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Argonaut RESOURCES NL

## TORRENS DRILLING UPDATE

# Building a Copper Development Company

## TORRENS: Massive Copper Target
## LUMWANA WEST: Advanced Copper-Cobalt Deposit

LINDSAY OWLER, Director/CEO – February 2019

Argonaut Resources NL • ASX:ARE •
Level 5, 126 Phillip St, Sydney, 2000 • phone (02) 9299 9690

# CORPORATE OVERVIEW

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## ASX Code

ARE

## Capital structure

| | |
|---|---|
| **Shares on issue:** | 1.544 billion |
| **Unlisted options:** | 65 million |
| **Market capitalisation:** | A$40 million |
| **Average daily volume:** | 6.8 million shares |

## Cash

A$4.7 million

## Directors

| | |
|---|---|
| **Pat Elliott** | Non-Executive Chairman |
| **Lindsay Owler** | Director and CEO |
| **Andrew Bursill** | Director and Company Secretary |
| **Malcolm Richmond** | Non-Executive Director |

# COPPER FOCUS

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## Torrens – Copper, SA

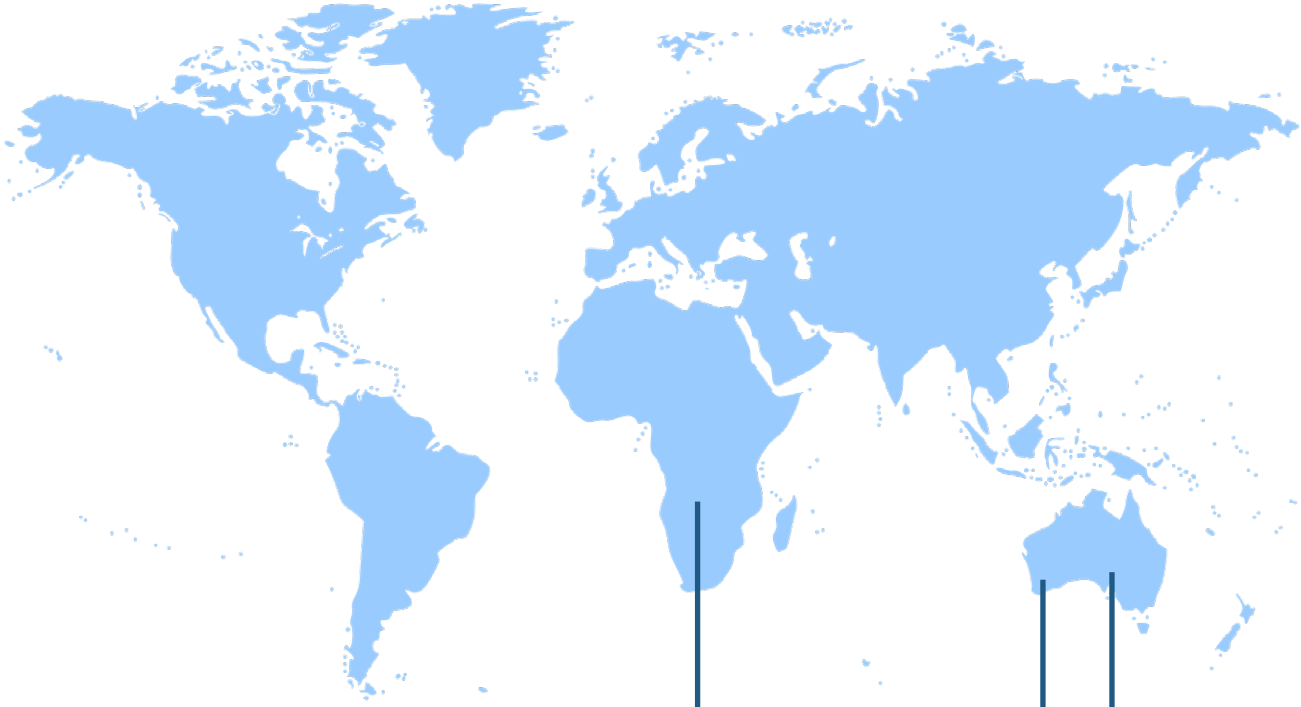
- Massive IOCG system
- Primary focus
- Drilling underway

