Geological Report

McKinlay Gold Mine
NT July 2014

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Minesite Services Australia

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EXECUTIVE SUMMARY

Under an agreement with the leaseholder, Minesite Services conducted a close spaced topographical survey of the McKinlay Mine area to relate various features spatially and to provide the first accurate topographical survey of the area. Unfortunately most if not all of the sampling data obtained to date has not been spatially located and this is the first attempt to do so accurately.
In a survey spanning 4 days and collecting approximately 1200 points, the natural surface of the McKinlay Gold Mine has been collected, along with various features, including Starr's 1993 open cut, several surviving drill hole collars, and pre-1970 shafts, costeans and open cuts.

A first order control framework of 4 points has been established for future work at the site.

Also located were Hossfeld's costeans 2, 3 and 4 and his Nos 1 and 2 open cuts, one diamond drill collar from Newton's 1974 drilling, (DDH 4), two percussion drill collars from Starr's 1996 drilling, (McKDH B and McKDH C), and 10 RC drill collars from Irelands 2008 drilling (MKRC01-10).

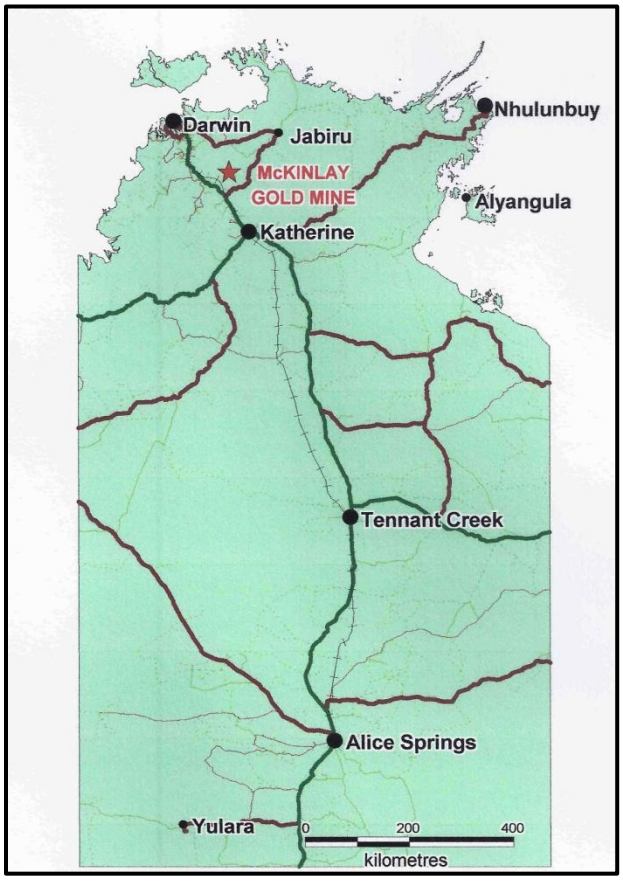
None of these features has been accurately surveyed in 3D before now.

Features such as Newton's other drill holes (DDH1 to DDH3) were scaled from his maps and surveyed in to give an approximate 3D location of the collar position.

As a corollary of this work the large open cut and 3 shafts on the northern flank of the hill were found to have been excavated sometime after 1974 and before 1985, but no records of this work remain.

1. INTRODUCTION

In July 2014 under an agreement with the leaseholder Mr Tom Starr, Minesite Services conducted a survey pickup of the natural surface (topographical) and any features of interest (drill holes, costeans, shafts, pits and adits) utilizing a Hemisphere S320 GPS survey system.
An initial site visit was undertaken by the author and the leaseholder Tom Starr to examine the site to collect data and allow planning of the survey field trip.
The field team consisted of A Jettner and 2 field assistants, Luke and Nick Jettner.
Whilst Luke Jettner undertook the topographical part of the survey Andrew and Nick Jettner examined the outcropping lodes and located the approximate positions of the Newton and Ireland drill collars that had been rehabilitated (covered over) or lost for later survey pickup.
The location of the various lodes were painted on the ground for pickup and construction into a 3D model incorporating the data collected in this survey. It must be noted that this work, whilst adding to the existing dataset, does not in any way represent anything other than exploration potential in terms of an ore resource.



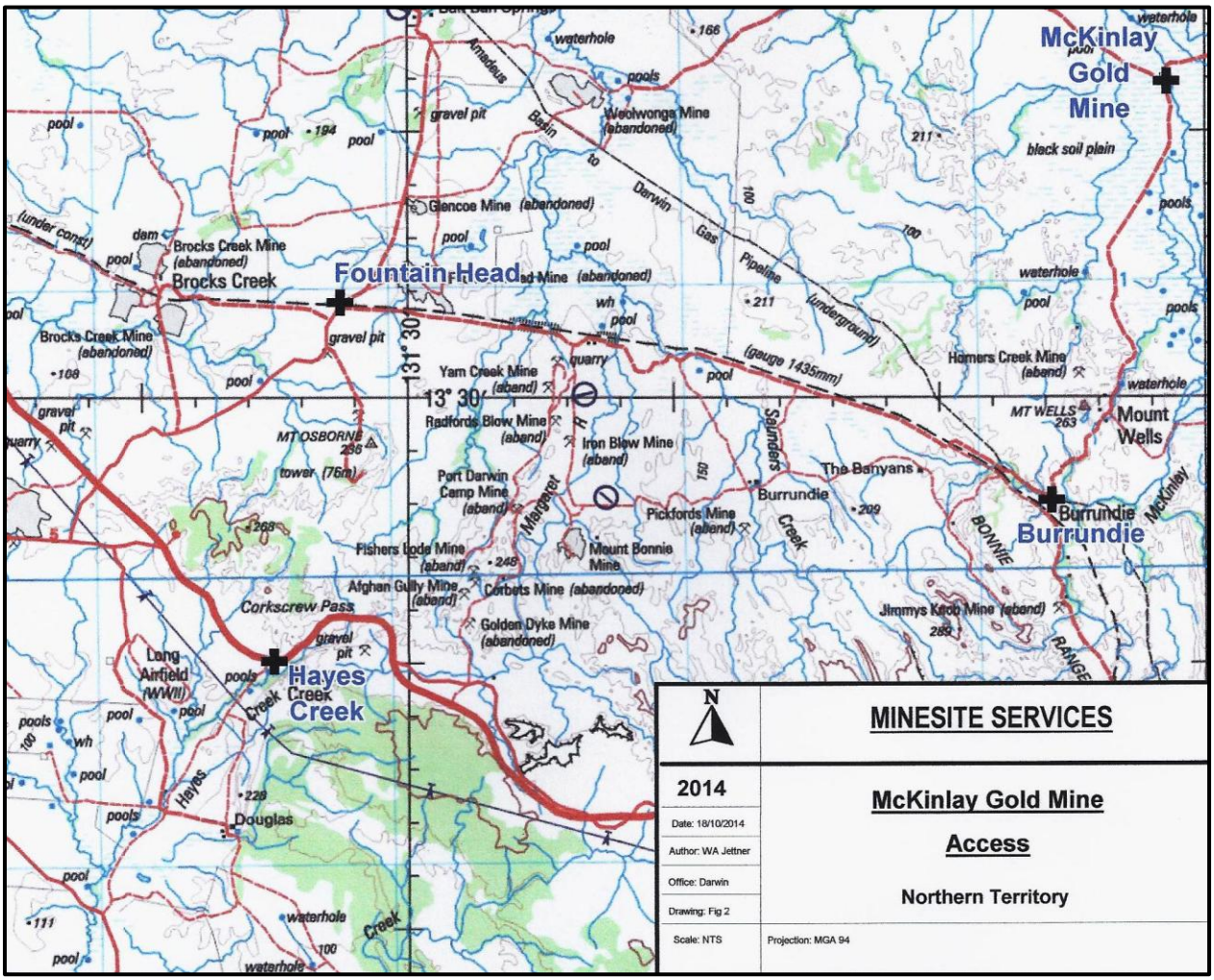
Location Map

2. LOCATION AND ACCESS

The McKinlay Gold Mine is located at 131° 44’ 14”E 13° 24’ 1”S (WGS 84) in the Northern Territory, which is approximately 50km to the north of the township of Pine Creek.

