GOLD MINES

CENTRAL DESERT JOINT VENTURE

4^{th} ANNUAL REPORT

EXPLORATION LICENSES
EL7799, EL7803, EL7837, EL8479

COOMARIE AGREEMENT
TANAMI DESERT, N.T.

13^{th} OCTOBER 2000 TO 12^{th} OCTOBER 2001

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PERIOD: 13^{th} October 2000 TO 12^{th} October 2001

COMPILED BY: Chris Large

LOCATION: Tamami 1:250,000 SE 52-15
Granites 1:250,000 SF 52-03

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SUMMARY

Exploration Licenses (EL) 7799, 7803, 7837 and 8479 were granted to the Central Desert Joint Venture partners (Otter Gold NL 60% and Acacia Resources Ltd 40%) on October 13^{th} 1997. The four exploration licenses are subject to a Deed (Coomarie) between the CDJV and the Traditional Owners executed 01/08/97.

The Coomarie tenement group comprises a significant proportion of the Granites-Tanami Province. The tenements are viewed as a single project and exploration efforts have primarily focussed upon generating targets. To date work programmes have constituted data compilation, airborne surveying, regional soil sampling and posthole drilling to define angled RAB targets.

Work during the 4^{th} year of tenure focused on drilling at the Tanami Lakes prospect in EL 7803. Encouraging results were returned although no primary source for the elevated gold values has been determined.

Exploration expenditure on all 4 licenses subject to the Coomarie Deed for the period 13^{th} October 2000 to 12^{th} October 2001 was $105,206.19 against a combined covenant of $78,700.00.

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1.0 INTRODUCTION

This report contains details of exploration activities conducted within EL7799, EL7803, EL 7837 and EL8479 for the period 13th October 2000 to 12th October 2001. The four exploration licenses are covered by a Deed between Otter Gold NL and the Traditional Owners, dated 1st August 1997. The tenements are viewed as a single project and were granted this status by the DME on the 13th October 1997. The Coomarie Agreement comprises tenements within the Central Desert Joint Venture (CDJV) between Otter Gold NL (60% and managers) and Acacia Resources (40%).

1.1 Location and Access

The CDJV tenements are located approximately 650km northwest of Alice Springs, and 300km southeast of Halls Creek. The Coomarie Agreement comprises four Exploration Licenses covering a large area (705 km^2) of the Granites-Tanami Province due southeast and north of the Tanami mine site (Figure 1).

Access to the tenements is by the Tanami Track, and the Lajamanu Road. Within the CDJV, access is via exploration tracks and grided baselines. Access to most areas is limited during the wet season (December to March).

1.2 Tenement Status

Permission to explore within the Coomarie tenements EL 7799, EL 7803, EL 7837 and EL 8479 was granted to Otter Gold NL on the 13th October 1997 for a period of six years. This report represents the fourth year of exploration.

Tenement	Year	Area (sq km)	Blocks	Rent ($)	Covenant ($)
EL 7799	4/6	428	133	10,640	19,500
EL 7803	4/6	209	65	5,200	28,800
EL 7837	4/6	23	7	560	15,200
EL 8479	4/6	45	14	1,120	15,200

Table 1. Tenement Status.

1.3 Exploration History

Previous exploration of this region has been minimal. Initial investigation of the Tanami area was conducted by Davidson (1905). Davidson discovered gold-bearing quartz reefs. The reefs were mined between 1902 and 1908. Mining was restricted to the wet season due to lack of permanent water.

A gold rush was precipitated by the discovery of slab of stone containing an estimated 180oz of gold in 1909. The rush continued until 1913 and up to 200 men were working the field. Intermittent exploration and mining was conducted between 1913 and 1938, including the construction of an amalgamation plant in 1927. No official exploration was conducted in the Tanami Desert between 1938 and 1965.

In 1985, Harlock Pty. Ltd. commenced exploration within the Tanami mining leases which led to the commencement of open pit mining in mid-1987. Zapopan NL. acquired the ground and continued mining until March 1994. Otter Gold Mines Pty. Ltd. was granted access to explore around the mine site in 1989. Low-level Au anomalism was discovered in late 1989 which lead to the identification of the Redback Rise area as highly prospective. The Otter screening process also identified the Dogbolter and Jim's Find prospects.

In September 1990, the Shell Company of Australia Ltd. (Shell) entered into a joint venture with Otter. Management of the project was entrusted to Shell. In August 1993, Shell completed its earning phase (50%) by spending $5 million on exploration. In October 1994, a new joint venture was formed between Otter Gold NL and Acacia Resources Ltd. as a result of Shell divesting its mineral assets. The new joint venture is known as the Central Desert Joint Venture (CDJV), with participating interests 60% Otter and 40% Acacia. Otter Gold NL has management of the project.

2.0 GEOLOGY

The Granites-Tanami Block is bound to the west by the Canning Basin, and to the east by the Wiso Basin. It is considered to be one of the western-most Palaeoproterozoic inliers of the North Australian Orogenic Province, developed during the Barramundi Orogeny (Blake et al., 1979).

The stratigraphy of the Tanami Region has been revised as a result of an intensive study recently completed by the NTGS (Hendrickx et, al., 2000). The stratigraphy outlined by Blake et al (1979) has had some significant modifications (Table 2).

<table>
<tr><th colspan="6">Blake et al (1979)</th><th colspan="3">Hendrickx et al (2000)</th></tr>
<tr><td colspan="3" rowspan="3">Birrindudu Group</td><td colspan="3">Coomarie Sandstone</td><td rowspan="3">Birrindudu Group</td><td>Coomarie Sandstone</td><td rowspan="3">Suplejack Downs Sandstone</td></tr>
<tr><td colspan="3">Talbot Well Formation</td><td>Talbot Well Formation</td></tr>
<tr><td colspan="3">Gardiner Sandstone</td><td>Gardiner Sandstone</td></tr>
<tr><td colspan="6">Supplejack Downs Sandstone</td><td rowspan="3">Pargee Sandstone</td><td colspan="2">Nanny Goat Creek Volcanics</td></tr>
<tr><td colspan="6">Mount Winnecke</td><td colspan="2">Mount Winnecke Group</td></tr>
<tr><td colspan="6">Pargee Sandstone</td><td colspan="2">Mount Charles Formation</td></tr>
<tr><td rowspan="2">Tanami Complex</td><td rowspan="2">Mt. Charles Beds</td><td rowspan="2">Killi Killi Beds</td><td rowspan="2">Nanny Goat Creek Beds</td><td rowspan="2">Nongra Beds</td><td rowspan="2">Helena Creek Beds</td><td>Tanami Group</td><td>Killi Killi Formation
Dead Bullock Formation</td><td>Twigg Formation</td></tr>
<tr><td colspan="3">MacFarlane Peak Group</td></tr>
<tr><td colspan="6">Archean</td><td colspan="3">Browns Range Metamorphics
“Billabong Complex”</td></tr>
</table>

Table 2. Comparison of stratigraphic nomenclature (Hendrickx et al, 2000).

The oldest rocks of Archean age belong to the Billabong Complex and the Browns Range Metamorphics.

Lying unconformably above the Archean basement is the palaeoproterozoic MacFarlane Peak Group. These rocks are characterised by a thick sequence of mafic volcanic, volcaniclastic and clastic sedimentary rocks, which possess a distinctive magnetic and gravity signature.

The Tanami Group is subdivided into three formations:

Twigg Formation:	purple siltstone with minor sandstone and chert
Killi Killi Formation:	turbiditic sandstone
Dead Bullock Formation:	siltstone, mudstone, chert and banded iron formation

The Pargee Sandstone unconformably overlies the Tanami Group and is exposed on the western side of the Coomarie Dome extending into Western Australia. The Pargee Sandstone comprises thick-bedded quartz arenite, lithic arenite and conglomerate with pebbly sandstone and conglomerate at the base.

The Mount Charles Formation comprises an intercalated package of basalts and turbiditic sediments, which occur on the western side of the Frankenia Dome. The Mount Charles Formation is host to structurally controlled vein hosted gold mineralisation in the Tanami Mine Corridor.

The Mt Winneke Group is also interpreted to lie unconformably over the Tanami Group. This group is divided into two units including siliclastic sediments and felsic volcanics.

The Nanny Goat Volcanics are characterised by extrusive volcanic rocks including quartz-feldspar ignimbrite, feldspar ignimbrite, rhyolite lava, basalt and minor siliclastic sediments.

The Birrindudu group comprises 3 or 4 units with Gardiner Sandstone at the base, overlain by Talbot Well Formation and Coomarie Sandstone. The Suplejack Downs sandstone is interpreted to belong to this group but its relationship is unclear.

Cainozoic laterite, silcrete, calcrete, and Quaternary debris cover 60 – 70% of the Tanami Desert. The Quaternary sediments are generally unconsolidated, representing the most recent phase of erosion and deposition of sands, gravels and lithic fragments.

3.0 EXPLORATION

3.1 EL 7799 (Ware Range)

Exploration on EL 7799 during the reporting period was limited to acquisition and analysis of geophysical and geochemical data. Magnetic and gravity datasets were 'wormed' by Fractal Graphics in Perth and the resulting data was analysed in three dimensions with the accompanying FracViewer software (Figure 2).

The worming process is designed to generate targets within stratigraphic units with moderately to strongly contrasting internal magnetic signatures.

Examination of historical geochemistry led to the definition of four possible targets in EL 7799 (Figure 3). It is possible however, that Gardiner Sandstone or younger cover sequences obscure the true geochemical respose in this region. Only a drilling programme will settle this debate.

The targeting exercise generally led to the down-grading of the prospectivity of EL 7799 tenements with respect to other areas. This does not mean however that some of the anomalies generated will not be tested in future programmes.

3.2 EL 7803 (Tanami Lakes)

A similar targeting process to that described in section 3.1 was applied to EL 7803 (Figure 4) where four worm, and one geochemical target were identified (Figure 5). In this case the geochemical target was considered significant and follow-up work in the form of posthole and angled aircore drilling was deemed appropriate. Petrological studies on drill chips were conducted (Appendix 1).

Posthole Drilling

A posthole programme of 32 holes (TLPH187-218) for 824m was drilled in two campaigns between November 2000 and January 2001. Hole spacing varied from 100m x 100m to 200m x 100m (Appendices 2,3 and 4).

The programme tested anomalism generated from previous programmes (Morrow, 2001). Drilling intersected a series of basalts and sediments with low levels of quartz veining. TLPH 201 was the exception with significant quartz between 20-23m. TLPH 201 also returned some interesting results 12ppb Au, 41ppb Au, and 19ppb Au. Other high results included 530ppb Au and 65 ppb Au at the base of the transported overburden. Posthole anomalism was determined to extend for over 500m in a NE orientation.

Angled Aircore Drilling

An aircore programme (TLAC 001-011) was designed to follow up the high posthole result of 530ppb Au. Eleven holes were drilled perpendicular to the trend of the anomalism. The drilling intersected Coomarie Granite. Hole TLAC008 intersected significant quartz veining (up to 80%) between 53-58m.

Several encouraging results were returned:

TLAC006	2m @ 1.60g/t Au	14m - 16m
TLAC007	2m @ 1.29g/t Au	14m – 16m

These results were located in the transported horizon. Several other lower order results were recorded between 0.03ppm Au and 0.21ppm Au. All but one of these was derived from the transported overburden in sands or gravels.

3.3 EL 7837

A similar targeting process to that described in section 3.1 was applied to EL 7837 however no significant geophysical or geochemical targets were identified within the tenement area. No further work was completed during the reporting period.

3.4 EL 8479

A similar targeting process to that described in section 3.1 was applied to EL 8479 where two worm anomalies were identified. Both anomalies have already been tested with regional surface sampling in previous campaigns. No further work was completed during the reporting period.

4.0 EXPENDITURE ON ELs 13/10/00 TO 12/10/01

Table 3 summarises the work programme for the second license year and the associated costs.

