Geophysics and Drilling Collaborations Program 2022

Round 15

EL32295
Leichhardt East Drilling (LE001), Georgina Basin, NT

Knox Resources Pty Ltd

Northern Territory Geological Survey

Report prepared by

SRK Consulting (Australasia) Pty Ltd

Tenements:	EL32295 (amalgamated with EL32820 and EL32821 and now referred to as EL33375)
Map Sheets:	250K: Frew River 5303 and Alroy SE5315
	100K: Epenarra 5957, Favenc 5958, Dalmore 60558
Holder:	Knox Resources Pty Ltd
Datum, Zone:	GDA94, Zone 53S
Date:	22 June 2023
Authors:	Carl D'Silva and Ben Jupp
Email:	cdsilva@srk.com.au
Project:	KNX004

Executive summary

Knox Resources Pty Ltd (Knox or the Company) was successfully awarded a grant under the Northern Territory (NT) Government's Geophysics and Drilling Collaborations (GDC) program, GDC1500035.

Knox holds a significant tenure in the prospective East Tennant (ET) region within the Georgina Basin, NT. Knox's exploration activities in the NT are focused on Tennant Creek–style ironstone associated with gold-copper-bismuth mineralisation, part of the iron oxide-copper-gold (IOCG) group of deposits.

The co-funding diamond drilling campaign supported by Knox and the GDC program resulted in a single drill hole, Leichhardt East - KNXLE001RDD (also referred as LE001) in exploration licence (EL) 32295. EL32295 lies approximately 160 km east of Tennant Creek. On 21 February 2023, EL32295 was amalgamated with EL32820 and EL32821 and is now EL33375.

LE001 drilling activities were executed by DDH1 Drilling between 21 November 2022 and 5 December 2022. LE001 was drilled to a total depth of 699.8 m to test a high-intensity, near-coincident, magnetic and gravimetric anomaly. Interpretations on solid geology revealed the anomaly's correlation with a strongly magnetic skarn, calc-silicates, or altered clastic sedimentary rocks.

Samples recovered from LE001 drill hole are interpreted as Proterozoic basement units consisting of coarse-grained granite (Tennant Creek Supersuite), underlain by sequences equivalent to the Warramunga Formation and/or the Alroy Formation (siltstones and felsic tuff). Additionally, numerous intervals of haematite-dominant ironstone with minor bornite and chalcopyrite overprinting were recognised. Alteration assemblages consist of haematite, chlorite and sericite. The preliminary results showed clear indications of potential for a Tennant Creek–style copper-gold mineralisation.

LE001 drill hole successfully achieved its primary objectives, having drilled through the magnetic anomaly and determined stratigraphic relationships within the Georgina Basin sequence.

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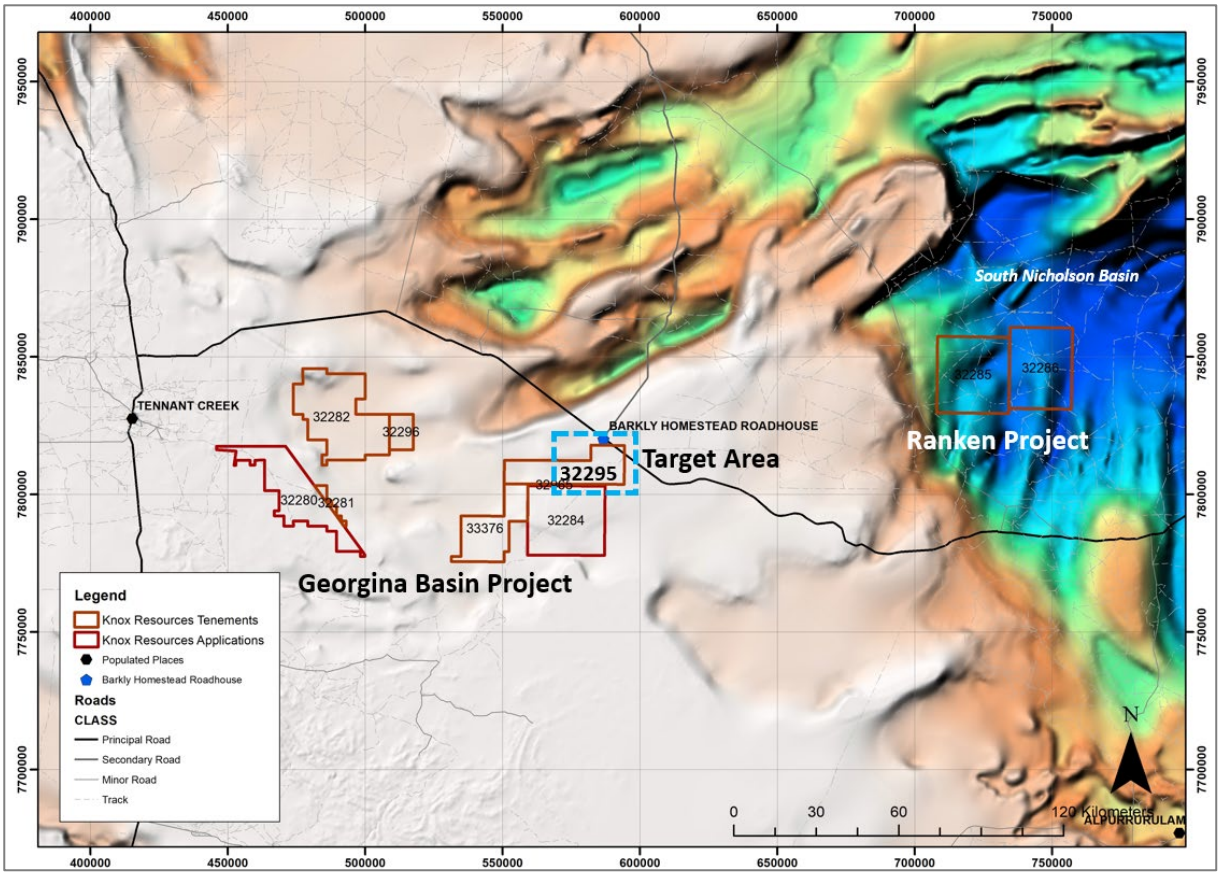
1 Introduction

Knox Resources Pty Ltd (Knox or the Company) is a subsidiary of Astro Resources NL (Astro), with 80%, and Greenvale Mining Limited (Greenvale), which holds 20% share. Knox holds significant tenure in the prospective East Tennant region, Northern Territory (NT). Knox's exploration activities are focused on Tennant Creek–style ironstone associated gold-copper-bismuth mineralisation, part of the iron oxide-copper-gold (IOCG) group of deposits.

Knox holds ten exploration licences (ELs) in the NT with seven granted ELs and three exploration licence application (ELA) areas. The ELs cover four distinct locations over some 4,475 km^2 between the IOCG provinces of Tennant Creek and Mount Isa (Figure 1-1). EL32295 is located approximately 160 km east of Tennant Creek.

Knox conducted a regional prospectivity assessment of its lease holdings in 2021 and identified several drill targets in EL32295 following the acquisition of high-resolution gravity and aeromagnetic data in August 2021. The geophysics data in EL32295 were acquired as part of the successful Round 14 co-funded application between the NTGS and Knox. The Leichhardt East (LE001) drill hole was drilled on a near-coincident magnetic and gravity high and is interpreted to contain Warramunga Formation equivalents. The LE001 drill hole is associated with a strong magnetic anomaly, with recent solid geology interpretation from Geoscience Australia (GA) having this high anomaly correlated with a magnetic skarn. It should be noted that this lithology was not intersected in any of the surrounding NDI holes (NDIBK05 and NDIBK10 drill holes), despite this interpretation.

