



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

---

**EL11/2005**

**SPECIMEN REEF**

**NW TASMANIA**

**FINAL EXPLORATION REPORT**

**JUNE 2013**

**Prepared for: Nimrodel Resources Ltd.**

**Tim Callaghan, June 2013**



## Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

### **EXECUTIVE SUMMARY**

Walkabout Resources Pty Ltd, a wholly owned subsidiary of Nimrodel Resources Ltd has entered into an agreement with Regency Resources Ltd to explore EL11/2005. EL11/2005 is a mature exploration tenement and requires an extension of term. Site access to the EL has been problematic with the site accessed via Grange Resources pipeline access road. Grange does not allow access to the road unsupervised. An access agreement has been negotiated but took most of the 2011-2012 year to finalize.

Nimrodel are targeting Iron-oxide-copper-gold (IOCG) style mineralisation within the Arthur Metamorphic Complex (AMC). The AMC is highly magnetically anomalous and hosts significant iron oxide deposits as well as numerous occurrences of copper and gold mineralisation, not least of which is the Savage River Magnetite Mine, Long Plains Magnetite deposit and Alpine copper-gold deposits.

The Specimen Reef Gold Mine is a small historic gold mine that has been adequately tested by previous explorers.

Exploration work completed during 2012-2013 includes processing and interpretation of Mineral Resources Tasmania open file aeromagnetic and radiometric data by consultant geophysicists Southern Geoscience (SGC). Five magnetic targets and six gold targets were generated by SGC

Historic drilling and geochemical data was compiled and assessed by consultant geologist Murray Surtees and two of the five anomalies were delineated for follow up exploration drilling. After reviewing the target sites, a two hole helicopter supported drilling program was proposed for initial drill testing.

Following the granting of environmental permitting from MRT in September 2012 contract track cutters were employed to prepare access tracks and drill pads. Contract drillers Van Dieman Drilling were contracted to complete the program which ran through November and December 2012. Tasmanian Helicopters were contracted to support the program.

The first hole just north of Specimen Reef (NS001) intersected strongly foliated Bowry Formation chlorite magnetite schist. Minor chalcopyrite mineralisation was associated with the magnetite with a maximum of 2m @ 0.01% Cu from 195m. The hole adequately explains the anomalism and no further work is recommended.

The second hole near Comstaff Creek (NS002) intersected moderately magnetic basaltic volcanics before intersecting a major shallow angle fault. The fault was strongly silica-sericite pyrite altered but contained no appreciable metals. The hole adequately explains the anomalism and no further work is recommended.

The EL is to be relinquished as no further work is recommended.



## Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

### CONTENTS

Executive Summary	2
1 Introduction	4
2 Regional Geology	6
3 Work Completed 2012 - 2013	10
3.1 Target Generation	10
3.2 Logistics	11
3.3 Diamond Drilling	12
4 Discussion and Recommendations	13
5 Proposed Work 2013 - 2014	16
Additional Notes	17
References	18
Appendices	

### LIST OF FIGURES

Figure 1	EL11/2005 Location Plan and TMI	5
Figure 2	Regional Geology Northwest Tasmania	8
Figure 3	Specimen Reef Regional Geology	9
Figure 4	NS001 Magnetic Susceptibility	13
Figure 5	NS001, TMI and soil geochemistry	14
Figure 6	NS002 Magnetic Susceptibility	15
Figure 7	NS002, TMI and soil geochemistry	16

### LIST OF TABLES

Table 1	Deposits in the Arthur Metamorphic Complex	7
Table 2	Drill hole details	12



## Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

### **1 INTRODUCTION**

EL11/2005 is located in NW Tasmania, approximately 5-10km north of the Savage River Magnetite Mine. The EL is held by Regency Resources Limited and currently operated by Walkabout Resources Pty Ltd, a wholly owned subsidiary of Nimrodel Mining Ltd. The EL is in its final year of tenure and a Term of Extension will not be applied for. Nimrodel operated the license between April 2011 and April 2013.

The EL is accessed via the Savage River Pipeline Road extending southwards from Port Latta on the north coast of Tasmania. Grange do not allow access through the Savage River Mine site for OH&S reasons as the road runs through their northern open pit. The pipeline road is an all weather dirt road privately owned by Grange Resources Limited. An access agreement to use the pipeline road has been signed by Nimrodel and Grange. The pipeline access agreement had not been finalized until April 2012 so site visits have been restricted to only 2 reconnaissance trips through 2011-2012.