## Lumwana West – Copper Cobalt, Zambia

- Copper Cobalt sulphides and oxides
- Metallurgical testing underway

## Higginsville – Gold, WA

- Multiple gold and nickel targets



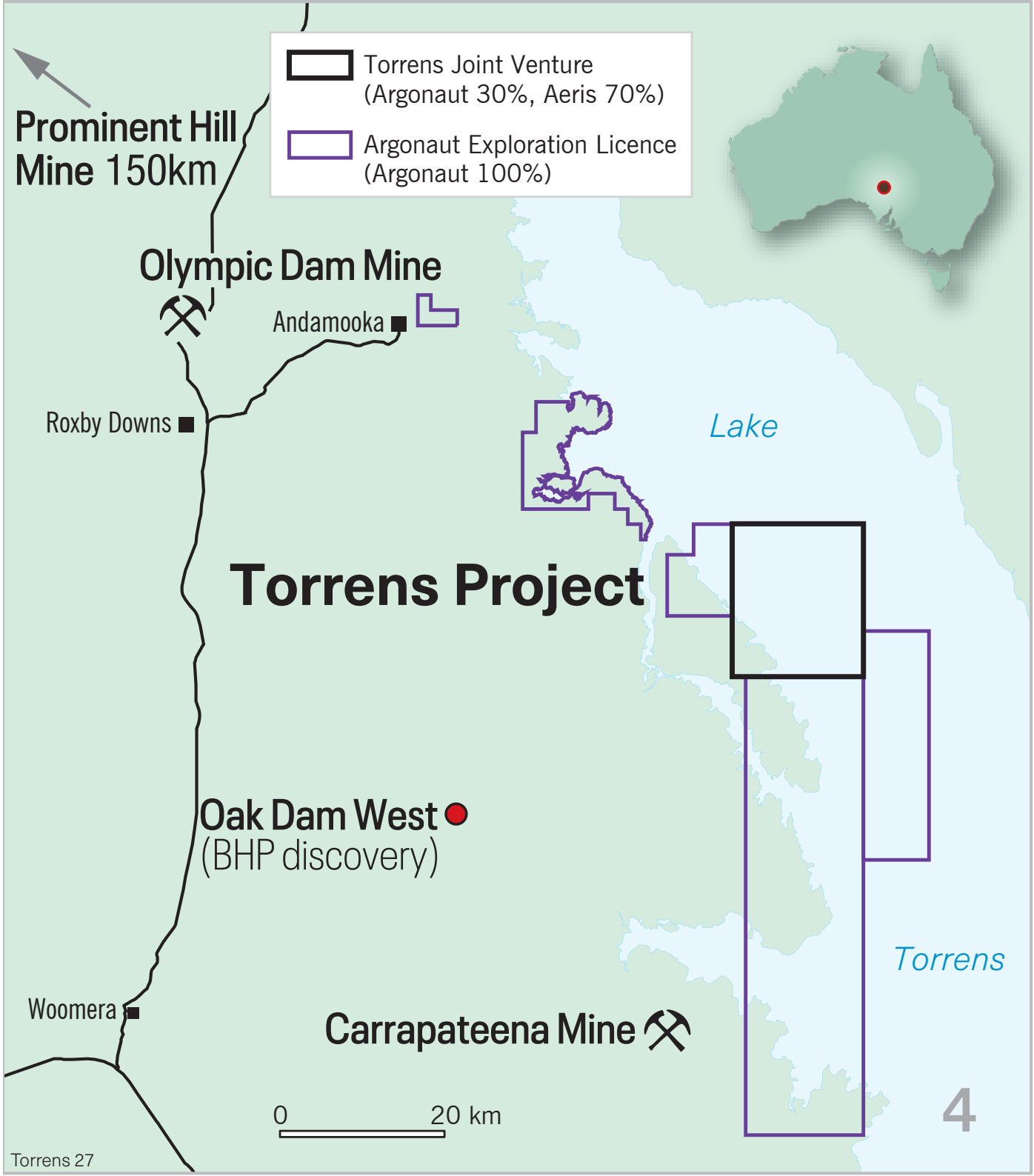
**Zambia Copper Cobalt**
*Lumwana West*

**WA Gold**
*Higginsville*

**Torrens Copper**
*South Australia*

# TORRENS COPPER PROJECT

1. The right geological address
2. Massive anomaly with multiple deposit-scale target zones
3. Confirmed Iron Oxide Copper-Gold (IOCG) system

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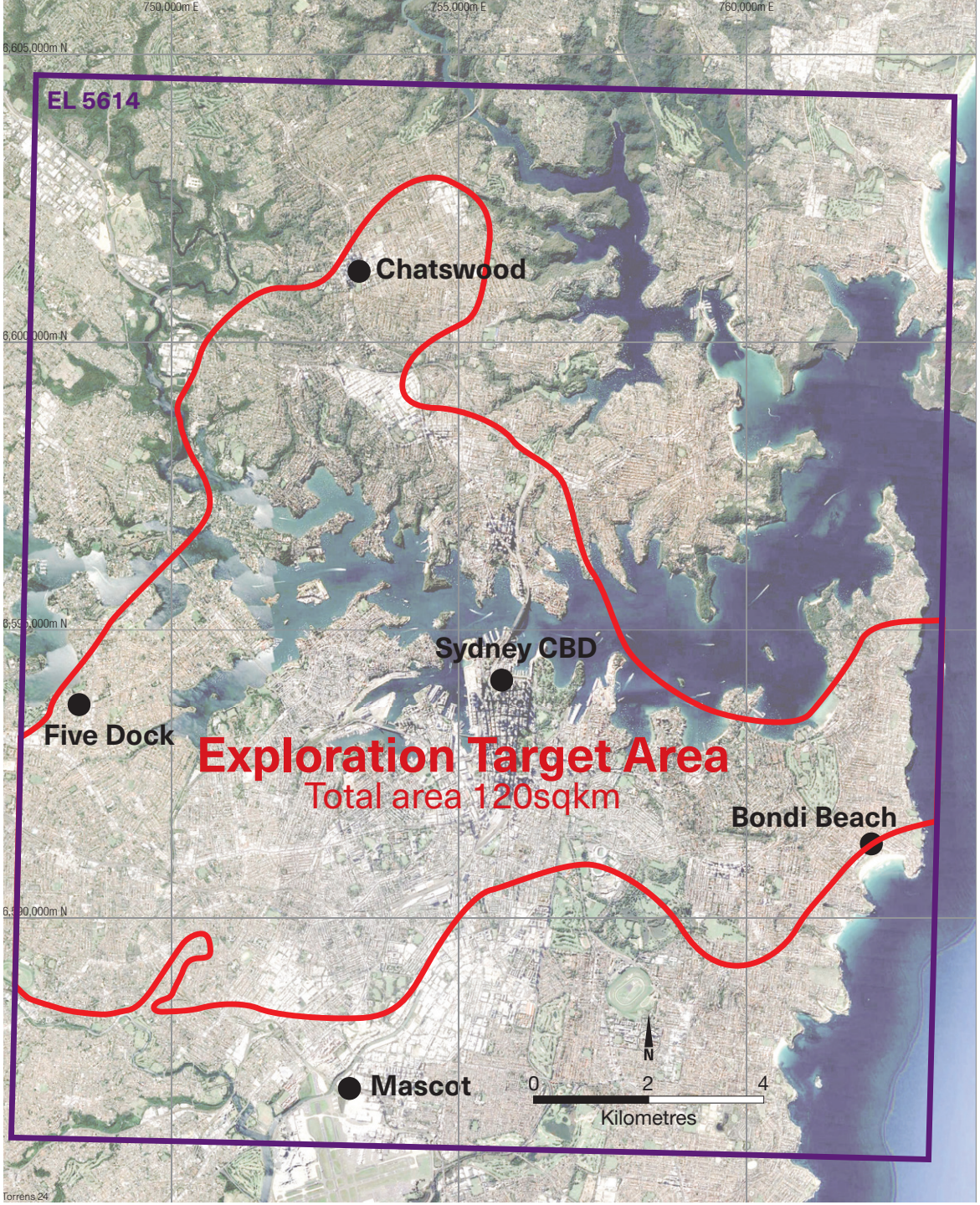
# TORRENS:
# MASSIVE SCALE