Figure 1-1: Knox tenement locations in the East Tennant region with EL32295 as focus area



Source: SRK

1.1 Location and access

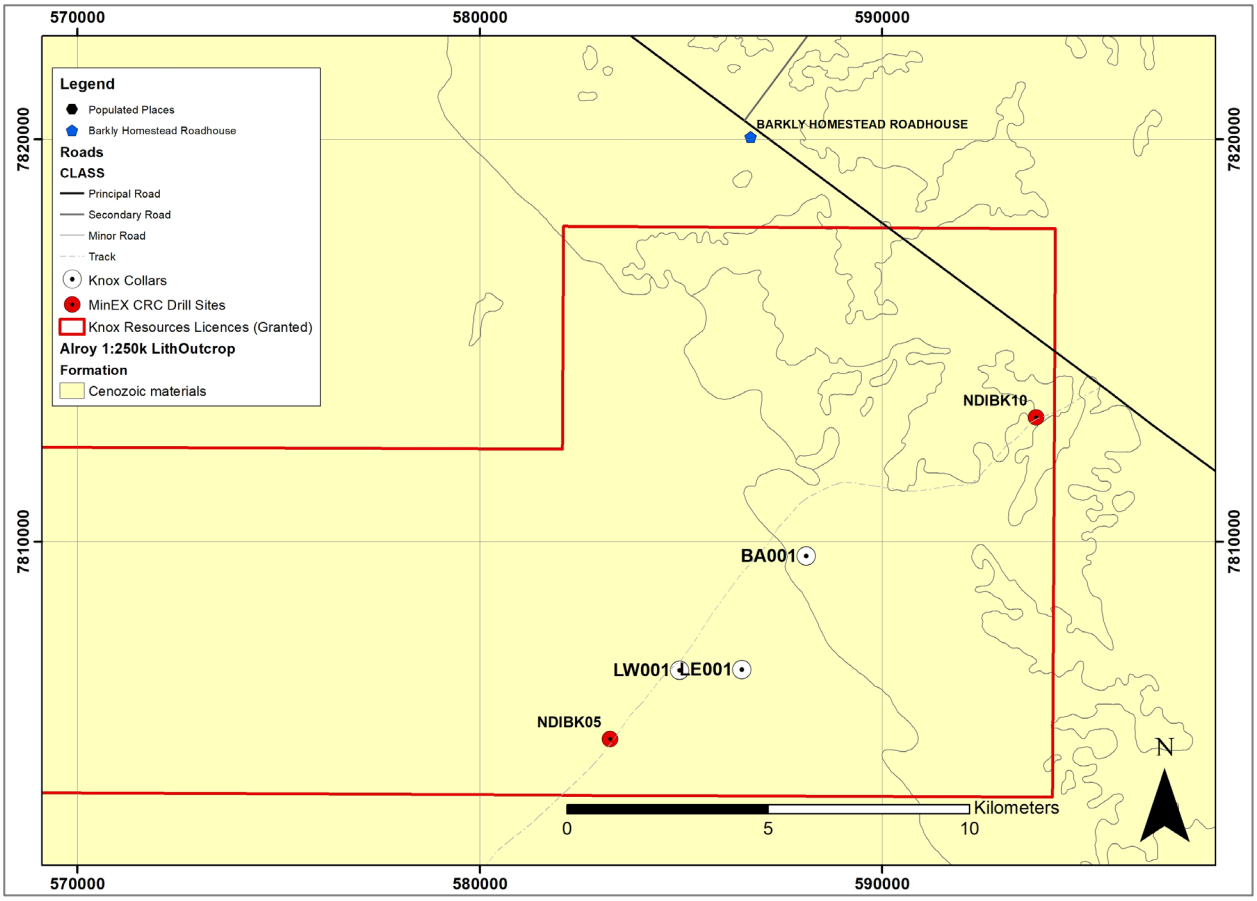
Drill hole KNXLE001RDD (LE001) is located in the Barkly Tablelands some 160 km east of Tennant Creek in the southeast corner of EL32295. Since completion of the drilling, EL32295 no longer exists. The permit was amalgamated on 21 February 2023 with EL32280 and EL32821, and is now referred to as EL33375.

The LE001 drill hole is located 12 km south of the Barkly Homestead (Figure 1-2). The Barkly Homestead provides accommodation, fuel and supplies.

The local geology consists of Cenozoic cover material which overlie sediments of the Cambrian Georgina Basin. There is no outcrop in the vicinity of EL32295.

The holes drilled nearest to LE001 are BA001 (KNXBA001RDD) and LW001 (KNXLW001RDD), which were drilled by Knox in 2022. Other drill holes near LE001 include NDIBK05 (~4 km to the southwest) and NDIBK10 (~12 km to the northeast), which were drilled by MinEx CRC's National Drilling Initiative to increase the understanding of the geology and mineral potential of Palaeoproterozoic basement rocks in the East Tennant region (Clark et al., 2021).

Figure 1-2: Location of Leichhardt East 1 (LE001) drill hole in EL32295



Source: SRK

2 Regional context

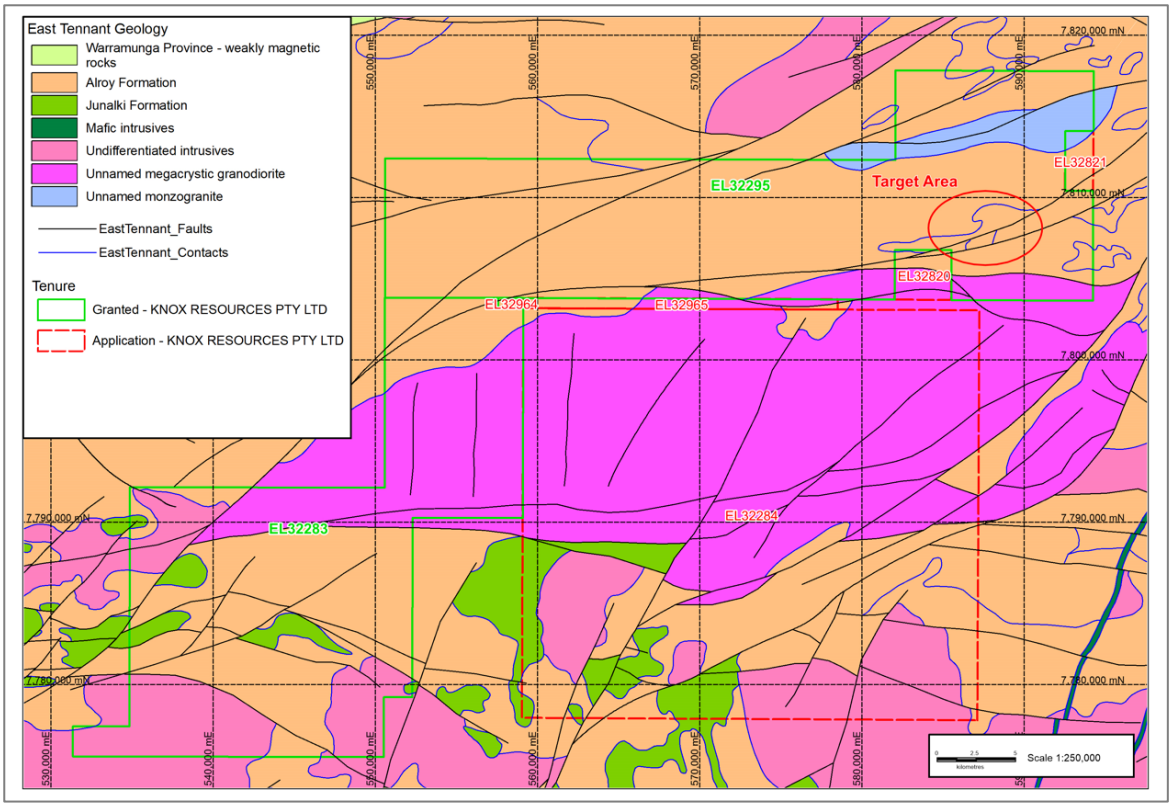
The geology of EL32295 consists of Cenozoic cover materials which overlie sediments of the Cambrian Georgina Basin and the Kalkararindji Suite. Below this, the solid geology of EL32295 has been interpreted to consist of Palaeoproterozoic sequences that broadly consist of highly magnetic metasediments and felsic intrusives equivalent to the Warramunga Formation (Figure 2-1).