The EL is located within an environmentally sensitive area known as the Tarkine Wilderness and is in the Savage River Recommended Area for Protection. All exploration works must be approved by the Mineral Exploration Working Group (MEWG) consisting of representatives from Mineral Resources Tasmania, Parks and Wildlife, the Environment Department and Forestry Tasmania.

The area receives a high annual rainfall and the topography is rugged and steeply incised. Access is difficult to most areas, requiring cut tracks. Vegetation consists of old growth rainforest ranging from large myrtle forests in the valleys to low horizontal and leatherwood dominated forest on ridge tops. Re-growth tea tree and eucalypt forest dominate areas previously damaged by fires.



Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

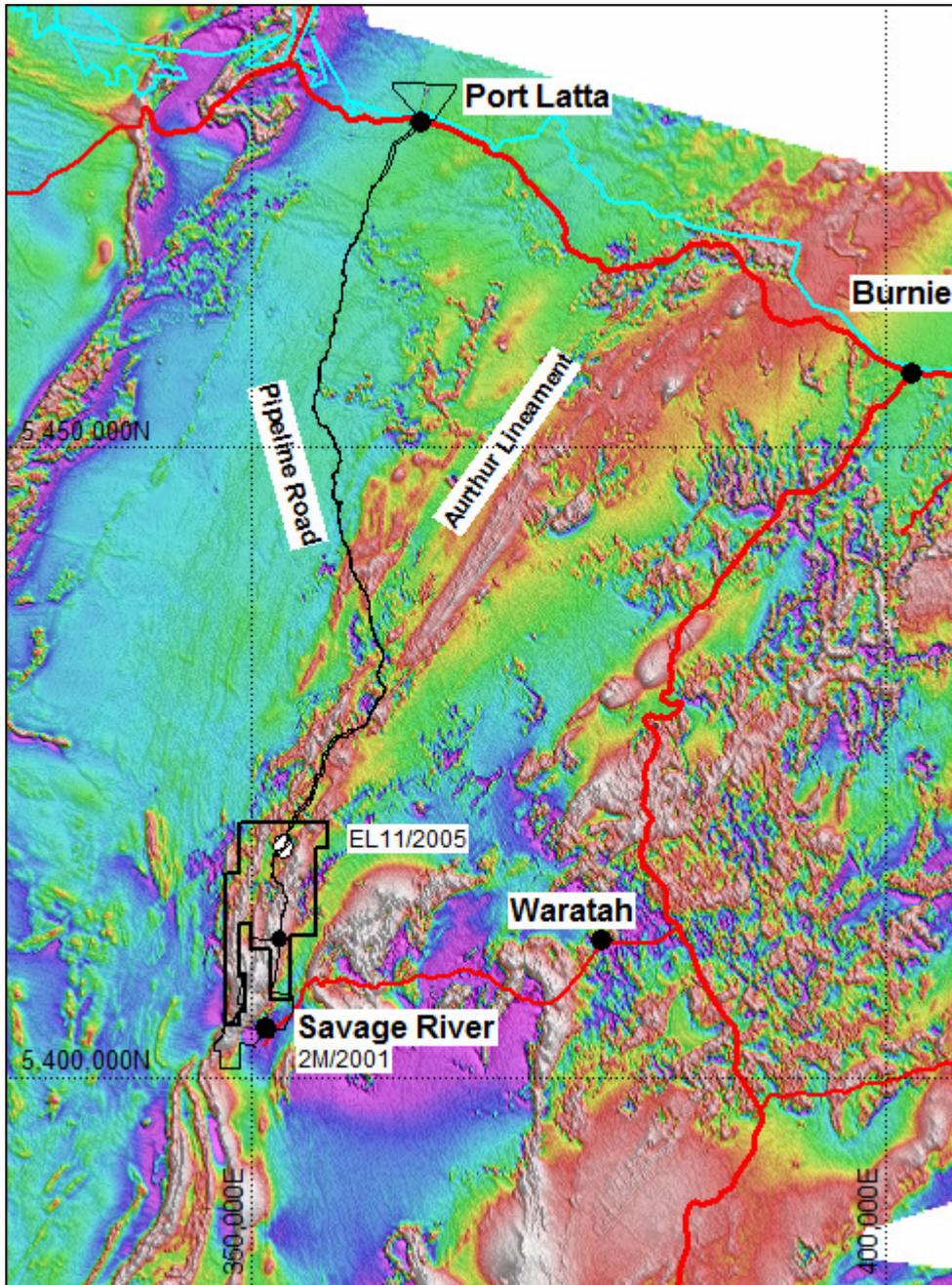


Figure 1. EL11/2005 Location Plan and TMI.