Access to the prospect is southwards from Darwin on the Stuart Highway, then eastwards on the Fountainhead and Mt Wells Roads to the historic Burrundie town site and then northwards past Mt Wells to the McKinlay Gold Mine.

Access from Fountain Head is via secondary gravel roads which are maintained to Mt Wells, beyond which the road is still trafficable but has not be regularly maintained since 1994.



Access

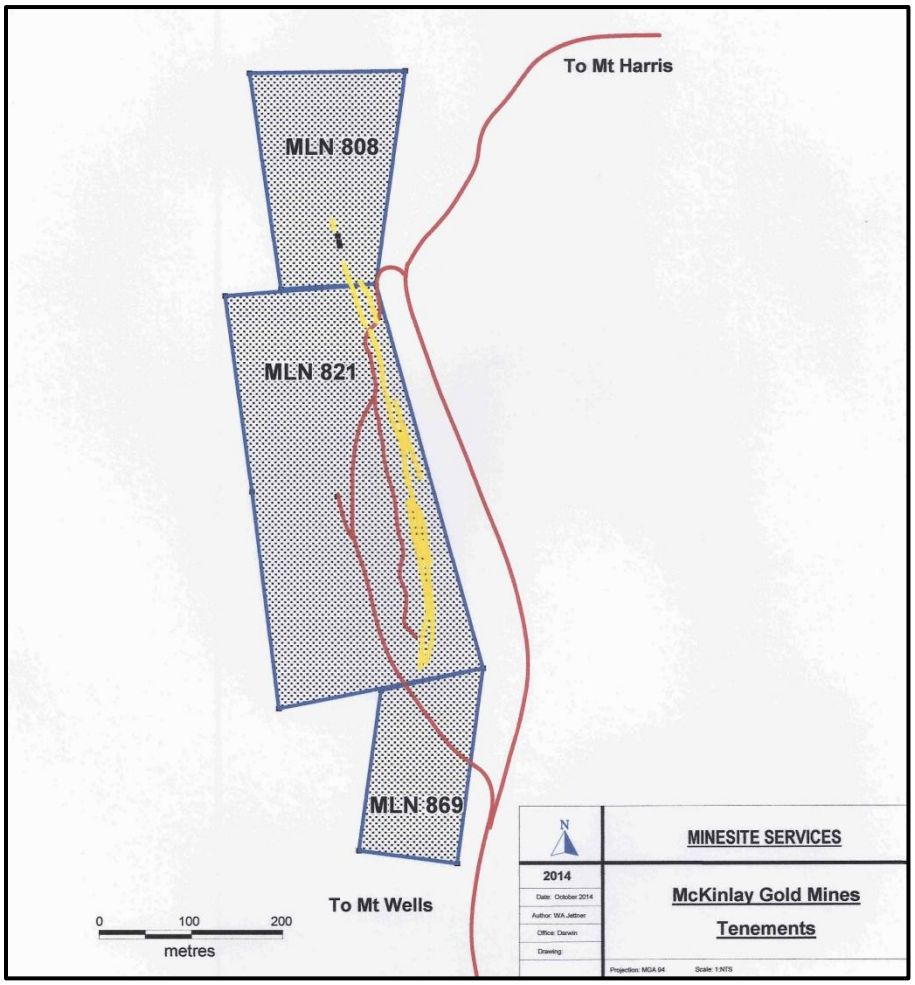
3. TENURE

The McKinlay Gold Mine is covered by three current mining leases MLNs 808, 821 and 869.

The leases are summarised below:

Lease No	Grant Date	Expiry Date	Area (Ha)	Current Owners
MLN 808	9/08/1974	31/12/2014	2.02	Starr K (5.33%), Starr L (7.67%), Starr M (8.67%), Starr T (78.33%)
MLN 821	24/05/1977	31/12/2017	8.09	Starr K (5.33%), Starr L (7.67%), Starr M (8.67%), Starr T (78.33%)
MLN 869	16/06/1980	31/12/2020	2.02	Starr K (5.33%), Starr L (7.67%), Starr M (8.67%), Starr T (78.33%)

MLN 808 expires at the end of 2014 and will be renewed at this time for a further 21 years.



Tenements

4. REGIONAL GEOLOGY

Within the Pine Creek Orogen the metamorphosed and deformed Palaeoproterozoic sequence is exposed over an area of ~66,000km^2. From west to east it can be divided into 5 sub-regions; Litchfield Province, Rum Jungle Region, Central Region, South Alligator Valley Region and the Alligator Rivers Region. The McKinlay Gold Mine occurs in the Central Region and this sub-region is described herein.

The age of the Pine Creek Orogen sequence is constrained between 2470 and 1870Ma and unconformably overlies the late Archean basement which is represented in the Central Region by the concealed Woolner Granite well to the north of the prospect area. The Orogen comprises an alternating sequence of psammitic and pelitic rocks with minor carbonate and volcanic rock. Dolerite sills were intruded prior to deformation and metamorphism. Regional metamorphic grades in the Central Region are of sub-greenschist to greenschist facies.

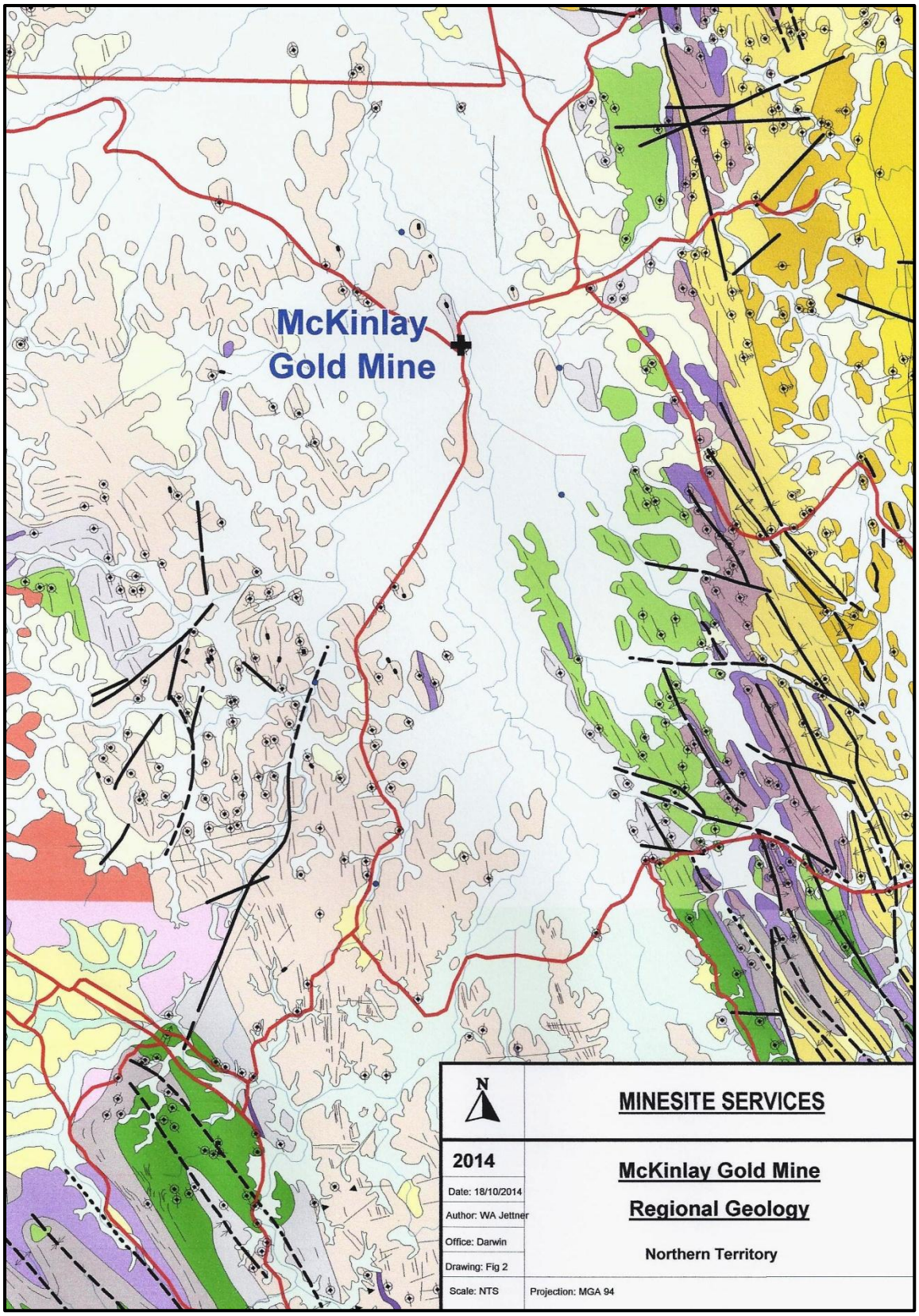
This period of deformation and metamorphism is recognised throughout the North Australian Craton and is known as the Barramundi Orogeny which is constrained at 1880 - 1850Ma.