To the north of EL32295, a major east–northeasterly trending fault is observed, across which volcanics and sediments of the Ooradidgee Group have been interpreted, with a thickening of cover also noted in this zone. A lower magnetic response is observed coincident with this zone, correlating with a thicker sedimentary package as well as thicker cover sequences. This is evidenced with a thick metasedimentary package (>700 m) intercepted in MinEx CRC hole NDIBK010 to the east along this zone and interpreted to contain South Nicholson Basin sequences.

Several major east–northeast trending fault structures have been interpreted across the lease areas from the magnetic and gravity datasets. These structures are long strike length features and are interpreted to have likely been long-lived within the region and to represent favourable target corridors for potential IOCG-style mineral systems.

The intrusive intersected in NDIBK005 is interpreted by Geoscience Australia (GA) to be extensive and lies at depth below the metasediments as intercepted in NDIBK005 (at 203 m depth) and NDIBK010 (at 747 m depth) below Georgina Basin sediments. Recent solid geology interpretations by NTGS/GA have demarcated this as a magnetite skarn.

Figure 2-1: Solid geology interpretation and structure of EL32295



Source: SRK

2.1 Stratigraphy – East Tennant Region

The Tennant Creek Inlier is divided into three provinces: Tomkinson Province to the north, Warramunga Province in the centre and Davenport Province to the south. To the east, underlying Middle Cambrian Georgina Basin sediments and Cenozoic cover rocks, is the recently identified East Tennant Creek region, which is interpreted as the undercover extension of the Warramunga Province.

The Warramunga Province is host to high-grade deposits of copper-gold-bismuth mineralisation associated with magnetite and/or haematite-bearing ironstones that have been mined in the Tennant Creek Inlier since the 1930s. These deposits are hosted in the Palaeoproterozoic Warramunga Formation. These rocks are unconformably overlain by the Ooradidgee Group. This package is in turn overlain by the Wauchope and Hanlon subgroups of the Hatches Creek Group in the south (Davenport Province) and Tomkinson Creek Group to the north (Tomkinson Province) (Ahmad & Munson, 2013).

The Warramunga Formation (deposited about 1862 Ma) is mostly composed of weakly metamorphosed turbiditic greywacke, locally tuffaceous, with lesser siltstone, shale and argillaceous ironstone, referred in the literature to as ‘haematitic ironstone’ (Donnellan, 2013; Huston et al., 2020 and references therein). Within the undercover East Tennant region, Warramunga-like metasedimentary units intercepted during the MinEx CRC’s National Drilling Initiative (NDI program) have been interpreted as lateral equivalents of the Warramunga Formation and assigned as the Alroy Formation. Recent age dating by Kositcin et al. (2022) of detrital zircons from the Alroy metasedimentary units in the East Tennant region gave a maximum depositional age of 1873–1864 Ma, suggesting these may be slightly older than dated Warramunga (~1860 Ma).

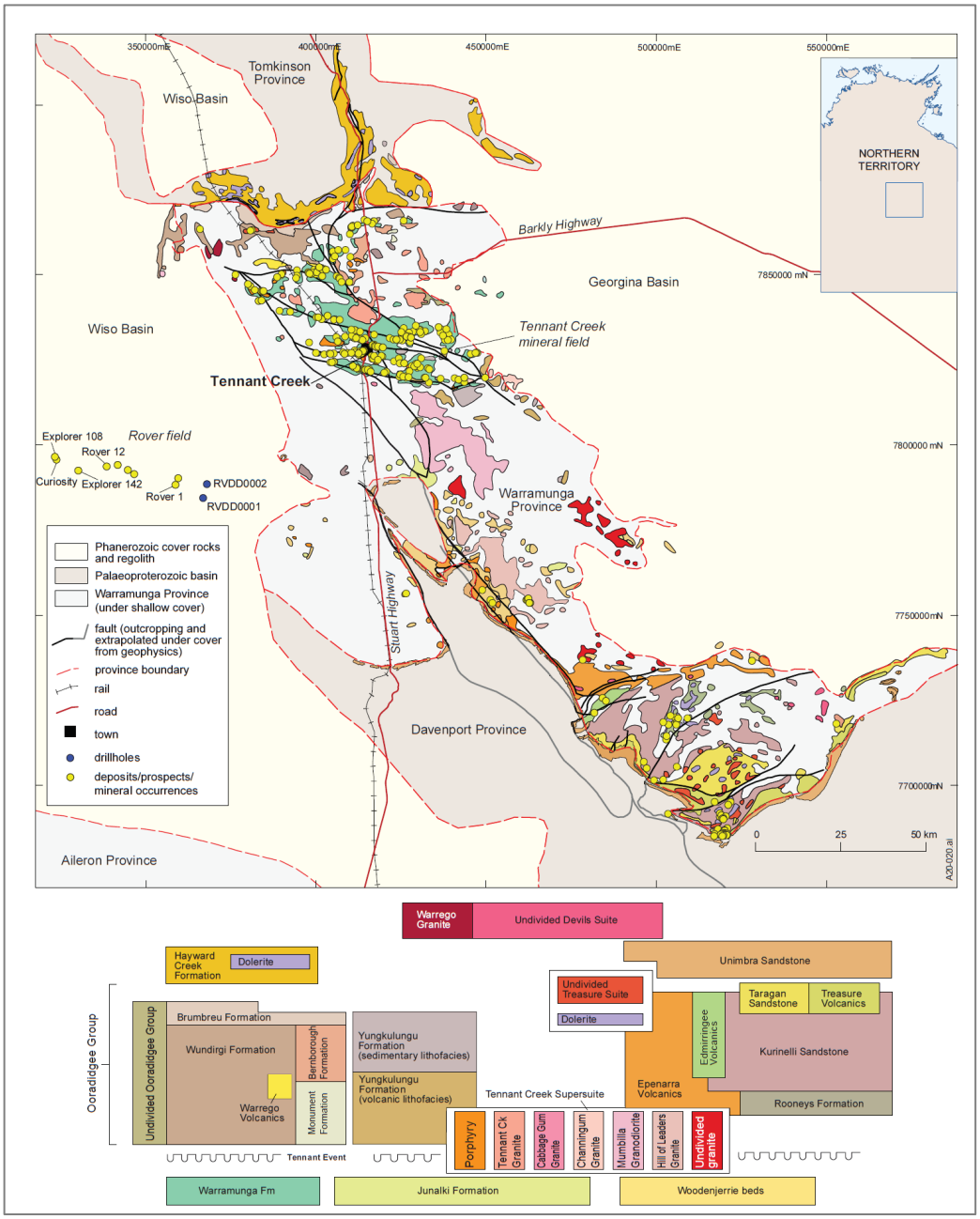
Between ~1860 and 1850 Ma, the Warramunga Formation and its equivalent sequences were affected by the tectono-magmatic Tennant Event that resulted in extensive syn- to post-tectonic magmatism (Tennant Creek Supersuite) and regional D_1 shortening of the crust, expressed as the east- or east–northeast trending, upright F_1 folds and low-grade metamorphism (Maidment et al., 2006; Donnellan, 2013).

