TOPTUNG LIMITED

ABN 12 118 788 846

THE TORRINGTON PROJECT

Tungsten exploration program at Torrington, with an emphasis on a couple of the newer exploration tools that are available now, notably Light Detection And Ranging (LiDAR) & Deep Ground Penetrating Radar (DGPR)

AusIMM
THE MINERALS INSTITUTE
Hunter Region Branch

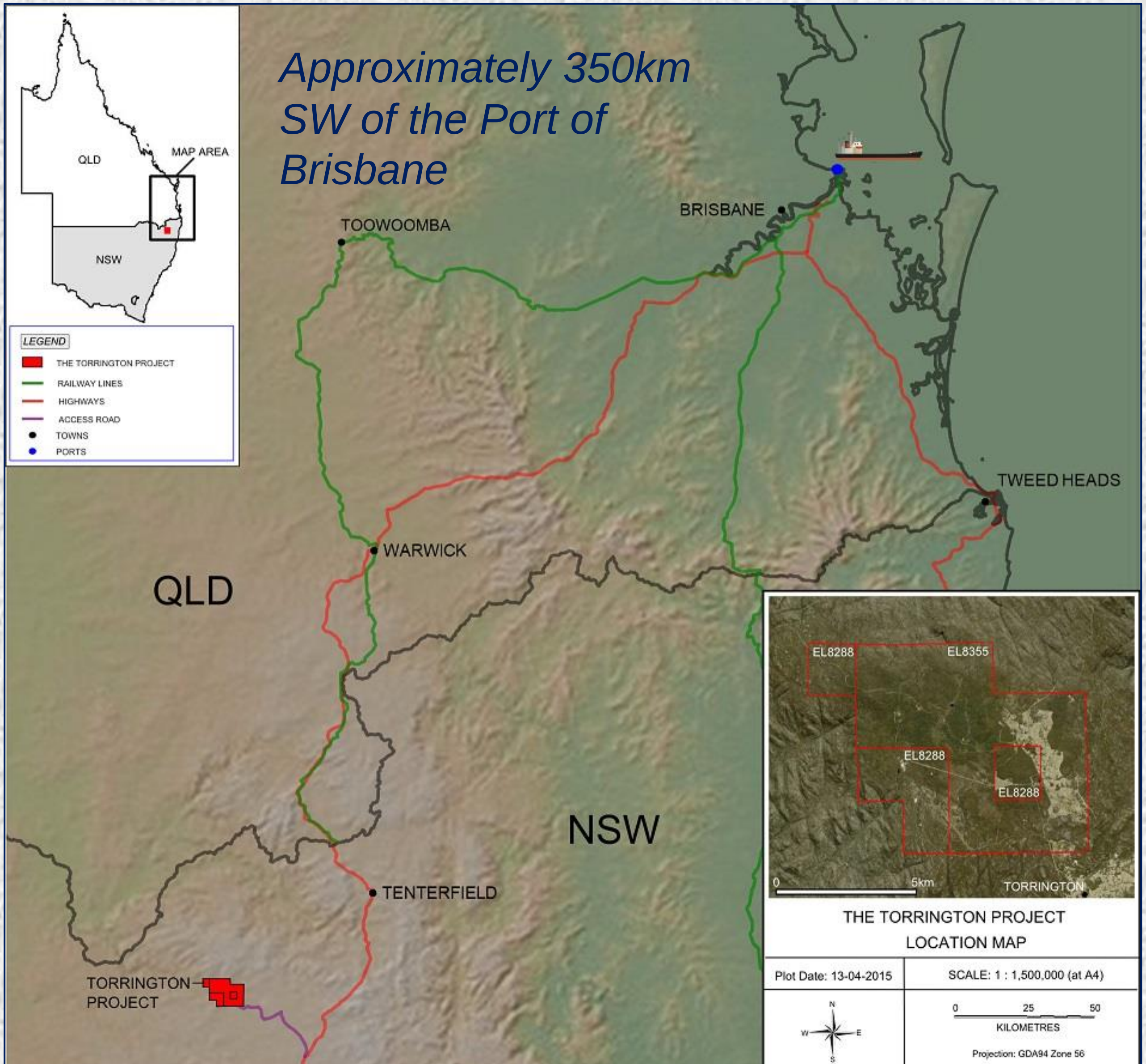
Armidale NSW August 2015

TOP TUNG

Resolve

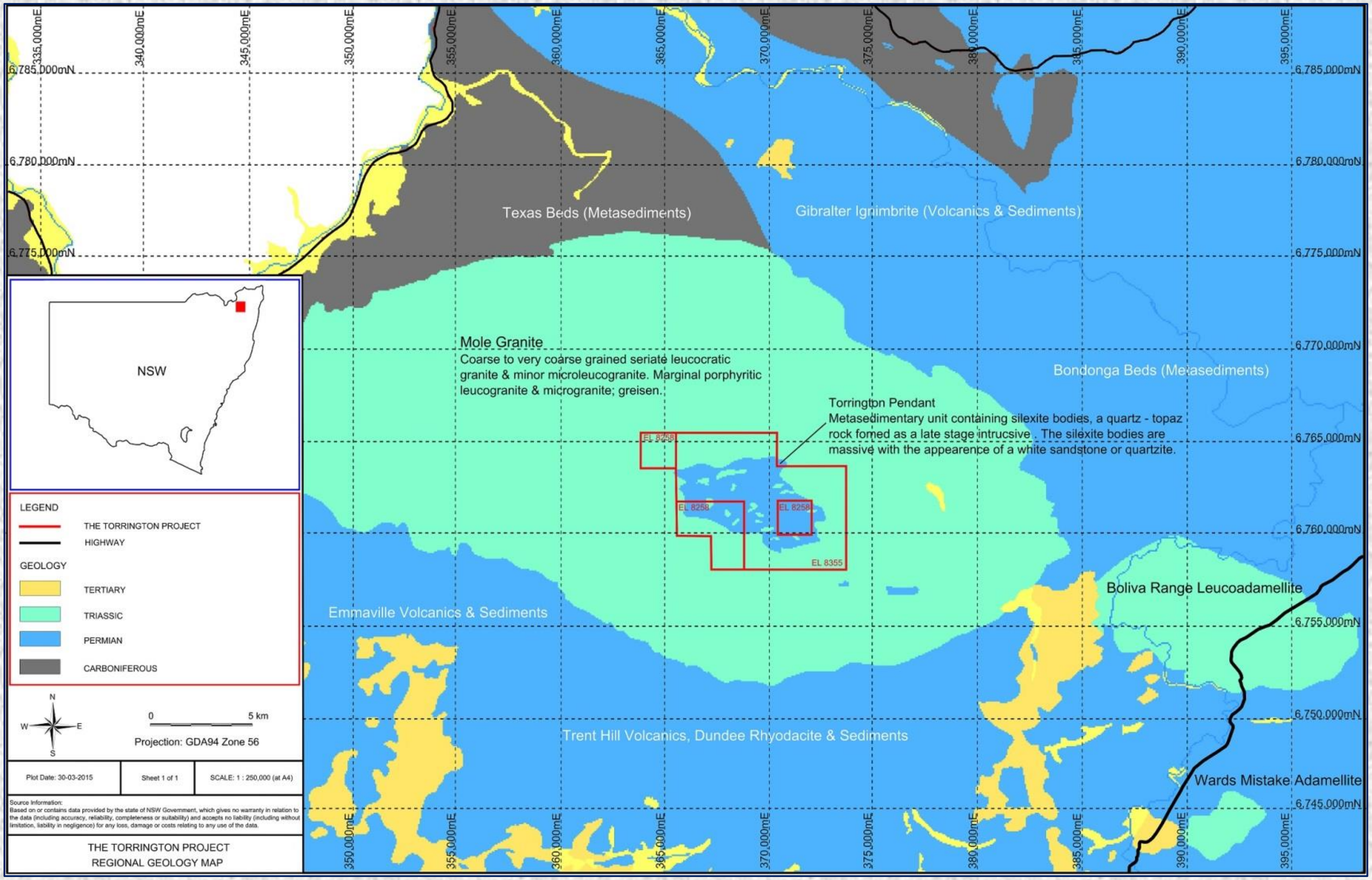
Mike Skinner

Torrington Project Location



Torrington Geology

The Torrington Project lies within the Late Permian Mole Granite and covers the Torrington Pendant, an elliptical body of Carboniferous- Early Permian metasediments which is the remnant roof of the Mole Granite.



What is Silexite??

The primary ore is silexite (called locally a quartz/topaz greisen), essentially a topaz bearing (>5%, typically 5-30%) quartz rich rock (<60-95% by volume).

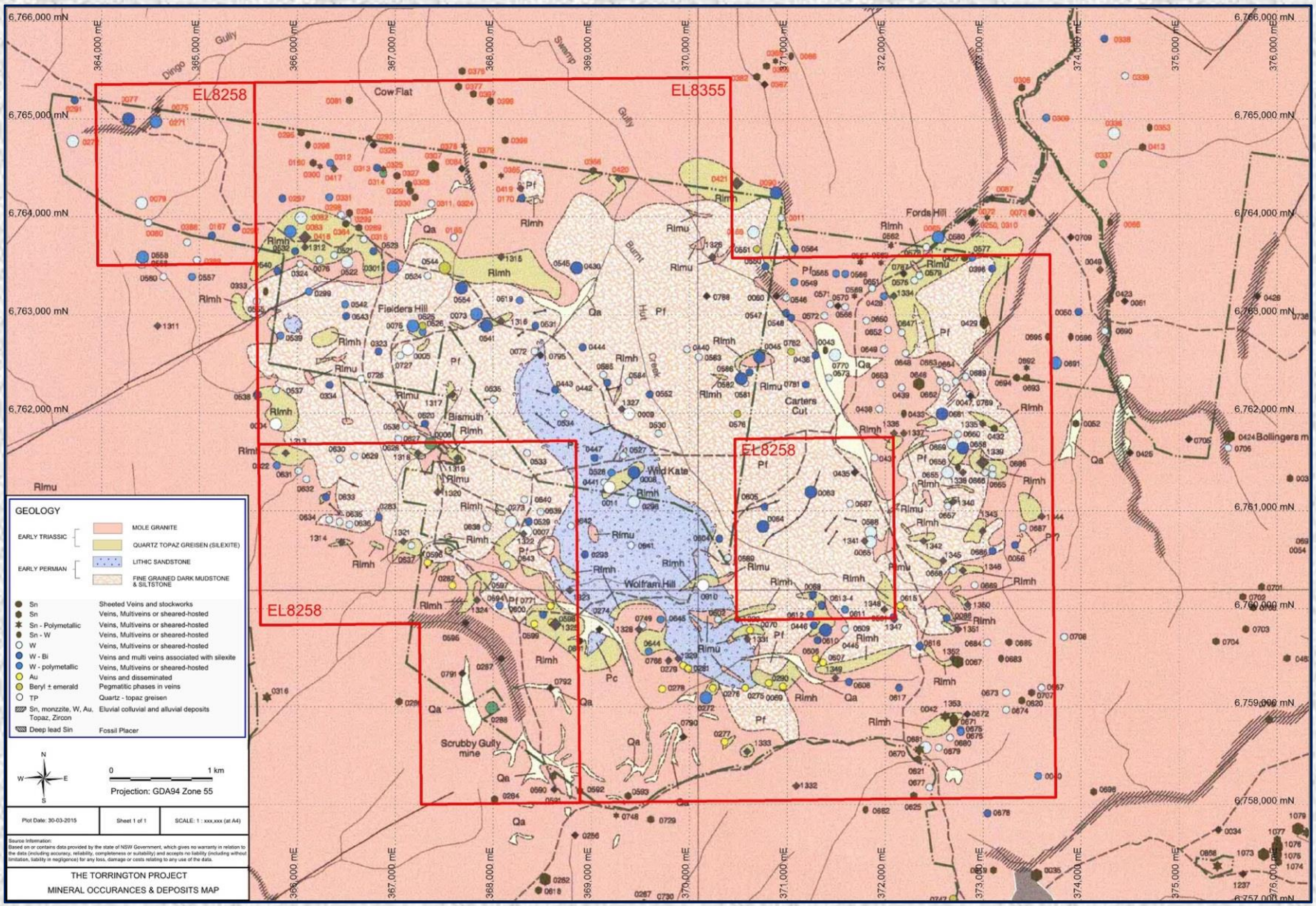
Silexite genesis is somewhat complex with two silexite types being evidenced in the field

Intrusive type with a saccharoidal texture that forms sills and dykes in/on the granite and in the metasediment cap (Torrington Pendant).

Metasomatic type which displays relict granitic texture and forms prominent outcropping massive hills, largely on the outer edges of the Torrington Pendant.