## In the event of discovery, there is scope for:

- Very large tonnages
- Successive discoveries

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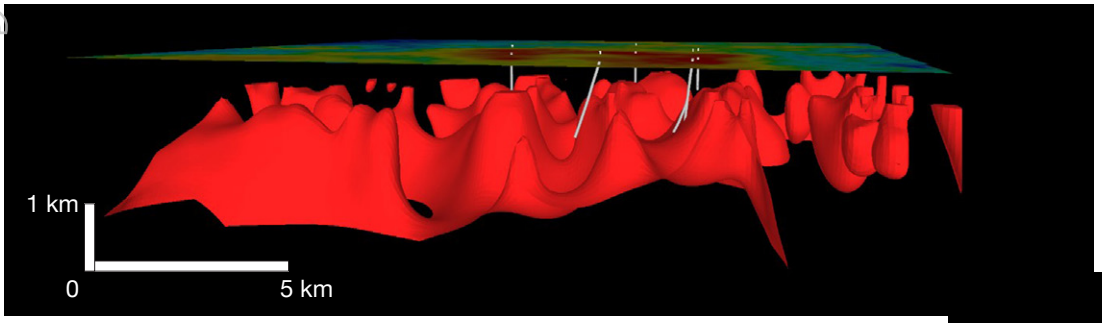
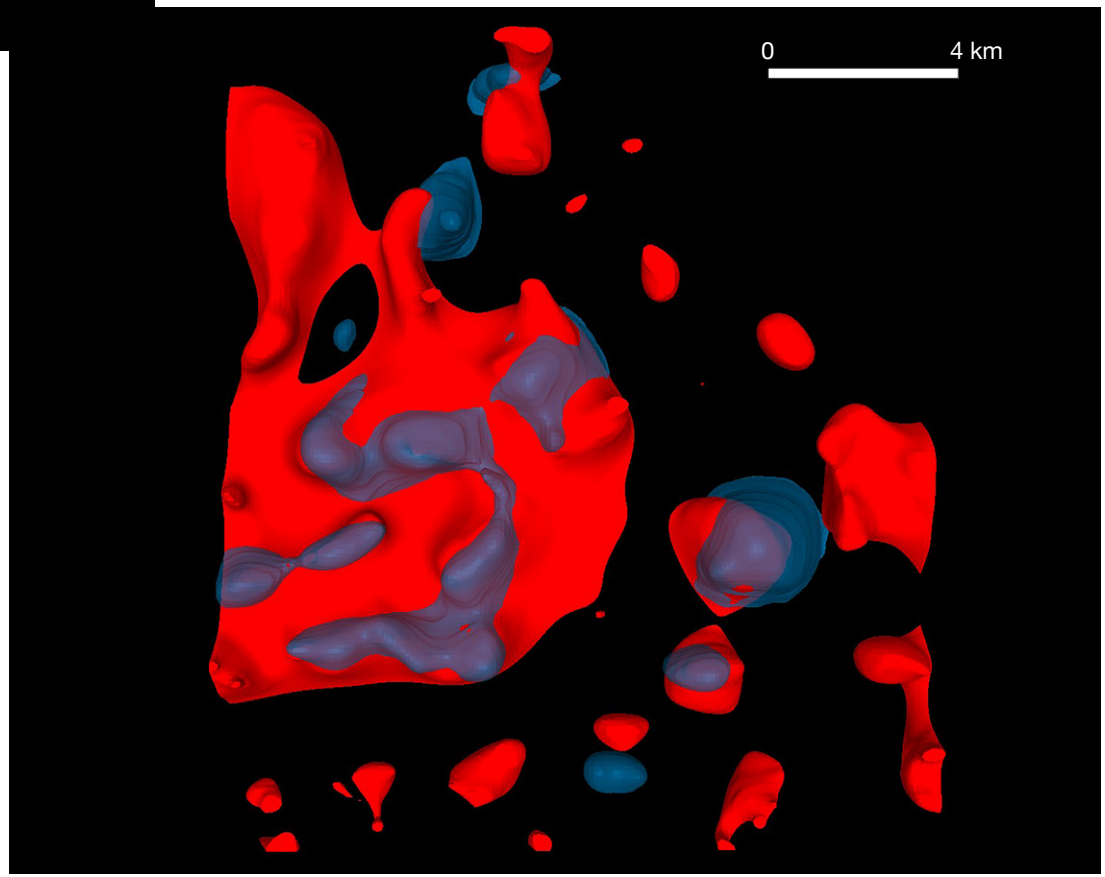
# TORRENS:
# MASSIVE ANOMALY WITH MULTIPLE TARGETS




*Gravity model with historic drillholes, looking east*

*Gravity model (red) and magnetic model (blue), plan view*




***Torrens offers a smorgasbord of IOCG targets***

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# TORRENS:
# MASSIVE ANOMALY WITH MULTIPLE COPPER TARGETS

## Twenty-eight individual target zones

- Multiple discovery opportunites
- Each target large enough to host a world-class deposit