	EL 7799	EL 7803	EL 7837	EL 8479
Geology	$6,517.22	$40,522.01	$2,940.06	$2,940.06
Geophysics	$801.00	$801.00	801.00	$801.00
Geochemistry	$0.00	$0.00	$0.00	$0.00
Survey	$0.00	$0.00	$0.00	$0.00
Drilling	$0.00	28,969.00	$0.00	$0.00
Assays	$0.00	$2,199.50	$0.00	$0.00
Field Costs	$1002.00	$14,664.97	$340.87	$577.63
Petrology	$0.00	$1,100.30	$0.00	$0.00
Computer Supp.	$0.00	$228.57	$0.00	$0.00
Covenant	*$19,500*	*$28,800*	*$15,200*	*$15,200*
TOTAL	**$ 8,320.22**	**$ 88,485.35**	**$ 4,081.93**	**$ 4318.69**

Table 3. Expenditure summary for Exploration Licenses.

5.0 PROPOSED WORK PROGRAMME

As the Coomarie project matures, it is becoming clear which tenements are prospective for cost effective exploration and which are not. Also, the smaller tenements EL 7837 and EL 8479 have been tested in a regional sense and failed to return positive results.

Future exploration will concentrate on the larger tenements EL 7799 and EL 7803. Further ground work must be completed on EL 7799 to determine why no encouraging results were returned from regional surface sampling in previous campaigns. Gardiner Sandstone is suspected to cover the more prospective rock and a walkabout posthole programme may be required to determine the extent of this cover.

Work on EL 7803 may include further deep posthole drilling to the north and west of the defined anomalism to follow possible sources for transported gold-bearing gravels.

	EL 7799	EL 7803	EL 7837	EL 8479
Expenditure	$ 20,000	$ 60,000	$ 10,000	$ 10,000

Table 2. Proposed Expenditure 2001-2002

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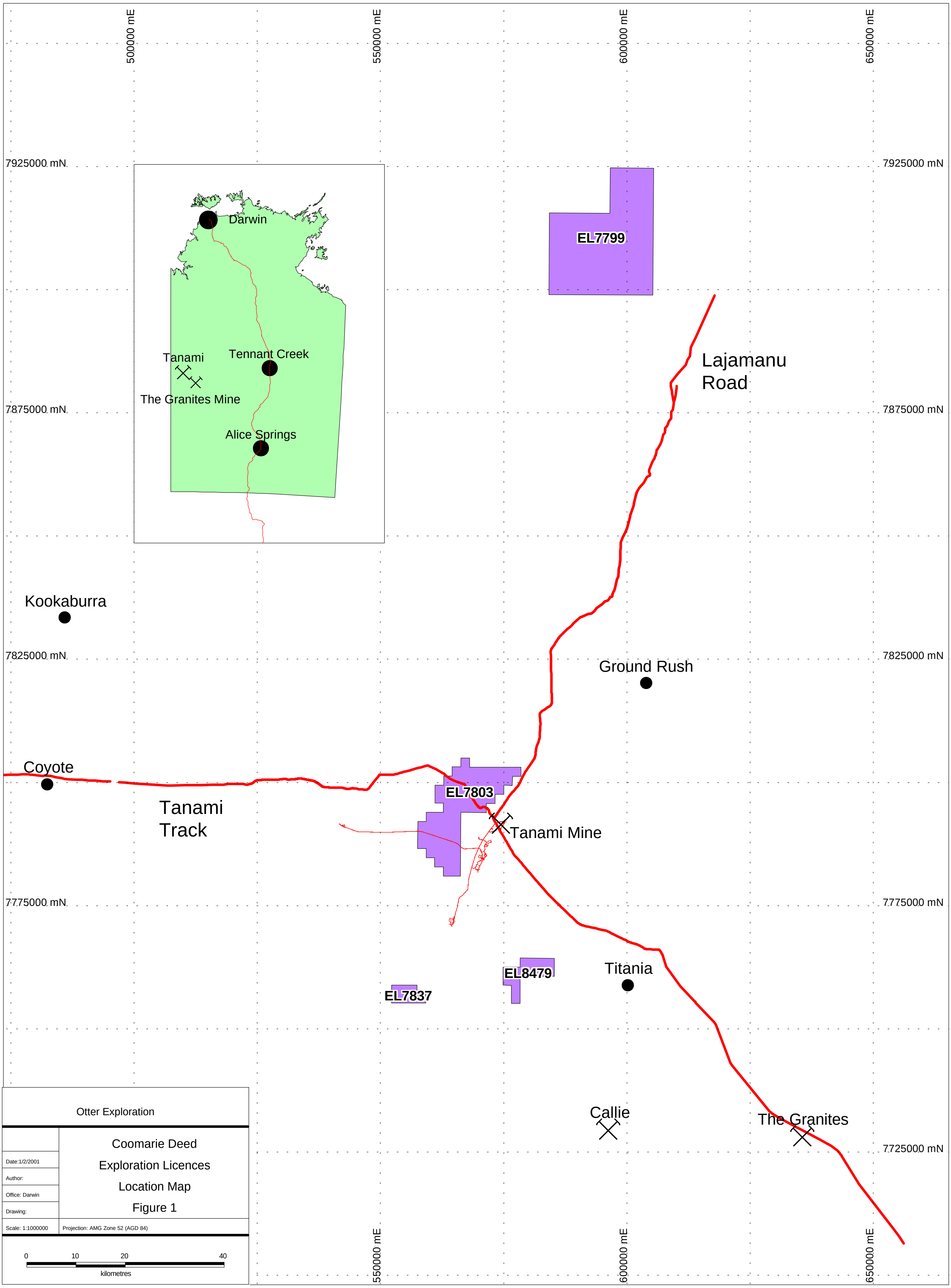
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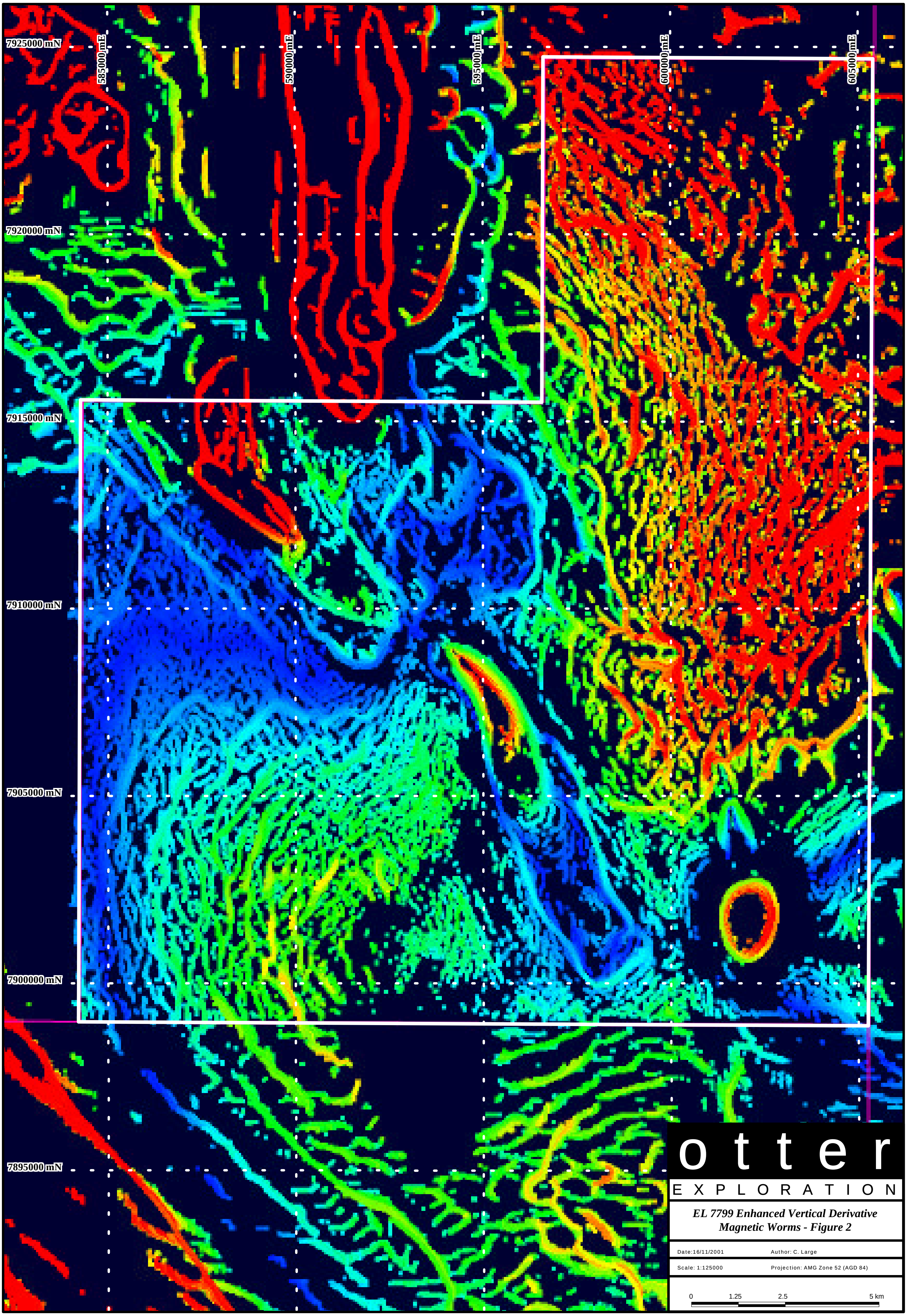
600000 mE
650000 mE
7925000 mN
7875000 mN
7825000 mN
7775000 mN
7725000 mN
Darwin
Tanami
Tennant Creek
The Granites Mine
Alice Springs
EL7799
Lajamanu
Road
Kookaburra
Ground Rush
Coyote
Tanami
Track
EL7803
Tanami Mine
EL8479
EL7837
Titania
Callie
The Granites
Otter Exploration
Coomarie Deed
Exploration Licences
Location Map
Figure 1
Date:1/2/2001
Author:
Office: Darwin
Drawing:
Scale: 1:1000000
Projection: AMG Zone 52 (AGD 84)
0
10
20
40
kilometres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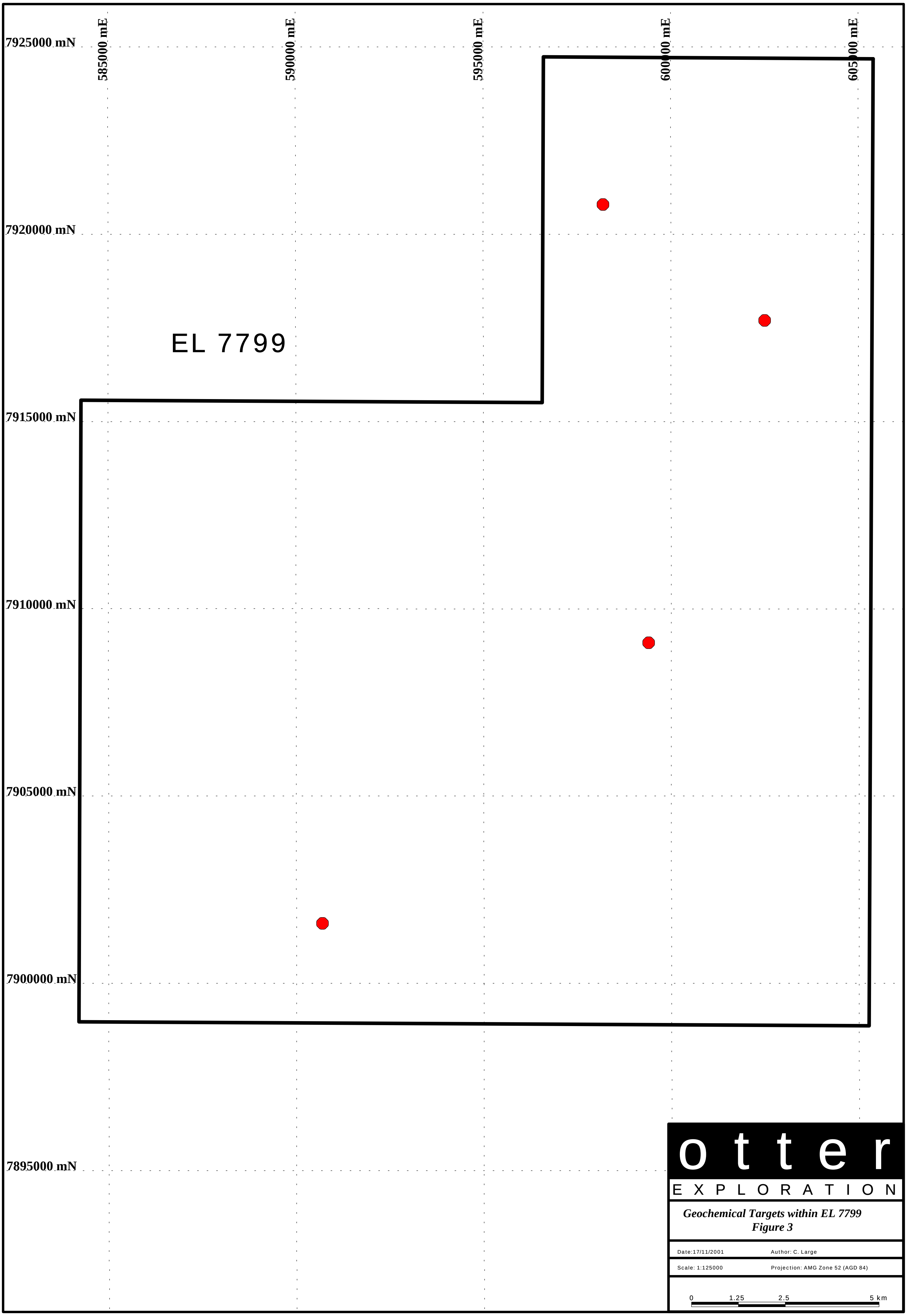
7910000 mN
7905000 mN
7900000 mN
7895000 mN
585000 mE
590000 mE
595000 mE
600000 mE
605000 mE
otter
EXPLORATION
EL 7799 Enhanced Vertical Derivative
Magnetic Worms - Figure 2
Date:16/11/2001
Author: C. Large
Scale: 1:125000
Projection: AMG Zone 52 (AGD 84)
0
1.25
2.5
5 km