The ca 1,850–1,840 Ma Tennant Creek Supersuite (Wyborn et al., 1998) comprises mainly granitic intrusions with lesser granodiorite, tonalite, felsic porphyry and dolerite, as well as extrusive felsic volcanic rocks (Donnellan, 2013). The Tennant Event folded and thrusted the sedimentary sequences and ultimately exhumed the entire package. This resulted in an erosional angular unconformity between the pre-Tennant Event rocks (Warramunga Formation, Junalki Formation and Woodenjerrie beds) and the overlying volcanosedimentary successions of the Ooradidgee Group (Donnellan, 2013).

In the East Tennant region, the Ooradidgee Group and Alroy Formation are truncated and dismembered by major east–west and southeast–northwest trending structures crosscutting the region. Based on magnetic data, complex folding is interpreted within the younger Ooradidgee sequences to the north of the East Tennant region, while several large-scale intrusions, interpreted to be chronologically equivalent to the Tennant Supersuite, are recognised as prospective thermal and fluid sources. Extensive alteration occurs in the faulted Yunkulungu Formation and the Warramunga Formation equivalents in EL32295. Several major east–northeast trending faults identified in the magnetic and gravity datasets may be long-lived favourable target corridors for IOCG-style mineral systems.

The basement lithologies identified by drilling primarily consisted of interbedded to massive siltstone and sandstone, breccias, schist and granite. In addition, several narrow ironstone formations hosted within a metasedimentary sequence (metamudstones, siltstone and greywackes) underlie an altered 'red' biotite granite. These ironstones, overprinted by minor occurrences of pyrite, bornite and chalcopyrite, form as magnetite and haematitic shale. Alteration consistent with IOCG-type systems was evidenced by zones of haematite and chlorite, with zones of silicic and sericitic alteration.

Figure 2-2: Geology map of the East Tennant region



Source: Modified slightly from Donnellan (2013)

3 Previous exploration

The region surrounding EL32295 has previously been of exploration interest, with several explorers having focused on gold and base metal mineralisation in the interpreted Palaeoproterozoic sequences below the Cambrian Georgina Basin and Cenozoic cover rocks.

Phosphate exploration has also been carried out in the region. Most exploration has been limited to desktop reviews, with limited geophysical data acquisition and drilling. Previous workers have noted the presence of interesting targets in their reviews; however, unfavourable economic cycles and the depths of targets have been limiting factors in pursuing exploration undercover.

Table 3-1: Previous explorers in EL32295

Period	Company	Tenements	Activities completed
2002-2010	Minerals Australia and Jacaranda Minerals	EL23767, EL29652, EL23726	Exploration focused on base metal mineralisation below the Georgina Basin sediments, including rock chip sampling, airborne magnetic surveys, targeted electromagnetic surveys and five diamond drill holes (1,296.2 m). The depth of the targets was considered a major obstacle and the leases were relinquished.
2010-2013	Northern Minerals	EL26775, EL26818, EL27754, EL27555	Concentrating on gold-copper mineralisation, the tenements were considered only prospective for phosphate.
2008-2009	St Barbara Ltd	EL26036	Exploration including desktop review, limited gravity survey (352 stations), data processing, 3D inversion and geophysical modelling/interpretation focused on copper-gold mineralisation. The depth to basement revealed one key target (TC101) at >250 m depth. The gravity data showed several discrete anomalies that warranted further exploration, but the targets were considered too deep and not profitable for drilling.
2015	Rum Jungle Resources	EL30209, EL30210, EL30211	Conducted exploration in the region between 2008 and 2015, but no economic prospects were identified.