Torrington Pendant >300 Mineral Occurrences

More than 60 silexite occurrences known to date within the Torrington Project



Torrington Historic Overview

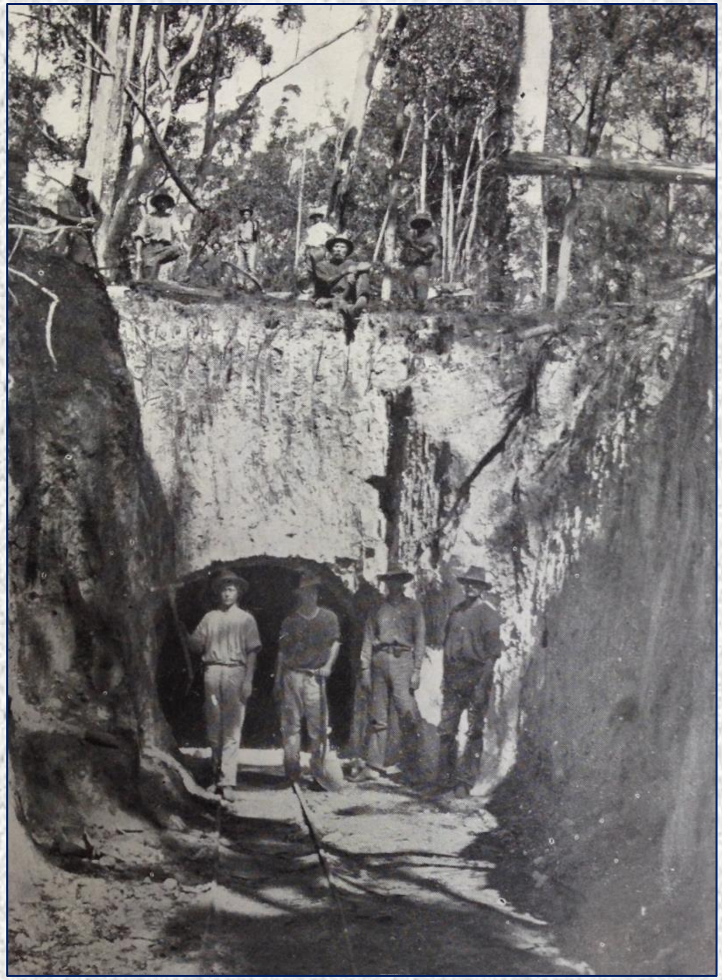
History	• Historical, successful multi-element mining (tungsten, bismuth and topaz) • Contained largest single wolfram mass (12.5t) recorded in Australia from a 35 ton vug of wolfram • >100 years mining activity within the area, including BHP • Pacific Copper tungsten and topaz production from mid 1970's to early 80's
Resource Definition	• Previous resource defined of ~ 5.75Mt (Pre-JORC) • Current Resource JORC 2012 • LiDAR survey completed and has contributed to increased resources • Friable nature of the tungsten (ferberite) resulted in low recoveries in RAB • 414 holes (from 434) in multiple drilling programmes (some for topaz) • 12 x 5T+ bulk samples for tungsten grade and process control • Mining and large bulk tests conducted from 1976-81
Successive price crashes, poor recoveries, small scale mining	• Tungsten prices peaked in 1917 and 1977 ($170/Mtu) and fell to $47/Mtu by 1986 with artisanal Chinese production – Mine closed • No fines circuit in previous mill design (30% topaz loss, >25% ferberite loss) • No recognition of potential other mineral credits • Historically small scale mining on small mining claims/tenements

- First company to control whole of the Torrington Pendant – economy of scale -

Torrington Historic Works

Torrington Wolfram Proprietary’s Krupp ball mill
& concentration plant circa 1911

Rockvale Wolfram Company tramway
Hawkins quarry, Torrington circa 1911



Rockvale Wolfram Company’s battery
& concentration plant circa 1911

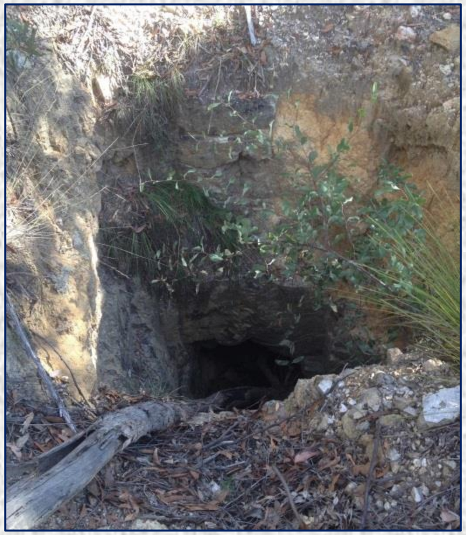
Torrington Historic Workings

Historic Workings
Wild Kate Deposit

Typical Silexite Body (Mt Everard) – Mined 1979-81

Torrington Historic Workings

Numerous historic
small scale operations



TUNGSTEN – Unique in its extremes, difficult to replace

***Very Hard*:** Strongest of all metals - three times harder than chrome and titanium

Very Dense: Greater density than lead or uranium

Very Heat Resistant: 3400°C highest of all metals

Environmentally Friendly: Very resistant to corrosion & completely non-toxic

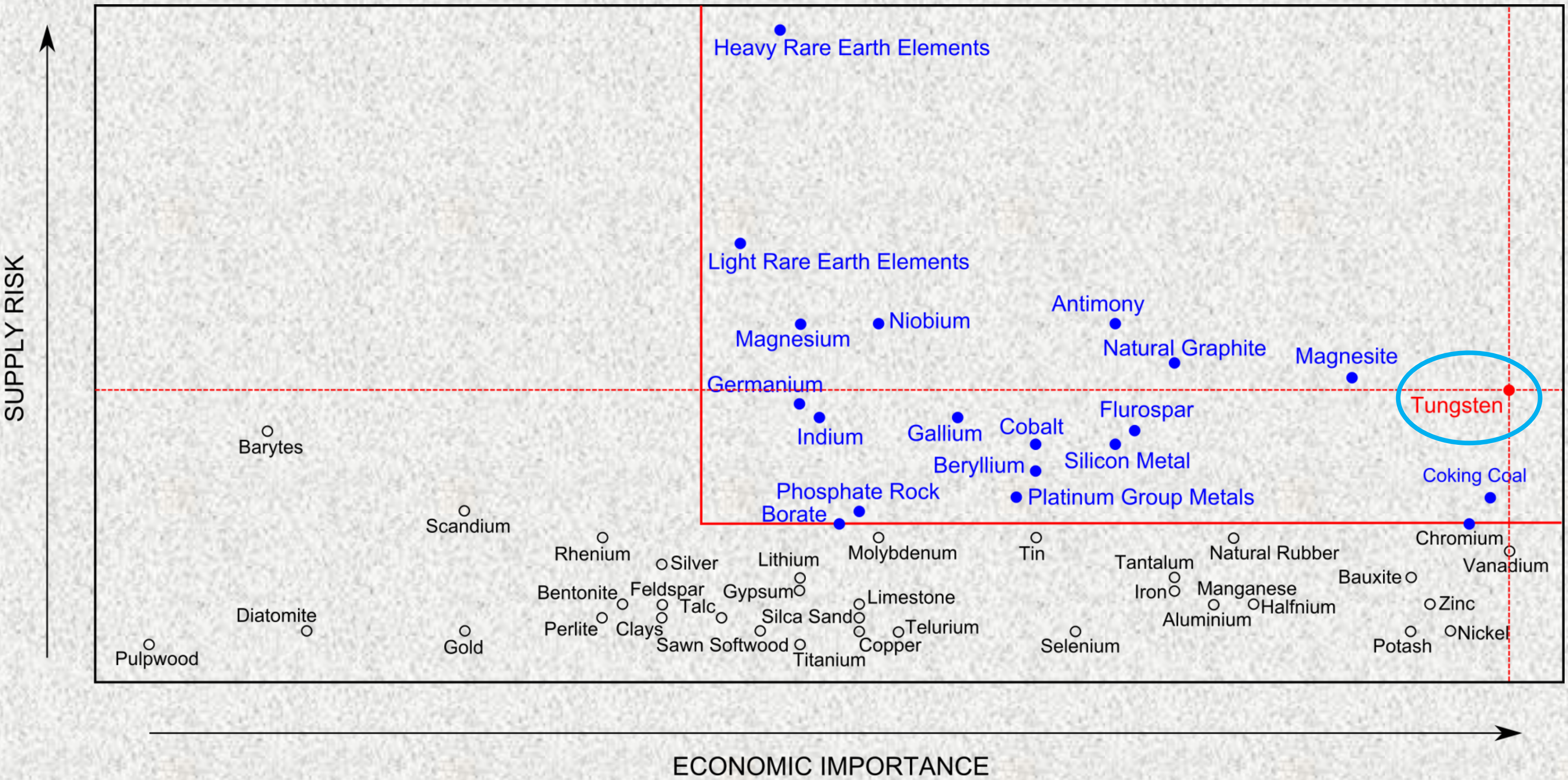
Uses: > 60% in tungsten carbide for cutting tools, as an additive in the production of specialist steel; filament wire for lighting and increasingly in specialty uses - mobile phone handsets, military, ballistics and aerospace

Ferberite Crystals (iron end member of wolframite)

***Importance*:** Classified as a "*Critical Raw Material*" by the EU and as a "*Strategic and Critical Material*" by the US Government

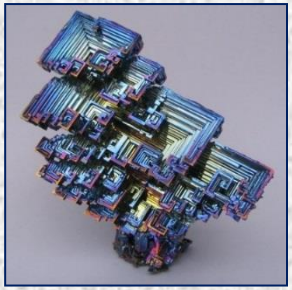
TUNGSTEN – Critical World Supply

Tungsten and its place in the list of critical raw materials



(*Report On Critical Raw Materials For The EU May 2014*)

BISMUTH – A mineral that is defining our future



Bismuth Crystals

***High Electrical Resistance*:** Has highest Hall effect of any metal (greatest increase in electrical resistance when placed in a magnetic field)

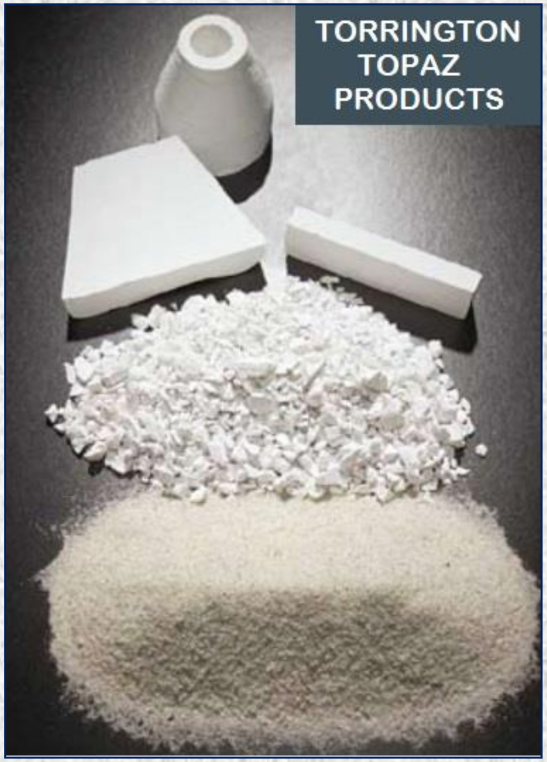
Low Conductivity: Lower than any metal except mercury

Environmentally Friendly: Non-toxic and increasingly used as a replacement for lead

Main Uses: Fire detectors & extinguishers, electrical fuses, solders, medicines, cosmetics, specialist low-melting alloys and in the automotive industry

***Importance*:** Classified as a "*Strategic and Critical Material*" by the US Government

TOPAZ – A superior refractory Mullite



Torrington topaz refractory products

- Very high Al_2O_3/SiO_2 ratio in sintered product = 7/3 vs conventional Al_2O_3/SiO_2 of 3/2
- A higher refractory temperature of 1880^{o}c
- Fluorine removal during calcination and sintering scavenges free silica from matrix and may replace fluorspar as a source of fluorine compounds
- Formation of acicular ceramic matrix occurs at lower temperatures than conventional mullite - forming a product with higher (*ca*.30%) thermal and physical shock resistance
- Potential to lower life cycle costs for many refractory applications
- Processing topaz to mullite results in a significant credit from scavenging fluorine compounds – significantly offsetting mullite production costs