The tectonic evolution of the Pine Creek Orogen is described in Needham et al (1988), and is summarised below.

An extensional event at about 2000Ma resulted in the formation of a basin in which about 10km of clastic, organic and chemical sediments were deposited. Initial depositional environments ranged from neritic to intertidal to fluviatile followed by flysh-like sedimentation towards the end.

During the early depositional phase (Namoona and Mt Partridge Groups) Archean palaeo-highs formed islands and were probably a major sediment source. Sedimentation at this stage, which has been considered as a rift phase, includes fluvial to shallow marine conglomerate and arkose succeeded by supratidal to intertidal carbonate facies. The overlying sag phase sediments are represented by the South Alligator Group which were deposited under shallow marine, low energy conditions and includes pyritic carbonaceous shale, chert, carbonate, banded iron formation, tuff and siltstone. This Group is succeeded by the Finniss River Group represented by a monotonous sequence of siltstone and greywacke deposited in high energy, deeper marine environments. Sedimentation and lithification were followed by the intrusion of dolerite sills (Zamu Dolerite and equivalents).

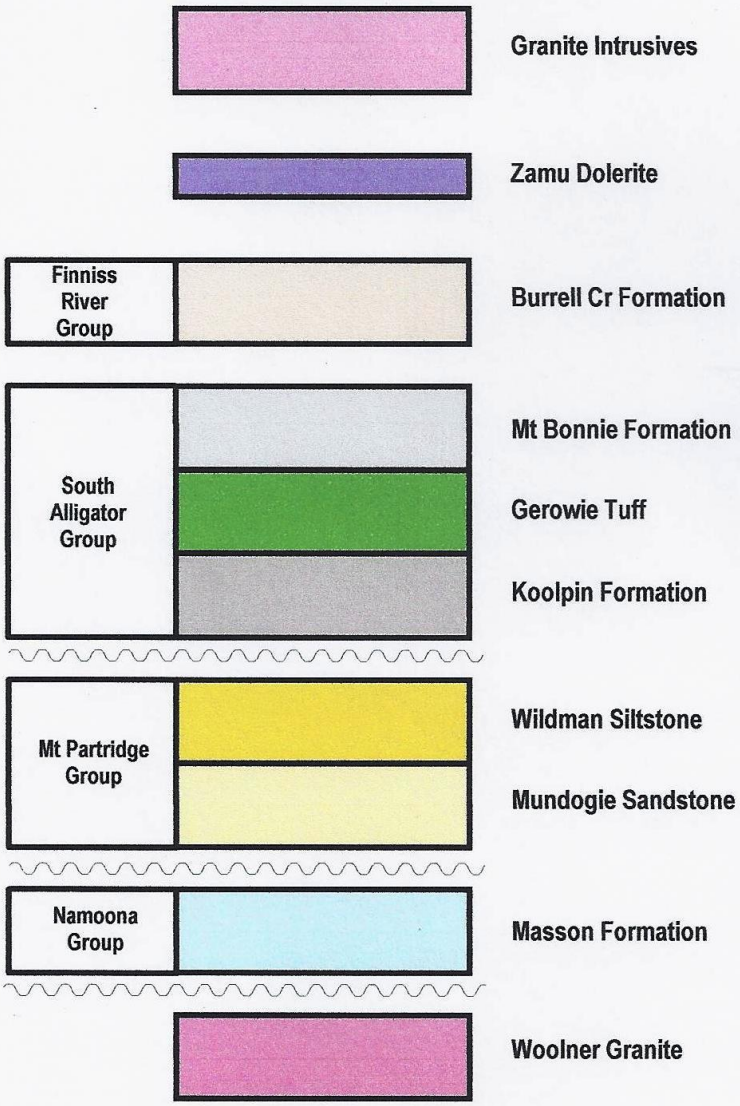
A period of granite intrusion and contact metamorphism dated at 1835-1800Ma accompanied and followed regional metamorphism and deformation. Based on age and composition Stuart-Smith (1993) recognised three broad groups of granites in the central region; an older group dominated by mafic granite phases, followed by concentrically zoned granite and leucogranite, and finally by a younger felsic granite phase.



Regional Geology

STRATIGRAPHY

Central PC Geosyncline



5. EXPLORATION WORK UNDERTAKEN

The exploration program was aimed towards surveying of the natural surface (topography) of the McKinlay Gold Mine hill and attempting to collect any spatial data that would help with the interpretation of the geology and mineralization. To date there has been an amount of work done on this prospect but no accurate spatial records of any of the work exist. Probably the most accurate and complete mapping done to date was done by CJ Sullivan as part of the AGGSNA program (Report No 46, authored by PS Hossfeld) undertaken in the Northern Territory in the late 1930s and early 1940s.

There have been a number of costeaning and drilling programs conducted on the prospect but little or no 3D spatial data has survived to the present day. This work is an attempt to obtain data before it is lost forever.

Work initially consisted of locating a suitable initial benchmark then laying out a number of control points for future work from this location.

The initial benchmark is a short blue painted star picket with an aluminium tag numbered MCK001 located adjacent to the northwest corner peg of MLN 821. This was located using Omnistar XP and was the average of 100 sequential readings and has an error of 0.3m horizontal and 0.5m elevation.

The initial position (MCK001) is: 8517172.812mN 796353.113mE 111.9927mRL.

The other 3 control stations were observed from this station in RTK mode and have an error (both horizontal and vertical) of 0.02m.

Control Station Positions

Station No	Northing	Easting	Elevation	Location
MCK001	8517172.812	796353.113	111.9927	Next to NWCP MLN 821
MCK002	8517235.072	796476.454	115.5578	Tagged bolt on main concrete shaft
MCK003	8517069.501	796498.319	122.9432	In garden to the south of Eric's shed
MCK004	8516927.037	796575.4695	133.7225	Hilltop to the south of Hossfeld's Costean 2

Note: blue star picket

Base Station on control point MCK004

The ordinary natural surface survey points were taken on an average of 25m spacings (and later filled in to create a better triangulated topographical surface on a computer). In areas requiring closer spacings (roads, crests, costeans, ore zones, pits and stockpiles), readings were taken at the spacing necessary to accurately define the feature.

Luke operating Rover

Whilst Luke was undertaking the topographical survey the author and Nick Jettner examined the site to locate various features for later addition to the topographical survey, these included the locations of Hossfeld's Nos 2, 3 and 4 costeans and Nos 1 and 2 open cuts.

The No 2 costean is a large handcut costean through the crest of the hill and some of the original channel that was sampled in 1940 can still be observed today along with some of the channel cut by Starr in the 1990s.

The No 3 costean has been filled in, but by locating the No 1 open cut which survives today as a concrete lined water tank and the old adit portal, the location of this costean is accurately located. The old original adit portal mapped by Sullivan (AGGSNA) survives intact.

The No 4 costean has also been filled in, but the No 2 open cut survives as a shallow depression between the 2 storage sheds (now collapsed) erected by Eric Gardner. This was located by its distance to the north of costean 3.

The location of Hossfeld's No 1 costean may be approximately located by its relative position to Newton's DDH 4, the drill pad and sump of which survives today.
The positions of Newton's other drill holes (DDHs 1 to 3) may be approximately located by scaling off from known locations (Hossfeld's open cuts) on his 1974 map.