## 2 REGIONAL GEOLOGY

The NW Tasmanian Geology is separated from the geology of Western Tasmania by the 510Ma Arthur Lineament, a major NNE trending thrust lineament (Figure 2). Regionally the Arthur Lineament separates the northwestern Neoproterozoic Rocky Cape Group and Ahrberg Group from the low strain Oonah Formation to the southeast (Everard *et al*, 2007). The Lefroy Ridge Fault forms the western boundary to the lineament.

The Arthur Metamorphic Complex is a steep dipping, NE-SW striking structural lineament of metamorphosed Cambrian mafic volcanics, carbonates and sediments of the Ahrberg Group, the Bowry Formation and a high strain part of the Oonah Formation (Keith Schist). The lineament is associated with isoclinal folding and a strong penetrative cleavage generally striking NNE and dipping west (Turner and Bottrill, 1993). The Lineament is folded just south of the Savage River Mine during the later Devonian Deformation event.

Geology to the west of the lineament is complex and not completely resolved. From west to east approaching the lineament the geology comprises the quartzite and slates of the Rocky Cape Group, overlain by the Donaldson Group composed of micaceous quartzwacke and pelitic siltstone with minor chert and conglomerate near the base. The Savage Dolomite conformably overlies the Donaldson Group which is in turn overlain by the Bernafai Volcanics consisting of basaltic volcanoclastics, quartzite and phyllitic siltstone. These are overlain by the Corinna Dolomite and the Tunnel Race mafic volcanics.

East of the Lefroy Ridge Fault the geology is dominated by metasediments and amphibolites of the Arthur Metamorphic Complex (AMC). The amphibolites occur in the Lucy (magnetic), Nancy, (weakly magnetic) and the Bowry Formations (strongly magnetic). The Bowry Formation consists of chloritic, schistose mafic volcanics with interbedded dolomite and magnesite. The Bowry formation is strongly altered with associated banded magnetite-pyrite-silica, reaching maximum intensity at the Savage River Magnetite Mine just south of EL11/2005. The western margin of the AMC is dominated by the quartz-mica schist and phyllites of the Keith Schist which is gradational with the unmetamorphosed quartz-wacke turbidites of the Oonah Formation.

The lineament occupies a gravity divide between the Devonian Pieman and Meredith Granites. Cambrian deformation has produced steep west dipping thrust faults and a strong regional lineament visible in magnetic images.

Tertiary sediments comprise channel fill gravel, sand and clay in ridge top positions generally overlain by basalt. They have been sporadically explored for gold/tin placers with minor historic workings in the district. Gold from the sediments has redistributed into the Quaternary creeks, contaminating heavy mineral stream sediment exploration efforts.

The Lucy and Bowry Formations which contain tholeiitic basalt and volcanoclastics are prospective for gold, copper, magnetite and magnesite. An important style of iron-oxide-copper-gold mineralisation is hosted in the Alpine Deposit, located several kilometers south of the Pieman River. The enigmatic Savage River magnetite mine consists of sub vertical lenses of massive magnetite with varying amounts of pyrite



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

and trace chalcopyrite. Other smaller deposits of the same style are located in the Bowry Formation including the Long Plains deposit to the south. Substantial magnesite deposits are found at the Arthur River and are associated with the Savage River deposit to the north and south at Main Creek and Lyons River.

Silica flour has been the focus of exploration northeast of Corinna on the Tasmanian Advanced Minerals Leases within the Savage Dolomite. Minor epithermal gold is reported from within the Savage Dolomite, although most of the gold from the district appears to be associated with Tertiary alluvial deposits. Titan-Goldstream used a combination of #80mesh copper analyses and gold grain morphology as a means of discriminating between alluvial gold and bedrock gold anomalies with limited success.