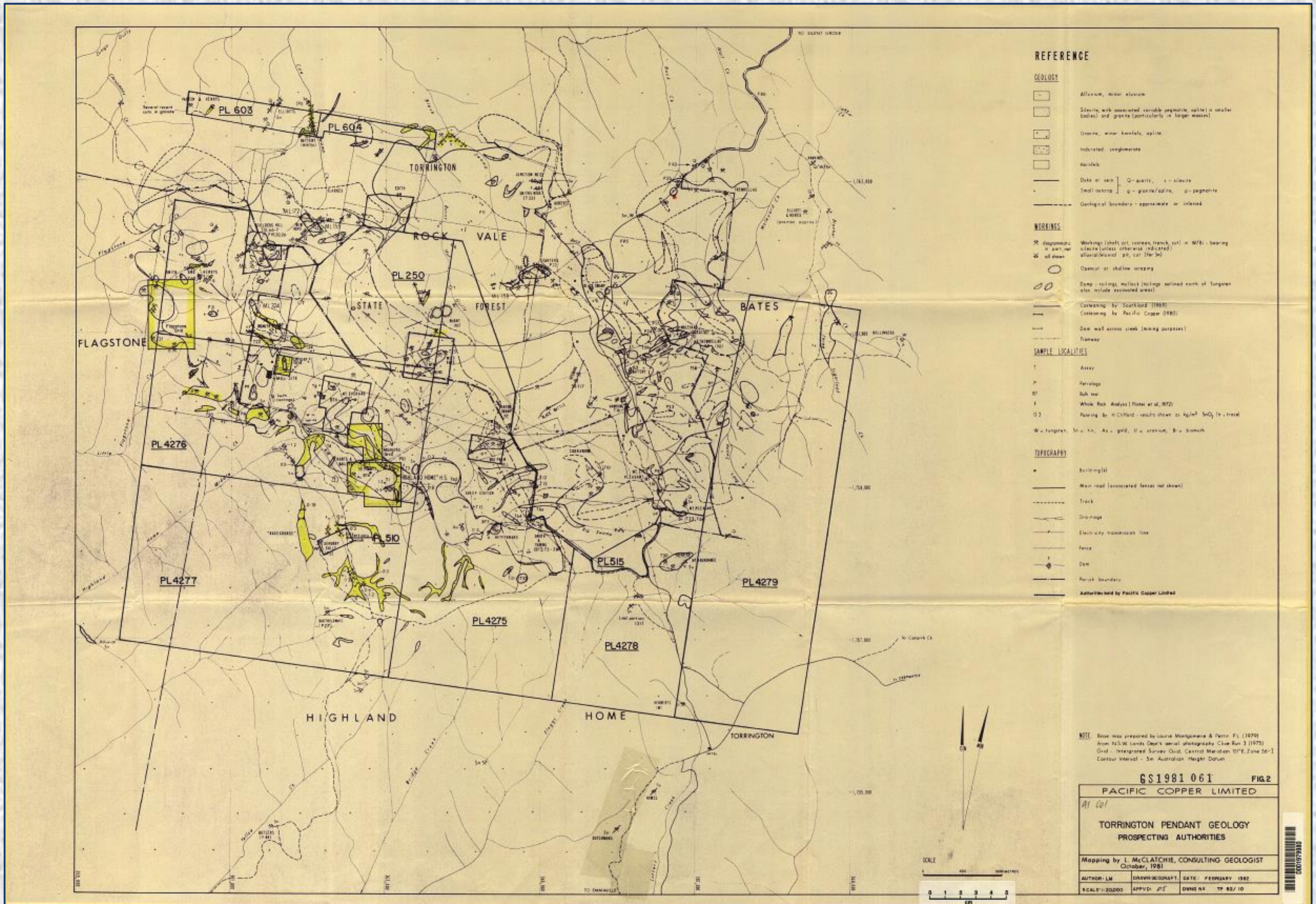
Torrington Topaz – CSIRO Pyrometric Cone Test

CSIRO Refractory Test: Performed to Australian standard for pyrometric cone test

Left to right: Orton Reference Cone 39 (1865 degrees c), Torrington Mullite, a Japanese sintered mullite, an English mullite and a German fused mullite.

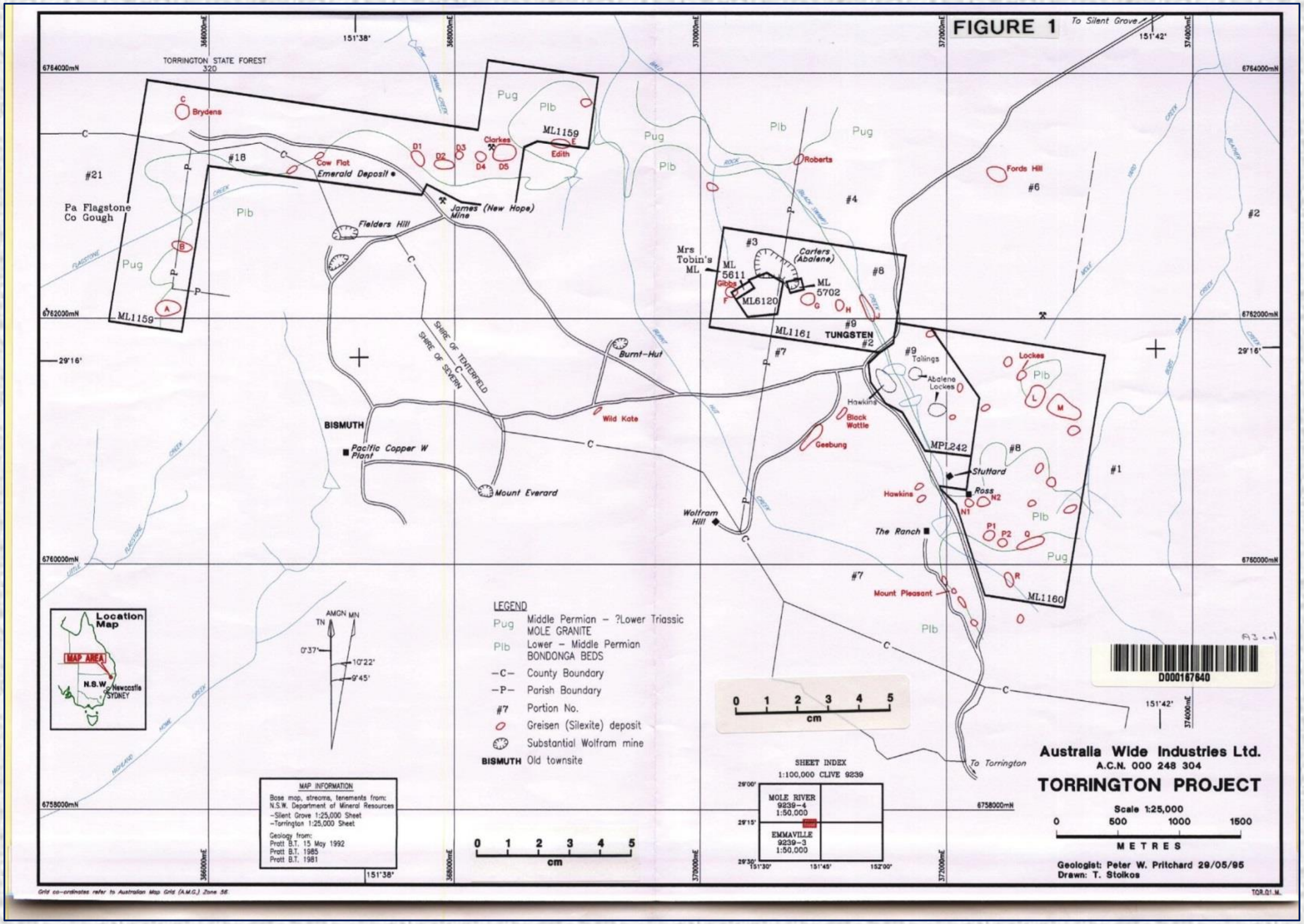
Torrington Deposit Map 1981

Good detail, but only in specific areas and on a local grid only



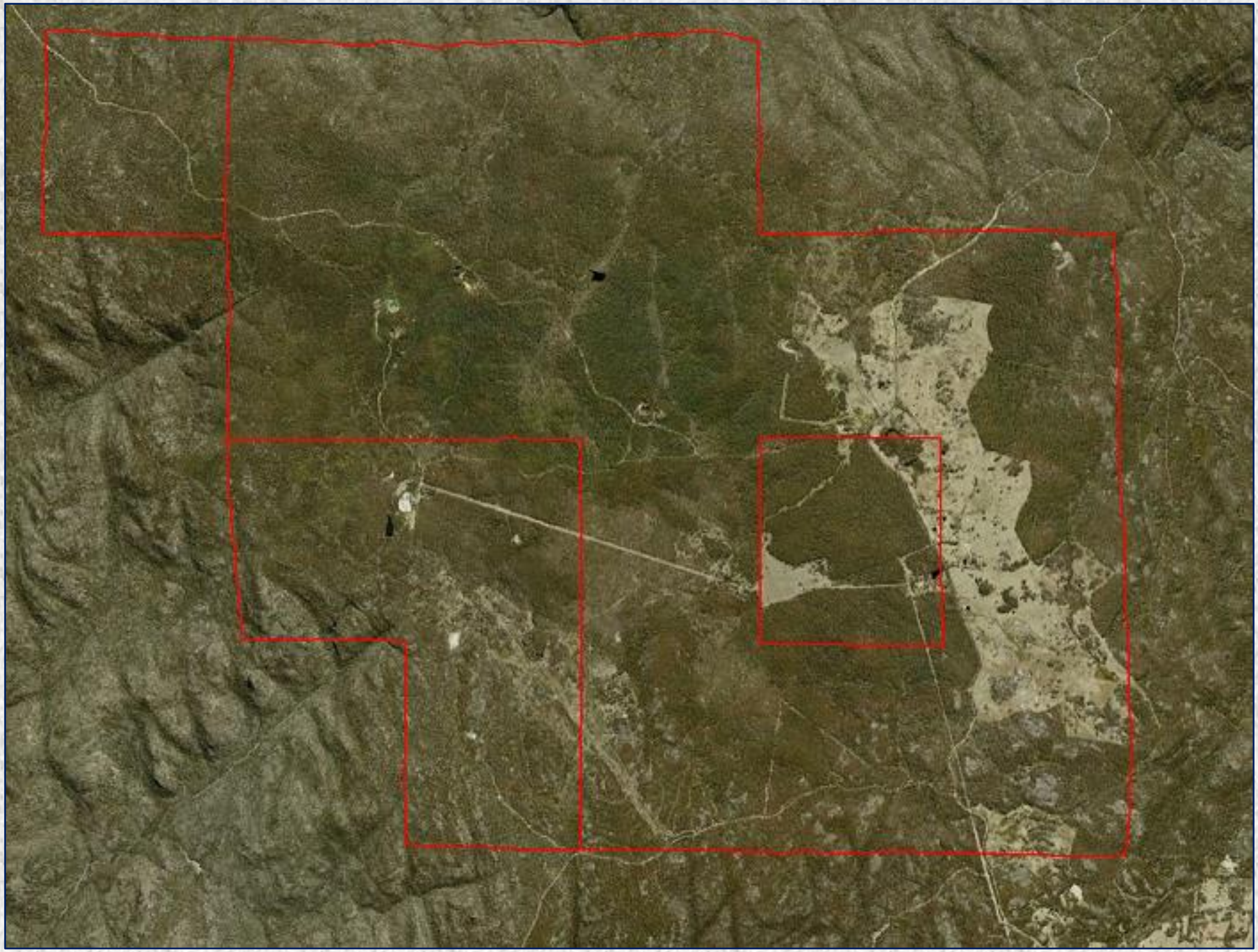
Torrington Deposit Map 1995

Good detail, on a universal coordinate system (but only in specific areas) and issues exist with the surveying the boundaries of the existing tenements



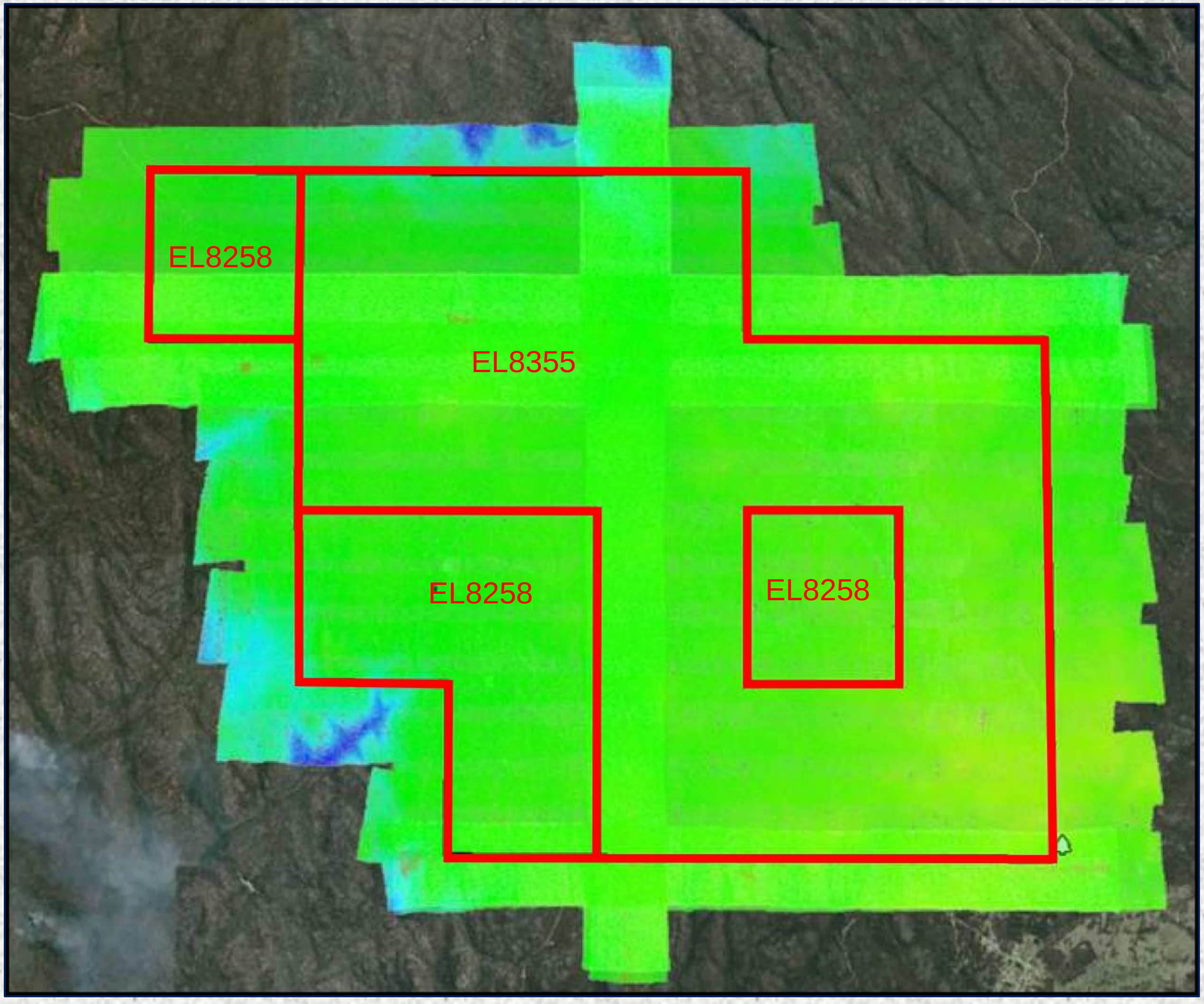
Torrington Map (Google, NSW Globe)

Excellent detail on infrastructure and regional structure, is on a universal coordinate system but no ground detail due to tree cover.