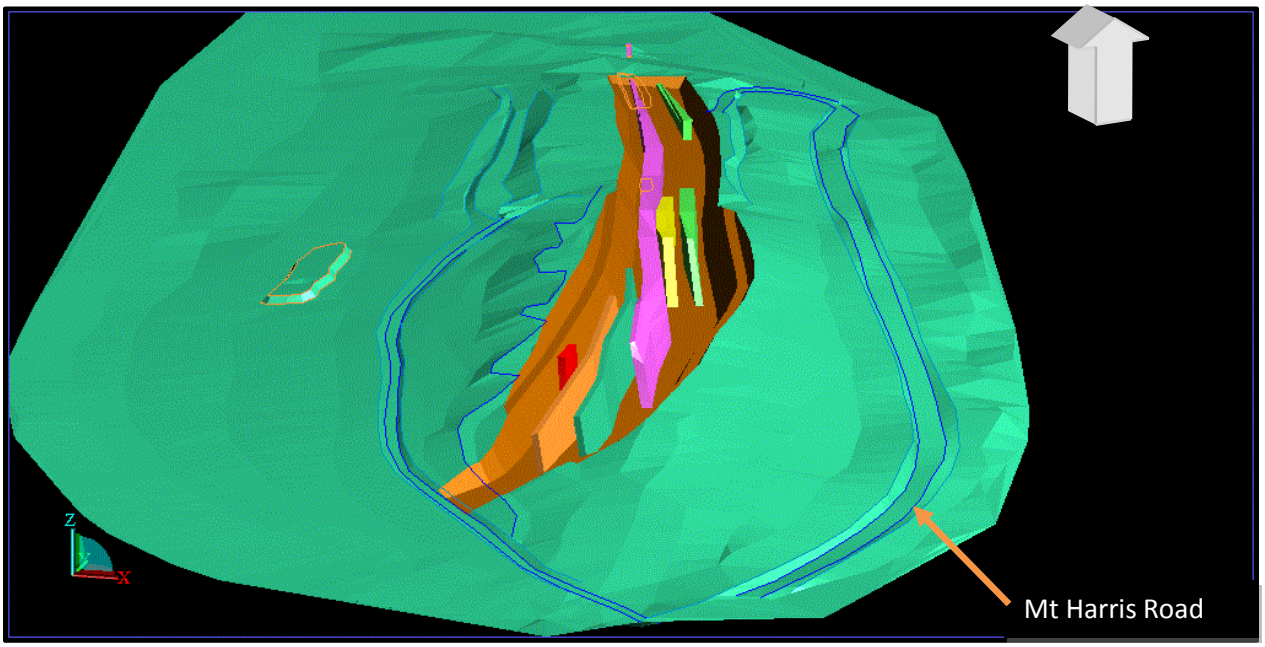
The collars of Starr's percussion drill holes McKDH B and C survive today and were surveyed. The position of McKDH A was approximated.

Starr's costeans were located from the directions of Tom Starr onsite and from direct survey where possible. The position of his open cut and ore stockpile were obtained by direct survey.

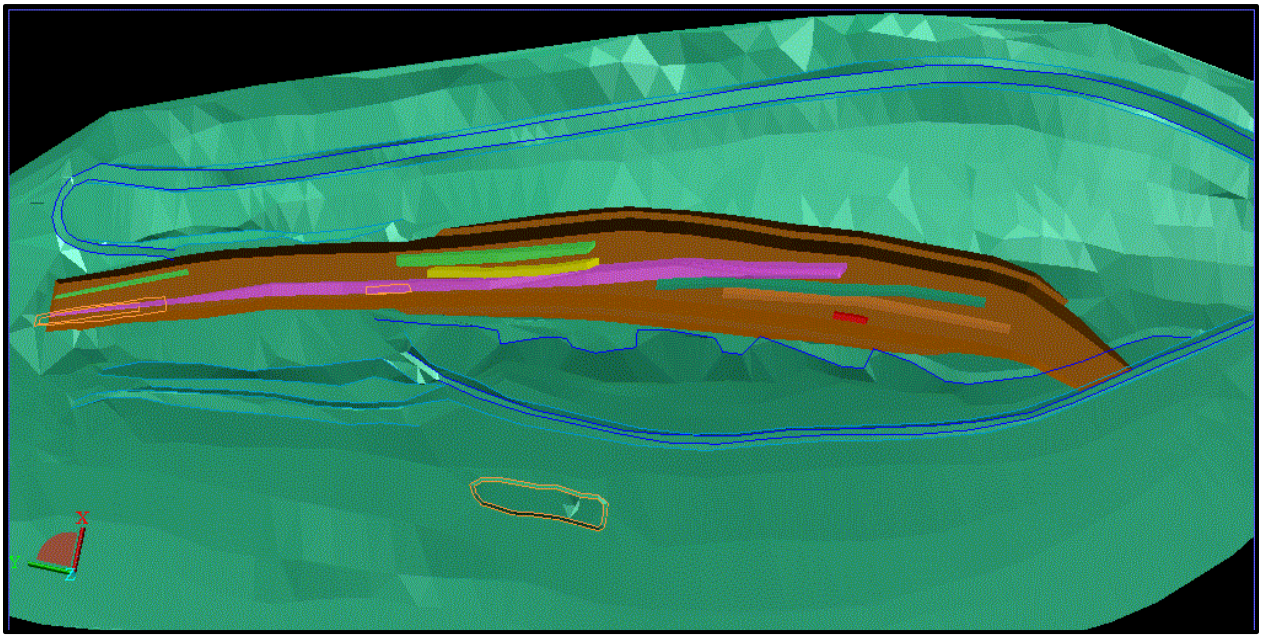
The positions of Irelands RC drill holes MCRC 1 to 10 were obtained from the location of the surviving sample bags and their GPS location as recorded at the time. These positions were approximated due to the collars having been rehabilitated and not outcropping.

The lodes were positioned on the ground by observation and their location obtained by direct survey. There were also a number of intercepts obtained in the drilling that were not surveyed due to soil cover or because they did not outcrop and these have been included in the 3D model.
In August the author collated the data and entered it into Surpac to allow the construction of a natural surface triangulation and a number of ore body 3DMs representing the orebodies from the limited data available, whilst the data had severe continuity limitations, the basis for future exploration has been obtained.

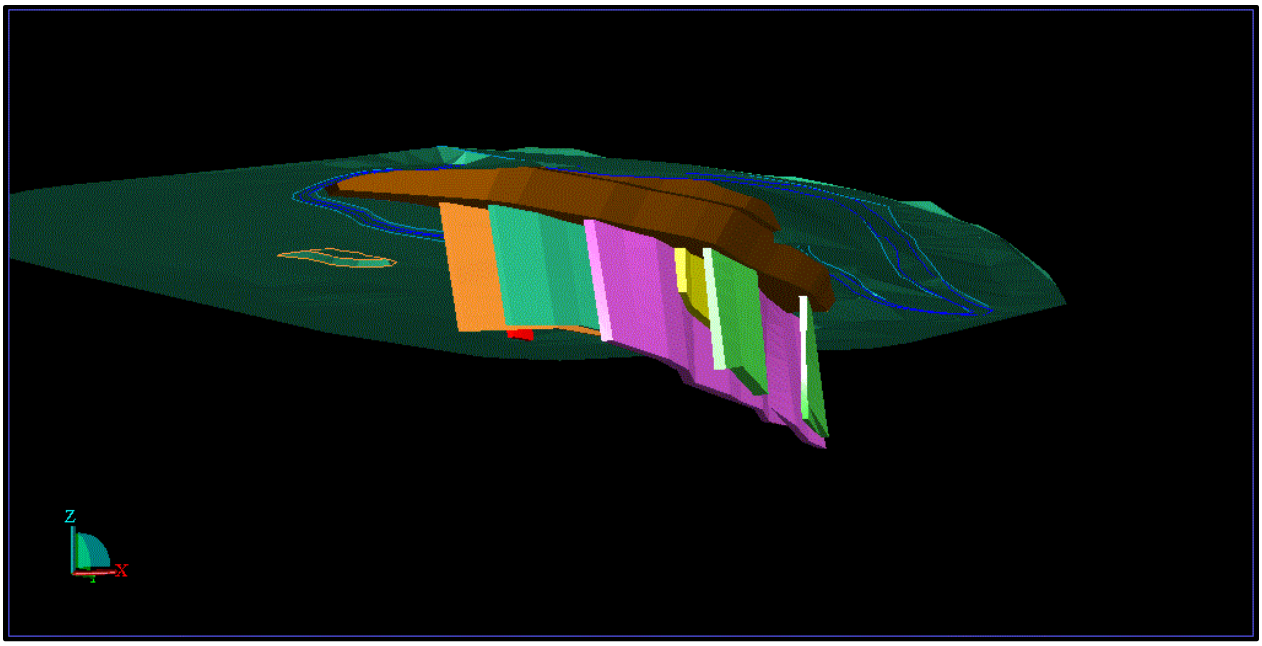
Screen shots of the resulting interpretation are shown below:



Oblique view looking north



Aerial view (north at left)



View from below (north into figure)

In these figures I have illustrated a pit that has a base at the same elevation (115mRL) as the base of the hill. As can be seen the quartz veins extend significantly below the base of the hill. This has a height difference of 21m from the highest point on the hill.

The proposed pit has a strip ratio of 5:1 but further work should significantly lower this and allow a deeper pit to be designed with more exploratory work needed to confirm continuity and grades.

6. CONCLUSIONS

Based on the data collected, the following conclusions can be made but the limitations of the dataset should be acknowledged in reading and interpreting the data.

Ore Body Style

The ore body consists of a number of quartz veins contained within a shear package that strikes approximately 345° T. The attitude of this system is approximately vertical. The continuity of the individual quartz veins is unknown at this time but outcrops indicate that at least one main quartz vein has a length of 400m with there being a good possibility of more attaining at least similar lengths. There are also several other quartz veins that have smaller lengths but potentially contain significant tonnages to the base of the hill. As with other gold deposits in the area there will be a significant (but currently unknown) contribution to the oxide gold grade by secondary enrichment.

Modelled Tonnages

Remembering the limitations of the dataset the following tonnages may be possible in the quartz veins to the base of the hill (115mRL). I have assumed a bulk density of 2.2 tonnes per bulk cubic metre (BCM).

Vein Tonnage Summary

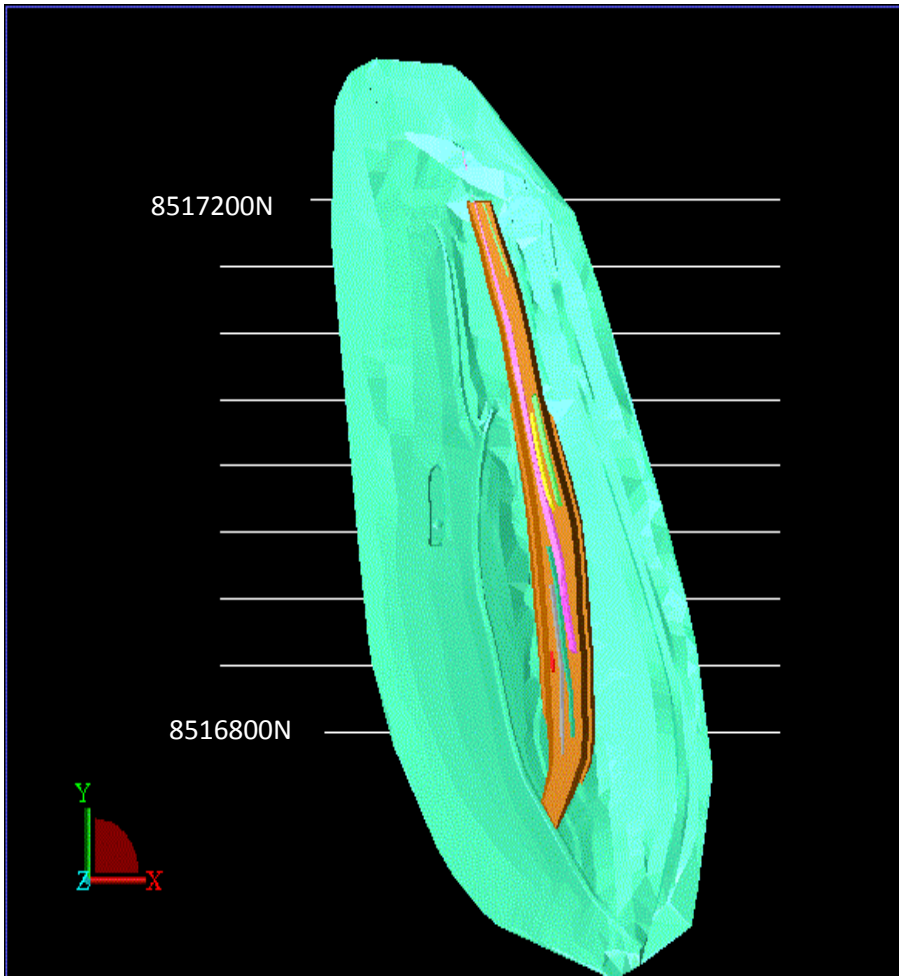
Vein No	BCM	Tonnage	Colour
OB 4	5,000	11,000	Light Blue
OB 5	5,300	11,600	Green
OB 6	3,500	7,700	Yellow
OB 7	4,100	9,000	Grey
OB 8	500	1,100	Red
OB 9	18,000	39,600	Purple
TOTAL	**36,400**	**80,000**	

Modelled Grades

The grade data that is available is neither accurately located and with very little continuity so it is impossible to accurately assign any grades to the quartz veins above. As stated above there is a significant contribution to the gold grade by secondary enrichment (also as stated by Hossfeld in his use of the description of “replacement lodes” to describe the quartz veins), this is also shown by the cryptocrystalline nature of the mineralized quartz veins themselves. Other gold deposits in the area were high grade, for example Touheys North (5.5 g/t) and Touheys South deposits (13 g/t), near the surface with the grades dropping to 3 g/t Au below the water table.

The use of the base of the hill at an elevation of 115mRL as the economic orebody base in the modelling puts the base still well above any water table effects.