***Twenty-eight target zones within a broad, intense anomaly***

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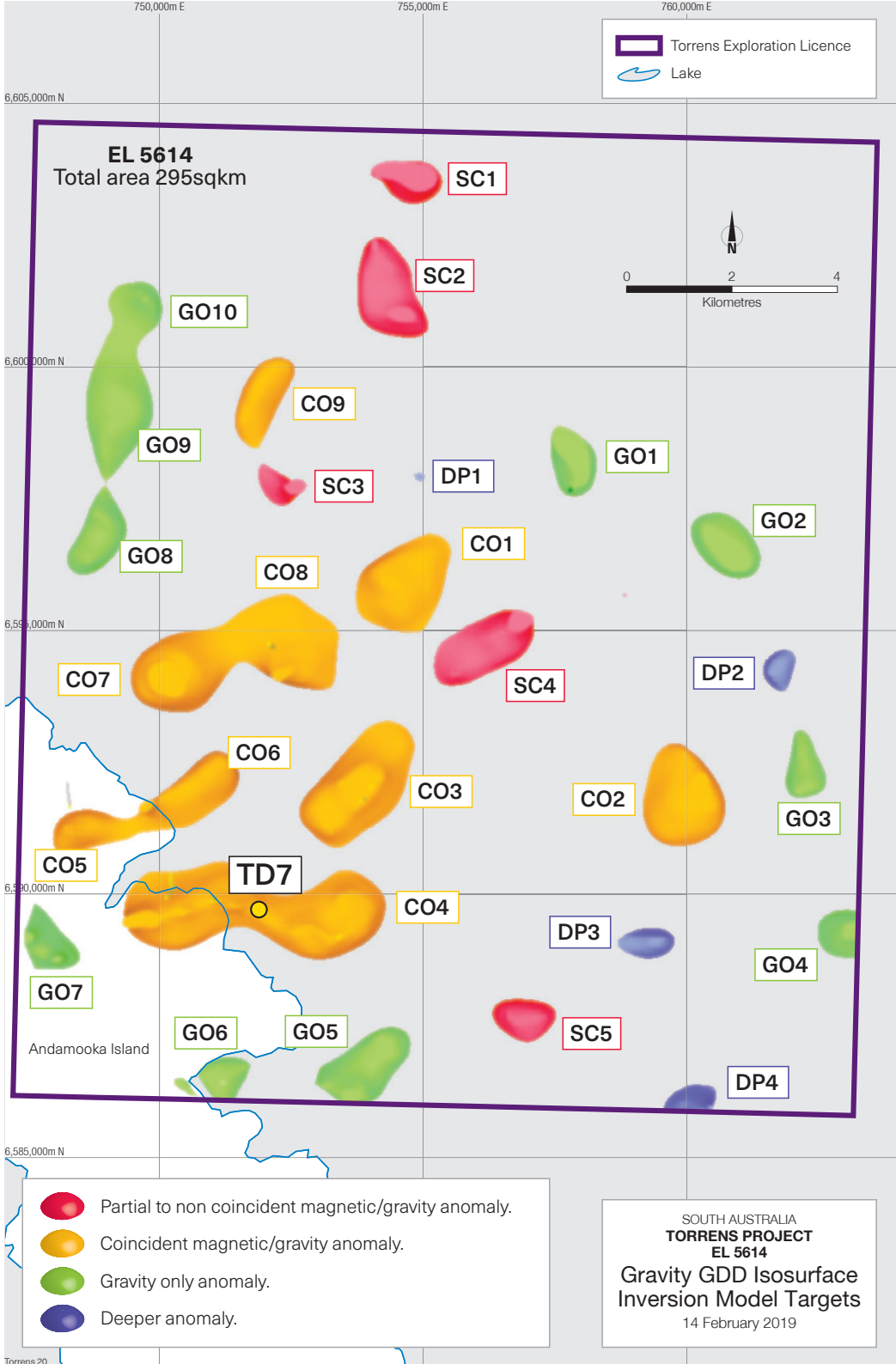

# TORRENS: CONFIRMED IOCG SYSTEM

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## IOCG CONFIRMATION:

### Copper sulphides associated with iron oxide:

- Copper assays to 1.36% Cu
- Chalcopyrite and bornite present
- Very large volume of magnetite/hematite

### Alteration minerals:

- All diagnostic alteration minerals noted
- Alteration zonation

### Late-stage hydrothermal mineralisation:

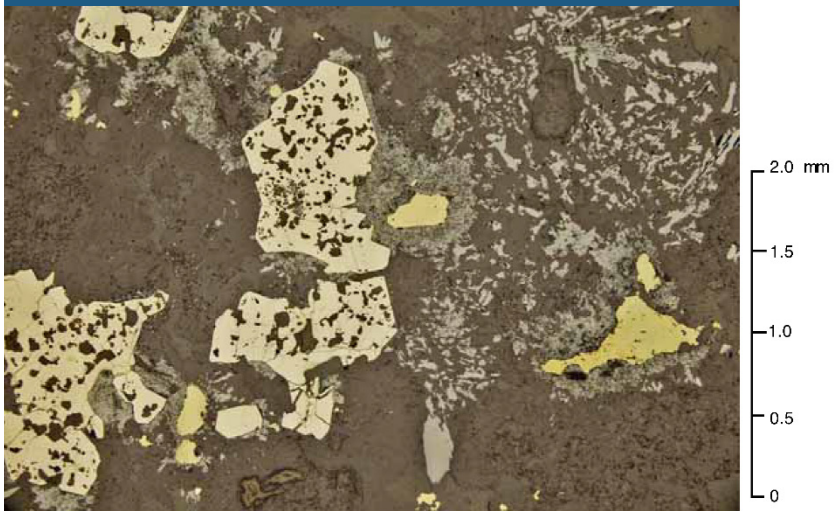
- Hematite replacement
- Sulphides and proximal alteration minerals

### Accessory/indicator elements:

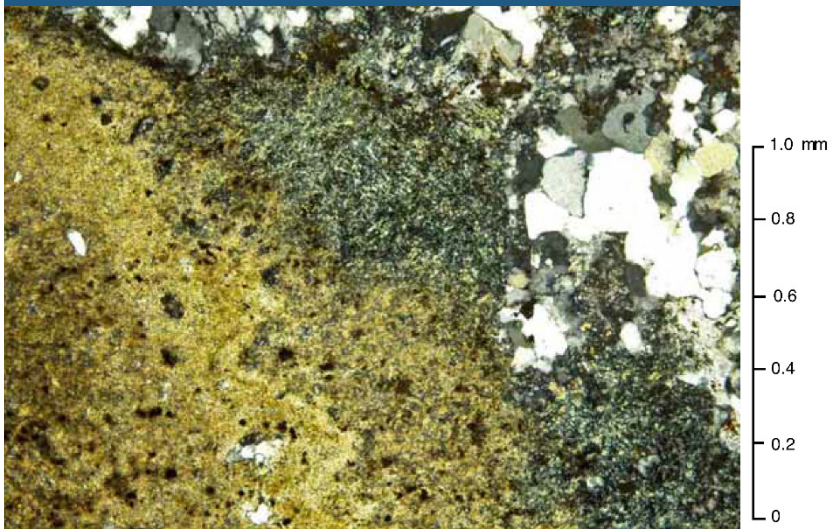
- Fluorine
- Rare earth elements

*TD4: Sulphide mineralisation*

*TD4: Hematite - chalcopyrite mineralisation*




*TD4: Chlorite – sericite alteration*



# TORRENS: ALL ACCESS APPROVALS GRANTED

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## Native title:

- Approval granted March 2017

## Operational/environment

- Approval granted in November 2017

## Aboriginal heritage:

- Approval granted in February 2018

***No further approvals required for drilling***

# TORRENS: DRILLING UNDERWAY

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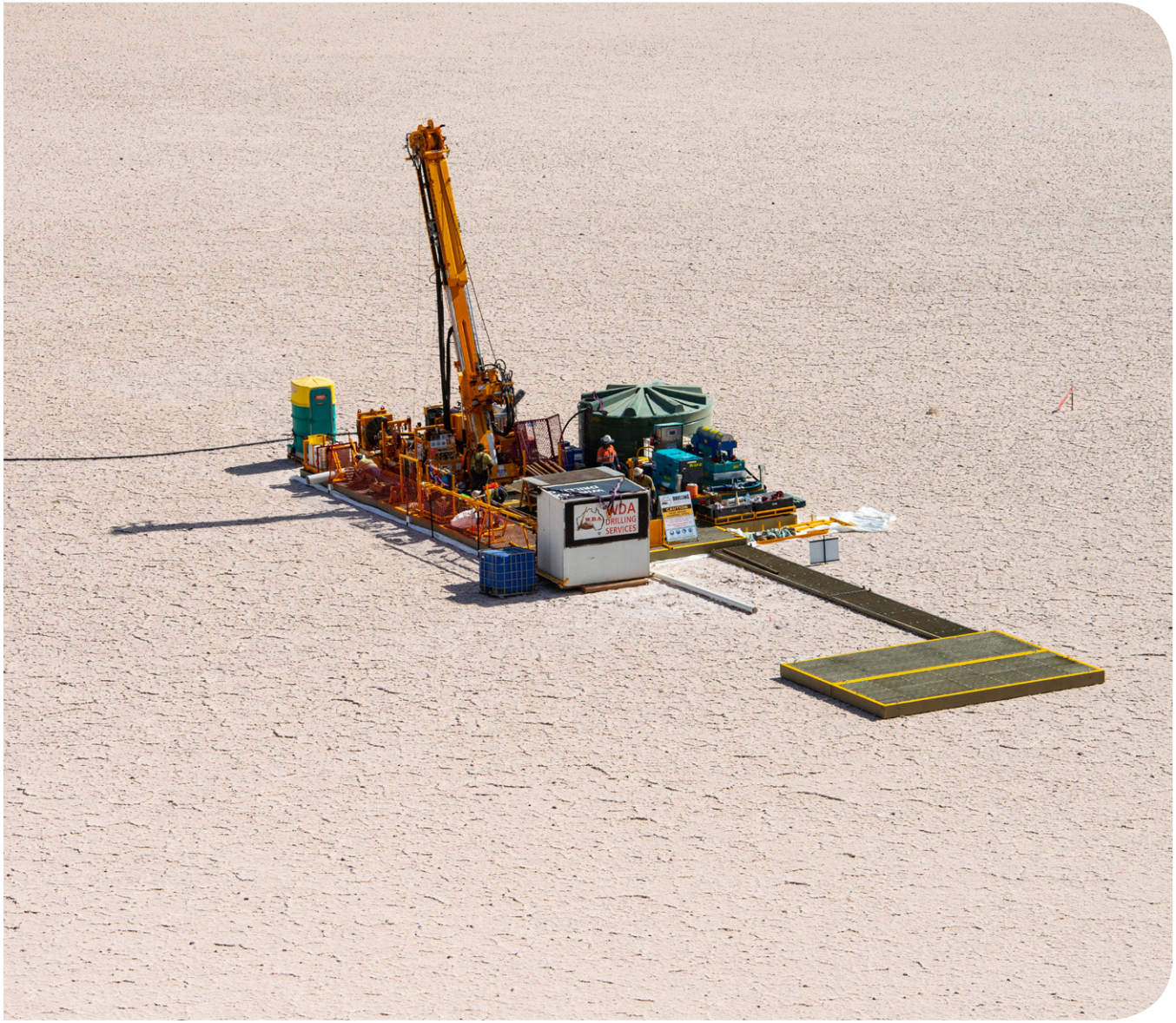
## DRILLING PROGRAM

- 25-30 diamond drill holes
- Average depth >1,000m
- Helicopter supported
- 1 to 3 drilling rigs
- Cost to JV A$15 million

## STAGE ONE

- 8–10 diamond drill holes
- Average depth >1,000m
- Initially one drilling rig
- Cost to JV A$5 million

***Drilling commenced January 2019***



# ARGONAUT: TORRENS EXPLORATION EXPOSURE

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## TORRENS JOINT VENTURE

- **Joint venture interests:**
  - » 30% Argonaut Resources NL
  - » 70% Aeris Resources Ltd
- **Operator:** Aeris Resources Ltd
- **Expenditure:**
  - » Pro rata
  - » Stage One: A$5 million (ARE: A$1.5 million)
  - » All stages: A$15 million (ARE: A$4.5 million)

# TORRENS: DRILLING INFRASTRUCTURE

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*21 person camp to support 24/7 drilling*

*Helicopter support to minimise environmental impact*

# TORRENS: SUMMARY

## The right geological address

- Olympic Domain

## Massive anomaly with 28 target zones

- Bigger than Olympic Dam
- Twenty-eight individual target zones

## Confirmed IOCG mineralisation

- Copper sulphides, alteration halos, indicator minerals

**DRILLING COMMENCED JANUARY 2019**

***THEREFORE:***

- ***Higher likelihood of discovery, and***
- ***Higher likelihood of commercial tonnages and grades.***

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# TORRENS: ADDITIONAL REGIONAL TARGETS

## Argonaut holds a commanding land position:

### MURDIE:

- Confirmed IOCG system
- One drill hole by WMC in 1981
- Native title access granted