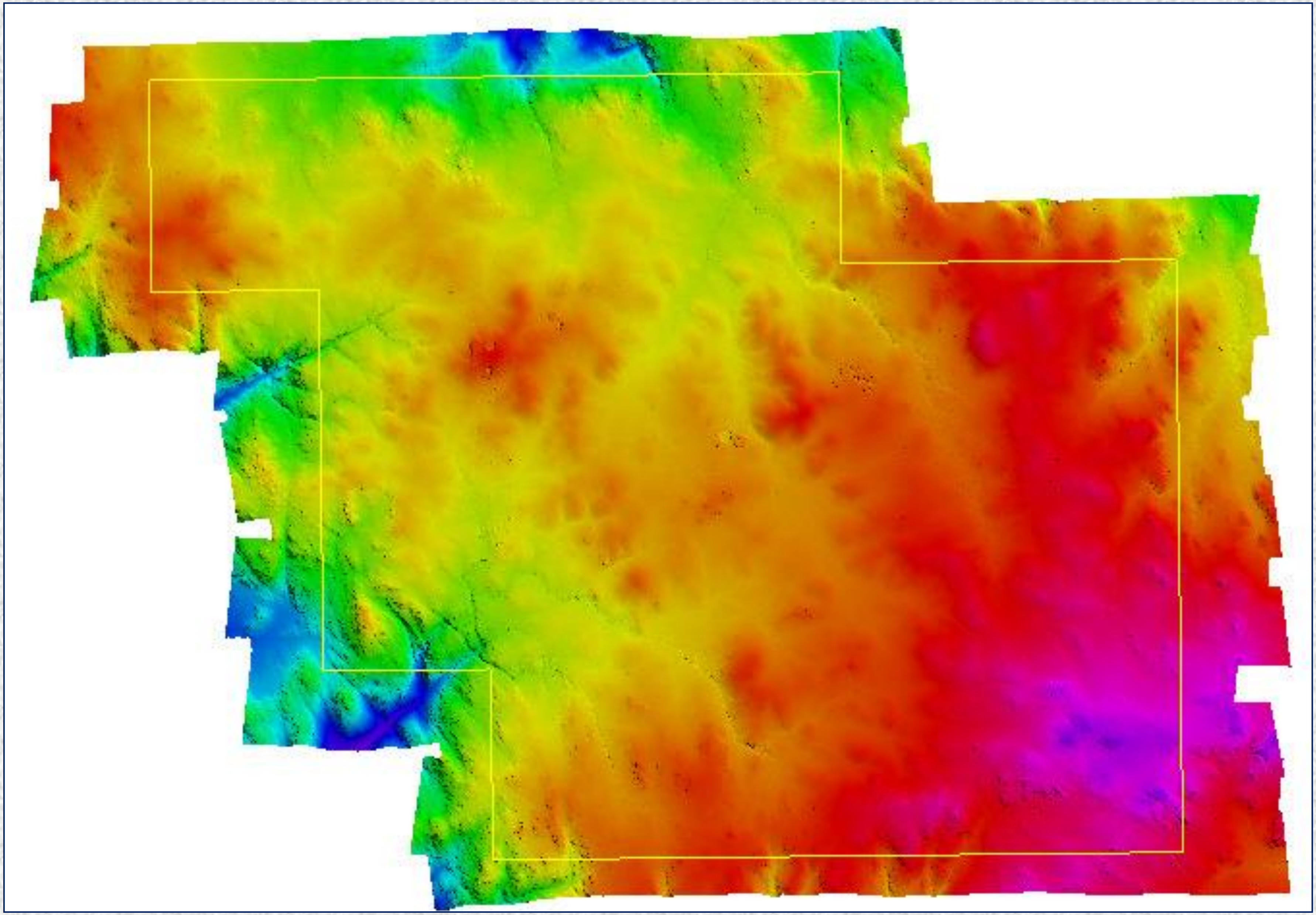


Light Detection And Ranging (LiDAR) Survey

The LiDAR survey was flown on the 12th and 15th March 2015 and flew 15 parallel runs in an east-west direction spaced at 500m intervals at an altitude of approximately 1,000m above ground level. The total survey area was approximately 53km². The LiDAR system defined the terrain surface, including in areas of dense vegetation, to an accuracy of 6 cm.



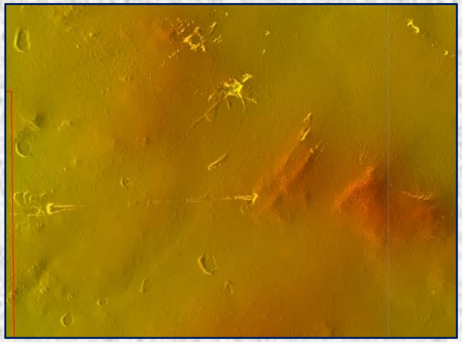
LiDAR Survey

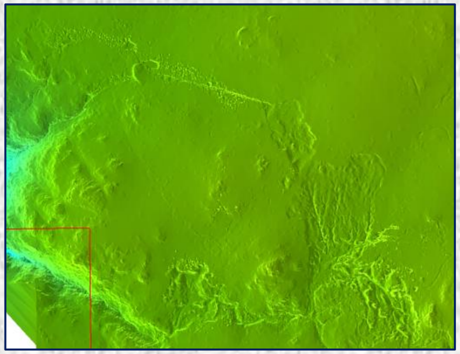


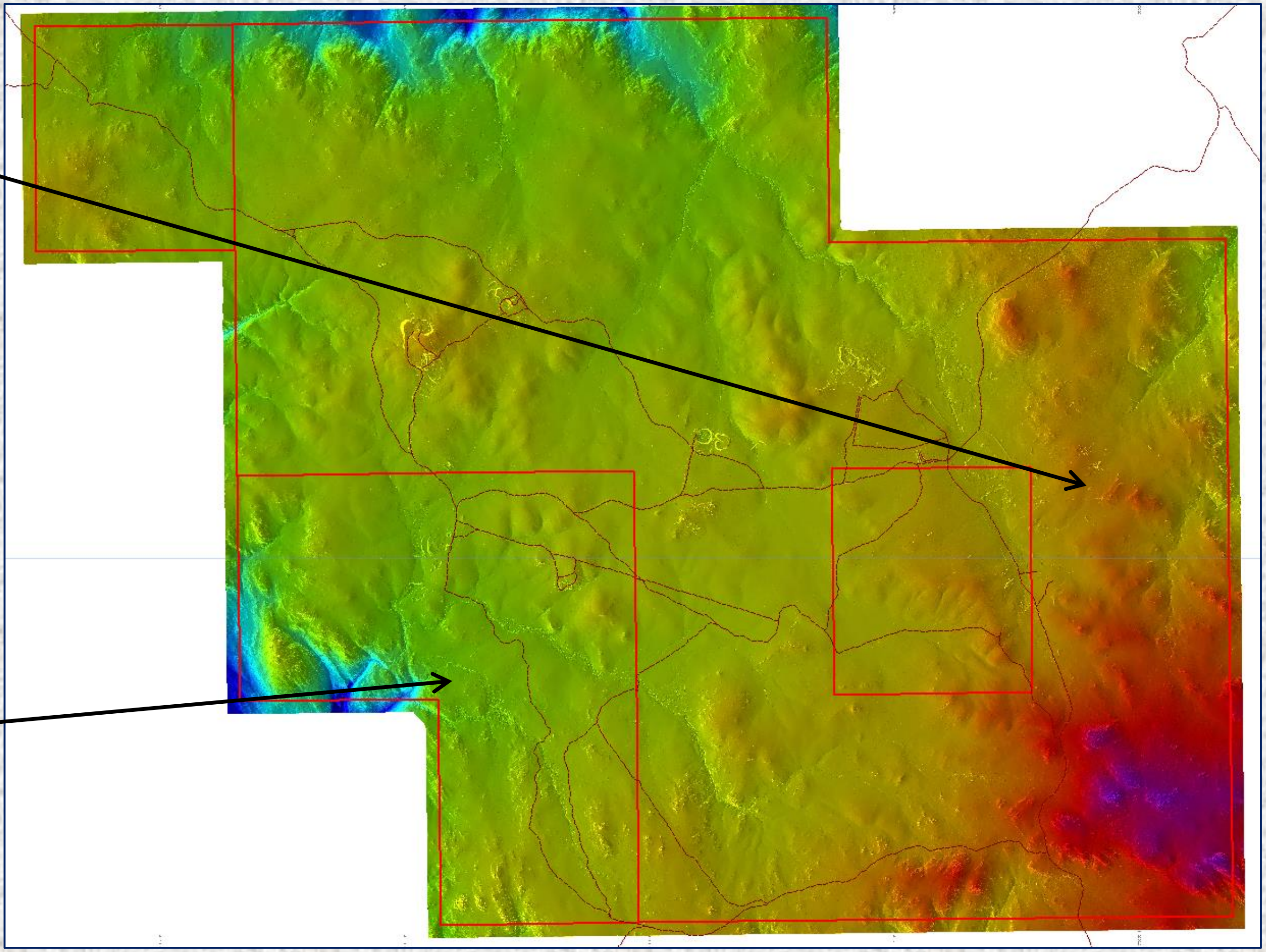
Torrington Bathymetric Survey

Bathymetry was acquired during early May 2015 with handheld bathymetric sounding equipment. Data points were acquired at a density of approximately 1 point per 4 square metre, which, in conjunction with previous pit cross sections, allowed contoured surfaces for the pit floors below the water.