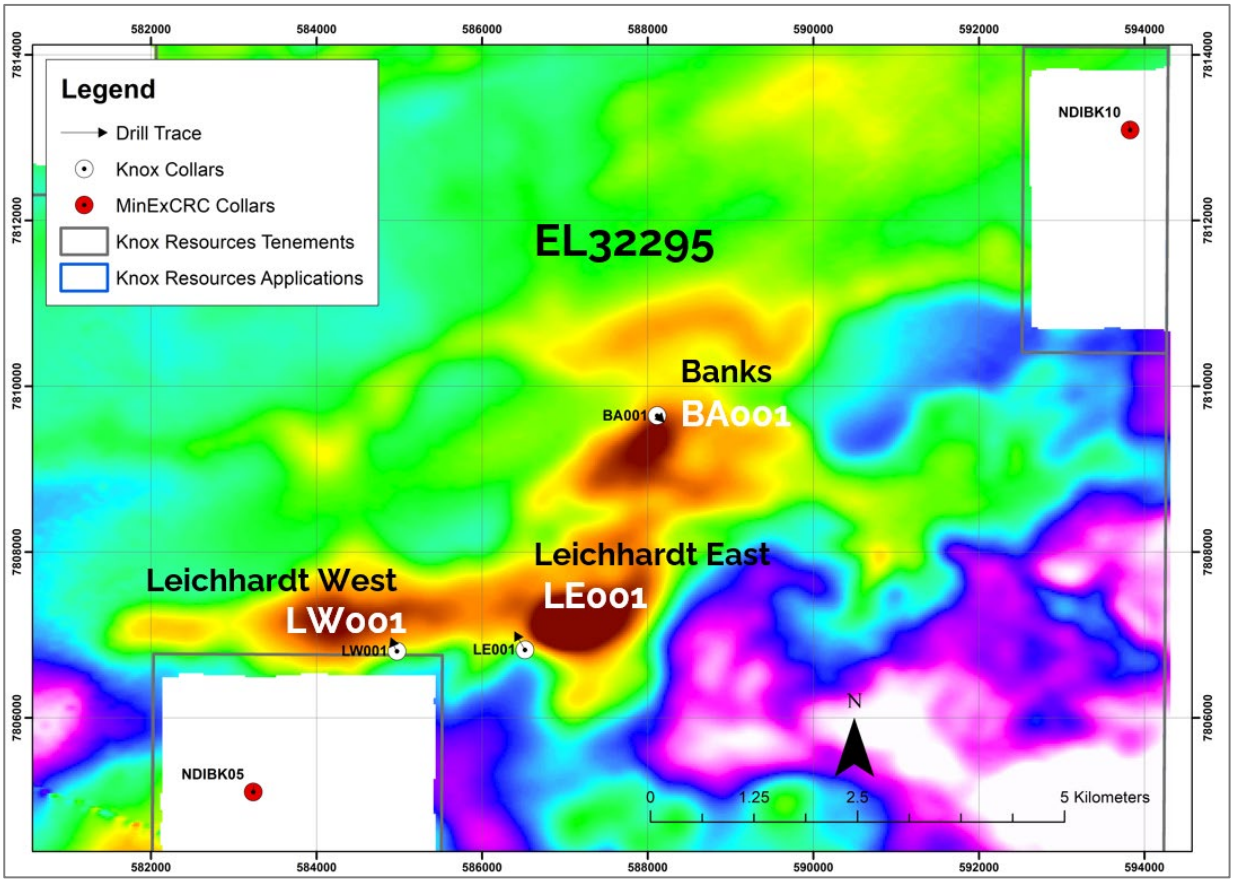
Source: SRK

4 Exploration concept

Several favourable IOCG mineral system features have been interpreted within EL32295. The Warramunga Formation is the primary host of Tennant Creek–style IOCG mineralisation forming within iron stones (haematite/magnetite). There is a close spatial and temporal relationship between mineralisation and intrusives (e.g. Tennant Creek Suite and equivalents). These intrusives are interpreted to have acted as a contributing fluid source and local thermal driver, circulating fluids through favourable pathways (e.g. faults or fold structures). Several intrusive rocks have been interpreted from geophysical datasets and intercepted in drilling. While the ages of these intrusives are uncertain, the presence of these units highlights the potential for favourable contributing source rocks.

Crustal-scale structures are important fluid flow pathways that focus migrating fluids from intrusive sources at depth. Several major structures are evident in EL32295, indicating favourable architecture for mineralisation. The concentration of magnetite and haematite (in addition to sulfide minerals) in Tennant Creek–style IOCG mineralisation is typically expressed in gravity data as a weak high. Gravity highs over areas of interpreted Warramunga Formation equivalents have been interpreted in the northeast of EL32295 with near-coincident magnetic anomalies (Figure 4-1).

Figure 4-1: Analytical signal magnetic image of Banks, Leichhardt East and Leichhardt West prospects in EL32295



Source: SRK

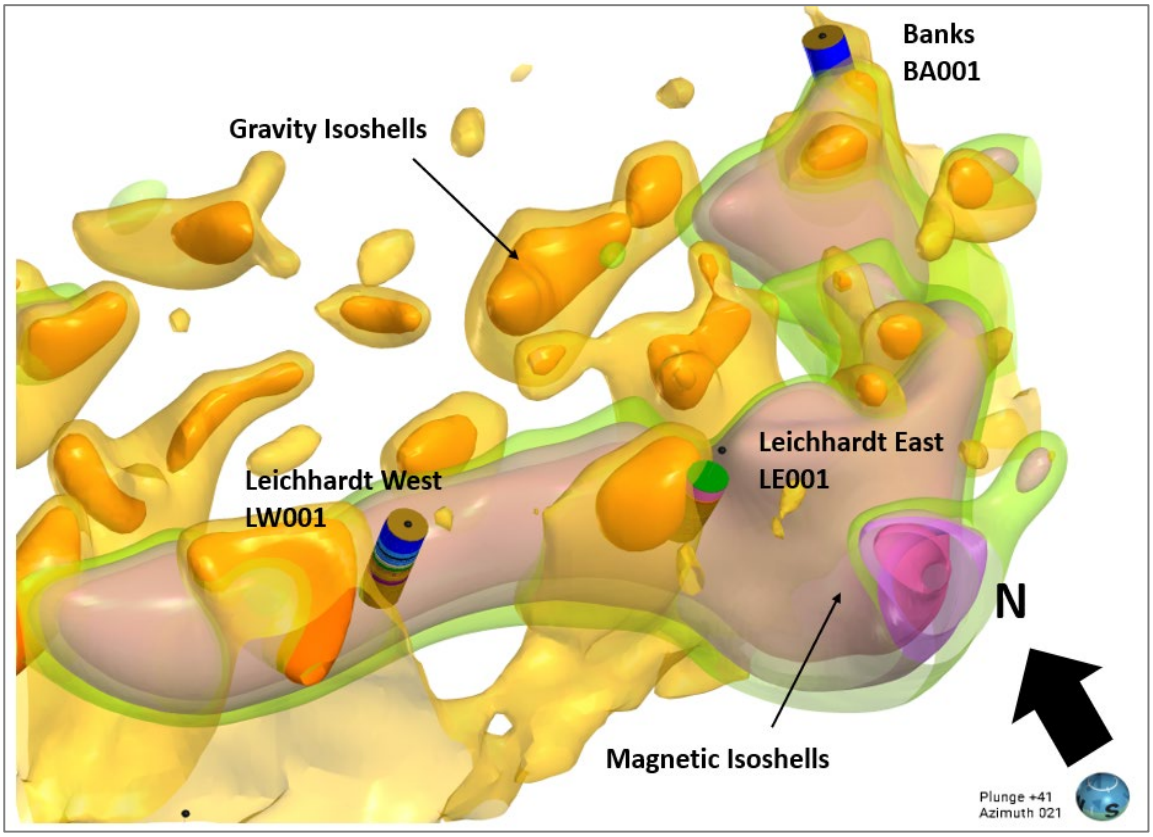
4.1 Drill targets in EL32295

A cluster of high-priority targets (Banks, Leichhardt East and Leichhardt West prospects) was identified in EL32295. Each target has IOCG deposit characteristics, including near-coincident magnetic and gravity high anomalies, presence of interpreted Warramunga Formation equivalents, and proximal regional-scale faults and intrusive rocks. These targets were initially identified as high-ranking targets during SRK's IOCG prospectivity review (SRK, 2021) and included:

- presence of near coincident magnetic and gravity highs
- interpreted Warramunga Formation equivalents
- structurally favourable area, inclusive of intersecting regional fault structures
- proximity to granites (unknown age).

Detailed gravity data were collected (200 m spacing) over the target area to assist with detailed drill targeting over the area of interest. Resource Potentials conducted 3D inversion modelling (magnetic and gravity) to characterise the subsurface density contrast and magnetic susceptibility of the target area (Figure 4-2).

Figure 4-2: Banks, Leichhardt East and Leichhardt West drill holes and 3D inversion isoshells



Source: SRK

Note: Density isoshells coloured orange, magnetic isoshells coloured pink.

5 LE001 drilling details

DDH 1 Drilling (DDH1) mobilised to site on 20 November 2022 and commenced drilling on 22 November 2022, using a Sandvik truck-mounted diamond rig and several support vehicles. As per the co-funding request, the drilling program comprised a single diamond drill hole (LE001).

Reverse circulation drilling commenced at surface with HQ diamond drilling from 146.5 m until the end-of-hole (EOH).

LE001 was completed on 4 December 2022 to an EOH depth of 699.8 m towards an azimuth of 322.09° (magnetic north), with a final azimuth of 330.46° (magnetic north). The initial hole dip was -70.32° with a final dip of -64.78°.

Diamond core was oriented, and metre marked before logging was completed. The detailed geological logs included records of mineralisation, weathering, lithology, composition, grain size, alteration, veining and structural measurements. Fieldwork associated with the project (logging and core processing) was completed on 21 February 2023.

5.1 Data and samples collected at LE001

5.1.1 Samples submitted to NTGS

The following reverse circulation drilling samples and core samples from LE0001 drill hole have been supplied to NTGS core library in Alice Springs.