Plans and Sections



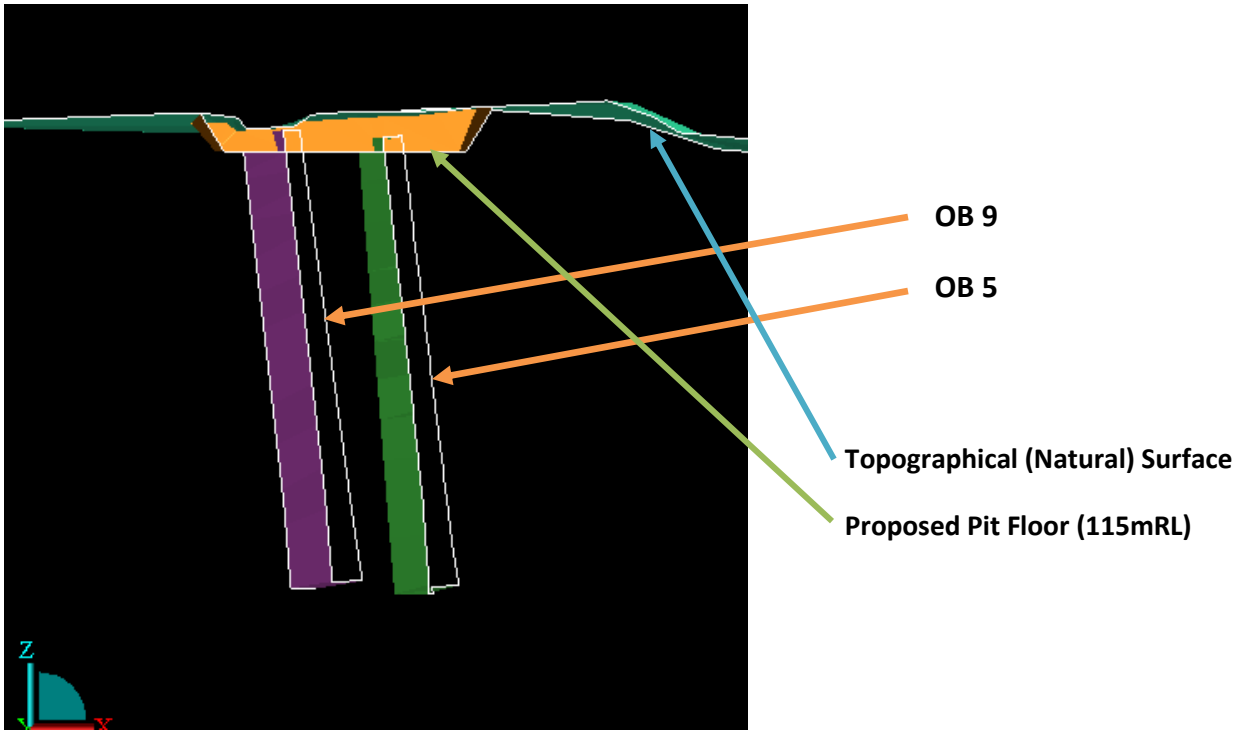
Plan View

Cross Sections are

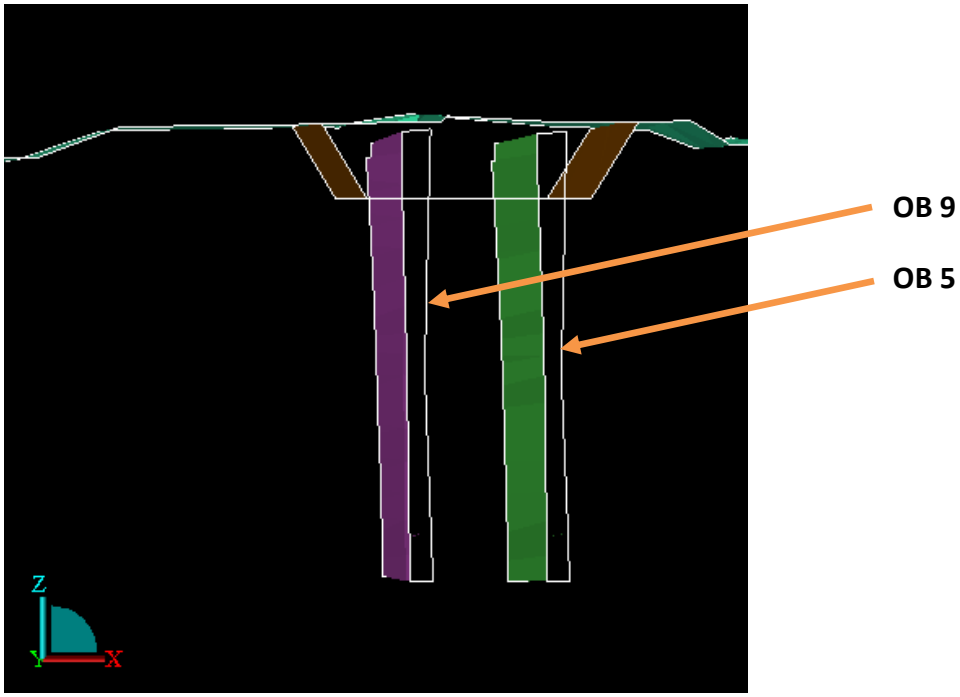
East – West

On a spacing of 50m Northings

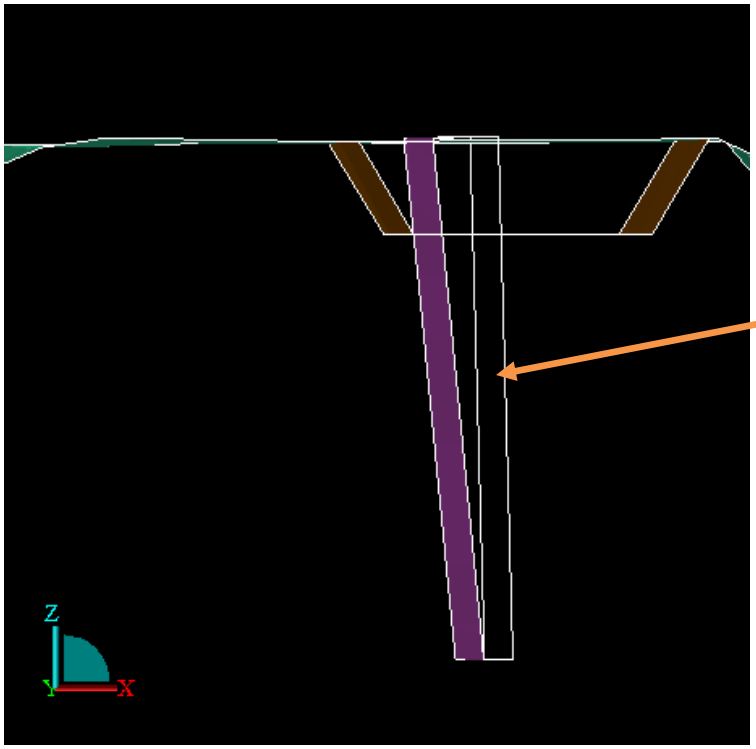
From
8517200N
To
8516800N



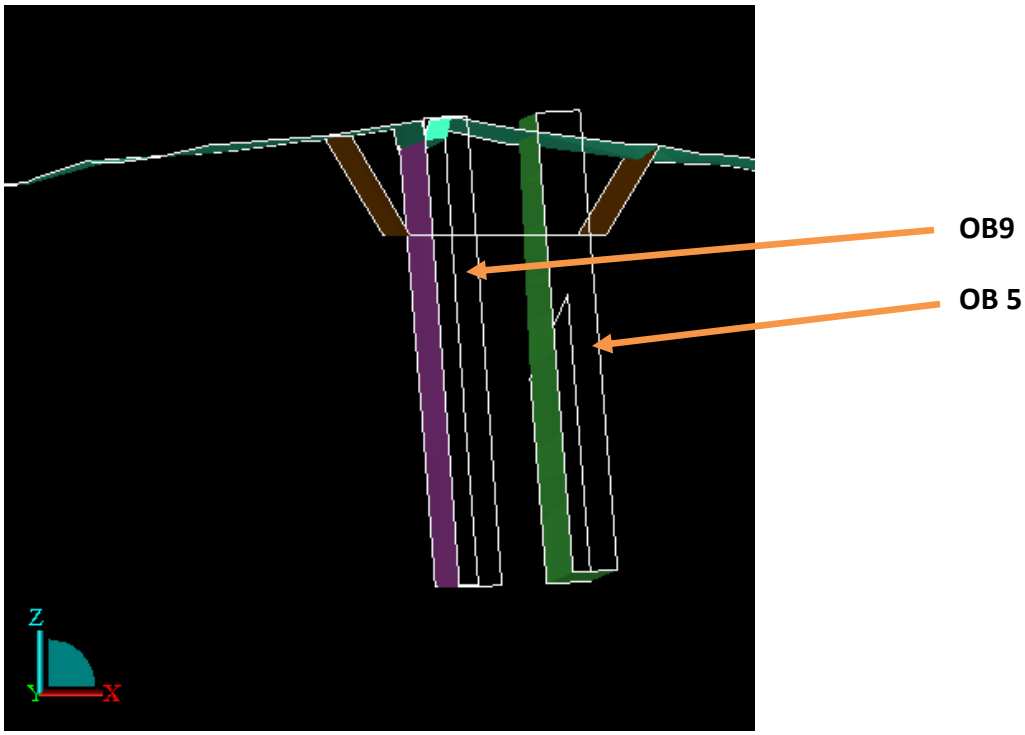
8517200N Section



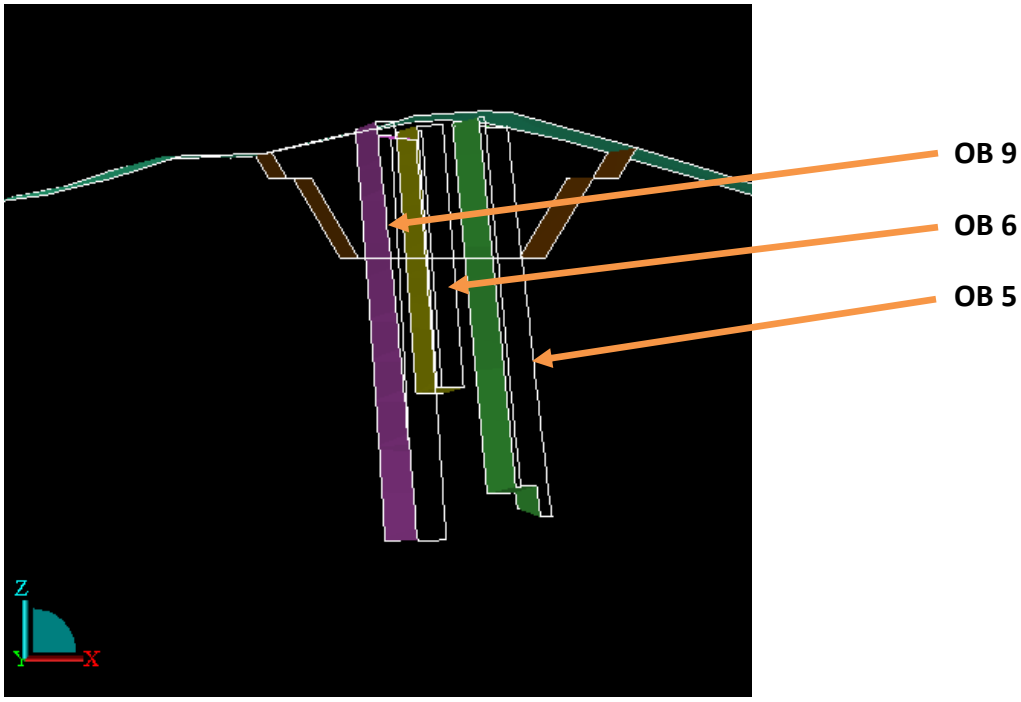
8517150N Section



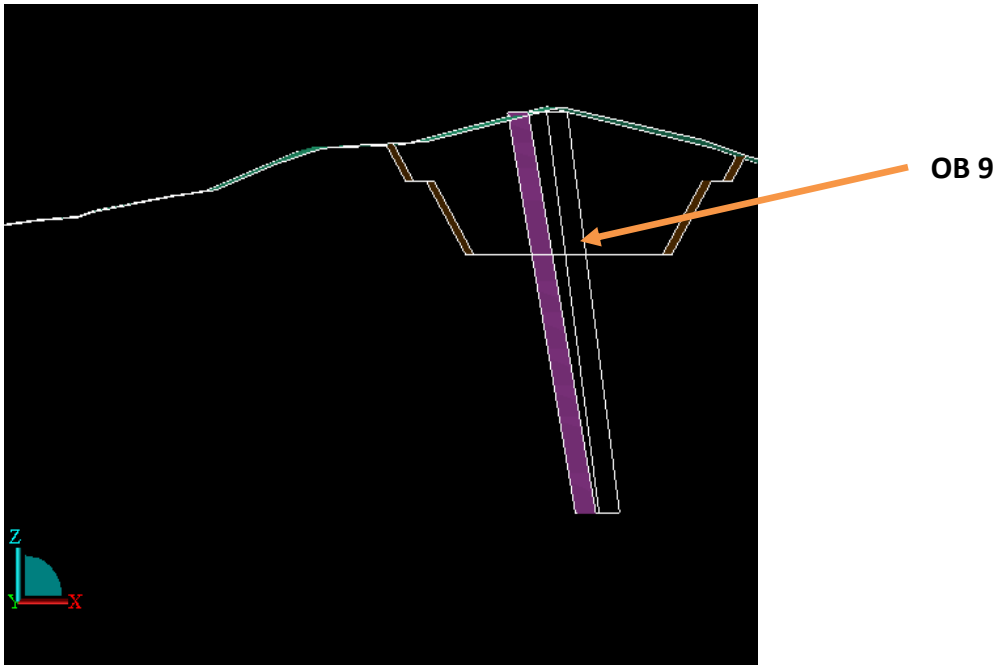
8517100N Section



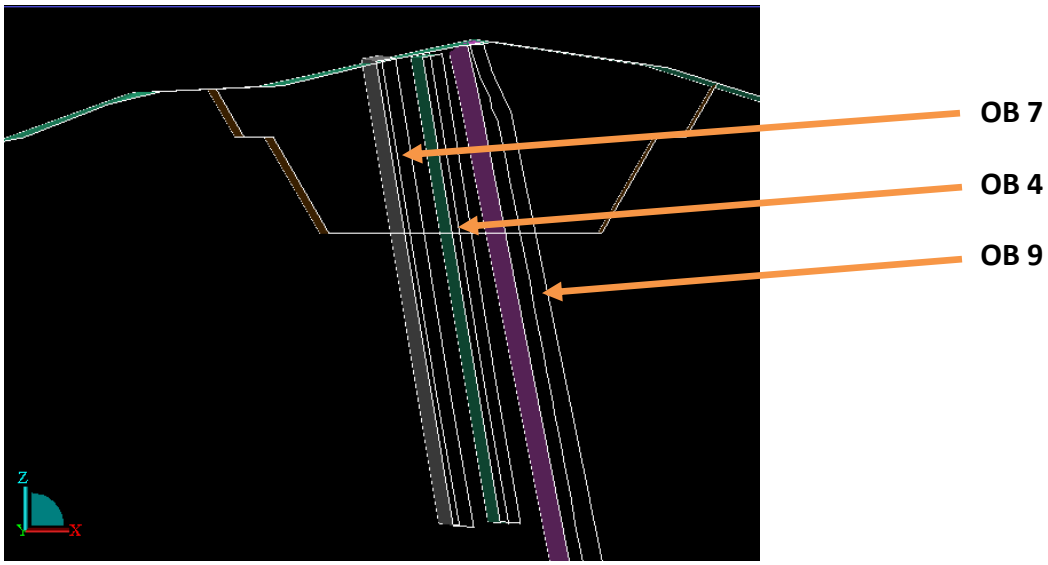
8517050N Section



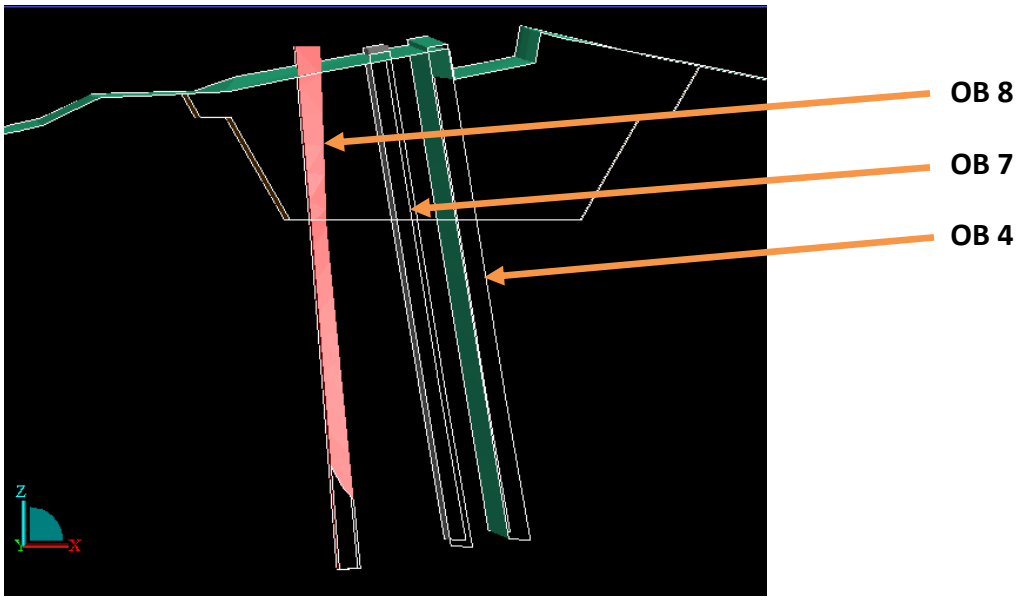
8517000N Section



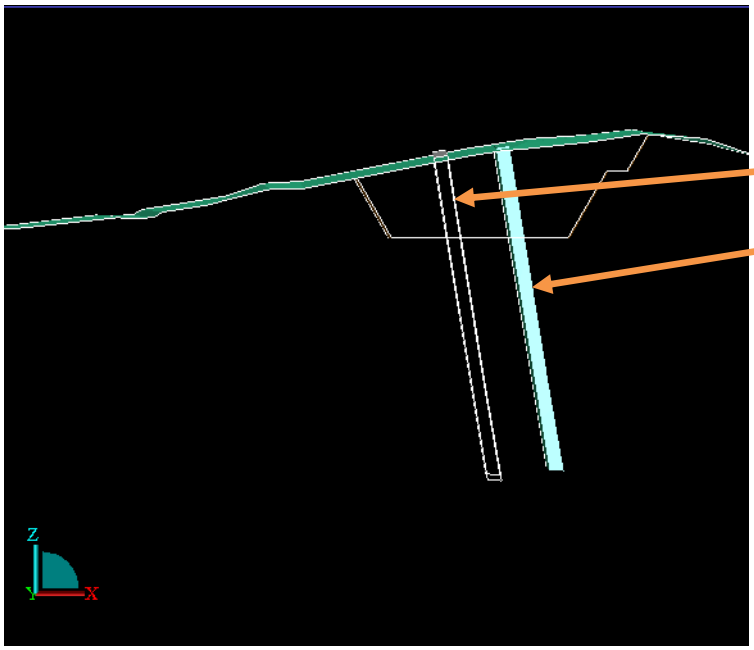
8516950N Section



8516900N Section



8516850N Section



8516800N Section

Historical Drillhole Summary

Drill Hole	Easting	Northing	Elevation	Depth	Azimuth	Dip
DDH 1	796482.352	8517154.507	120.195	75	79.5	-45
DDH 2	796499.542	8517044.124	119.779	75	79.5	-45
DDH 3	796535.616	8516968.016	128.567	75	79.5	-45
DDH 4	796609.122	8516852.126	124.599	80	269.5	-45
McKDH A	796534.999	8516844.976	121.599	34	79.5	-56