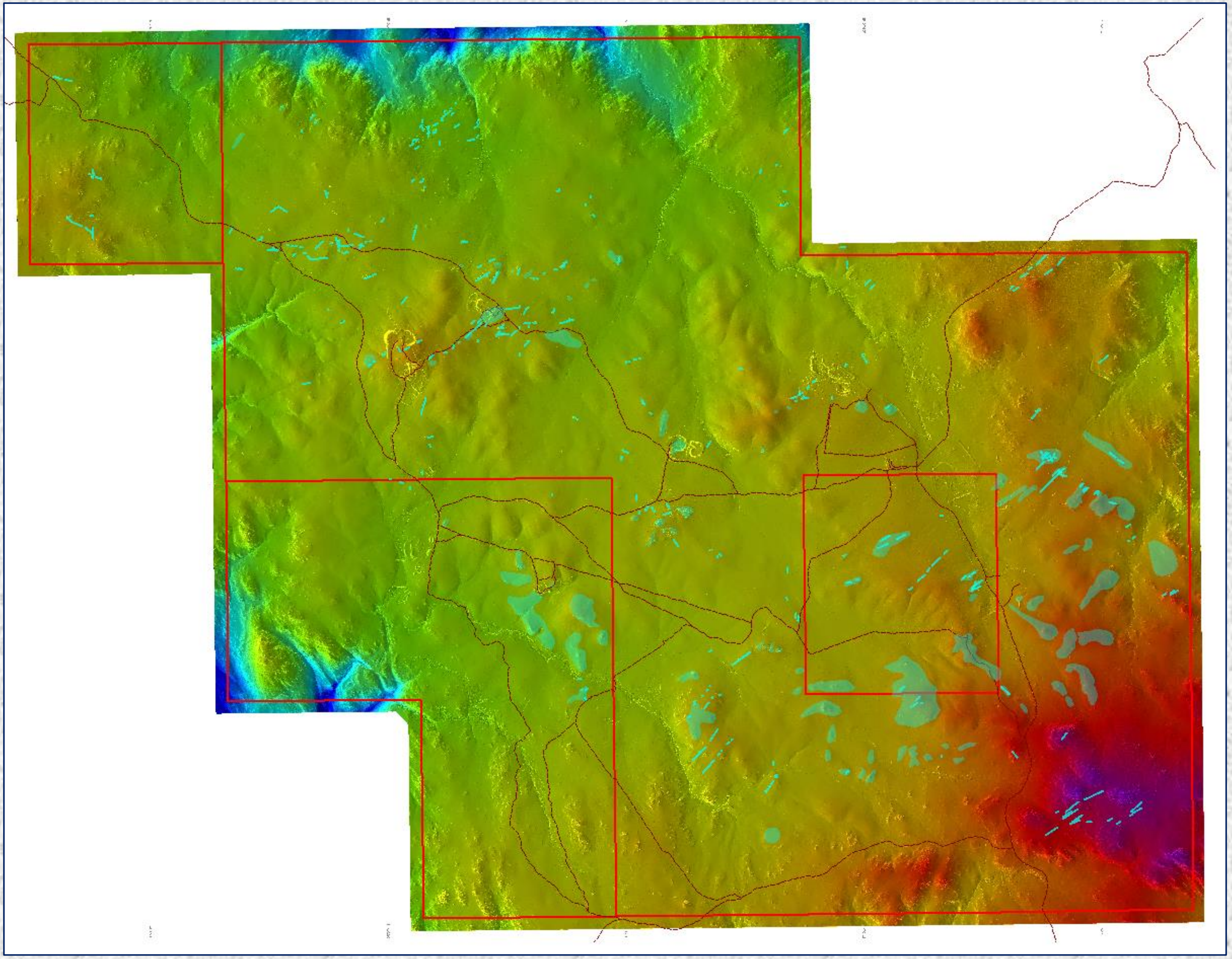
LiDAR Survey False Colour Elevation


Detail historic tramway to workings

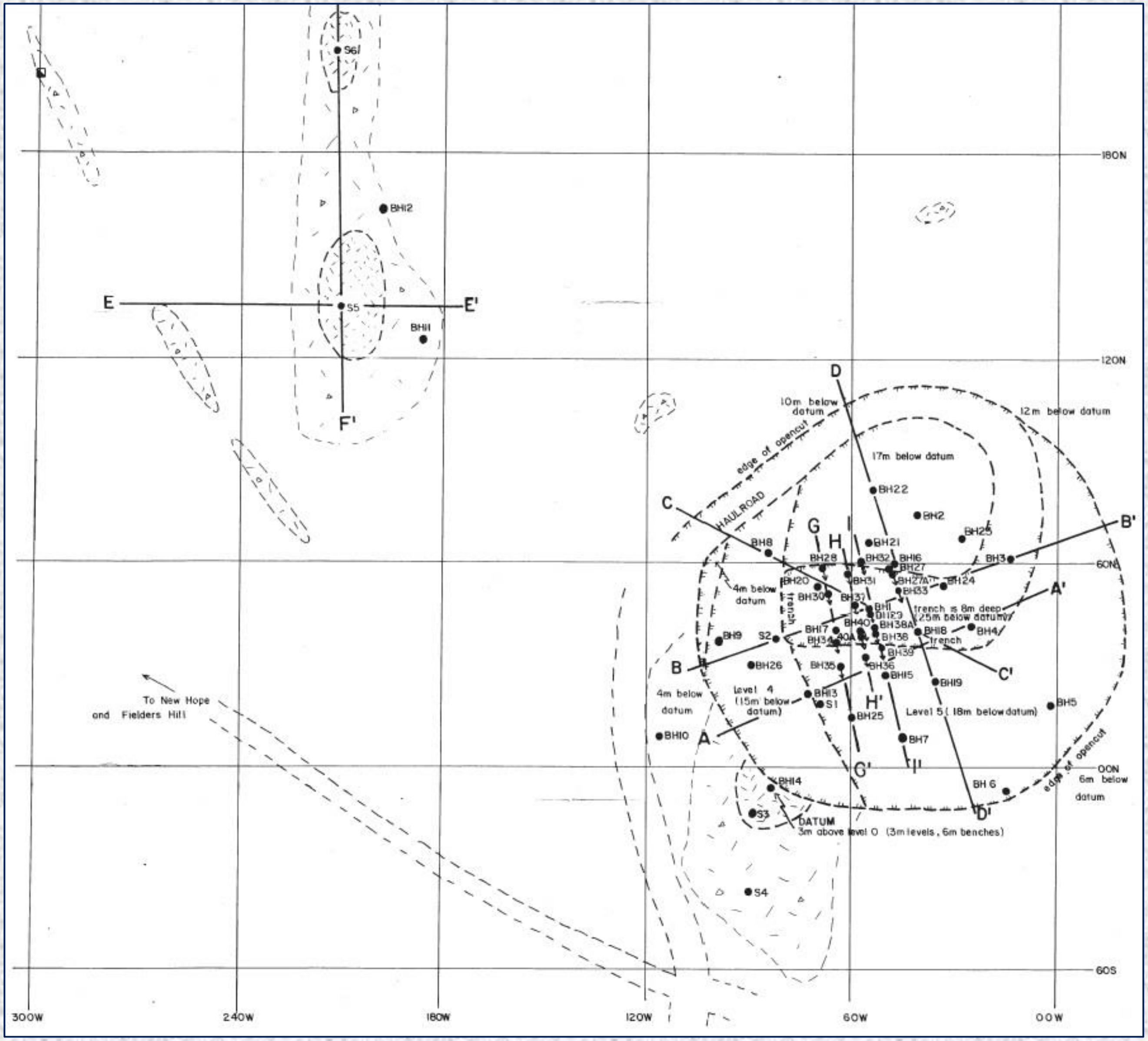

Detail historic alluvial workings



LiDAR Image With Silexite Bodies

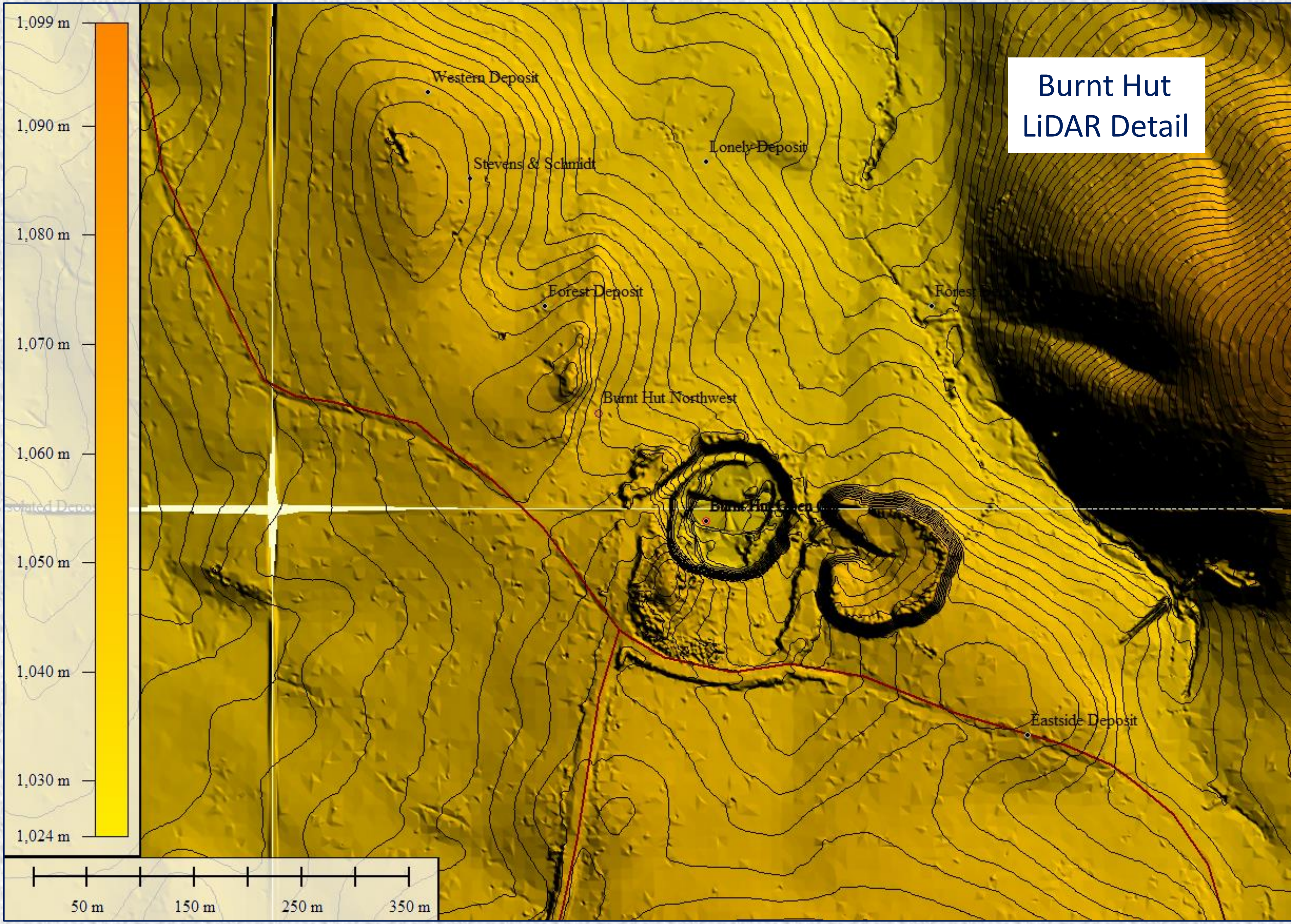


Example 1: Burnt Hut Deposit Map ~ 1981

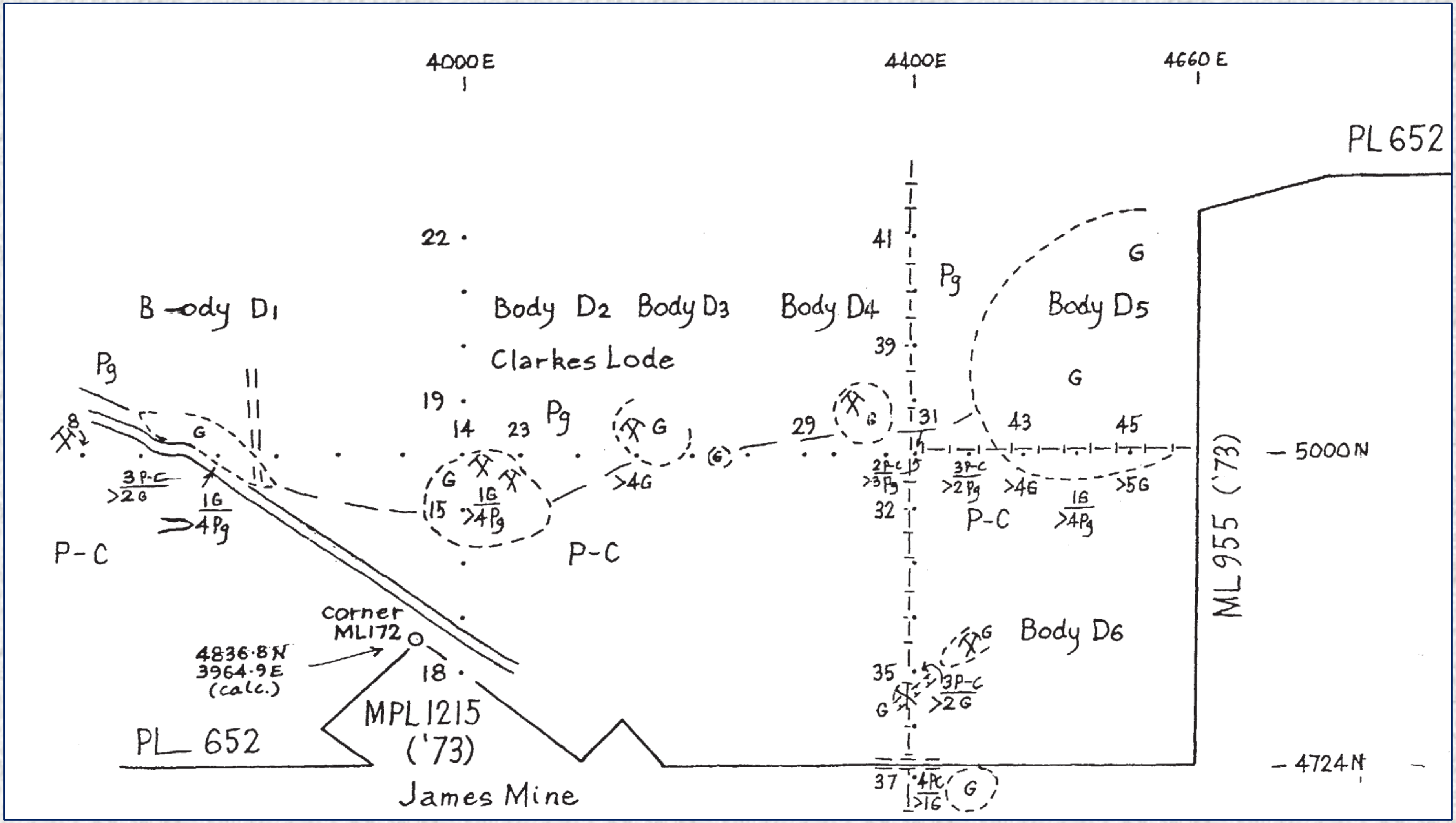


Burnt Hut Satellite Image (Google, NSW Globe)