- Reverse circulation drilling:
  - Chip trays with 1 m representative sample, labelled with hole number and depth interval.
  - 250–500 g bags or vials to be labelled with hole number and depth interval.
    - Either of the above to be laid out in a core tray, in a similar fashion to drill core – top left to right and then down.
    - End of core trays to be marked with:

Hole No. ‘Cuttings’	Depth interval	‘KnoxRes’

- Core samples:
  - At least half HQ core for full length of core drilling (cut lengthways).
  - Start and associated depth to be marked on top left of each core tray.
  - Ends of core trays to be marked with:

Hole no. ‘Core’	Depth interval	Tray # ‘KnoxRes’

5.1.2 Collar location

Details of the final collar location for the LE001 diamond hole are shown in Table 5-1. The collar location was determined by handheld GPS (see Appendix A.1).

Table 5-1: Collar location for LE001

Hole ID	Abbreviation	Datum	Easting	Northing	Elevation (mRL)	Total depth (m)	Method
KNXLE001RDD	LE001	GDA94/MGA53	586519	7806821	231	699.8	Handheld GPS

Source: Knox

5.1.3 Core photography

Core photographs of wet core in each labelled core tray were taken at the drill site. Photographs were taken facing directly down over the core trays. All core was photographed on site prior to any sampling. Copies of the wet core photographs are shown in Appendix A.2.

All core trays contained approximately 4 m of drill core. Photographs were taken of all diamond collected core collected from 146.5 m to 699.8 m (EOH). Reverse circulation drilling was conducted above this depth to surface.

5.2 Core Logging

5.2.1 Lithology

The lithology logging program includes:

- Lithology
- Weathering and Regolith (captured in Lithology)
- Structure
- Alteration.

The LE001 lithology data are included in Appendix A.3.

5.3 Geotechnical/petrophysical

5.3.1 Rock Quality Designation (RQD)

The drillers run sheets and associated RQD measurements (lengths, core loss, etc.) are attached in Appendix A.4.

5.3.2 Specific gravity results

Downhole specific gravity (SG) measurements were collected on site by a Knox geologist between 230.8 m and 698.20 m depth. Samples were collected on 0.5–2 m intervals with an average of 0.5 m between sample intervals. Samples measured were typically 0.1 or 0.15 m in core length. Sample weights were measured as dry and wet weights, with the SG value calculated applying the Archimedes method (SG = dry weight/dry weight – wet weight). LE001 SG measurements are attached in Appendix A.4.

5.3.3 Downhole magnetic and electromagnetic survey

Drill hole LE001 was surveyed between 19 and 24 January 2023 for downhole electromagnetics (DHEM) and magnetic susceptibility by Gap Geophysics Australia (Gap). Two passes of the survey were conducted, with the first pass used to acquire magnetics data at 0.5 m intervals and the second pass used to acquire DHEM data at 10 m intervals.

The downhole surveys used the following transmitter and receiver specifications:

- Transmitter: 450 × 450 m transmitter loop. Gap GeoPak HPTX-70 (703)
- Turnoff Mode: Fast Turnoff
- Timing: Internal Control – GPS synchronisation
- Loop: Single turn 35 mm^2 (cross-sectional area) double insulated copper
- Receiver Probe: EMIT DigiAtlantis Receiver using a 3-component fluxgate magnetometer (B-field) probe.

Gap considered the data quality to be high. Gap noted the presence rods in KNXLE001RDD at some depths to affect the data quality of the electromagnetic and magnetic susceptibility surveys.

Full survey details are provided in Appendix A.6.

5.3.4 Handheld magnetic susceptibility readings

Magnetic susceptibility readings were collected using a KT-10 v2 unit, with a 6-second sample cycle. Readings were collected on Full Core (HQ) routinely at 1 m intervals downhole (230–699.8 m), with additional readings being collected on a sub-metre interval as noted within the data.

Two readings were collected at each reading site and averaged – these readings were collected 180º apart on the core (i.e. one at the “front” and one at the “back” of the core).

Readings were taken on dry drill core, with the core being removed from the core tray and held vertically away from any metal objects. Readings were recorded as outlined in the data presented in Appendix A.4 and the “front” reading has site also been noted on the physical drill core.

5.4 LE001 sampling assay intervals

Intervals were selectively sampled for laboratory assay as half-core on nominal 1 m intervals or to geological/mineralisation boundaries where appropriate. Core cutting was completed on a core saw, using the correct boats for the core size and following the cut line approximately 5 cm to the right of the core orientation line where present. A Knox geologist supervised the process of sampling into pre-numbered calico bags.

The numbers of gold, base metal, multi-element and QAQC samples taken are shown in Table 5-2 and Appendix A.5.

Table 5-2: Summary of assay samples taken from LE001

Hole ID	Number of gold/base metal samples	Number of multi-element samples
LE001	458	458

5.4.1 pXRF

Portable x-ray fluorescence (pXRF) data were collected on site. Readings were collected on 1 m intervals from 149.1 m to 699.8 m (EOH), with a total of 585 readings collected (Appendix A.5). An Olympus Vanta pXRF (instrument serial number 843679) unit was used for the survey using the geochemistry (3-beam) mode, and with each beam analysis collected on 10 second intervals for a total of 30 seconds per sample analysis. No QAQC (standards or blank data) was measured during pXRF analysis.

5.4.2 Assays

A total of 458 samples were assayed by Intertek. Samples were submitted for assay between a depth range of 232.7 m and 699.8 m, with samples submitted on nominal 1 m intervals or to geological/ mineralisation boundaries where appropriate.

All assays were conducted by Intertek. Gold was analysed by fire assay (laboratory code FA25P/OE) with a detection limit of 5 ppb to 350 ppm. All multi-element analysis, including base metals, was analysed by a four-acid digest and inductively coupled mass spectrometry (ICP-MS) methods (laboratory code 4A/MS) for 48 elements. The multi-element analysis list and detection limits are given in Table 5-3.

Assay results are provided in Appendix A.5.

Table 5-3: Intertek four-acid multi-element analytes and detection limits

ELEMENT	RANGE PPM	ELEMENT	RANGE PPM	ELEMENT	RANGE PPM
Ag	0.05 - 500	Hf	0.05 - 2000	Sb	0.05 - 1%
Al	50 - 15%	In	0.01 - 2000	Sc	0.1 - 5000
As	0.5 - 1%	K	20 - 10%	Se	0.5 - 1%
Ba	0.1 - 5000	La	0.01 - 5000	Sn	0.1 - 2000
Be	0.05 - 2000	Li	0.1 - 5000	Sr	0.05 - 1%
Bi	0.01 - 1%	Mg	20 - 40%	Ta	0.01 - 2000
Ca	50 - 40%	Mn	1 - 5%	Te	0.2 - 2000
Cd	0.02 - 2000	Mo	0.1 - 1%	Th	0.01 - 5000
Ce	0.01 - 1%	Na	20 - 10%	Ti	5 - 2%
Co	0.1 - 2%	Nb	0.05 - 2000	Tl	0.02 - 2000
Cr	1 - 2%	Ni	0.5 - 2%	U	0.01 - 1%
Cs	0.05 - 2000	P	50 - 5%	V	1 - 2%
Cu	0.5 - 2%	Pb	0.5 - 1%	W	0.1 - 2000
Fe	100 - 50%	Rb	0.05 - 2000	Y	0.05 - 2000
Ga	0.05 - 2000	Re	0.002 - 2000	Zn	1 - 2%
Ge	0.1 - 2000	S	500 - 10% (50 - 10%*)	Zr	0.1 - 2000

Source: Intertek, 2020

5.4.3 Targeted petrography

Thirteen rocks from LE001 were petrographically analysed and described by Dr. Tony Crawford of A& A Crawford Geological Research Consultants in April 2023. All samples were prepared as polished thin sections, and offcut billets and thin sections of all samples were scanned to provide visual context beyond the 4–10 photomicrographs provided for each thin section. Additional review of the litho-geochemistry was conducted as part of the review. All samples and high-level summary are provided in Table 5-4.