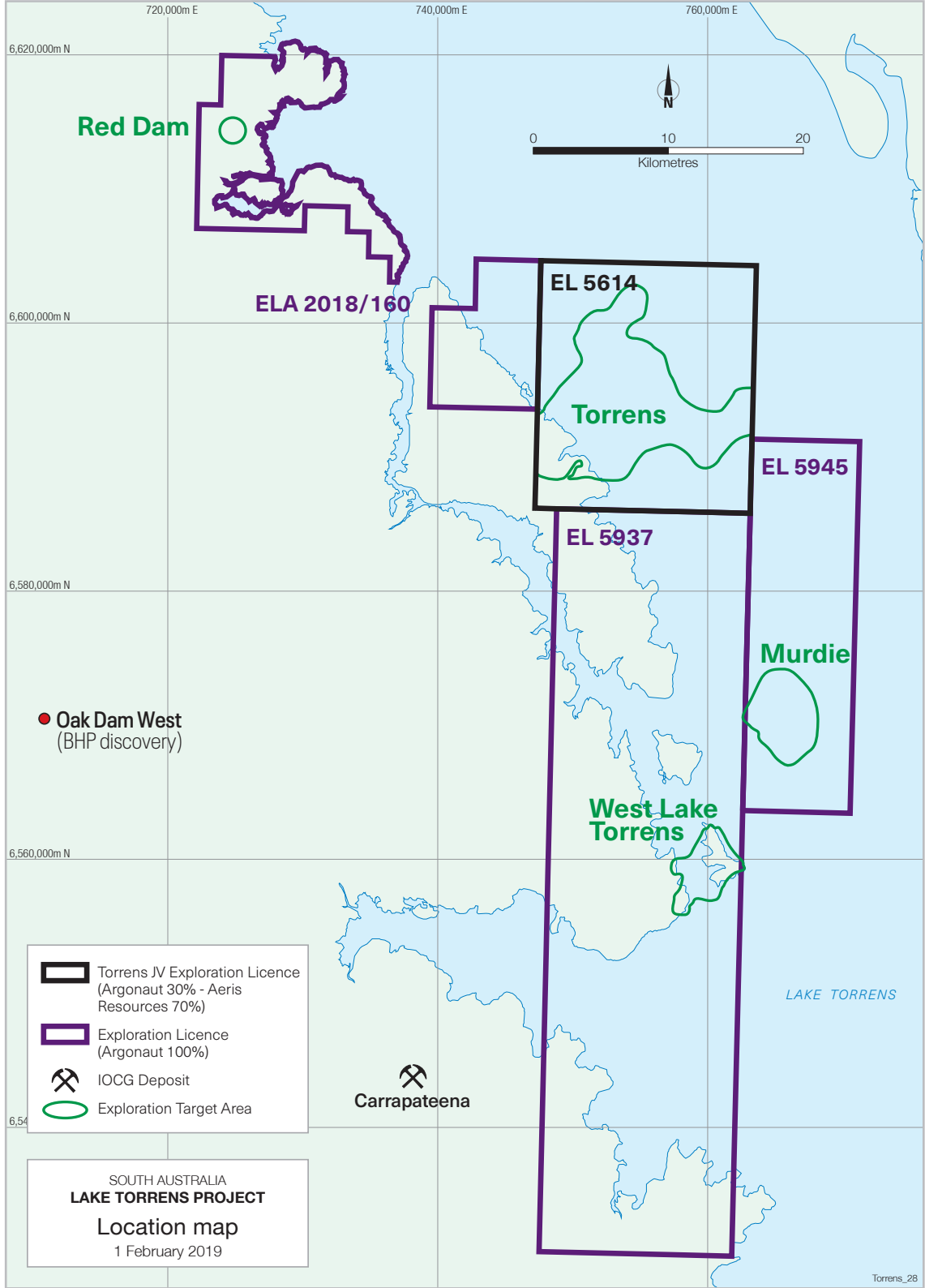
### WEST LAKE TORRENS:

- Prospective gravity anomalies
- Investigation warranted
- Native title access granted

### RED DAM:

- Package of 3 licence areas
- Includes Red Dam target
- Pre-Oak Dam BHP relinquishment

## Primary and secondary exploration targets held in one package

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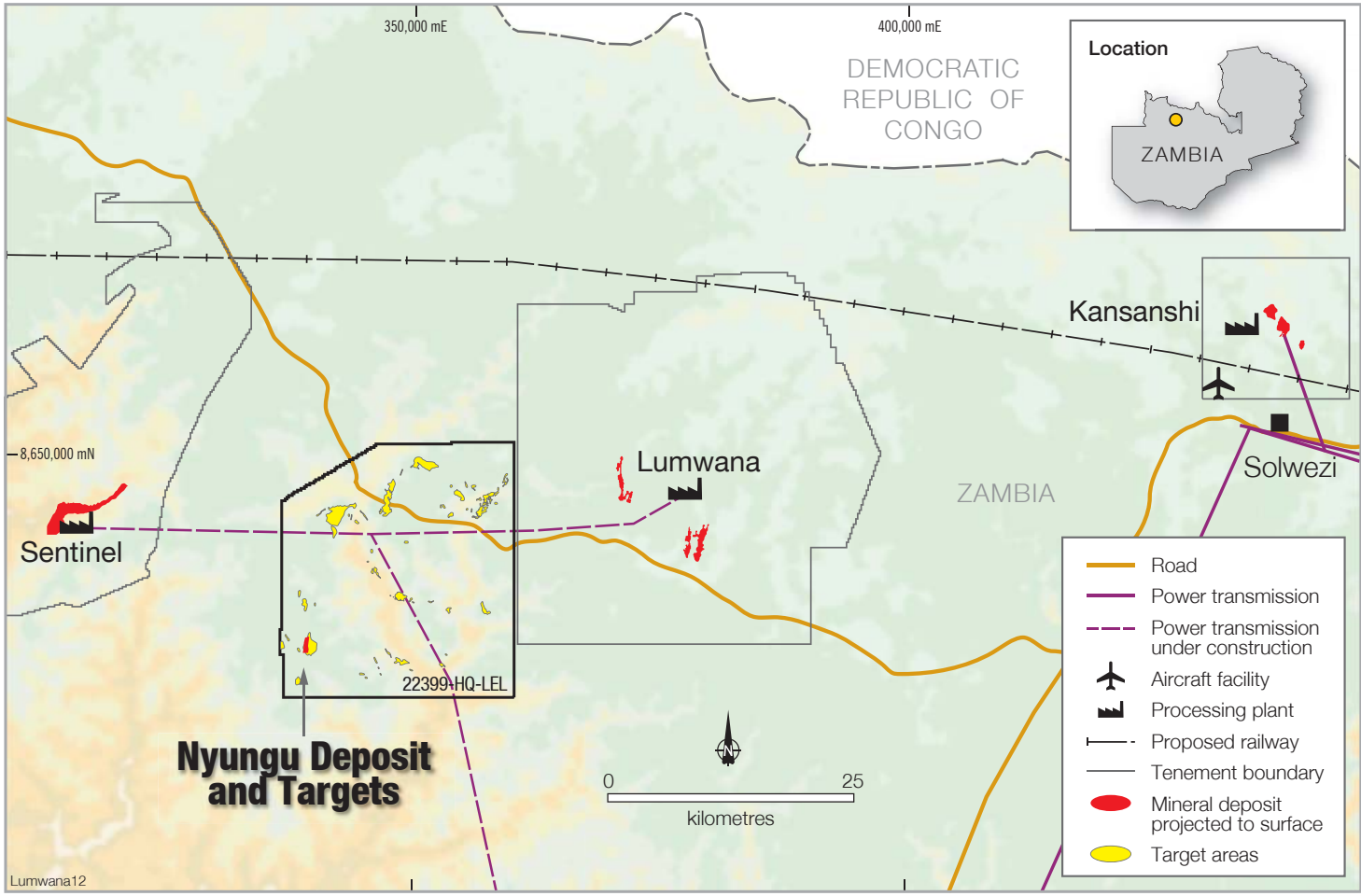
# LUMWANA WEST, ZAMBIA