Burnt Hut LiDAR Detail

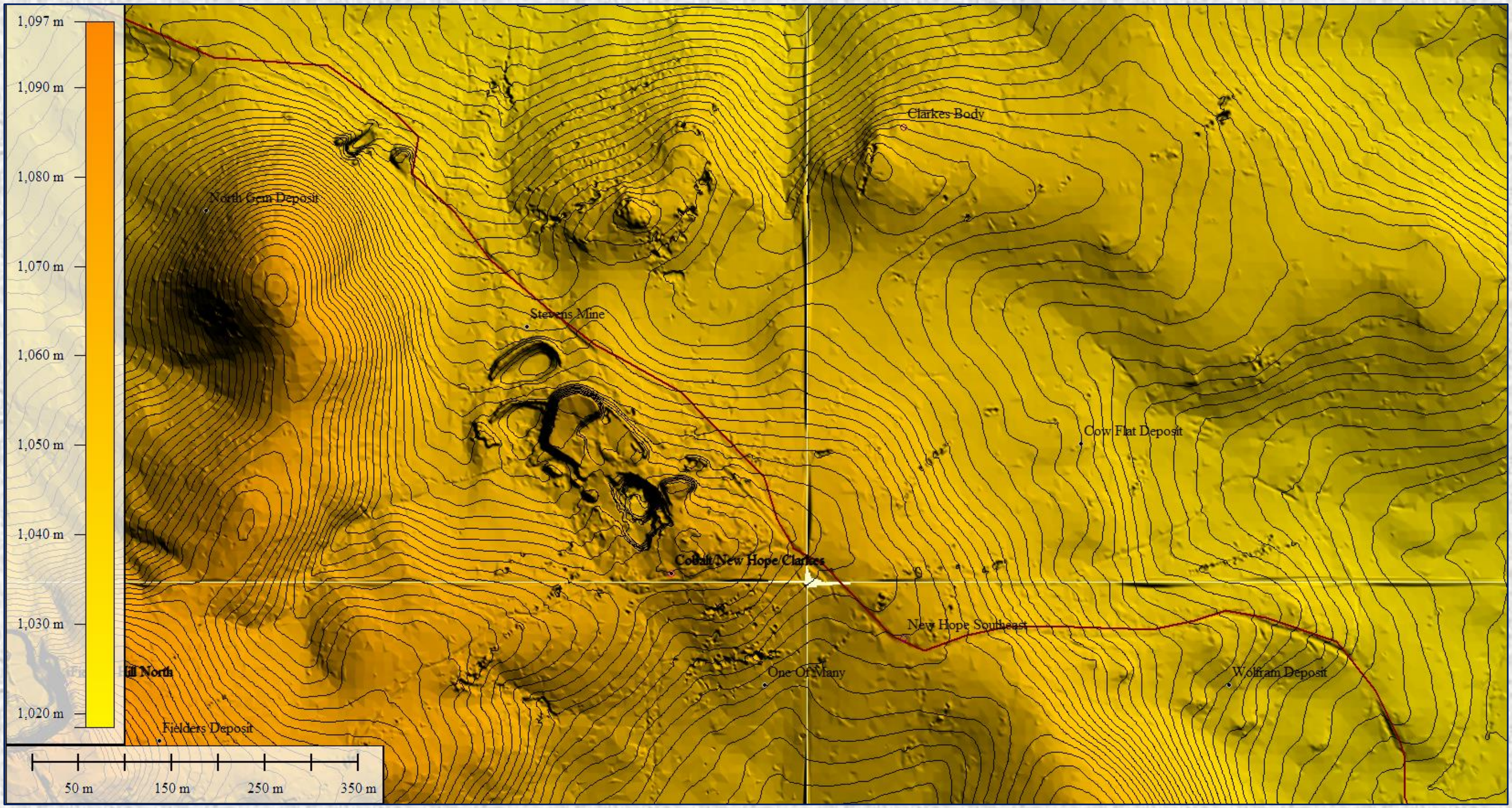


Example 2: D Bodies Deposit Map ~ 1982

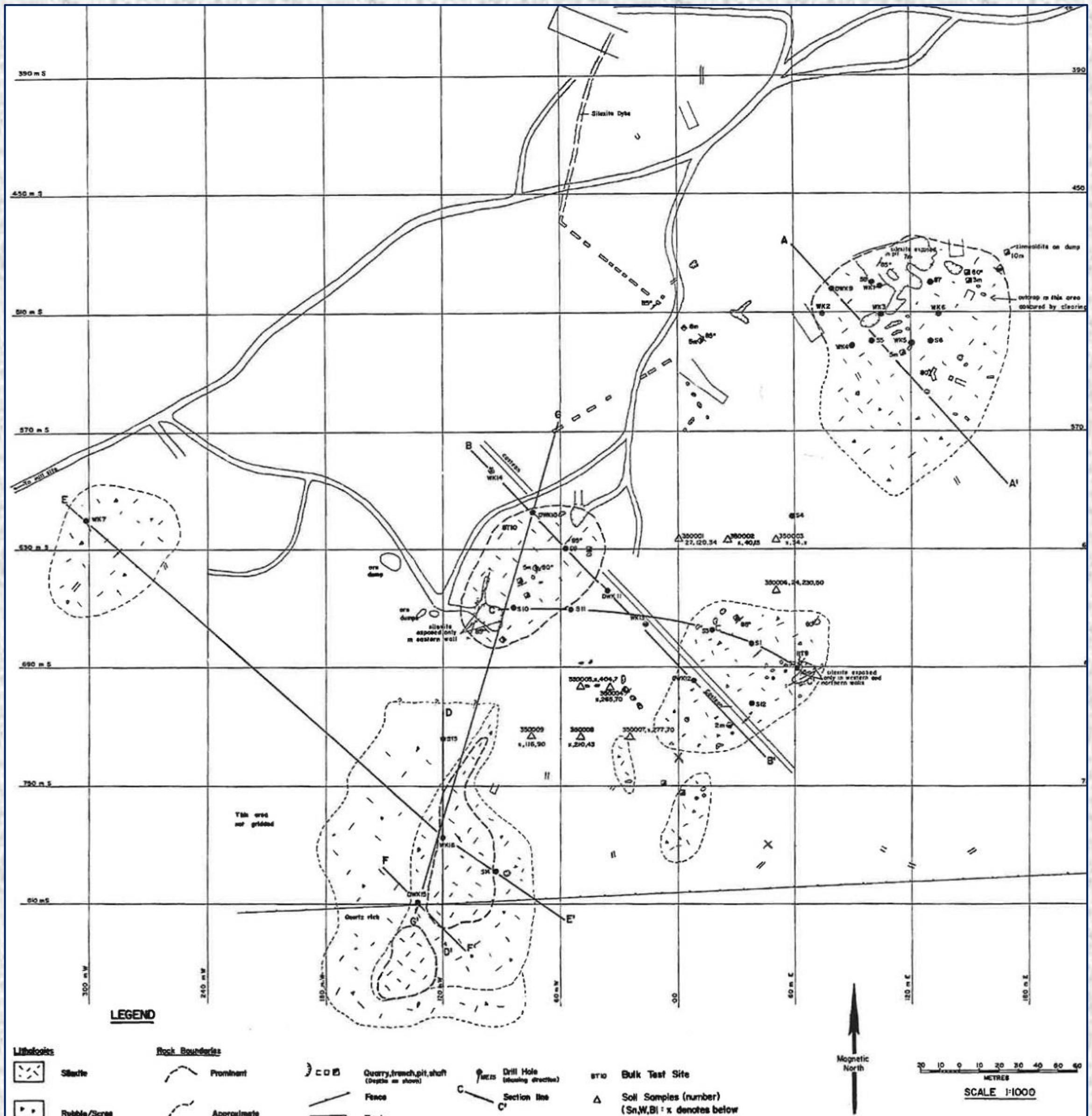


D Bodies Satellite Image (Google, NSW Globe)

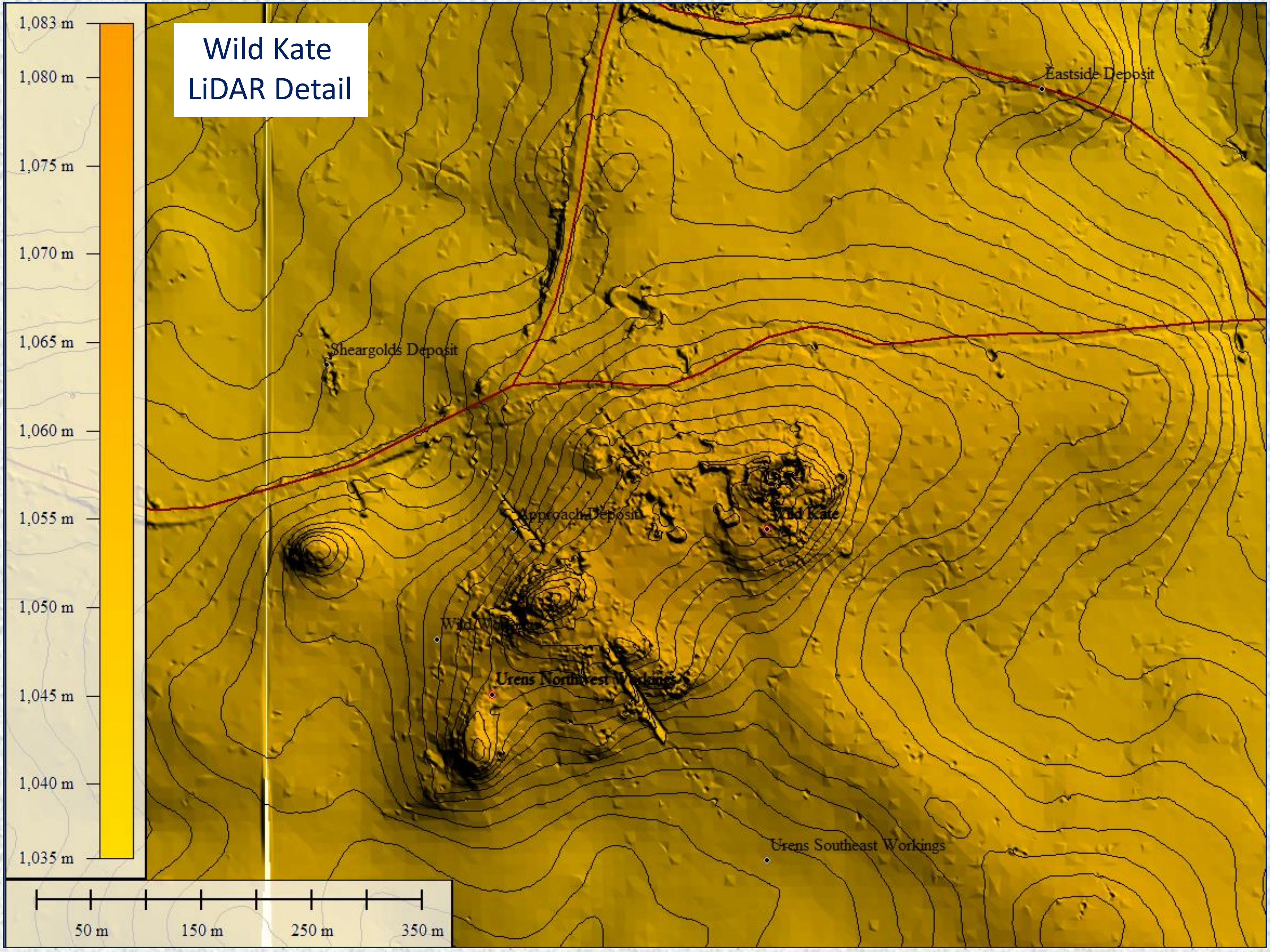
D Bodies LiDAR Detail



Example 3: Wild Kate Deposit Map ~ 1981

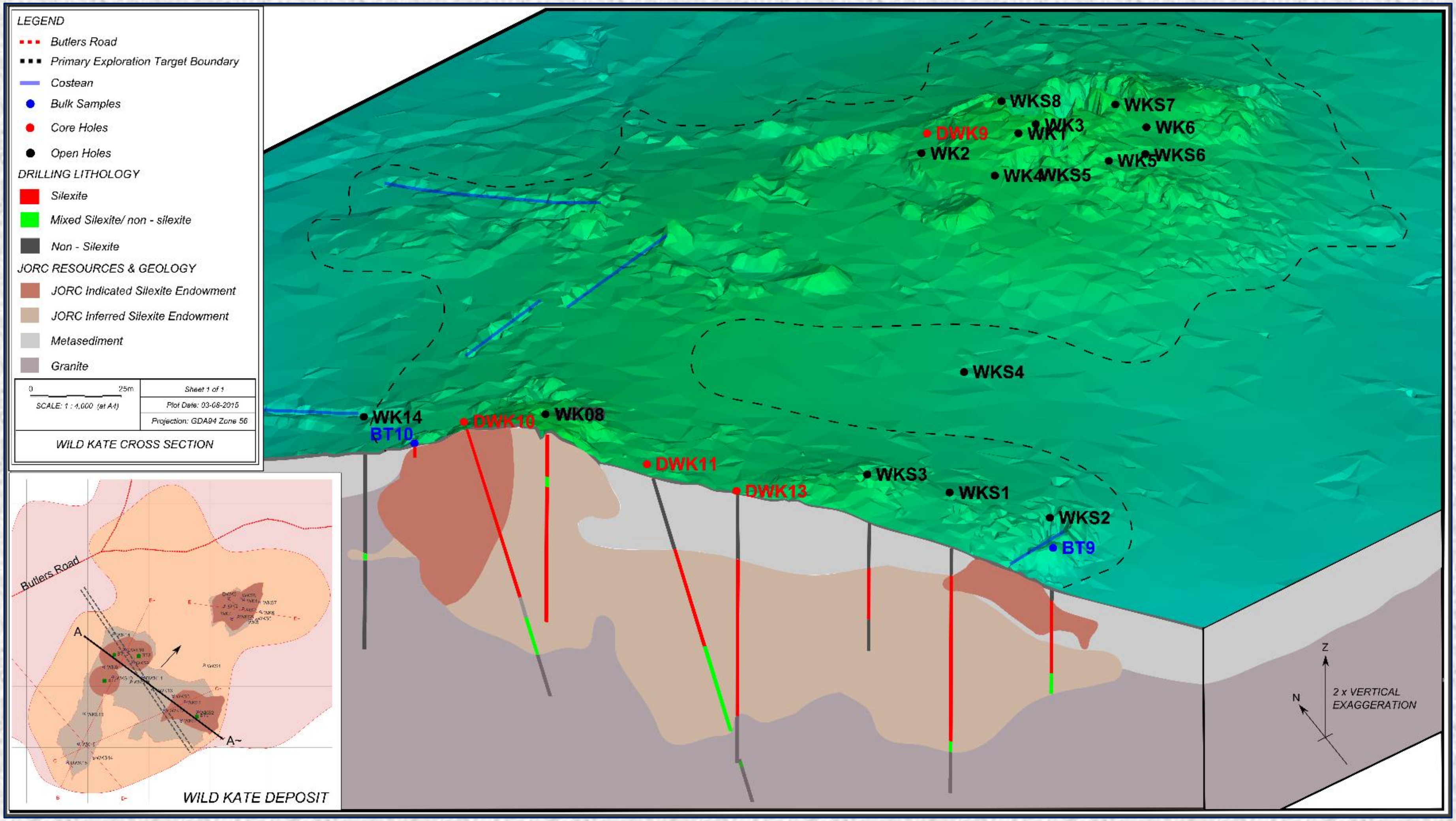


Wild Kate Satellite Image (Google, NSW Globe)