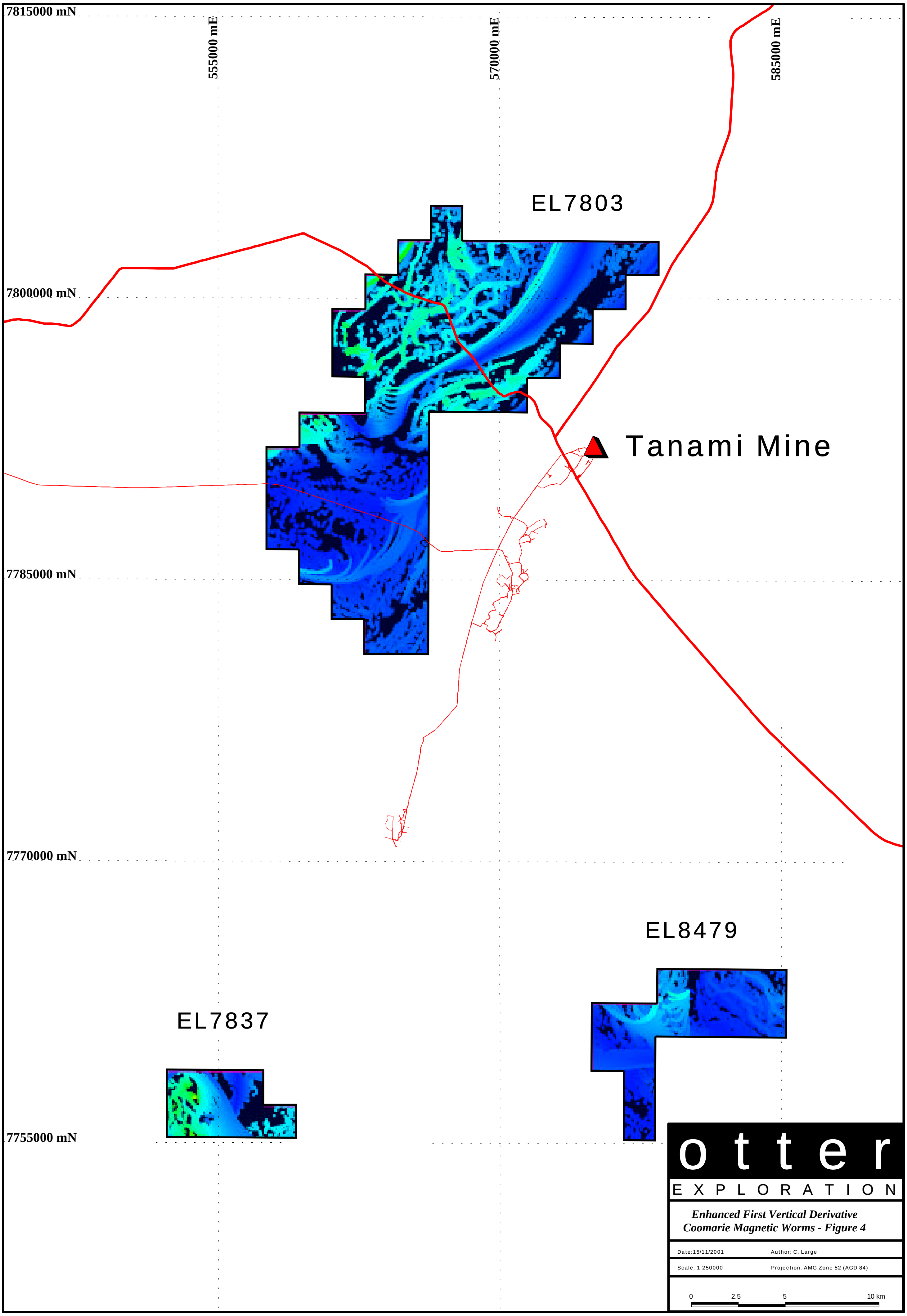


otter EXPLORATION

Geochemical Targets within EL 7799
Figure 3

Date:17/11/2001 Author: C. Large

Scale: 1:125000 Projection: AMG Zone 52 (AGD 84)

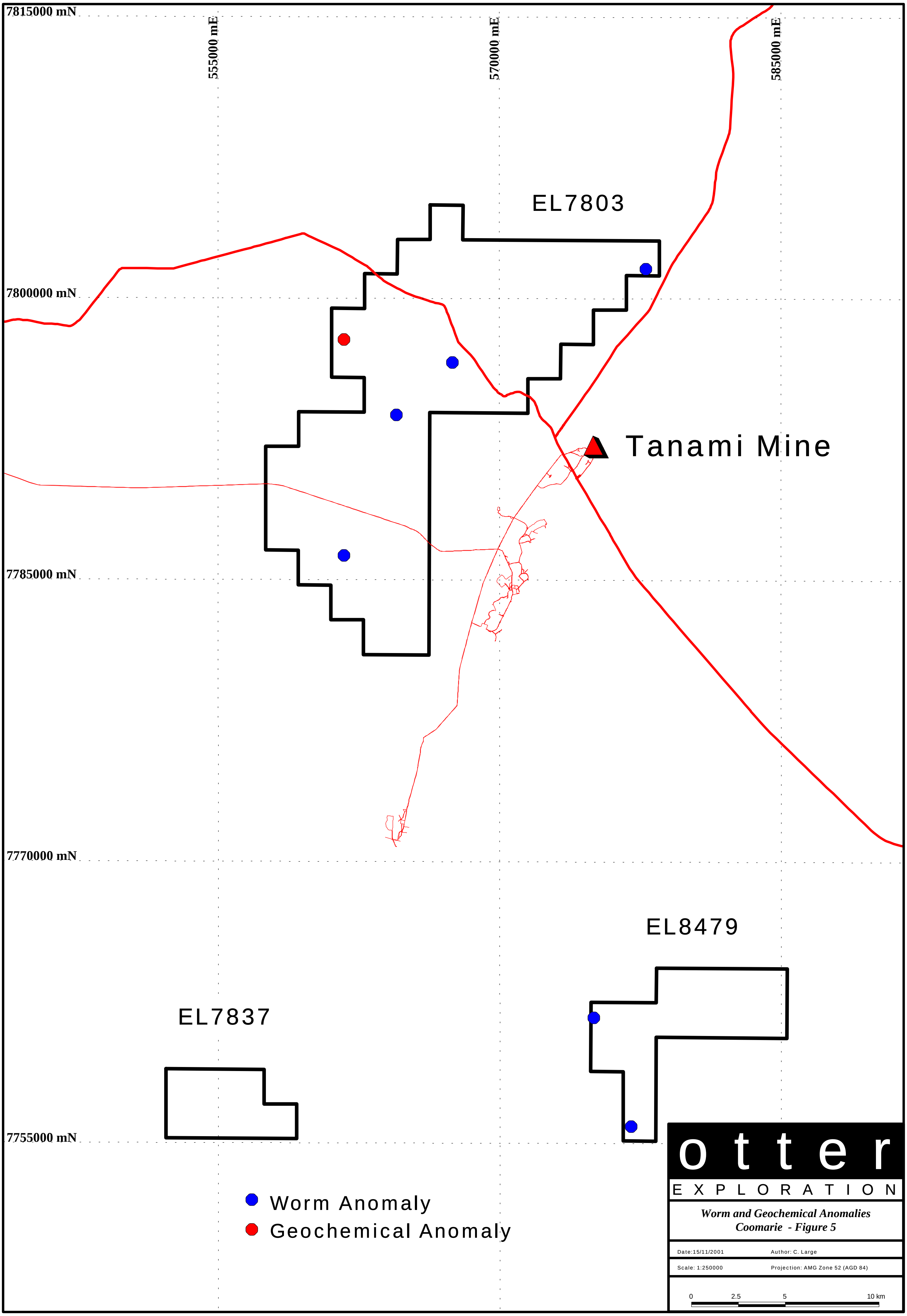


otter
EXPLORATION

Enhanced First Vertical Derivative
Coomarie Magnetic Worms - Figure 4

Date:15/11/2001 Author: C. Large

Scale: 1:250000 Projection: AMG Zone 52 (AGD 84)


7815000 mN
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570000 mE
585000 mE
7800000 mN
7785000 mN
7770000 mN
7755000 mN
EL7803
Tanami Mine
EL8479
EL7837
Worm Anomaly
Geochemical Anomaly
otter
EXPLORATION
Worm and Geochemical Anomalies
Coomarie - Figure 5
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Author: C. Large
Scale: 1:250000
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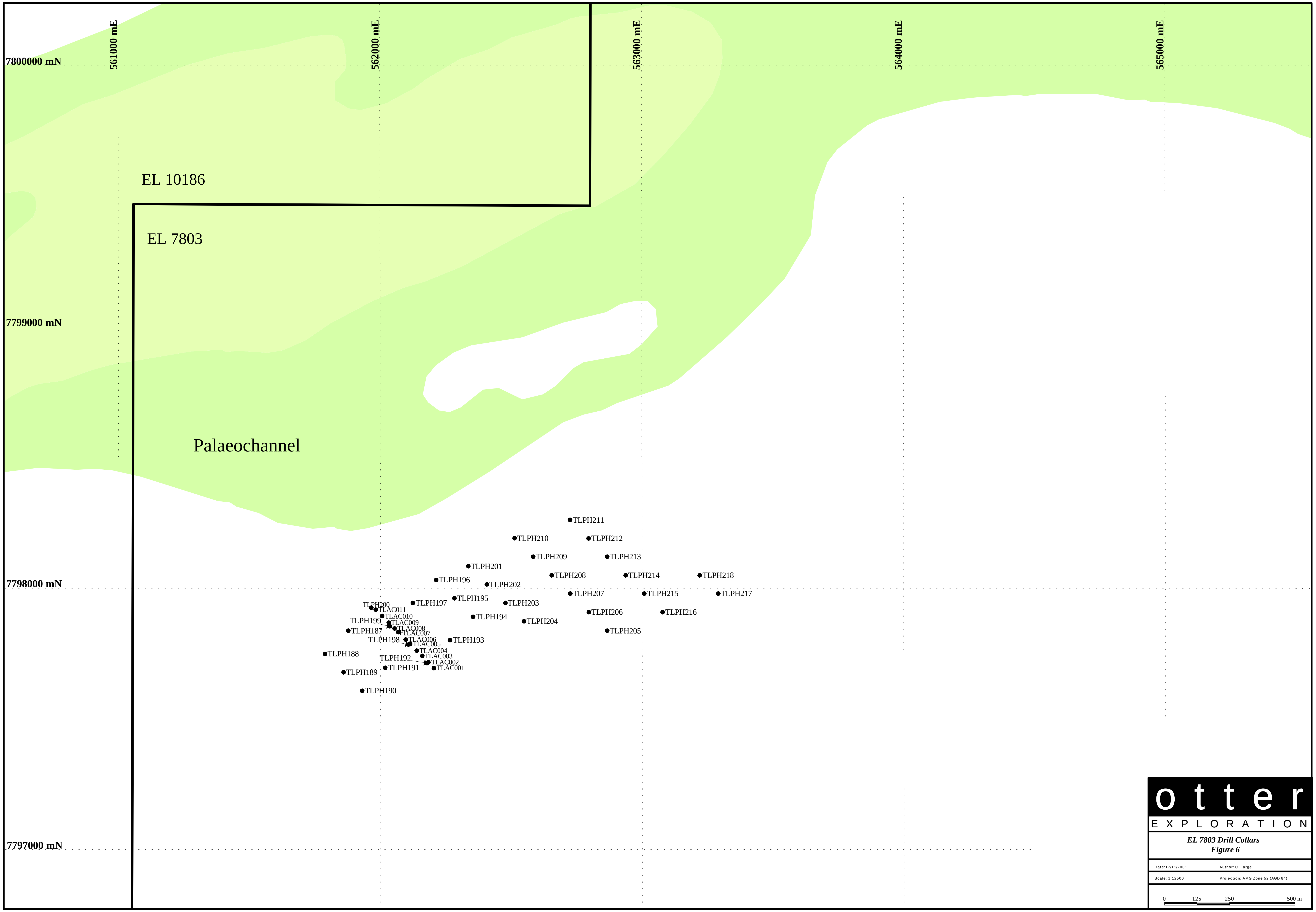
0
2.5
5
10 km