- Large tonnage copper-cobalt sulphide and oxide deposit
- Large-scale regional copper-cobalt deposits/ targets
- Metallurgical pathways to early, low-cost production
- Argonaut holds a 90% interest

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# LUMWANA WEST: NYUNGU COPPER-COBALT DEPOSIT

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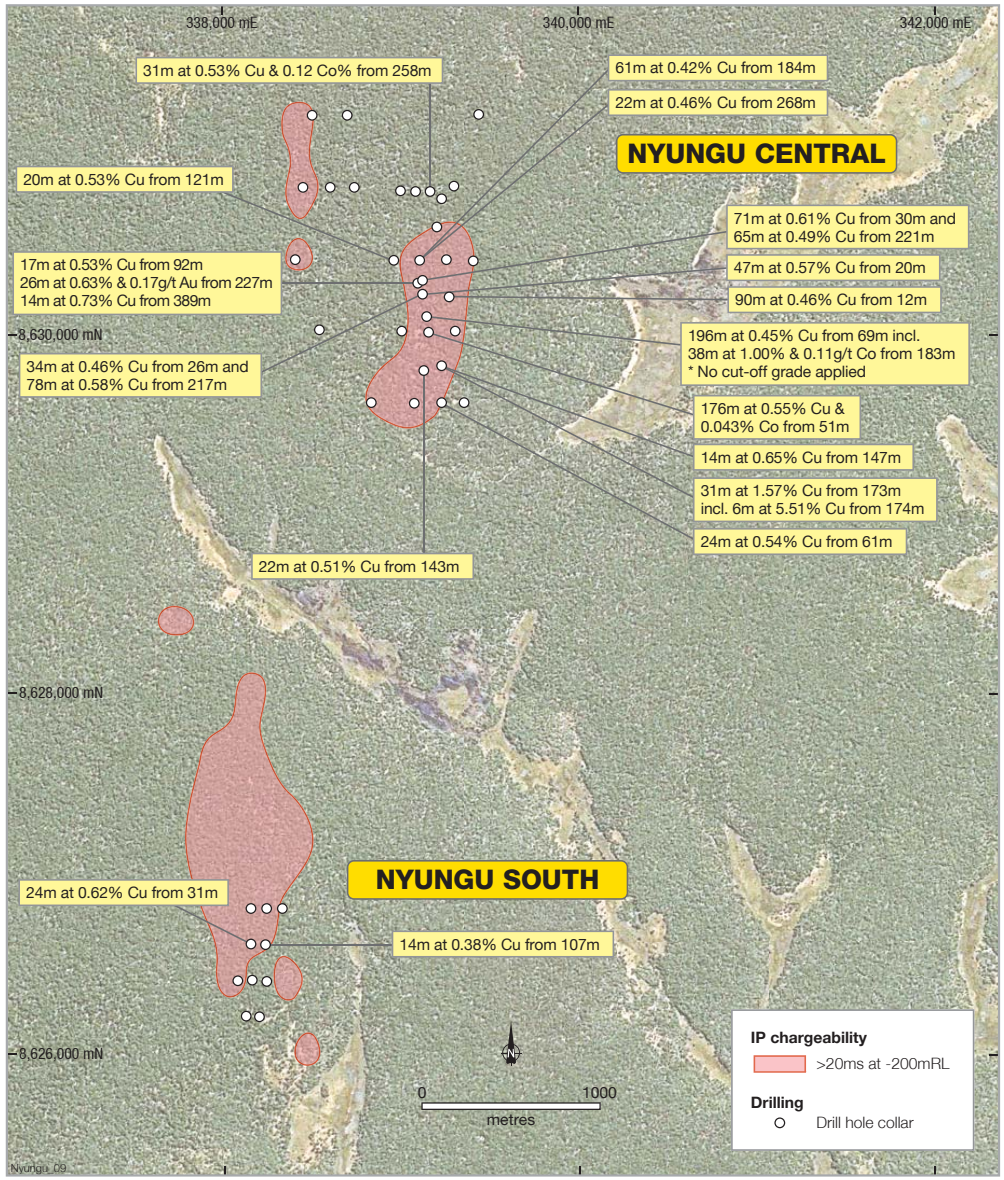
## Nyungu

- **NYUNGU CENTRAL** deposit defined by 48 modern drill holes – significant mineralised copper-cobalt body.

  **Demonstrated strike length: 1,700m**

- **NYUNGU SOUTH**: edge of mineralised body intercepted by Argonaut drilling. Vast, undrilled IP anomaly to be tested.
- **NYUNGU WEST** and **NYUNGU NORTH**: drilling to date has not accounted for IP anomalies.

**Major copper-cobalt deposit with potential for large extensions and repetitions**



# LUMWANA WEST: NYUNGU EXPLORATION TARGET

| Commodity | Tonnage Range | Grade Range | Contained Metal Range |
|---|---|---|---|
| | (Mt) | (%) | (kt) |
| Copper* | 130 to 180 | 0.45 to 0.65 | 580 to 1,150 |
| Cobalt^ | 15 to 20 | 0.08 to 0.12 | 12 to 24 |

** Copper Exploration Target estimation announced to the ASX by Argonaut on 9 April 2013.*

*^ Cobalt Exploration Target estimation announced to the ASX by Argonaut on 28 March 2017.*

Exploration Targets have been independently estimated to JORC 2012 standards.