Wild Kate
LiDAR Detail
1,083 m
1,080 m
1,075 m
1,070 m
1,065 m
1,060 m
1,055 m
1,050 m
1,045 m
1,040 m
1,035 m
Eastside Deposit
Sheargolds Deposit
Approach Deposit
Wild Kate
Urens Northwest
Urens Southeast Workings
50 m
150 m
250 m
350 m

Wild Kate 3D Cross Section



Torrington Resources Update (JORC 2012)

Original JORC Resource Estimates

Orebody	Classification	Silexite (t)	Grade (%) W	Tungsten (t)
Wild Kate	Inferred	770,000	0.14	**1,100**
	Indicated	192,000	0.17	**330**
	Total	962,000		**1,430**

New JORC Inferred Resource Estimates

Orebody	Silexite >0.05 % W[(1)]	Grade (%) W	Tungsten (t)
Wild Kate (exc. Indicated)	941,789	0.17	1,568
Wild Kate East (Lower)	56,093	0.20	93
Sub Total (all Wild Kate)	997,882		**1,661**
Fielders Hill North	134,232	0.21	287
Fielders Hill South	343,596	0.21	736
Burnt Hut	192,393	0.17	336
Mt Everard	55,572	0.16	89
Total (rounded)	1,724,000	0.18	**3,110**

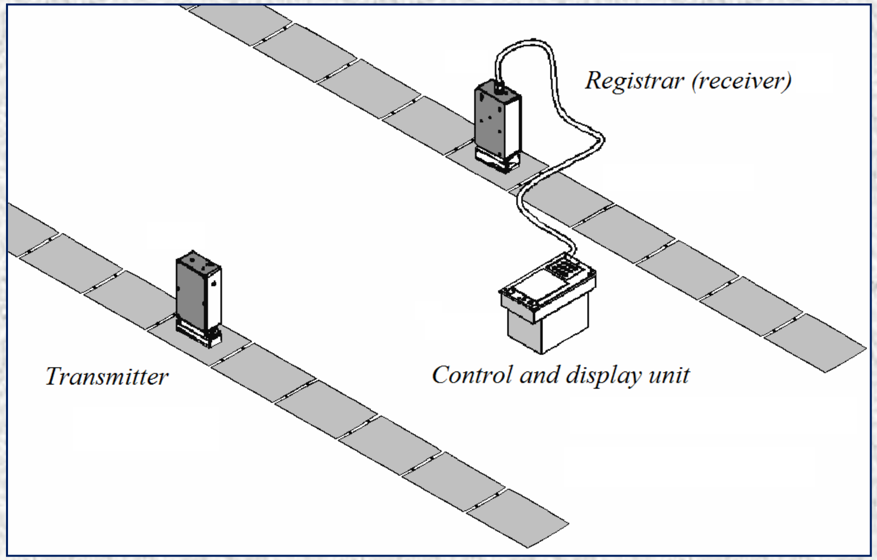
New JORC Indicated Resource Estimates

Orebody	Silexite (t) >0.05 % W[(1)]	Grade (%) W	Tungsten (t)
Wild Kate	151,310	0.17	257
Wild Kate South	67,126	0.32	215
Wild Kate East (Upper)	77,474	0.20	154
Sub Total	**295,910**		**626**
Mt Everard	126,457	0.16	202
Total (rounded)	**422,000**	0.20	**827**

Deep Ground Penetrating Radar (DGPR)

- New Ground Penetrating RADAR (GPR) that can image to several hundred meters through a wide range of geology.
- Operating principle is based on the transmission of super broadband electromagnetic pulses without spreading to the target(s) and registration of their reflections. Wherever the dielectric changes – a reflection is generated.
- High energy transmission allows mapping is areas of high conductivity, for example in loam or damp clay traditionally ‘off limits’ to conventional GPR (which is limited to ~10m depth).
- High resolution images.
- Depth calibrated through proprietary antennas offsets.
- Profile over rugged terrain (including stockpiles, bush).
- Up to 10 line km per day per crew.

Deep Ground Penetrating Radar (DGPR) Specifications



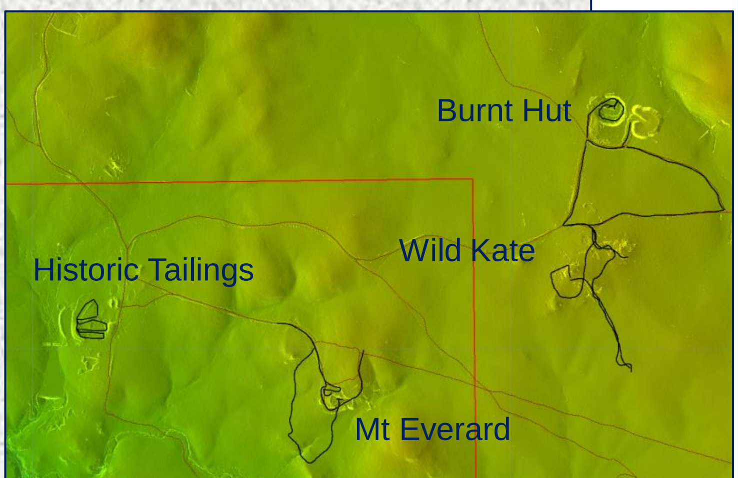
- Mean radiated power, 50 mW
- Peak pulse voltage, >5.5 kV
- Pulse duration, 3-5 ns
- Repetition rate, 1000 Hz
- Radar potential, 120 dB
- Sensitivity, 200 µV
- Discretisation rate, 1000/500MHz
- Frequency band, 1-50+ MHz
- Dynamic range, >95 dB
- Time resolution, 1, 2, 4 ns
- Registration range, 256,512,1024, 2048, 4096 nS
- Registration cycle (averaging on/off), s:-binary mode 0,2/0.015; -full waveform mode 2,2/0,6
- Operation modes: manual; automatic with period 1s, 2 s, 3s; with user-defined period
- Number of frames (128x256 format): -binary mode>500; -full waveform mode>30 000
- Averaging over shots 16
- Two manual threshold ranges, ± 16dB
- LCD b/w 240*320
- PC connection via RS232
- Data processing PC
- Consumed power, 3, 7 W
- Temperature range, -20 ° to 50° C
- Dimensions (CIU with batteries), 260*150*160 mm

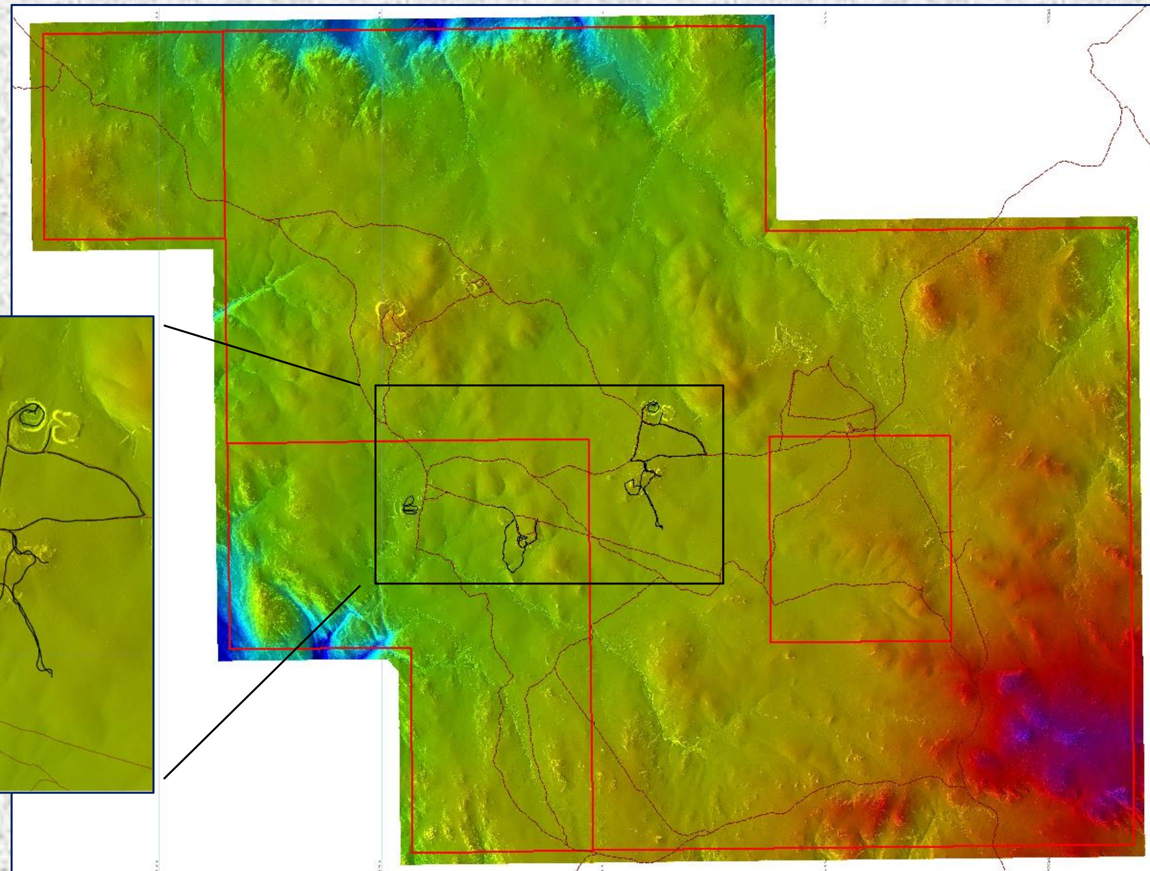
Deep Ground Penetrating Radar (DGPR)

Deep Ground Penetrating Radar (DGPR)

On the 18th/19th June, 2015, a 2 day trial acquisition of DGPR was conducted as part of an exclusive 3 week trial of the DGPR technology in Australia.