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562000 mE
563000 mE
564000 mE
565000 mE
7800000 mN
7799000 mN
7798000 mN
7797000 mN
EL 10186
EL 7803
Palaeochannel
TLPH211
TLPH210
TLPH212
TLPH209
TLPH213
TLPH201
TLPH208
TLPH214
TLPH218
TLPH196
TLPH202
TLPH207
TLPH215
TLPH217
TLPH200
TLPH197
TLPH195
TLPH203
TLAC011
TLAC010
TLPH194
TLPH206
TLPH216
TLPH199
TLAC009
TLPH204
TLPH187
TLAC008
TLAC007
TLPH205
TLPH198
TLAC006
TLPH193
TLAC005
TLAC004
TLPH188
TLAC003
TLPH192
TLAC002
TLPH191
TLAC001
TLPH189
TLPH190
otter
EXPLORATION
EL 7803 Drill Collars
Figure 6
Date:17/11/2001
Author: C. Large
Scale: 1:12500
Projection: AMG Zone 52 (AGD 84)
0
125
250
500 m

APPENDIX 1

Petrological Report

EL 7803

Applied Petrological Services

PETROLOGICAL STUDIES
OF
POST HOLE AND AIRCORE DRILL CHIP SAMPLES
FROM
THE TANAMI LAKES PROJECT (EL7803)

FOR
OTTER EXPLORATION NL

March 2001

APS Report 210
Project No. 04057

Main Road
St Arnaud
New Zealand

Telephone (64) (3) 5211 034
Facsimile (64) (3) 5211 030

SUMMARY

1. Petrological studies have been undertaken on 23 posthole and 3 air-core dill chip samples collected from the Tanami Lakes project area (EL7803) of the Tanami Desert. The petrological studies are based upon hand-specimen analyses, with follow-up detailed optical microscopically based petrographic/mineragraphic studies on 7 of the 26 samples.

2. The drill chip samples are identified and interpreted as mafic volcanics (including volcaniclastics) and more felsic sediments that have been subjected to thermal metamorphism set against a background of a regional strain regime. From a consideration of the degree of preservation of primary textures, and crystallinity and composition of the thermal metamorphic mineralogy, greenschist facies metamorphism is interpreted.

3. The style and grade of metamorphism of mafic volcanics and sediments in the Tanami Lakes project area is comparable with that identified/interpreted has having developed within similar rocks in the Troy project area (to the northeast). A higher grade of thermal metamorphism of similar primary rocks is interpreted for rocks from the Suva area (to the north). The variation and similarities in grade of thermal metamorphism and development of strain fabrics within rocks in the Tanami Lakes-Troy-Suva domain may be attributed to unique spatial relationships between a common stratigraphy, and causative granitoid intrusions of differing volumes in a dynamic orogenic setting.

4. Metamorphic style quartz veining is evidence of widespread metasomatism (or hydrothermal activity) that has accompanied thermal metamorphism and regional deformation. A correlation between gold mineralisation and this style of quartz veining in some samples indicates a potential for economic gold mineralisation to be present within the geological and hydrothermal environment as defined by rocks from the Tanami Lakes area. Elevated gold assays associated with transported sand and silcrete may be attributed to remobilisation of gold from metamorphic/metasomatic association.

RESULTS

TABLE 1. PETROLOGICAL SUMMARY

Sample	Rock Type	Wallrock Replacement	Deposition
TLPH020 22-24	Dolerite (thermally metamorphosed)	100% (met) amphibole, biotite, muscovite, quartz, feldspar (weathering) hematite, goethite, smectite, kaolinite	(veinlet) muscovite, amphibole (veinlet/cavity) kaolinite, smectite, hematite
TLPH071 20-21	Mafic volcaniclastic (thermally metamorphosed)	100% (met) quartz, amphibole, muscovite (weathering) smectite, kaolinite, hematite, goethite	(veinlet) kaolinite, smectite
TLPH103 23-27 5-18ppbAu	Interbedded mudstone and muddy siltstone	100% (met) biotite, muscovite, quartz (weathering) kaolinite, smectite, goethite, hematite	(vein) quartz, K-feldspar, epidote, tourmaline, muscovite; carbonate (cavity) hematite
TLPH176 22-24	Mudstone (thermally metamorphosed)	100% (met)muscovite, biotite, quartz (weathering) goethite, smectite, kaolinite, hematite	(veinlet) kaolinite, smectite, hematite, goethite
TLPH207? 18-21	Mafic volcanic (thermally metamorphosed)	100% (met)actinolite, feldspar, muscovite, biotite, ?andalusite (weathering) hematite, smectite, goethite, kaolinite	(cavities/veinlet) quartz, feldspar (veinlet) hematite, goethite
TLAC006 14-16 m	Transported regolith including granitoid derived fragments and fragments of silcrete.	100% (weathering) kaolinite, smectite, goethite	(silcrete) cristobalite, kaolinite, opaline silica, chalcedony, smectite
TLAC006 80-96 m	Biotite tonalite	5% (deuteric) sericite/muscovite (weathering) smectite, kaolinite	(veinlet) smectite, kaolinite

TABLE 2. PHOTOMICROGRAPHS

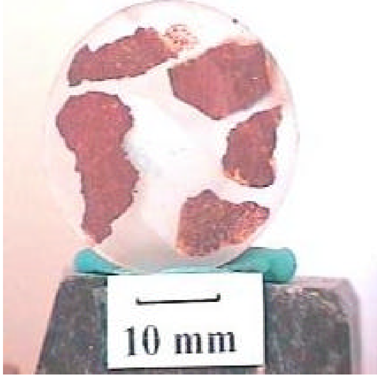

Plate 1 a & b. TLPH020/22-24 Ghosted (by hematite) prismatic to tabular amphibole of metamorphic replacement assemblage (right, width of view is approx. 1300 µm)

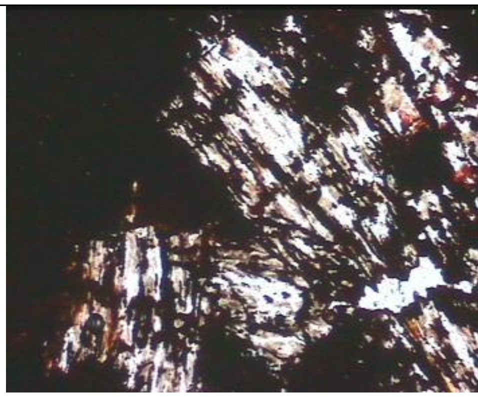

Plate 2 a & b. TLPH071/20-21 Poorly preserved but relict fragmental texture overprinted by domains of ghosted, crystalline metamorphic mineralogy (right, width of view approx. 1300 µm).

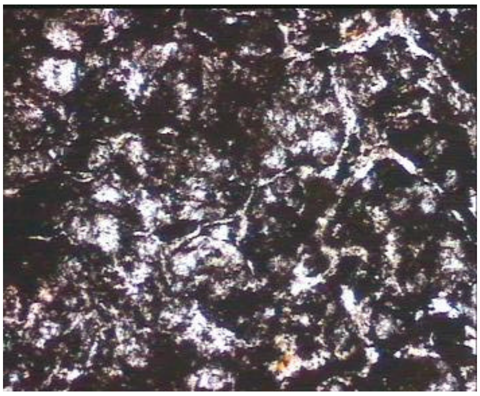

Plate 3 a & b. TLPH103/23-27 Metamorphic, granoblastic to mosaic textured vein quartz (right) with dynamic recrystallisation textures, host to vapour-rich and liquid-rich secondary fluid inclusions (width of view approx. 1300µm)

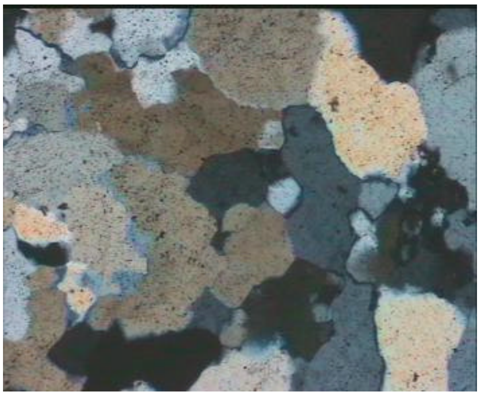

Plate 4 a & b. TLPH176/22-24 Ghosted porphyroblasts of biotite (right) in thermally metamorphosed mudstone (width of view is approx. 1300 µm).

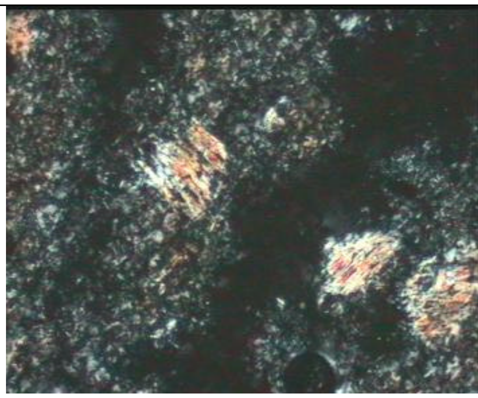

Plate 5 a & b. TLPH207/18-21 Relict metamorphic style mosaic to granoblastic textured quartz veining (right) hosted by thermally metamorphosed, intergranular to micro-porphyritic textured volcanic rock (width of view is approx. 1300 µm).

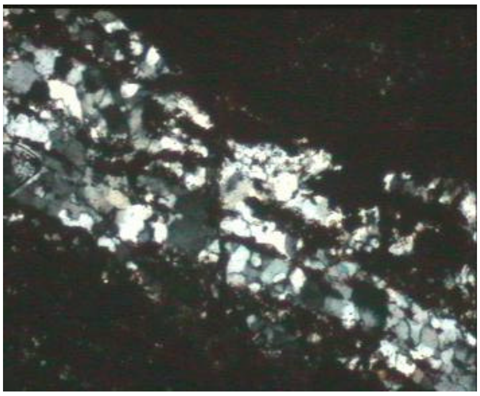

Plate 6 a & b. TLAC006/80-96
Discrete igneous style albite veinlets (right) crosscutting framework quartz in biotite tonalite (width of view is approx. 1300 µm)

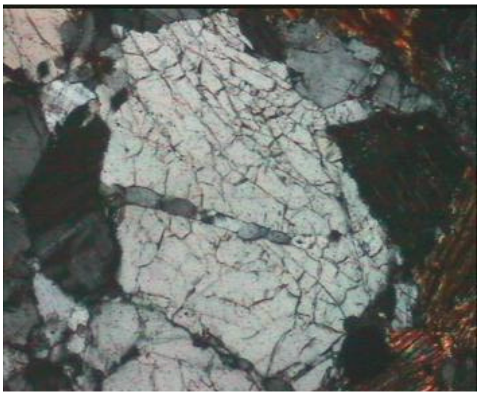

Plate 7 a & b. TLAC006/6-14 Fragment of igneous (granitoid) framework quartz (right) enclosed by crustiform banded silcrete lithology comprising cristobalite, kaolinite and smectite (width of view is approx. 1300 µm).