McKDH B	796558.007	8516901.974	131.454	30	79.5	-56
McKDH C	796548.971	8516957.206	129.770	30	79.5	-56
MKRC 01	796558.971	8516800.154	122.350	55	90.5	-55
MKRC 02	796546.907	8516849.974	124.125	55	85	-55
MKRC 03	796541.896	8516904.116	128.773	55	80	-56
MKRC 04	796533.323	8516954.625	127.629	55	80	-55
MKRC 05	796523.692	8517001.479	126.129	55	80	-55
MKRC 06	796503.964	8517055.403	119.507	55	82	-55.5
MKRC 07	796493.383	8517112.825	120.056	52	86	-55.1
MKRC 08	796487.090	8517145.855	120.951	55	80	-55.1
MKRC 09	796458.234	8517211.894	113.931	45	80	-55
MKRC 10	796459.974	8517249.544	112.019	55	80	-55

7. RECOMMENDATIONS

Before a small scale mining operation proceeds the author would recommend the following work be done to reduce investment risk.

- Further costeaning and surface sampling be undertaken to the north of Starr's 1993 open cut and to the south of Hossfeld's Costean 2, there are indications of quartz veining to the west of the cleared area on the crest of the hill and these should be sampled as they could add considerably to the tonnage in this area.

- Further costeaning and surface sampling to the west of Starr's 1993 open cut as the Australasia drilling indicates quartz veining in this area.

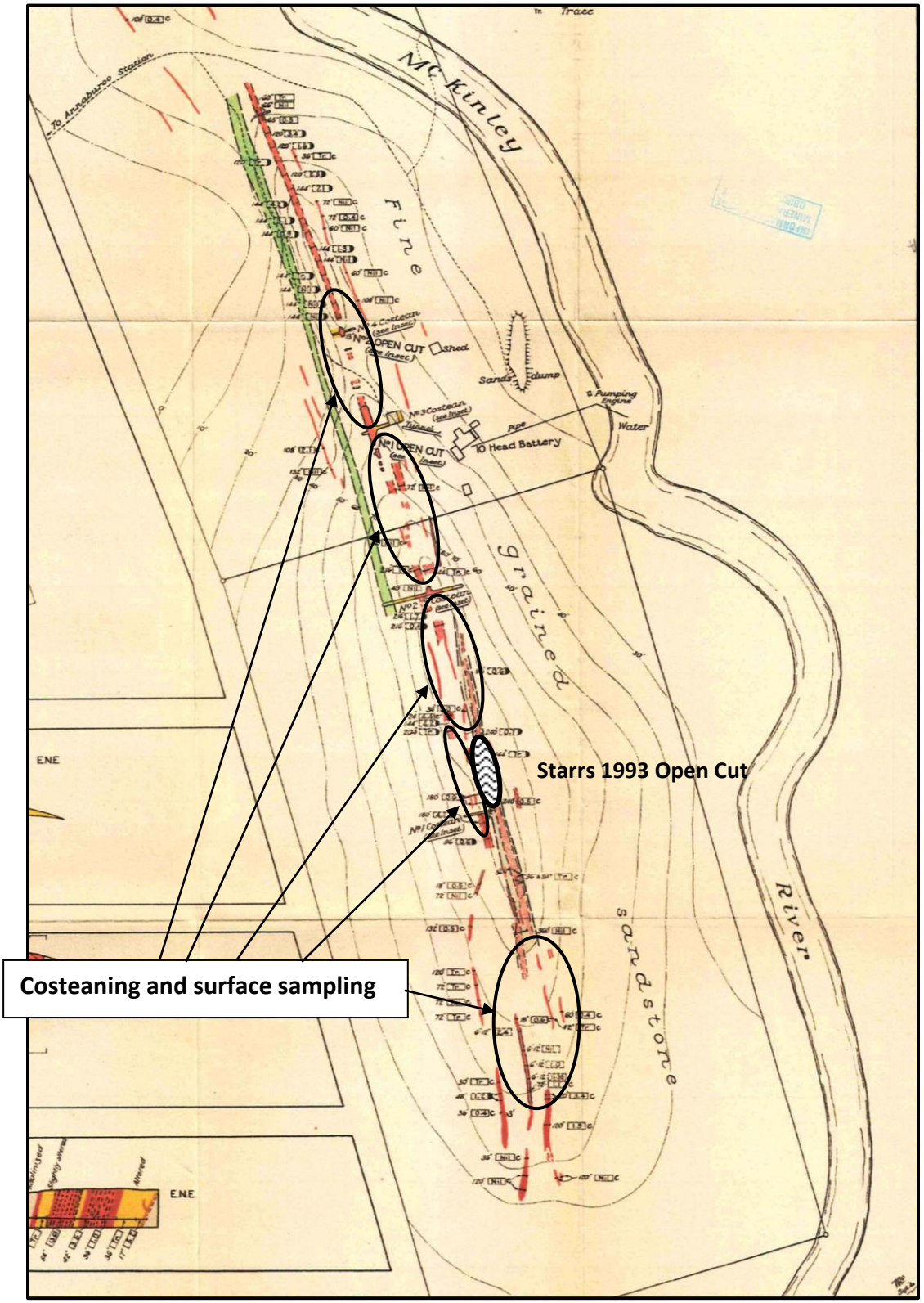
- Further costeaning and surface sampling in the area between Hossfeld's Nos 2 and 3 costeans.

- Further work to elucidate the relationships between the buck quartz veins on the southern flank of the hill and the gold bearing quartz veins that curve to the west immediately to the south of Starr's 1993 open cut.

- The area under Eric's storage sheds should be investigated as soon as the steel can be removed.

- All work should have the sample positions recorded, "a sample with no location is just a bag of rocks".

These areas are indicated on the southern extent of Hossfeld's 1940 map below:



Recommended future exploration

8. REFERENCES

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