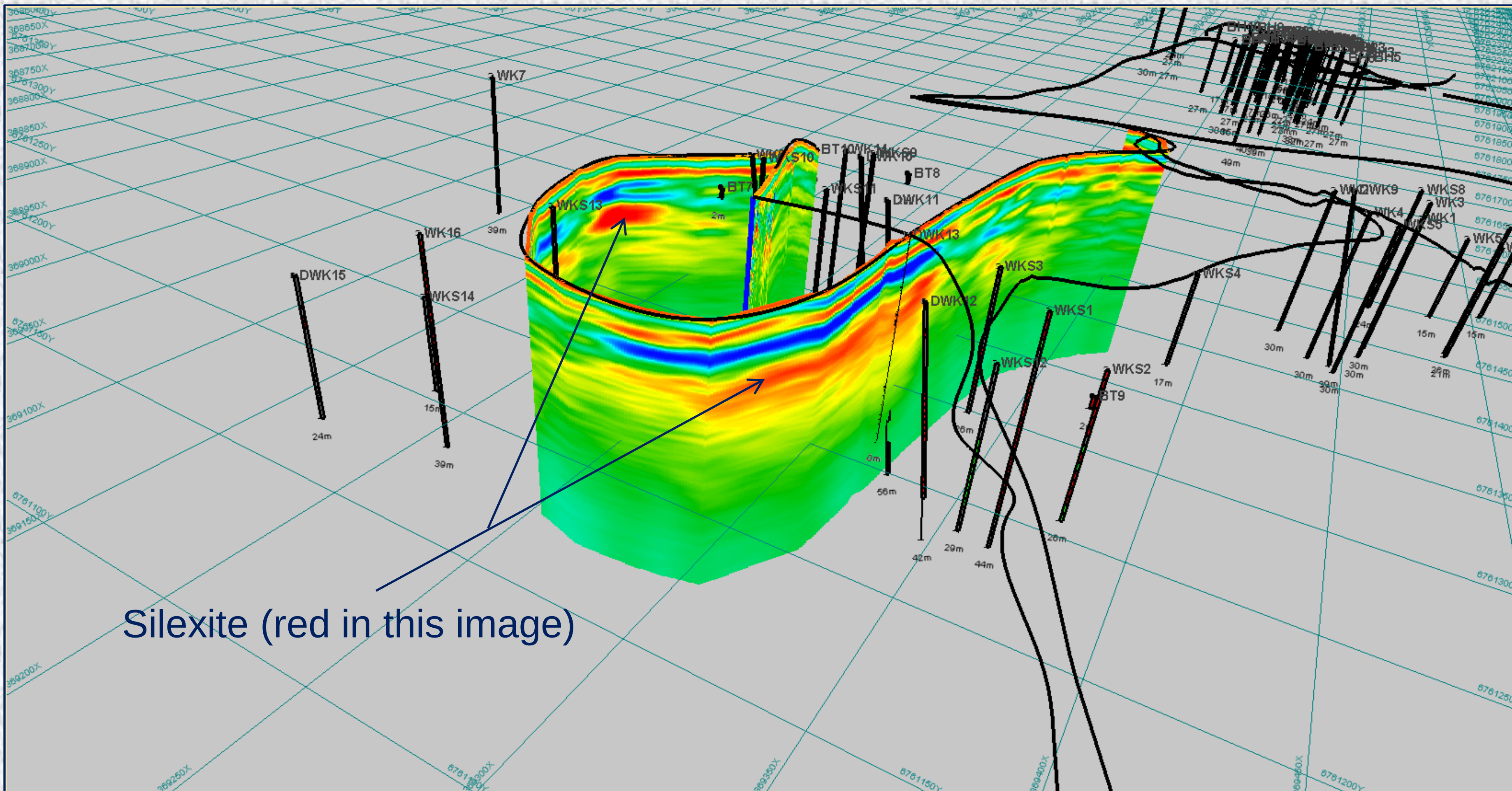
Detail DGPR ground traces



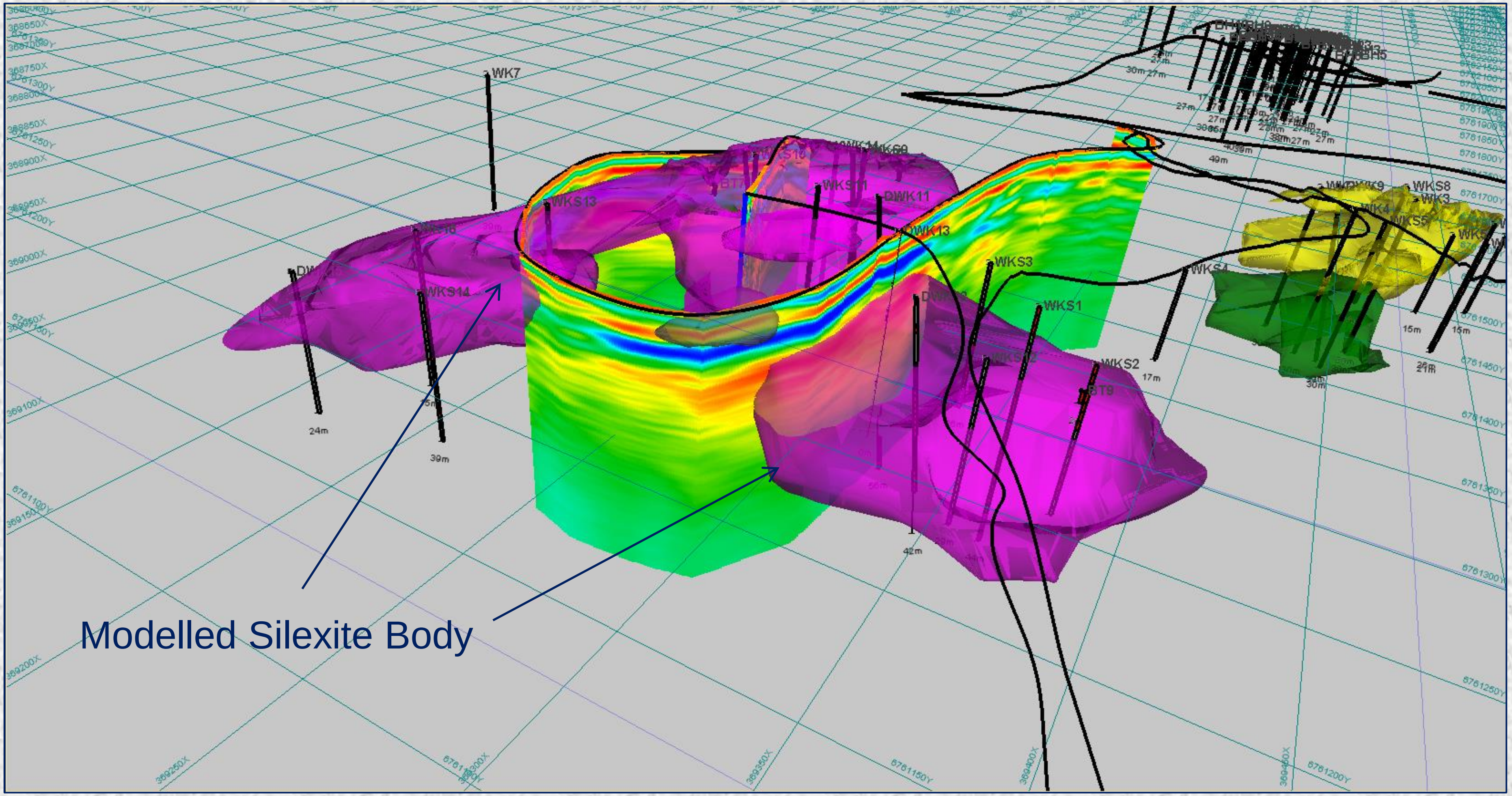


Wild Kate DGPR

The scope of the survey and follow up interpretation was to assess the ability for the DGPR system to successfully image key lithological changes at Torrington. The potential to be able to accurately image the granite basement material would be a useful exploration tool.

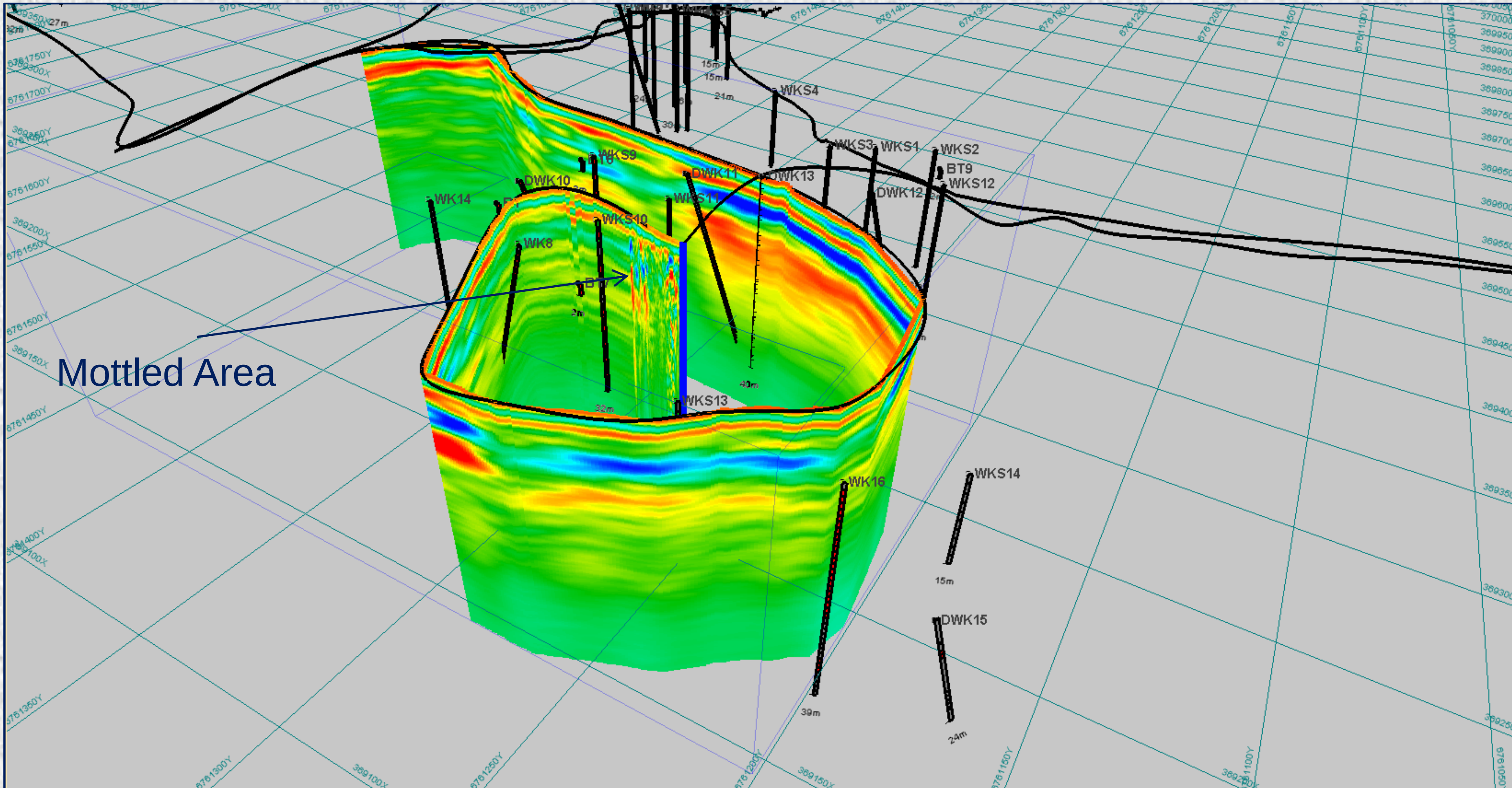


How the DGPR trial compared to existing model?



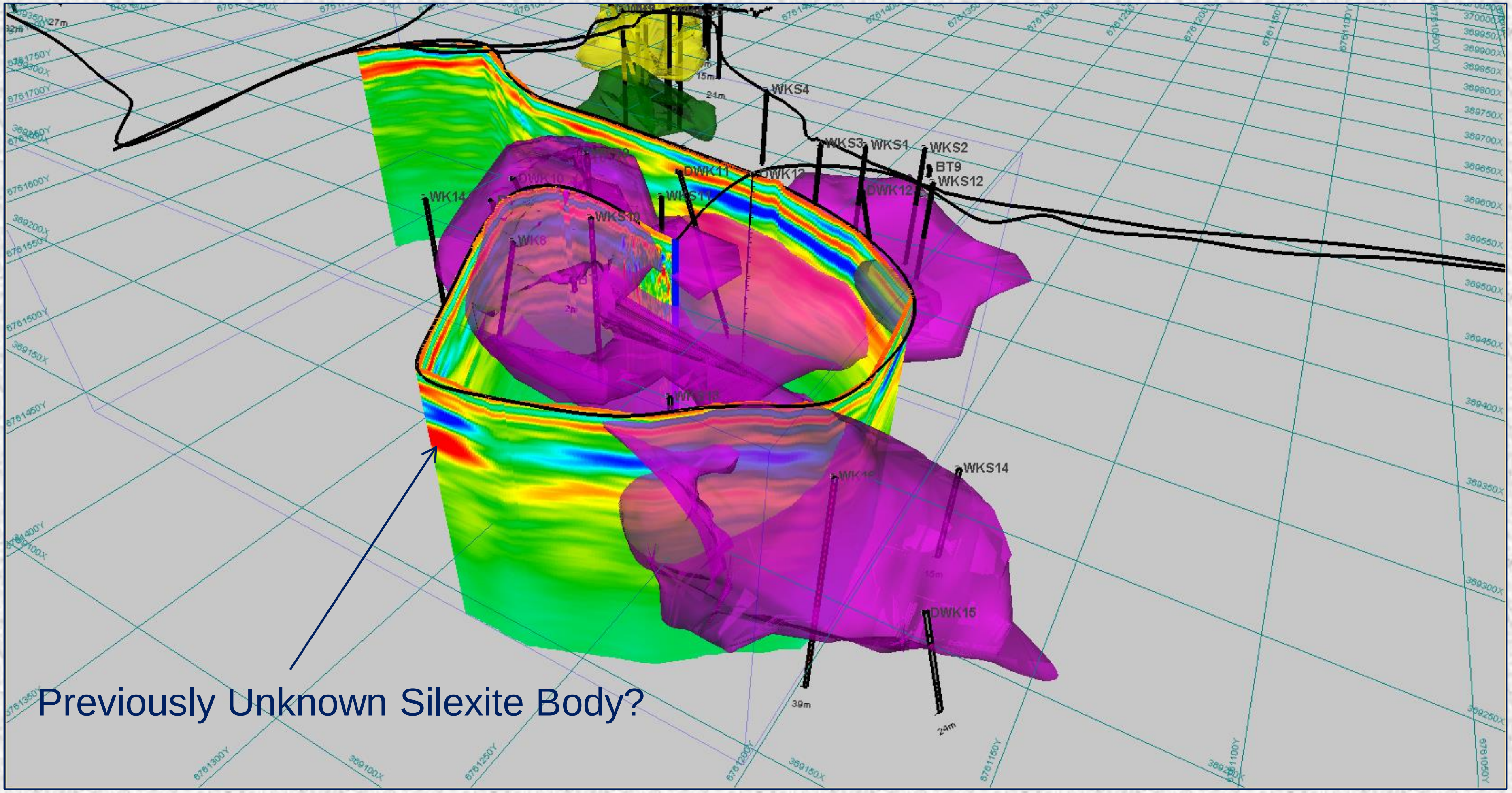
Wild Kate DGPR

The central mottled area is where we dragged the gear over the exposed outcrop, resulting in a different sort of response. This may be due to air gaps over the exposed outcrop



Wild Kate DGPR

Again the red patches (below the blue) are broadly correlative to the modelled orebodies but show that the models need refining after further drilling and correlation to DGPR. The DGPR does seem to illustrate a silling emplacement which reflects our assumptions and those of previous work by Pacific Copper. The DGPR also detected what could be new previously unknown silexite which will need to be confirmed by drilling.



THANK YOU

QUESTIONS?