TABLE 3. HAND-SPECIMEN DESCRIPTIONS	
Sample	**Description**
TLPH017 18-21	Metamorphosed quartz bearing sediment or granitoid. Residual quartz crystals are present in hematitic/goethitic clay. Quartz crystals have subhedral shapes and are possibly relict granitoid origin.
TLPH018 22-24	Metamorphosed quartz-bearing sediment. Relict fragmental texture including subrounded detrital quartz framework clasts. Some clasts have relict crystalline fabric, possibly representative of metamorphic mineralogy.
TLPH020* 22-24	Thermally metamorphosed dolerite. Metamorphic minerals comprising ghosted amphibole, biotite, muscovite and feldspar, and preserved quartz. Early microfractures sealed with ghosted muscovite and amphibole. Weathering overprint comprising hematite, goethite, smectite and kaolinite.
TLPH023 16-18	Metamorphosed mudstone. Some clay textures after metamorphic mica, and some coarser grained, relict mica may be present. Ghosted crystalline fabric, with some possible relict detrital quartz or metamorphic quartz
TLPH032 14-18	?Metamorphosed siltstone. Relatively well preserved fragmental texture. Some relict detrital quartz. May belong to the Gardiner Sandstone formation. No mica present which is normally found in siltstones and mudstones of the Gardener Sandstone Fm.
TLPH046 10-12	Metamorphosed mafic rock. Relict crystalline fabric of a metamorphic rock and/or metamorphosed mafic. No relict detrital texture, or relict quartz framework clasts of Gardiner sandstone. Hardness due to hematite.
TLPH049 13-15	Metamorphosed mafic rock. A crystalline texture with penetrative strain fabric. Possible ghosted or relict biotite and amphibole present.
TLPH054 16-18	Metamorphosed mafic sediment or mafic volcaniclastic. Relict strain fabric and crystalline texture. Possible amphibole present. Silicic alteration and hematite alteration strong in places.
TLPH060 13-15	Granitoid. Relict vitreous, smoky grey igneous quartz and hypidiomorphic texture. Strong clay alteration and hematite along microfractures.
TLPH067 20-24	Metamorphosed mafic rock. Strongly hematite and clay altered with very little in the way of textures or fabrics preserved. Crystalline fabric evident in places after metamorphic mineralogy.
TLPH071* 20-21	Thermally metamorphosed mafic volcaniclastic. Metamorphic mineralogy comprising preserved quartz, and ghosted amphibole and muscovite. Pervasive weathering assemblage comprising smectite, kaolinite, hematite, and goethite.
TLPH072 22-24	Metamorphosed mafic rock. A relict, ghosted crystalline fabric. Ghosted amphibole is present. Strong clay and hematite alteration.
TLPH088 24-27	Metamorphosed sediment. Relict crystalline texture and strain fabric. Former mudstone. Possibly some hydrothermal quartz present.
TLPH102 20-24	Metamorphosed mafic rock. Relict crystalline texture. No strain fabric evident.

TLPH103* 23-27 5-18ppb Au	Metamorphosed interbedded mudstone and muddy siltstone. Metamorphic mineralogy comprising ghosted biotite and muscovite, and preserved quartz. Mosaic/granoblastic vein quartz interlocking with minor amounts of ghosted feldspar and preserved tourmaline, muscovite and epidote, locally overgrown by dolomite. A weathering assemblage comprising kaolinite, smectite, goethite and hematite.
TLPH151 22-24	Metamorphosed sediment. Siltstone and mudstone. Preserved crystalline and fragmental textures. Incomplete recrystallisation of a sediment. Vitreous grey to white (indicating locally abundant secondary FIs) vein quartz present in the chip assemblage.
TLPH162 24-27	Metamorphosed mafic rock. A relict shear fabric is evident, that may have been superimposed upon a former (metamorphic) crystalline fabric.
TLPH165 22-24	Metamorphosed mafic rock. A ghosted crystalline texture and week strain fabric. Ghosted amphibole present. Residual but high within the upper saprolite.
TLPH176* 22-24	Thermally metamorphosed mudstone. Metamorphic mineralogy comprising ghosted muscovite and biotite, and preserved quartz. Pervasive weathering overprint comprising goethite, smectite, kaolinite and hematite, with microfractures sealed with kaolinite, smectite, hematite and goethite
TLPH178 20-24	Silicic alteration of rock is supergene. Nature of primary rock is unresolvable. Crustiform and colloform banding of ultra fine grained quartz and chalcedony or amorphous quartz. Only minor clays present. Quartz veining associated with silicic alteration.
TLPH199 12-14 m	Crustiform to colloform banded hematite, goethite and amorphous silica. Irregular shaped cavities are sealed with clay (smectite and kaolinite). The quartz and Fe-oxides were deposited from solution. Leaching of rock and sealing with the above assemblage. Gold in with hematite ?
TLPH207* 18-21	Thermally metamorphosed mafic volcanic rock. Metamorphic replacement mineralogy comprising ghosted actinolite, feldspar, muscovite, biotite, and ?andalusite. Early fractures sealed with quartz and feldspar. Strong weathering assemblage comprising hematite.
TLPH211 26-30	Metamorphosed mafic rock. Ghosted crystalline texture, with only a weak strain fabric. Ghosted metamorphic amphibole present. Strong clay alteration.
TLAC006* 14-16 m	Transported regolith including granitoid derived fragments and fragments of silcrete. Replacement of non-quartz wallrock fragments with kaolinite, smectite and goethite. Crustiform banded fragments of silcrete comprising cristobalite, kaolinite, opaline silica, chalcedony and smectite
TLAC007 14-16 m	Fragments of crustiform and colloform banded quartz, chalcedonic quartz, hematite and goethite. Cavities sealed with clays. Possible fragments of detrital biotite/mica and quartz.
TLAC006* 80-96 m	Biotite tonalite. Weak deuteric alteration comprising sericite/muscovite. Weak weathering comprising smectite, kaolinite. Microfractures sealed with smectite and kaolinite

COMMENTS AND INTERPRETATIONS

GEOLOGICAL AND HYDROTHERMAL ENVIRONMENT

Through hand-specimen analysis the twenty-six drill chip samples were determined to comprise strongly weathered metamorphosed mafic volcanics and detrital quartz bearing felsic sediments, and granitoids. The mafic volcanics comprise those with relict doleritic to intergranular textures and those with relict fragmental textures. While primary sedimentary and/or fragmental textures are evident, most (with the exception of the granitoids) may be interpreted to have some degree of crystalline metamorphic textural overprint. This metamorphic textural overprint is mainly in the form of ghosting of amphibole and mica (muscovite and/or biotite).

Optical microscopy and detailed petrography of a selection of the twenty six drill chip samples reveals that the ghosted metamorphic mineralogy and textures overprinting the primary sedimentary and volcanic lithologies, are representative of thermal metamorphism. The mostly equigranular nature of the metamorphic minerals, including quartz, muscovite, biotite, feldspar and amphibole, and presence of ghosted andalusite in one sample indicates thermal metamorphism. Localised strain fabrics (defined by preferred orientation of ghosted, fine-grained muscovite in finer grained sediments) within the metamorphic overprint suggest that thermal metamorphism took place against a background of regional strain.

The fact that primary (sedimentary and volcanic) textures are moderately well preserved, precludes the grade of thermal metamorphism being anything higher than greenschist facies. The presence of biotite (as porphyroblasts in places), the fine-grained nature of muscovite and indications that the amphibole present is actinolite indicate greenschist facies thermal metamorphism.

The style of quartz veining or quartz vein material present in some samples (TLPH103/23-27, TLPH151/22-24, and TLPH207/18-21) is consistent with a thermal metamorphic environment and underlying regional strain. The quartz is typically equigranular, tabular and anhedral in form and is interlocking with or enclosing less abundant feldspar, muscovite, rutile and tourmaline. The equigranular (or granoblastic) nature of the quartz indicates formation (from hydrothermal fluids) under high confining pressures (approaching lithostatic load). The dynamic recrystallisation textures indicate a transitional ductile to brittle regime. In sample from TLPH207/18-21 this style of quartz veining can actually be seen in equilibrium with the thermally metamorphosed wallrock. As is the case in such geological settings, thermal metamorphism is accompanied by metasomatism (hydrothermal fluid of magmatic and/or metamorphic source) resulting in quartz veining.

Part of a causative granitoid is perhaps represented by sample material from TLAC006/80-96. On the basis of modal feldspars present, the granitoid is classified as a tonalite. The Fe and Ti bearing phases present are ilmenite and rutile. The absence of magnetite is consistent with the aeromagnetic signature for this granitoid. In the tonalite from TLAC006/80-96 there is only weak evidence for exsolution of magmatic derived hydrothermal fluids. This evidence is in the form of discrete albite veinlets. The preservation of the granitoid is such that it may be a good candidate for trace element, isotope and age determination studies.

REGIONAL CONTEXT

Previous reports, and an analysis of regional aeromag data in conjunction with the petrological data of this study provide a basis for making interpretations of the regional geology. Interpretations would suggest that the geology of the sampled project area (Tanami Lakes: NW EL 7803), comprises a veneer of thermally metamorphosed, folded volcanics and related sediments (mafic through to felsic) that overly a granitoid intrusion or intrusions of the Coomarie Complex. In the context of orogenic related granitoid intrusion, it is probable that to some extent granitoid intrusion was simultaneous with deformation (mainly folding in the early stages) of the volcanic/sedimentary strata. It would not be unreasonable to conclude that granitoid intrusion has to some extent stoped out part of the sedimentary strata. With depth, thermal metamorphism of the volcanic/sedimentary strata may attain amphibolite facies grade. However, given the relatively small volume (as interpreted from aeromag data) of the granitoid intrusion underlying the metamorphosed sediments in the vicinity of the Tanami Lakes project area, it is likely that greenschist facies is the maximum grade attained.

The grade of thermal metamorphism in sediments/volcanics in the Tanami Lakes project area is similar to that in sediments and volcanics adjacent to a granitoid intrusion in the Troy project area to the northeast (Figure 1, Appendix 2 petrology: F0886-> F0891). In the Troy project area, volcanics and related sediments are juxtaposed with an extension of the same or another of two similar sized causative granitoid intrusions occupying a NE-SW trend. By comparison, the thermal metamorphism of steeply dipping volcanics and related sediments in the Suva (north and south) project area (Figure 1, Appendix Two: F0920-> F0928 & F0625 -> F0636) is of a distinctly higher grade. Greenschist to amphibolite facies thermal metamorphism is interpreted for a belt of rocks with a high magnetic response in the north and south Suva areas. Poor preservation of primary textures/fabrics, coarser grained metamorphic mineralogy, presence of secondary magnetite, and the presence of metamorphic banding or foliation (mainly reflecting primary bedding/lamination) represent the higher grade of metamorphism. The higher grade of thermal metamorphism of volcanics/sediments in the Suva areas may be attributed to a close proximity to a more voluminous granitoid intrusion or intrusions of the Coomarie Complex (to northwest).

The greenschist facies thermal metamorphism of the volcanics/sediments in the Tanami Lakes project area may be compared with the sub-greenschist facies metamorphism of mafic volcanics and related sediments in ML 153 and ML 167 (Tanami Mine leases), and the Pendragon Mine lease. In the Pendragon and Tanami Mine leases, the sub-greenschist facies grade metamorphism can be attributed solely to the effects of regional metamorphism associated with folding of the volcanics and related sediments. The volcanics and related sediments of the Tanami and Pendragon Mine leases appear spatially to have been beyond the effects of thermal metamorphism.