Full descriptions are provided in the report provided in Appendix A.5.

5.4.4 Remnant magnetism sampling

Four samples from LE001 were dispatched to Terra Petrophysics laboratory in O'Connor, Perth, to test for remnant magnetism. A further seven samples were sent to CSIRO North Ryde magnetic petrophysics laboratory in New South Wales to determine the shape distribution of magnetisation in the deformation fabric (Roberts and Tikoff, 2021).

Details of the results are included in Appendix A.5.

Table 5-4: Summary of petrographic samples from LE001

Sample ID	Sample depth (m)	Rock type	Summary description
100021	237	Granite	An intensely haematite-chlorite-altered, heavily fractured but not foliated, medium-grained granite.
100022	270	Granite	A crushed and brecciated granite likely derived from the same granitic protolith as the preceding sample, but lacking the haematite alteration that characterises that rock.
100023	290	Granite	A relatively quartz-poor, effectively syenitic section of a red granite surrounded by more typical, medium- to coarse-grained granite with 20–30% quartz.
100024	347.55	Mudstone	A ferruginous mudstone with occasional, millimetre-thick silty laminae in which the angular detrital grains are quartz.
100025	359	Greywacke	A poorly sorted, matrix-supported greywacke with a maximum grainsize between 0.5 mm and 1 mm.
100026	360	Greywacke/mudstone	An interbedded series of medium-grained, matrix-supported and poorly sorted greywacke and mudstone, in which significant soft sediment blending of the shale into adjacent greywacke beds is evident.
100027	481	Siltstone	A well-sorted, recrystallised siltstone to mudstone with very poorly defined bedding marked by subtle changes in the grainsize of the recrystallised, sericite-dominated intergrowth that dominates this rock, along with uncommon, detrital quartz grains in more coarse-grained silty domains.
100028	570.97	Mudstone	A heavily fractured ferruginous mudstone to siltstone in which there is abundant fine-grained magnetite (now converted to haematite/martite).
100029A	577.38	Siltstone/mudstone	A homogeneous, very fine-grained siltstone/mudstone with only vague bedding defined by a few sub-millimetre laminae of siltstone with detrital quartz grains.
100029B	577.1	Mudstone	A heavily fractured, quartz-veined, recrystallised mudstone to siltstone.
100030	615.75	Ferruginous mudstone	Bedding contact between a darker, recrystallised ferruginous mudstone/shale and a pale, recrystallised, relatively martite-poor mudstone.
100031	635	Tuff	A strongly altered rhyolitic vitric crystal tuff with local preservation of glass shard shapes in a recrystallised matrix of comminuted vitroclastic detritus with occasional, rounded and resorbed quartz microphenocrysts.
100032	678.88	Ironstone	A strongly ferruginous meta-mudstone, effectively an ironstone, with bands of brecciation to several centimetres wide formed during hydraulic fragmentation of quartz veins.

6 Results and initial interpretation

Drill hole LE001 targeted a near-coincident magnetic and gravity feature. Geologically, the target was interpreted to consist of Warramunga Formation equivalents underlying Georgina Basin sediments, with the target also proximal to regional-scale faults and intrusive rocks.

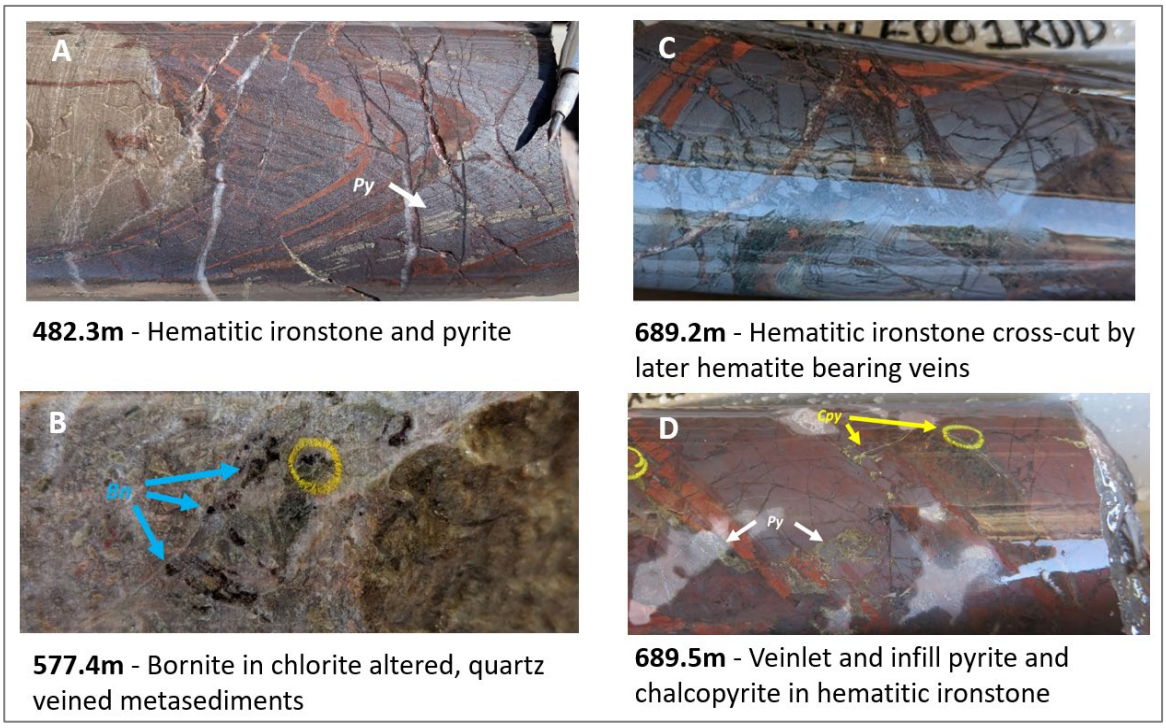
LE001 was drilled to a total depth of 699.8 m and intersected Georgina Basin cover rocks to a depth of 232.4 m. The base of the Georgina Basin was marked by the Kalkarindji Volcanics, intercepted between 210 m and 232.4 m. The overlying Georgina Basin was dominantly composed of variably vuggy limestones and siltstones.

The intercepted underlying basement lithologies (Proterozoic age) dominantly consisted of metasediments, inclusive of interbedded to massive siltstones, mudstones and sandstone (greywacke) with intermittent and irregular ironstones. Additional units intercepted included schist as well as minor vitric tuff and several intervals of granite. Intercepted granites were red and medium grained. Potassium-feldspar was the dominant feldspar, with sericitic alteration observed. Petrographic analysis indicated these granites to be petrographically similar to literature descriptions of the Tennant Creek Supersuite biotite granites and syenogranites.

Of significance, several narrow ironstone formations were intersected in LE001. These formations are hosted within a metasedimentary sequence (meta-mudstones, siltstone and greywackes) underlying an altered ‘red’ biotite granite. Minor occurrences of bornite and chalcopyrite overprinting the ironstones were also observed, with pyrite overprints more common. Ironstones were observed to form as magnetite and haematitic shale, with zones of jasper and minor pyrite (Figure 6-1). Thicknesses of interbedded haematitic shale ranged from 8 cm to 3.1 m. Alteration within LE001 is consistent with a Tennant Creek–style IOCG system consistent with the alteration assemblage observed (zones of haematite and chlorite, with zones of silicic and sericitic alteration).

