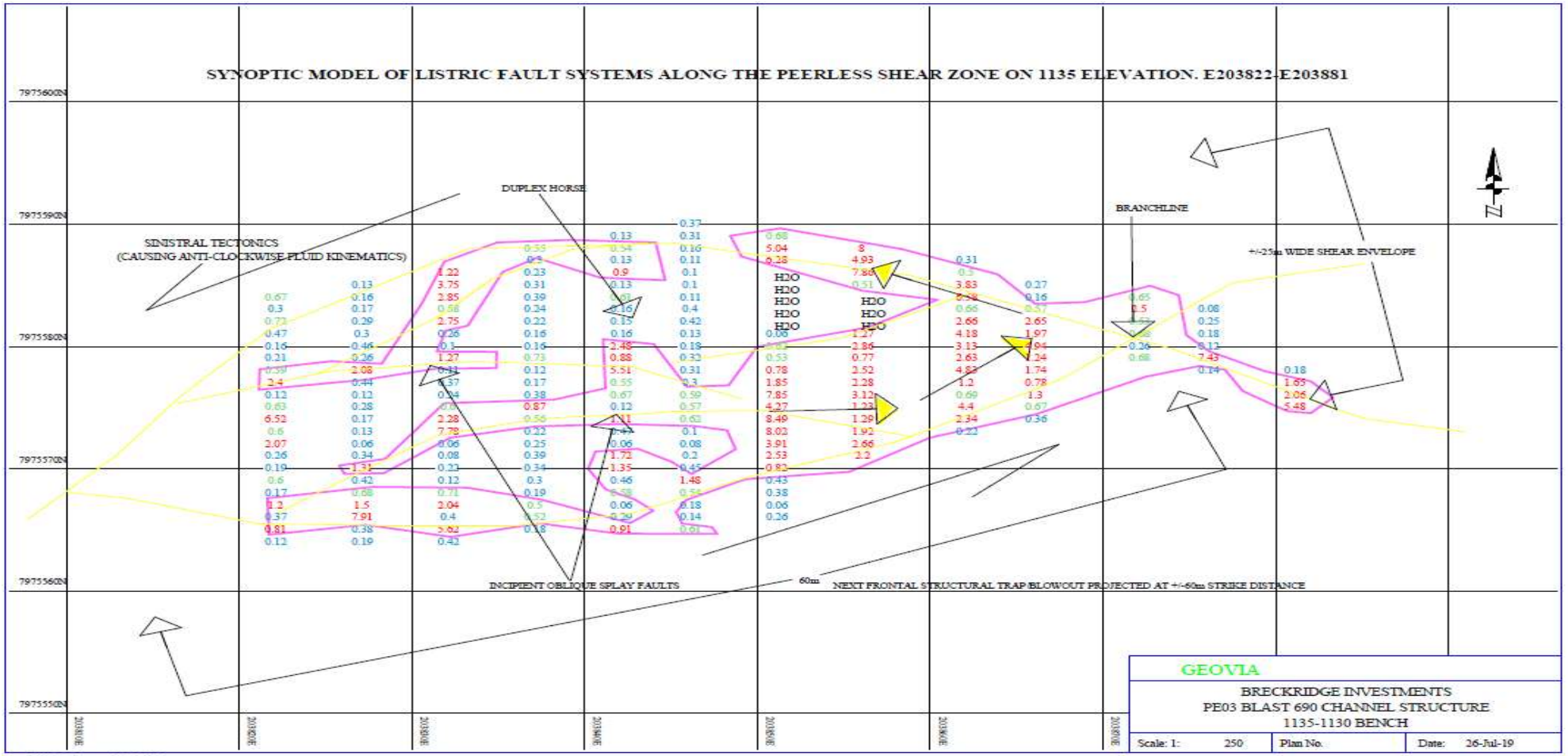
1150 BLAST 662CHANNEL MODEL vs BLOCK MODEL OUTLINE



TRANSVERSE SECTION LOOKING WEST SHOWING DEVELOPMENT OF REEF BIFURCATION AT STRUCTURAL INFLECTION (PICKED BY CHANNEL SAMPLING)