GARDINER SANDSTONE

Two samples of the current petrology suite taken from the south of the project area (TLPH032/14-18 and TLPH046/10-12) are, from field analysis, thought to be from the Gardiner Sandstone Formation. One of these rocks (TLPH046/10-12) is determined in this study to be a thermally metamorphosed mafic igneous rock, possibly a volcaniclastic, and therefore is not of the Gardiner Sandstone Formation. The other rock (TLPH032/14-18) is determined to be a detrital quartz bearing siltstone of unresolvable metamorphic modification. This rock may be representative of the finer grained sediments (mudstones to siltstones) that are known to form (basal) parts of the Gardiner Sandstone Formation. However these finer grained, and typically quartz-poor units of the Gardiner Sandstone Formation commonly contain some amounts of detrital mica (usually mechanically orientated into a common plane). No detrital mica appears to be present in the sample from TLPH032.

GOLD ASSOCIATIONS

Sample material from TLPH103, that included significant amounts of metamorphic style vein quartz, assayed between 5 ppb and 18 ppb Au. In the absence of any other style of quartz veining, it could be concluded that the gold mineralisation is associated with the quartz veining that has been determined to be genetically related to thermal metamorphism and metasomatism (Table 1, Plate 3, Appendix One; TLPH103/23-27). Similar and higher levels of gold mineralisation are reported to be associated with abundant quartz veining intersected in other post holes (e.g. TLPH201), however the nature of this quartz veining has not yet been assessed.

Of the samples of this study, most significant gold assay values were obtained from two samples of transported sand and silcrete (TLAC006/14-16m & TLAC007/14-16m). These assays include 2 m @ 1.58 g/t Au and 2 m @ 1.24 g/t Au. Both these samples comprise fragments of crustiform-banded silcrete and fragments of a transported sand or silt lithology. Petrographic studies determined that the transported sand/silt lithologies were mainly of a granitoid provenance. Fragments of granitoid derived quartz were also enclosed within the silcrete lithologies. Combined

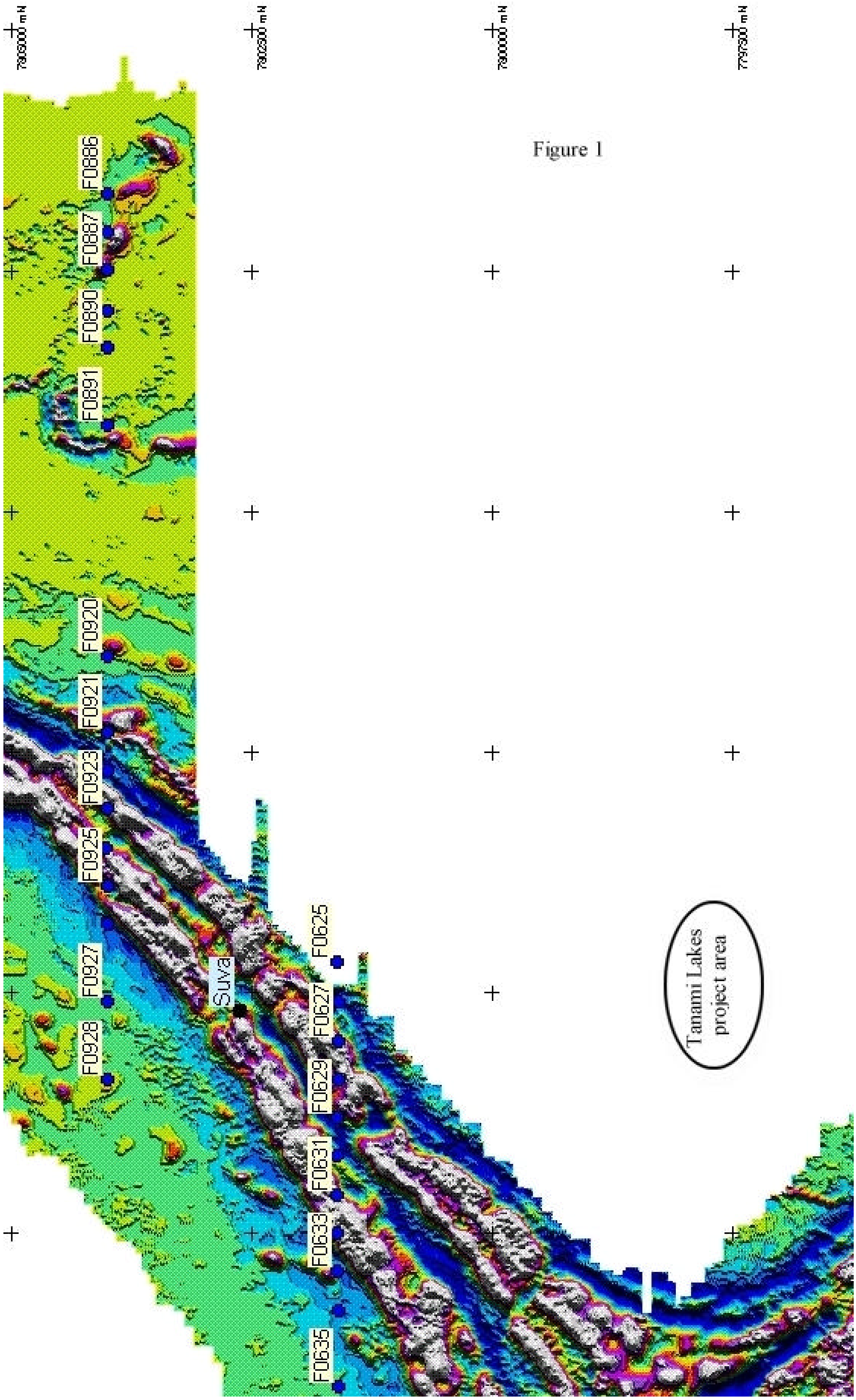
F0886
F0887
F0890
F0891
F0920
F0921
F0923
F0925
F0927
F0928
Suva
F0625
F0627
F0629
F0631
F0633
F0635
Tanami Lakes project area

Figure 1

petrographic and mineragraphic studies failed to find any gold minerals, either in the transported sand lithologies or fragments of silcrete. It is most likely that the gold is associated with and "nuggetted" within the silcrete lithology, and that the gold has been mobilised (possibly in more than one stage) from a hypogene source such as the metamorphic style quartz veining.

APPENDIX ONE:

PETROGRAPHIC/MINERAGRAPHIC DESCRIPTIONS

SAMPLE NUMBER: TLPH020/22-24

LOCATION: Tanami Lakes

ROCK NAME: Strongly weathered, thermally metamorphosed, dolerite

FIELD DESCRIPTION: Silicified/oxidised mafic

OFFCUT DESCRIPTION:

A selection of post-hole drill chips. The chips are of dark red-brown to brown-white, oxidised/weathered and clay altered mafic rock. The rock has a ghosted crystalline fabric preserved by hematite and clay minerals.

THIN SECTION DESCRIPTION

LITHOLOGY: PRIMARY MINERALOGY, TEXTURES

The drill chips have ghosted crystalline fabrics or textures. Ghosted doleritic to granoblastic textures are preserved by the distribution and grain-size variation of weathering minerals. The ghosted mineralogy is interpreted to have comprised feldspar (?plagioclase) and mafics (pyroxene and/or amphibole).

ALTERATION

REPLACEMENT

Alteration of the crystalline rock is complete. The early mineralogy is totally altered to a pervasion of very fine-grained hematite and goethite, and platy smectite and kaolinite. Preserved with the kaolinite/smectite and hydrated Fe-oxide alteration are plates of fine-grained muscovite (possibly after plagioclase). Ghosted by the weathering minerals are fibrous actinolite and possible biotite. Sparse grains of anhedral quartz are interlocking with the ghosted amphibole and partly preserved muscovite. The quartz is host to inclusions of muscovite.

DEPOSITION

Early microfractures or shears are sealed with ghosted platy muscovite and or fibrous actinolite. Late microfracturing and cavities along shears are sealed with voluminous smectite, kaolinite and hematite.

COMMENTS

Metamorphism of a mafic igneous rock. The metamorphic mineralogy is interpreted and observed to comprise muscovite, quartz, actinolite and possibly biotite. Greenschist facies metamorphism. The equigranular nature of the metamorphic mineralogy suggests thermal metamorphism.

SAMPLE NUMBER: TLPH071

LOCATION: Tanami Lakes

ROCK NAME: Strongly weathered, thermally metamorphosed mafic volcaniclastic

FIELD DESCRIPTION: Bleached mafic

OFFCUT DESCRIPTION:

A selection of angular granule to pebble-sized posthole drill chips. The chips are of dark red-brown to pale grey-white, clay and hydrated Fe-oxide altered volcaniclastic rock. Kaolinite dominates the clay alteration.

THIN SECTION DESCRIPTION

LITHOLOGY: PRIMARY MINERALOGY, TEXTURES

The drill chips have relict fragmental textures. Moderately well sorted, framework clast supported populations of subangular to sub-rounded sand-sized framework clasts define these textures. Textures and mineralogy internal to the framework clasts are not preserved. Ghosted secondary minerals blur the boundaries of detrital framework clasts in some places.

ALTERATION

REPLACEMENT

Alteration is complete. A pervasive weathering assemblage comprises platy smectite and kaolinite, and in places more abundant granular, very fine grained hematite and less abundant goethite. In some fragments, the weathering is dominated by kaolinite, whereas in others it is dominated by hematite. Earlier formed amphibole and muscovite are ghosted by the pervasive smectite/kaolinite and hydrated Fe-oxides. Sparse amounts of very fine-grained anhedral quartz are interlocking with the ghosted mica and amphibole.

DEPOSITION

The clay and hematite altered rock has been subjected to discrete shearing. Kaolinite and smectite have formed along the shears and cavities within the shears.

COMMENTS

Strong weathering of a metamorphosed volcaniclastic. The ghosting of amphibole indicates that volcaniclastic was probably mafic in composition. The mainly equigranular nature of the amphibole and mica indicates metamorphism was mainly thermal in nature. Greenschist facies metamorphism.

SAMPLE NUMBER: TLPH103

LOCATION: Tanami Lakes

ROCK NAME: Weathered, thermally metamorphosed and quartz veined interbedded mudstone and muddy siltstone

FIELD DESCRIPTION: Siltstone with quartz veining. 5 ppb to 18 ppb Au

OFFCUT DESCRIPTION:

A selection of silt to pebble-sized posthole drill chips. The drill chips are mainly of hematite and clay altered sedimentary rock. Subangular, pebble-size chips of vein quartz are also present. The vein quartz has a pale smoky grey vitreous appearance. Some of the granule to pebble-sized chips are in fact fragmental saprolite lithologies comprising silt to sand-sized framework clasts.

THIN SECTION DESCRIPTION

LITHOLOGY: PRIMARY MINERALOGY, TEXTURES

Silt to sand-sized drill chips have poorly preserved primary fragmental textures. In some of these, sparse, silt-sized quartz framework clasts are contained within a mainly obscured silt to mud-sized medium. The quartz framework clasts include mono and polycrystalline types. Other ghosted, silt-sized framework clasts are possibly of feldspar or rock fragments. Other drill chips have what are interpreted to be ghosted mudstone fabrics/textures.

ALTERATION

REPLACEMENT

With the exception of trace amounts of quartz, alteration of the sedimentary lithologies is complete. The lithologies are altered to pervasive kaolinite, smectite, hematite and goethite. Kaolinite is more abundant than smectite, and hematite more abundant than goethite. Within the pervasive clay and hydrated Fe-oxide alteration are ghosted mica minerals. These ghosted mica minerals are interpreted to be muscovite and biotite. In places there are what are interpreted to be fine-grained plates of ghosted, randomly orientated biotite enclosed by more voluminous, finer grained, ghosted muscovite. Detrital quartz is recrystallised, the secondary quartz being intergrown with ghosted mica minerals. Within the altered mudstone lithologies, a preferred orientation of the ghosted mica minerals defines a penetrative strain fabric.