*The potential quantity and grade of the Exploration Targets are conceptual in nature. There has been insufficient exploration to estimate a Mineral Resource and it is uncertain if further exploration will result in the estimation of a Mineral Resource.*

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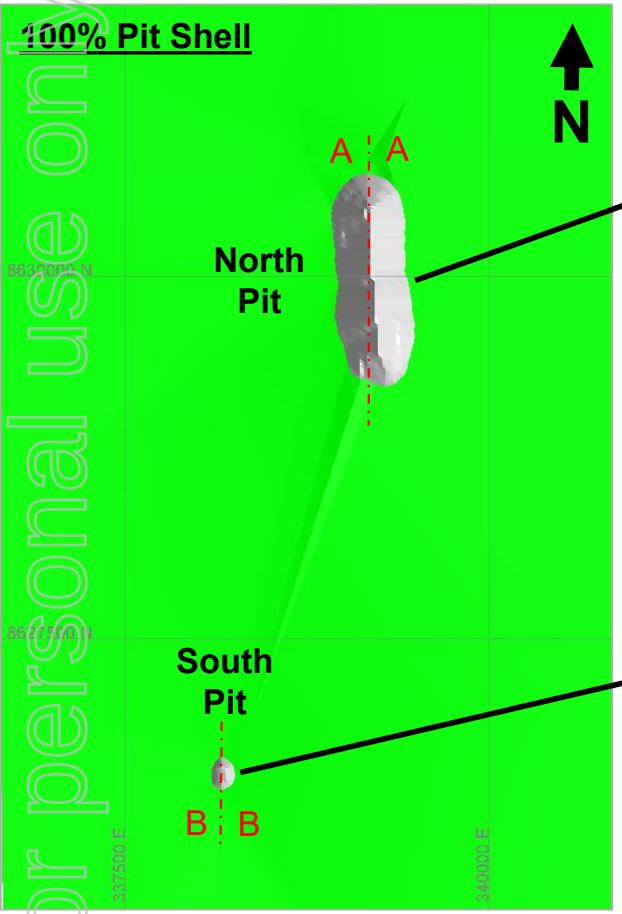
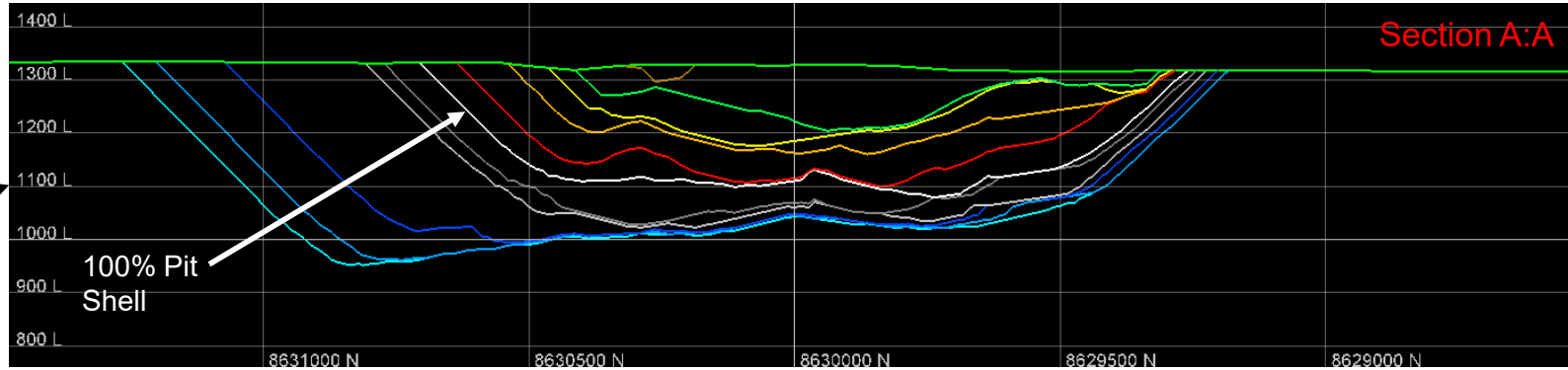
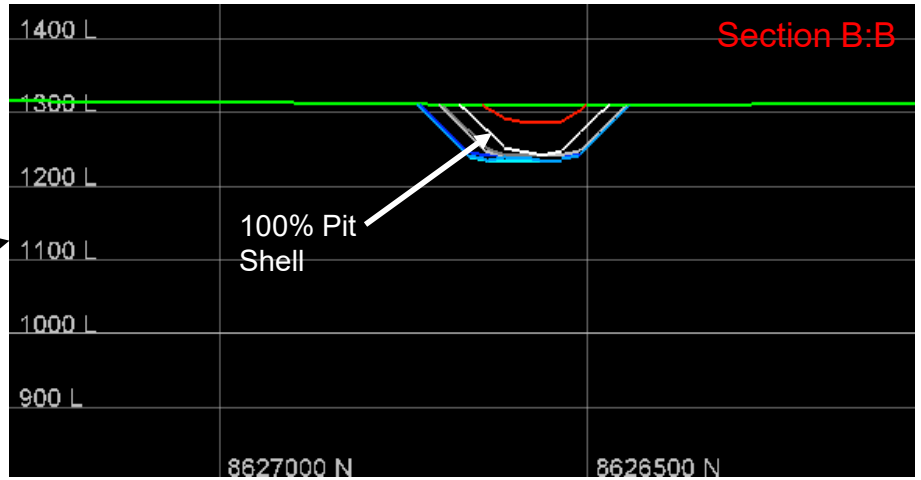
# LUMWANA WEST: VERY LOW STRIPPING RATIO

## Whittle Pits




- Stripping ratio 1.5:1 to 280m (white line)
- Stripping ratio of 2.3:1 to >350m (light blue line)

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# NYUNGU COPPER-COBALT DEPOSIT

## Metallurgical testwork

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- Potential exists for a two-stage, low capital cost, short lead-time copper-cobalt mine.
  - » Stage one – dense media separation of cobalt oxide.
  - » Stage two – heap leach and solvent extraction of copper and cobalt sulphides.
- Metallurgical samples have been selected from existing drill core and these samples are being exported to Australia for testwork.
- Initial testwork will involve a mineralogical study of four mineralisation types.
- Follow-up metallurgical work may include:
  - » dense media separation of copper and cobalt oxide;
  - » leaching of copper and copper-cobalt sulphide; and
  - » conventional flotation of copper-cobalt sulphide.

# ARGONAUT SUMMARY

**Market Capitalisation:** A$40 million

## Focus on Torrens IOCG Target:

- Right geological address
- Massive scale
- Confirmed IOCG system
- Drilling underway

**Extreme leverage to discovery**

## Lumwana West

- Copper-cobalt deposit with scale
- Metallurgical pathways to low-cost, early production

***ARGONAUT AT TORRENS:***

- *Multiple drill targets = higher likelihood of discovery, and*
- *Huge upside potential on discovery*

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