1135L PLAN SHOWING GOLD MINERALISATION PROFILE ALONG SHEAR ZONES AND FAULT PLANES



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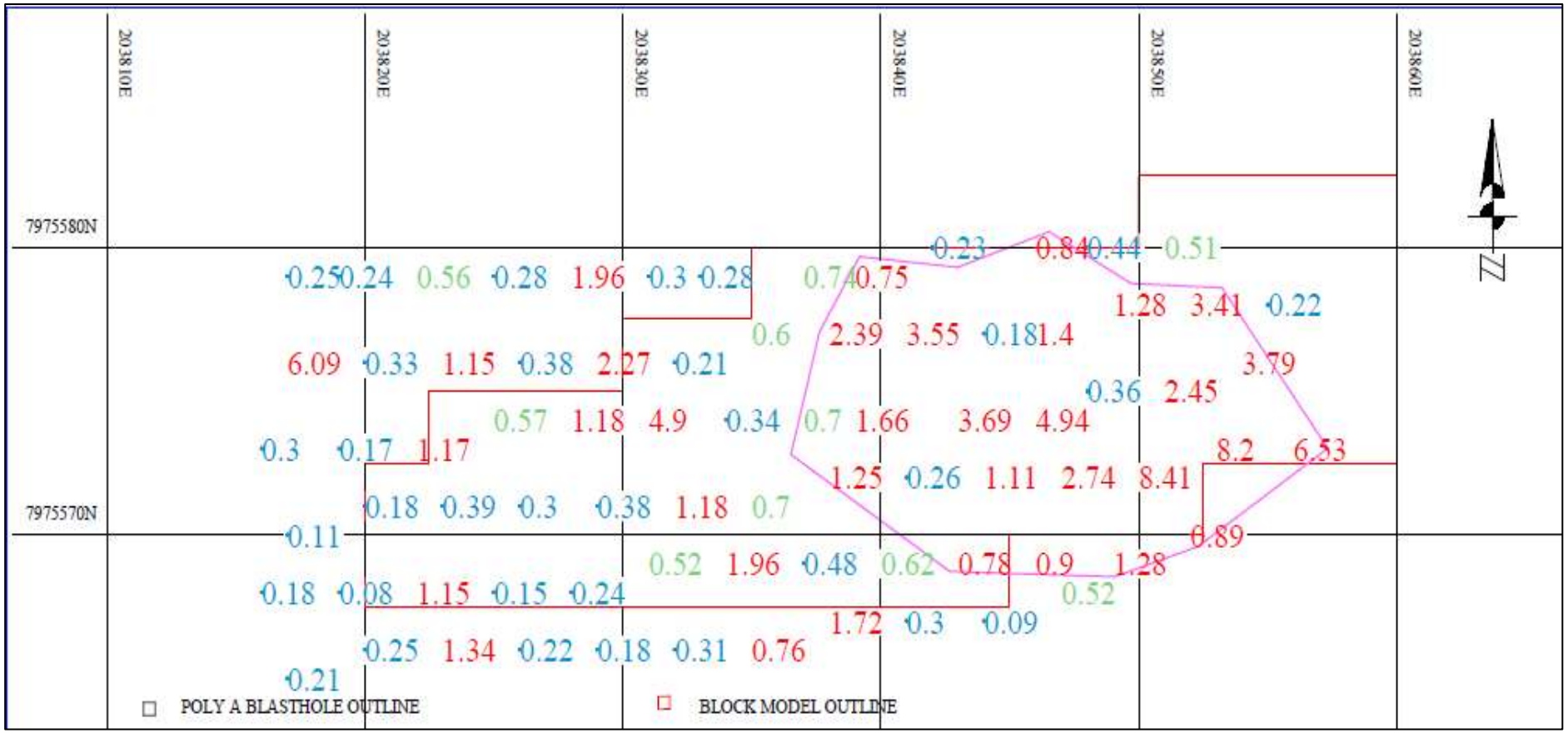
CARTOON SHOWING A GEOLOGIST'S NIGHTMARE AFTER BLASTHOLE DRILLING



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