DEPOSITION

Microfractures and cavities within the clay and Fe-oxide altered lithologies are sealed with very fine to ultra fine-grained anhedral quartz. The mosaic or granoblastic quartz has textures indicative of dynamic recrystallisation and strain. Crenulate grain boundaries are common, and individual grains have undulatory extinction. The quartz is host to abundant liquid-rich and vapour-rich fluid inclusions (mainly secondary or pseudosecondary), many of that are contained along annealed microfractures. Many inclusions are CO2 rich, and some are vapour-filled. Some inclusions contain daughter salts (halite). Minor amounts of variably preserved K-feldspar (altered to kaolinite) are intergrown with the quartz. Trace amounts of epidote occur as inclusions within quartz or are interstitial to quartz. Needles of tourmaline and rutile are common inclusions within quartz. Trace amounts of muscovite occur as ultra fine-grained inclusions within quartz.

In places, fine-grained carbonate forms overgrowths to quartz or is interstitial to quartz. The carbonate is interpreted to be dolomite.

Microfractures (mainly along quartz grain boundaries) are sealed with ultra fine-grained hematite.

COMMENTS

Strong weathering of a metamorphosed interbedded mudstone and muddy siltstone. The random orientation of biotite flakes within the mudstone domain indicates thermal metamorphism. The granoblastic texture and superimposed dynamic recrystallisation textures within the vein quartz is consistent with a metamorphic, or more specifically thermal metamorphic environment. The metamorphic mineralogy was in equilibrium with vein quartz.

SAMPLE NUMBER: TLPH176

LOCATION: Tanami Lakes

ROCK NAME: Strongly weathered, thermally metamorphosed mudstone

FIELD DESCRIPTION: Silicified siltstone or mafic

OFFCUT DESCRIPTION:

A sample comprising a selection of subangular to subrounded, coarse sand to pebble-sized drill chip fragments. The drill chip fragments are of brown to brown-white, clay and hydrated Fe-oxide altered sedimentary rock.

THIN SECTION DESCRIPTION

LITHOLOGY: PRIMARY MINERALOGY, TEXTURES

The strongly weathered drill chip fragments have poorly preserved primary fragmental textures. Sparse relict silt-size quartz fragments define these textures and slightly more abundant ghosted silt-sized fragments enclosed by voluminous obscured mud-sized mediums. Ghosted detrital muscovite may be present.

ALTERATION

REPLACEMENT

With the exception of trace amounts of detrital quartz, alteration is complete. The lithologies within each drill chip are altered to pervasive intergrowths of kaolinite, smectite, hematite and goethite. Kaolinite is more abundant than smectite, and hematite more abundant than goethite. The weathering minerals, particularly kaolinite and smectite, mask an early alteration assemblage that is interpreted to have been dominated by fine-grained muscovite. A preferred orientation of the ghosted muscovite in some places defines a penetrative strain fabric. In places, randomly orientated plates of biotite are enclosed by the finer grained muscovite. Detrital quartz appears to have undergone some amounts of recrystallisation, the secondary quartz intergrown with ghosted muscovite.

DEPOSITION

Microfractures and cavities along micro-shears are sealed with kaolinite, smectite and less abundant hematite and goethite.

COMMENTS

A strongly weathered/oxidised, metamorphosed silty mudstone. Ghosted muscovite and biotite represent metamorphism. The random orientation of the biotite plates is consistent with thermal metamorphism. The preferred orientation of more abundant ghosted muscovite is consistent with thermal metamorphism within a regional or localised strain environment.

SAMPLE NUMBER: TLPH 207

LOCATION: Tanami Lakes

ROCK NAME: Weathered, thermally metamorphosed and quartz veined, mafic volcanic (flow).

FIELD DESCRIPTION: None provided

OFFCUT DESCRIPTION:

A selection of angular to subangular, coarse sand to pebble-sized posthole drill chips. The drill chips are of medium to dark red-brown, oxidised/weathered, and fine-grained mafic igneous rock. The weathered lithologies are host to discrete quartz veinlets.

THIN SECTION DESCRIPTION

LITHOLOGY: PRIMARY MINERALOGY, TEXTURES

The drill chips have poorly preserved fine-grained igneous textures. These textures include microphyric through to intergranular, intersertal (almost doleritic) and hyalopilitic. Prior to weathering these textures appear to have been partly modified by the development of metamorphic mineralogy and textures. Prior to alteration the pre-metamorphic lithology was subjected to some amount of shearing and deformation generally. In places a fragmental shear texture may be interpreted to have developed along some of the more substantial shear planes.

ALTERATION

REPLACEMENT

Alteration is complete. The primary lithology and any prograde replacement mineralogy are strongly masked by pervasive smectite, kaolinite, hematite and goethite.

The weathering assemblage is interpreted to mask an early replacement assemblage comprising actinolite and feldspar (plagioclase ?) and possible biotite.

Where the volcanic lithology was subjected to substantial shearing and fragmentation, the deformed domain is replaced by an assemblage or mutually interlocking quartz, and ghosted feldspar (?plagioclase), actinolite, muscovite and possible biotite and andalusite.

DEPOSITION

Cavities within domains of strong prograde alteration are sealed with anhedral (mosaic or granoblastic) quartz. Penetrative fractures and microfractures are sealed with fine to very fine-grained granoblastic quartz. Ghosted grains of subhedral feldspar (?plagioclase) are interlocking with the quartz in some places. The quartz has been subjected to recrystallisation as evidenced by undulatory extinction and crenulate grain boundaries.

Late microfractures and shears are sealed with hematite and goethite.

COMMENTS

Strongly weathered, metamorphosed, sheared/deformed fine grained mafic rock (volcanic), possibly a flow or dyke. The relationships between metamorphic minerals and textures defined suggests thermal metamorphism. The fabric evident in hand-specimen is a function of a discrete network of microshears rather than preferred orientation of prograde minerals.

SAMPLE NUMBER: TLAC006/80-96m

LOCATION: Tanami Lakes

ROCK NAME: Biotite tonalite

FIELD DESCRIPTION: Weathered biotite granite (Au assay, below detection)

OFFCUT DESCRIPTION:

A selection of subangular to subrounded pebble-sized aircore drill chips. The drill chips are of pale grey, weathered/oxidised, and biotite bearing granitoid. Microfractures are sealed with weathering clays.

THIN SECTION DESCRIPTION

LITHOLOGY: PRIMARY MINERALOGY, TEXTURES

A primary hypidiomorphic textures. The composition of the rock is estimated as:
Quartz (25%)
Plagioclase (55%)
Biotite (15%)
K-feldspar (4%)
Muscovite (<1%)
Ilmenite (<1%)
Rutile (<1%)

Interlocking tabular to prismatic, subhedral to anhedral plagioclase (oligoclase to albite) and quartz dominates the composition and texture of the rock. The Plagioclase is in most places concentrically zoned (oligoclase → albite). Abundant grains and aggregates of brown biotite are interstitial to and interlocking with the quartz and plagioclase. Minor to trace amounts of subhedral to euhedral K-feldspar occur as inclusions within quartz, and form overgrowths to plagioclase. Very fine-grained muscovite and biotite occur as inclusions within feldspar and quartz. Minor to trace amounts of rutile and ilmenite occur mainly as inclusions within biotite. Discontinuous microfractures are sealed with very fine-grained albite, some of the albite having also formed interstitial to framework quartz and plagioclase.

The rock is weakly to moderately strained. Quartz and some plagioclase grains exhibit undulatory extinction.

ALTERATION

REPLACEMENT

Alteration is weak. Minor amounts of very fine-grained sericite have formed after plagioclase. Plagioclase (some oligoclase zones particularly) is altered to more pervasive smectite and kaolinite in some places.

DEPOSITION

A network of discrete microfractures is sealed with platy smectite and kaolinite.

COMMENTS

A tonalite. The Fe bearing phases are biotite and ilmenite. Very weak deuteric alteration is represented by trace amounts of muscovite. There is no evidence of any significant wallrock interaction with hydrothermal fluid exsolved from a cooling melt. Alteration is weak and the rock may be suitable for geochemical analysis.

SAMPLE NUMBER: TLAC006/14-16m

LOCATION: Tanami Lakes

ROCK NAME: Cristobalite, chalcedony, opaline silica, kaolinite and smectite bearing silcrete fragments enclosing fragments of granitoid provenance

FIELD DESCRIPTION: Transported sand/silcrete, 2 m @ 1.58 g/t Au

OFFCUT DESCRIPTION:

A selection of subangular coarse sand to pebble-sized aircore drill chips. The chips are of : 1, fragments of crustiform and colloform banded clay and amorphous silica; 2, fragments of more massive and abundant amorphous silica; and 3, fragments of mixed kaolinite and hydrated Fe-oxides enclosing silt to sand-sized, clay altered rock fragments.

THIN SECTION DESCRIPTION

LITHOLOGY: PRIMARY MINERALOGY, TEXTURES

Crustiform banded fragments comprise tabular, euhedral crystals of cristobalite, platy kaolinite and platy smectite. The distribution and variation in proportions of cristobalite, kaolinite and smectite essentially define the crustiform banding. In some fragments, central parts of the crustiform banding are occupied by domains of amorphous or opaline silica. Some silt-sized fragments of crystalline quartz are suspended within the clay + cristobalite assemblages.

More massive textured fragments of siliceous material are composed mainly of amorphous silica. Enclosed by these massive domains of amorphous or opaline silica are minor amounts of chalcedony. In places the chalcedony appears to seal cavities within the more voluminous opaline silica.

Other more massive textured drill chips comprise mostly smectite and kaolinite that enclose relatively minor amounts of euhedral cristobalite. The smectite and kaolinite also enclose silt to fine sand-sized fragments of clay-altered rock and quartz.

Mostly the enclosed quartz is monocrystalline, but some of these are polycrystalline. The vein quartz is host to secondary or pseudosecondary fluid inclusions. Some of these fluid inclusions have negative quartz crystal shapes and are vapour-rich and others contain liquid CO_2. Some of the vein quartz fragments contain inclusions of rutile or muscovite. Rock fragments are of quartz + ghosted biotite, or quartz + feldspar (altered to clay). Pervasive smectite and kaolinite have formed after the biotite.

COMMENTS

Fragments or silcrete and more clay-rich fragments, both of which enclose fragments of crystalline quartz and mostly clay altered rock fragments. The silica mineralogy in the silcrete fragments comprises cristobalite, opaline silica and chalcedony. Altered rock fragments, comprising quartz + biotite may be interpreted to be of granitoid provenance. The crystalline quartz fragments may also be interpreted to be of granitoid provenance. No gold minerals were identified within the silica and clay deposition/cement assemblages.

APPENDIX TWO:

REGIONAL PETROLOGY (4026/4027)

TROY BOTTOM OF POSTHOLE PETROLOGY (HAND-SPECIMEN ANALYSIS ONLY)	
F0886	Quartz + mica sandstone interbedded with siltstone/mudstone. Silicification and quartz veining.
F0887	Microgranitoid
F0888	Granitoid
F0889	Metamorphosed medium grained gabbro. Amphibole (actinolite ?) after mafics. Late clay alteration.
F0890	Clay altered metamorphosed dolerite
F0891	Granitoid

PETROLOGICAL SUMMARY: TROY (4026/4027)			
Sample	**Lithology**	**Wallrock Replacement**	**Deposition**
FO886	weakly to moderately deformed, quartz lithic/feldspathic sandstone or sheared/brecciated metamorphic/igneous rock ?	100% 1.sericite/muscovite ?, quartz, opaques (pyrite), 2. kaolinite, hematite, smectite, hydrated Fe-oxides	1. (vein) quartz, pyrite, sericite/ muscovite; carbonate 2. (vein) carbonate
FO889	diorite (weakly deformed)	100% 1. sericite/muscovite, quartz, mafic, opaques 2. smectite, kaolinite, vermiculite, hydrated Fe-oxides	

SUVA (NORTH ?) BOTTOM OF POSTHOLE PETROLOGY (HAND-SPECIMEN ANALYSIS ONLY)	
F0920	?
F0921	Metamorphosed sediment or granitoid ?
F0922	Granitoid
F0923	Metamorphosed sediment with strong foliated fabric
F0924	Mica bearing metamorphosed volcaniclastic with foliated fabric.
F0925	Mica bearing metamorphosed sediments with metamorphic foliation
F0926	Mica bearing granitoid/microgranitoid
F0927	Granitoid
F0928	Biotite granitoid