The presence of ironstones and haematite/magnetite alteration in LE001 is interpreted to provide encouraging indications of a Tennant Creek–style IOCG style mineral system within this zone. The associated chlorite alteration and presence of sulfides overprinting the ironstones, inclusive of bornite, chalcopyrite and pyrite, additionally provides some evidence of an IOCG mineral system active within this region. However, sulfide concentrations and associated copper and gold enrichment from assays are not at economic levels. Assay results show evidence of copper, silver and bismuth anomalism, with maximum values of up to 818 ppm Cu, 0.26 ppm Ag and 40.8 ppm Bi. In addition, there is an interesting association with uranium, with several anomalous intervals also identified (maximum values of 0.24% U_3O_8). Uranium is not uncommon to IOCG systems: it is found at Olympic Dam in South Australia, more locally at Juno (Tennant Creek) and at Ernest Henry (Mount Isa, Queensland).

Figure 6-1: Selected ironstone intervals in LE001



482.3m - Hematitic ironstone and pyrite

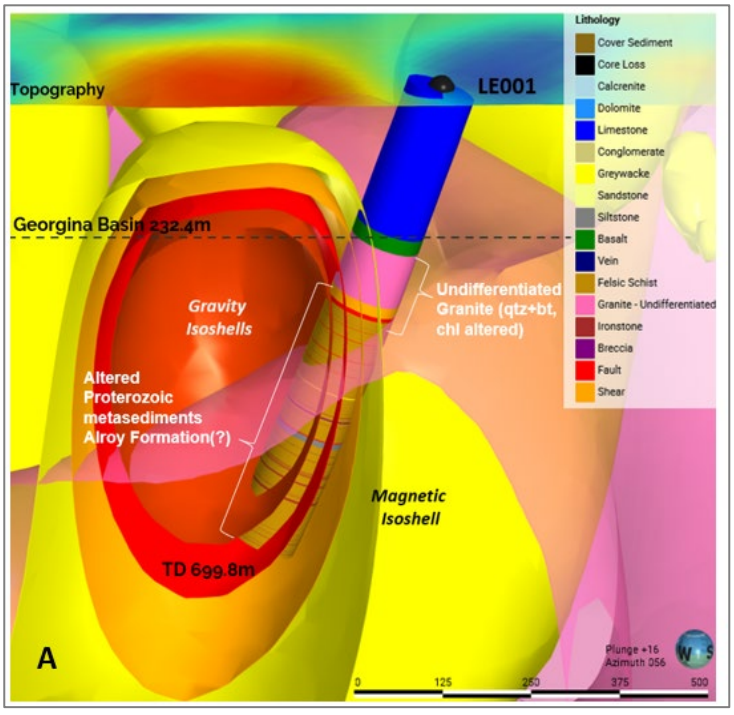
689.2m - Hematitic ironstone cross-cut by later hematite bearing veins

577.4m - Bornite in chlorite altered, quartz veined metasediments

689.5m - Veinlet and infill pyrite and chalcopyrite in hematitic ironstone

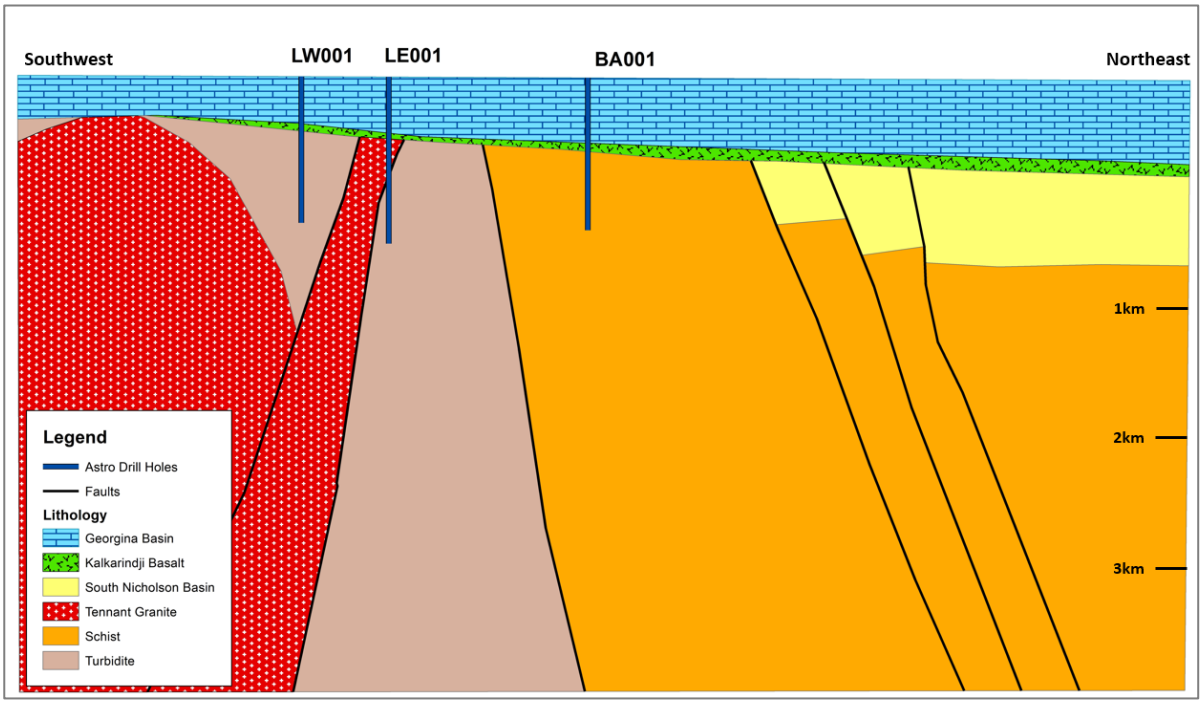
Source: Astro, 2022

Figure 6-2: LE001 drill hole and target gravity and magnetic isoshells



Source: SRK

Figure 6-3: Cross-section of interpreted geology from recent drill hole data (Banks, Leichhardt East and Leichhardt West) in EL32295



Source: Astro, 2023

7 Conclusions

The completion of a deep diamond hole at Leichhardt East supported under the Round 15 GDC program has greatly assisted in advancing the understanding of the prospectivity and geological understanding of the East Tennant region in terms of lithology, alteration mineralogy and geochemistry of Proterozoic basement rocks.

LE001 was drilled on a high-intensity coincident magnetic and gravity anomaly. Several intervals of ironstone were intersected, with the presence of minor bornite and chalcopyrite overprinting ironstone. Alteration assemblages consist of chlorite, haematite and sericite, which clearly shows indications of a Tennant Creek–style copper-gold mineralisation system.

Knox intends to build on the data collected from LE001, and others in the vicinity, through generating constrained geophysical modelling of both gravity and magnetic data, consideration of ambient noise tomography surveying and undertaking further drilling in EL32995 as warranted.

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Appendices

Appendix A.1 Collar and downhole survey

(provided as separate file in digital format)

Appendix A.2 Core photography

(provided as separate file in digital format)

Appendix A.3 Logging

(provided as separate file in digital format)

Appendix A.4 Geotechnical/petrophysical

(provided as separate file in digital format)

Appendix A.5 Sampling

(provided as separate file in digital format)

Appendix A.6 Downhole geophysics

(provided as separate file in digital format)