PETROLOGICAL SUMMARY: SUVA NORTH (4026/4027)			
Sample	**Lithology**	**Wallrock Replacement**	**Deposition**
FO924	deformed/sheared siltstone/ mudstone (thermally/regionally metamorphosed ?)	100% 1. quartz, muscovite, Al-silicates, opaques (magnetite ?), tourmaline 2. kaolinite, hematite, hydrated Fe-oxides, smectite	1. (vein) quartz (saline, CO_2 and vapour-rich FIs)
FO925	weakly deformed sediment (thermally metamorphosed) (gneissic, foliation or ghosted bedding)	100% 1. quartz, muscovite/biotite, cordierite, Al-silicates, opaques (magnetite ?), tourmaline 2. kaolinite, hematite, hydrated Fe- oxides, smectite	1. (vein) quartz

SUVA (SOUTH) BOTTOM OF POSTHOLE PETROLOGY (HAND-SPECIMEN ANALYSIS ONLY)	
F0625	Metamorphosed basalt. No strong fabric. Some silicic alteration.
F0626	?
F0627	Metamorphosed basalt
F0628	Metamorphosed basalt. Fabric defined by sub-preferred orientation of ghosted amphibole and/or biotite. Some discrete quartz veining.
F0629	?
F0630	?
F0631	Metamorphosed volcaniclastic. Strong foliation defined by biotite and muscovite.
F0632	Metamorphosed quartz-bearing sediment. Foliation partly defined by muscovite.
F0633	Granitoid
F0634	Granitoid
F0635	Mica bearing granitoid
F0636	Biotite granitoid

PETROGRAPHIC SUMMARY: SUVA SOUTH POST HOLE (4026)			
Sample	**Lithology**	**Wallrock Replacement**	**Deposition**
FO632	sediment (?) thermally/regionally metamorphosed	100% 1. quartz, ?muscovite, ?Al-silicates opaques ? (CO2/H2O Fis) 2. smectite, kaolinite, hematite, hydrated Fe-oxides	n (vein/cem) carbonate n +1 (vein/veinlet) hematite, hydrated Fe-oxides
FO640	sediment (regionally/thermally metamorphosed) a gneiss ?, foliation or ghosted bedding ?	100% 1. quartz, Al-silicate, opaques, tourmaline 2. smectite, kaolinite, hematite, hydrated Fe-oxides	1. (vein) quartz (CO2 and vapour rich FI's) some undulatory extinction
FO644	sediment (siltstone/mudstone) (thermally metamorphosed) foliation or ghosted bedding)	100% 1. muscovite, Al-silicates, opaques (magnetite/pyrite ?), tourmaline 2. kaolinite, smectite, hematite, hydrated Fe-oxides	1. (vein) quartz, tourmaline (CO2 and vapour rich FI's) (tourmaline rich)

		(moderate deformation fabric)	
FO631	interbedded siltstone/mudstone (thermally metamorphosed)	100% 1. quartz, muscovite, opaques (magnetite/pyrite ?), Al-silicate 2. hydrated Fe-oxides, kaolinite	1. (vein/vug) quartz, pyrite; carbonate 2. (vein) carbonate
FO628	basalt/dolerite (thermally/regionally? metamorphosed) some PO's	100% 1. actinolite/tremolite, quartz, opaques (magnetite ?) 2. smectite, kaolinite, hematite, hydrated Fe-oxides	1. (vein/veinlet) quartz, opaques, tourmaline, actinolite (smectite, kaolinite, hematite/hydrated Fe-oxides)
FO625	olivine basalt and mudstone (thermally metamorphosed ?)	100% 1. muscovite, Al-silicates, actinolite/tremolite, opaques 2. smectite, kaolinite, hematite, hydrated Fe-oxides	

APPENDIX 2

Coomarie Collars

APPENDIX 3

Coormarie Drill Logs

(RCK) LEGEND v 2.4 (Rock Codes)

Col 1	Col 2	Col 3	Description
M	**B**	P	Pillow Basalt
(Mafic)	(Basalt)	X	Autoclastic Basalt
		V	Vesicular Basalt
		C	Coarse Grained Massive (Doleritic)
		M	Amygdaloidal
		F	Fine Grained Massive
		T	Porphyritic Basalt
		A	Aphanitic Basalt
		Y	Pyritic Basalt
	D	P	Porphyritic Dyke
	(Dyke)	A	Aphanitic Dyke
F	**R**	F	Flow Banded
(Felsic)	(Rhyolites)	M	Massive
	C	G	Fragmental
	(Dacite)	P	Porphyritic
	D	P	Porphyritic Dyke
	(Dykes)	A	Aphanitic Dyke
G	**A**	O	Aplite
(Plutonic)	**N**	O	Granodiorite
	D	O	Diorite
	T	O	Granite
S	**C**	P	Polymictic Conglomerate
(Sedi-	(Conglomerate)	M	Monomictic Conglomerate
mentary)	**X**	P	Polymictic Breccia
	(Breccia)	M	Monomictic Breccia
	S	F	Feldspathic
	(Sandstones)	Q	Quartzose
	L	H	Haematitic
	(Siltstones)	L	Lithic
		M	Micaceous
	I	S	Sandstone to Siltstone
	(Interbedded)	L	Sandstone to Mudstone
		M	Siltstone to Mudstone
	M (Mudstone)	O	Undifferentiated
		H	Haematitic
	B	Y	Pyritic
	(Carbonaceous)	P	Pale
	T	H	Haematitic
	(Chert)	W	White
Z	**S**	A	Amphibole
(Meta-	(Slate)	B	Carbonate
morphics)	**P**	C	Chlorite
	(Phyllite)	E	Epidote
	Z	G	Garnet
	(Schist)	N	Andalusite
	G	M	Mica
	(Gneiss)	Q	Quartz
	A	R	Graphite
	(Amphibolite)		
	H	S	Spotted
	(Hornfels)		

Stratigraphic Codes (AGE)

QOO	Transported Alluvial Cover
CLA	Antrim Plataeu Volcanics
KLO	Larranganni Beds
PDK	Coomarie Sandstone
PDT	Talbot Wells Formation
PDG	Gardiner Sandstone
PLS	Supplejack Downs Sandstone
PLW	Mt Winnecke Formation
PFU	Felsic Rocks - Undifferentiated
PLG	Pargee Sandstone
PTH	Mt Charles Beds - Hangingwall Seq.
PTM	Mt Charles Beds - Mine Sequence
PTF	Mt Charles Beds - Footwall Seq
PTC	Mt Charles Beds - Undifferentiated
PTW	Nanny Goat Creek Beds
PGG	Granites Complex - Undifferentiated
PGC	Coomarie Dome
PGF	Frankenia Dome
PGW	Mt Winnecke Granite
PGU	Granite Undifferentiated

Abbreviated MM Codes in File Structure

Prospect	Drilling Area
Hole_nm	Hole Name
Geo	Geologist
Smpl_No	Sample Number
From	From Metre
To	To Metre
Rec	Recovery %
Hrd	Hardness
Colour	Colour
Strat	Stratigraphic Name
Reg	Regolith
Rck	Rock Code
Rck_Ql	Rock Qualifier
Alt	Alteration
Int	Alteration Intensity
Vn	Vein Code
Vn%	Vein %
Str	Structure
Wtr	Water
Mag_Sus	Magnetic Suseptibility (x10^-5)

The Four Commandments

Thou shalt use the letter O as a filler when only one or two characters are used in a three character code field.

Thou MUST have three characters within Rock Codes, Alteration, Veining, Stucture and Regolith when data needs to be entered.

Thou shalt not use any code that is not listed.

Thou shalt discuss new coding requirements at the monthly assembly.

Selah.

LEGEND v. 2.4 (Descriptions)

Col 1 Col 2 Col 3

Colour (COLOUR)

BK	Black	MU	Mustard
BL	Blue	OR	Orange
BR	Brown	PI	Pink
CR	Cream	PU	Purple
GR	Green	RE	Red
GY	Grey	WH	White
KH	Khaki	YE	Yellow
MA	Maroon		

Primary Sedimentary Structures (RCK_QL)

FS	Flame Structure
BD	Bedding
GB	Graded Bedding
LC	Load Clasts
PA	Parallel Laminations
CR	Cross Bedding
MS	Matrix Supported
CS	Clast Supported
PO	Poorly Sorted
MO	Moderately Sorted
WE	Well Sorted
MA	Massive
AN	Angular Clasts
SA	Sub-Angular Clasts
SR	Sub-Rounded Clasts
RO	Rounded Clasts

Minerals List (RCK_QL)

Rock Forming

AD	Andalusite	QZ	Quartz
AK	Ankerite	SE	Sericite
AM	Amphibole	TO	Tourmaline
BT	Biotite		
CB	Carbonate	Sulphides	
CH	Chlorite	AS	Arsenopyrite
CL	Clay	CP	Chalcopyrite
EP	Epidote	PY	Pyrite
GT	Garnet	SU	Sulphides
KA	Kaolinite		
KS	K-Spar	Oxides	
LX	Leucoxene	GO	Goethite
MI	White Mica	HM	Haematite
NO	Nontronite	LM	Limonite
PL	Plagioclase	MH	Maghaemite
PX	Pyroxene	MN	Manganese

Hardness (HRD)

1	Soft
2	Firm, broken by hand
3	Hard and Competent
4	Rings and breaks
5	Rings and breaks not

Alteration Intensity (INT)

W	Weak
M	Moderate
S	Strong
I	Intense

Water (WTR)

D	Dry
M	Moist and Inject Water
W	Wet and Blown Dry

Sampling Type (TYP)

1	Zarg Transported Sample
2	Multi element Unconformity Sample
3	FA3 BOH Sample
4	FA3 Redox Sample
5	FA3 Quartz Sample
6	Zarg Calcrete Sample

Regolith (REG)

Col 1	Col 2		Col 3	
R	**T**	Transported	C	Calcrete
(Regolith)	**L**	Laterite	D	Sand Dominant
	M	Upper Saprolite	F	Ferricrete
	S	Lower Saprolite	G	Sands, Pisolites, Lithics
	W	Weathered Bedrock	H	Silcrete
	B	Transitional Bedrock	I	Lithic Fragments
	F	Fresh Bedrock	L	Laterite Component
			M	Mottled Clays
			P	Pisolith Dominant
			Q	Pervassive Silica
			S	Saprolite Clay
			T	Transported

Alteration (ALT)

Col 1	Col 2		Col 3	
A	**C**	Carbonate	D	Disseminated
(Alteration)		(cb±qz±py) (acid fizz)	F	Fracture
	G	Green Chloritisation	P	Pervasive
		(ch±cb±py) (gr clays)	S	Selvedge
	B	Bleaching	O	Unknown
		(clay±silica±py) (wh clays)		
	E	Sericite ± Pyrite		
	S	Silicification		
		(qz±clay±py) (wh pervassive qz)		
	F	Feruginous Silicification		
		(FeO±qz±clay) (Red/Yellow/Brown)		

Veining (VN)

Col 1	Col 2		Col 3	
V	**C**	Carbonate	B	Banded
(Veining)		(Cb±Qz±Py±Ch)	C	Breccia
	F	Ferruginous Carbonate	K	Crackly
		(Cb±Hm)	M	Milky
	H	Ferruginous Quartz	S	Stockwork
		(Hm±Qz±FeO)	T	Translucent
	Q	Quartz	X	Crystalline
		(Qz±Cb±Py±Se±Ch)		

Structure (STR)

Col 1	Col 2		Col 3	
T	**U**	Unqualified	A	Alteration Front
(Structure)			B	Boundary
			C	Geological Contact
			D	Bedding
			P	Point
	S	Foliation	A	Axial
	L	Linear Feature	M	Mineral Lineations
			S	Strain/Rodding Lintn
			H	Fold Hinge Lineation
	D	Folds	S	Slump Folds
			D	Drag Folds
	J	Joints	T	Stepped
	R	Fracture	H	Hackly
			P	Planar
			S	Smooth
			C	Clay filled
	F	Faults	B	Brecciated
		(Brittle)	G	Gauge
	K	Slickenlines	F	Frictional
			B	Fibrous
			T	Tensile Failure
			D	Ductile
	Z	Shear Zone	M	Mylonite Fabric
		(Ductile)	S	S-C Fabrics

APPENDIX 4

Coomarie Assays