<b>TABLE 1. ARTHUR METAMORPHIC COMPLEX MINERAL RESOURCES</b>	
Savage River	371 Mt @ 31.9%Fe
Arthur River	29 Mt @ 42.8% Mg
Main Creek	42.8 Mt @ 42.4% Mg



Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

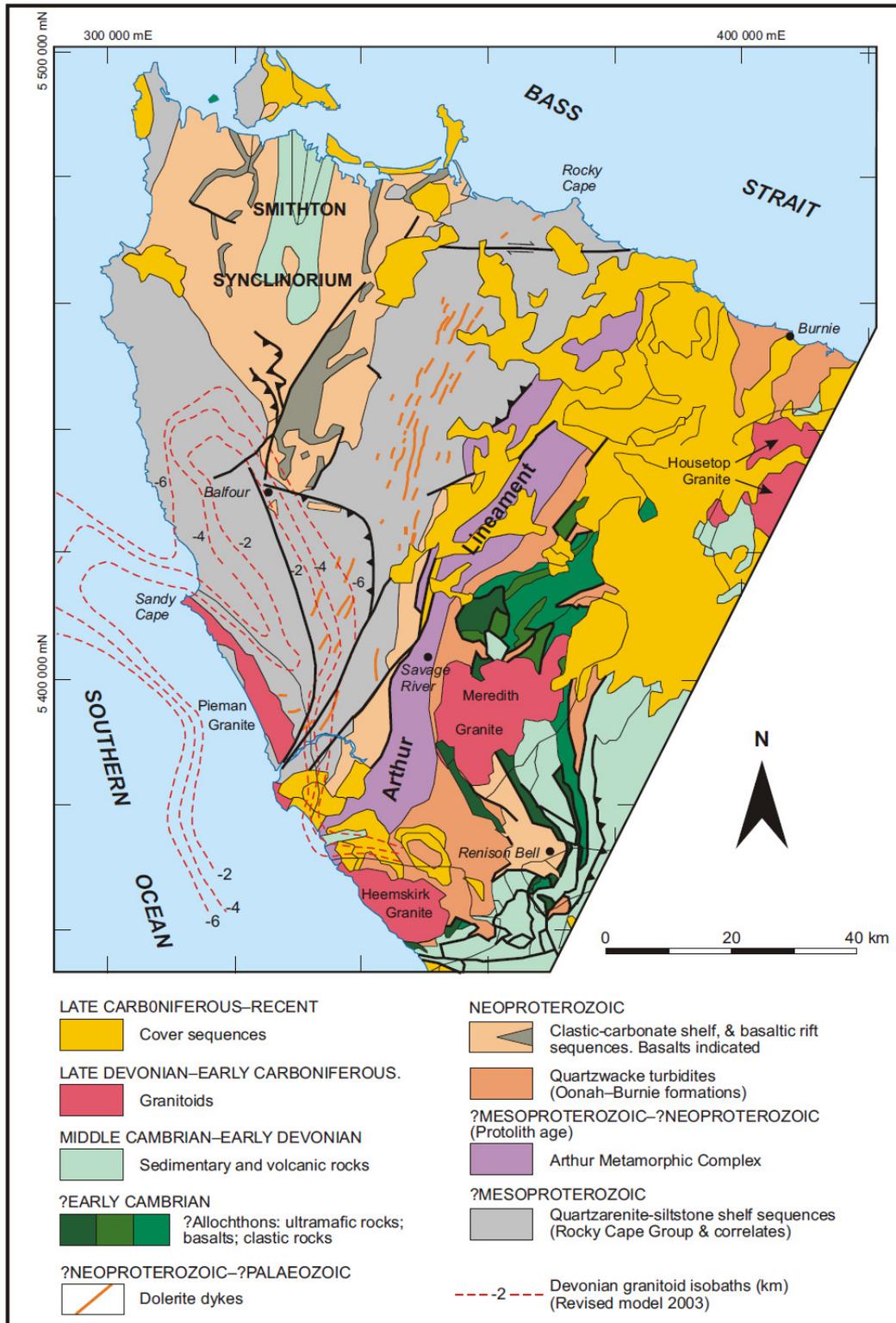


Figure 2. Regional Geology Northwest Tasmania (Everard *et al*, 2007).



Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

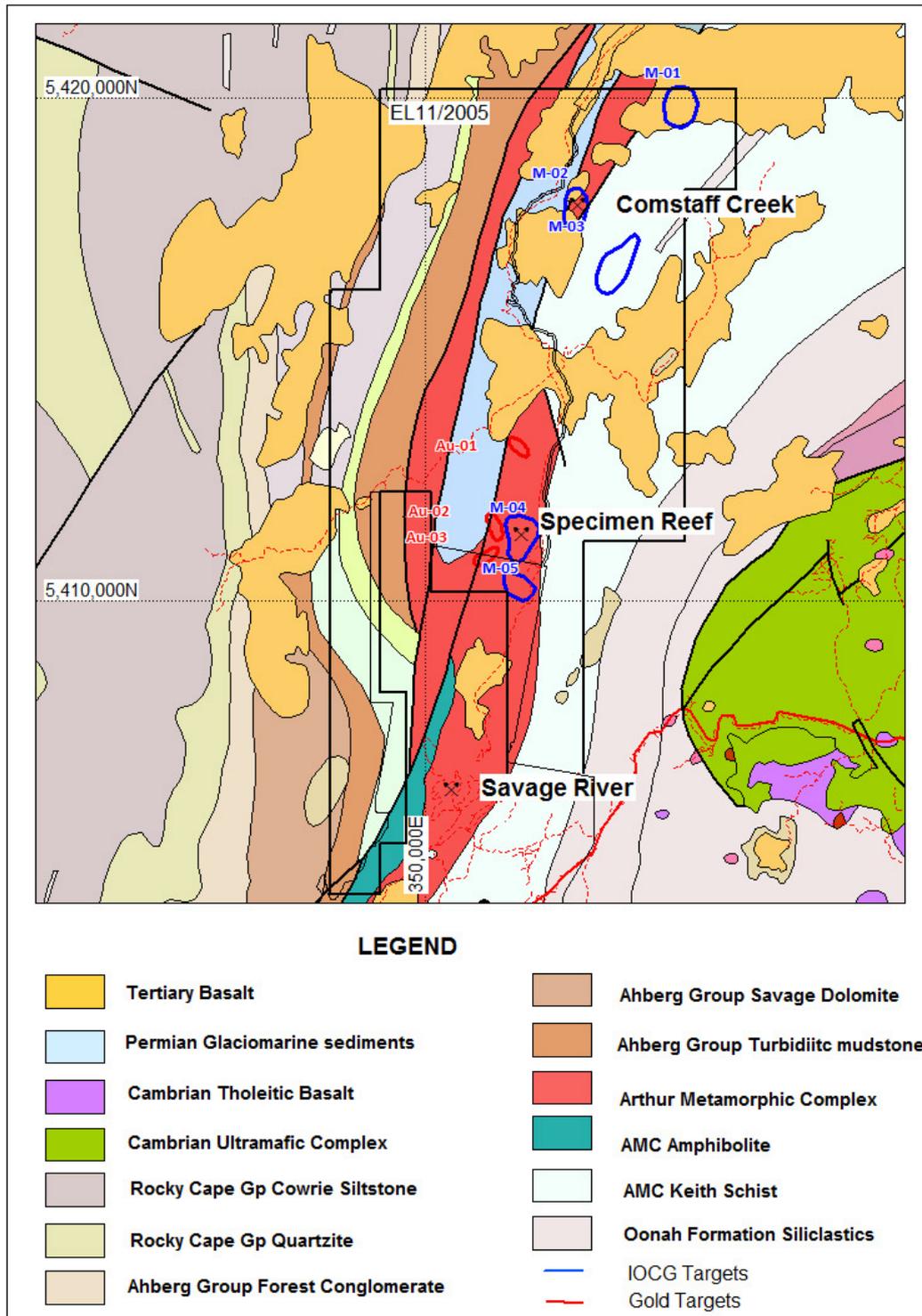


Figure 3. Specimen Reef Regional Geology (modified from MRT 1:250 000 scale Mapping)



Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

### 3 WORK COMPLETED, APRIL 2012 – APRIL 2013

Work completed during 2012 to 2013 included refining of targets for drill testing and the completion of two diamond drillholes.

#### 3.1 TARGET GENERATION

In 2011, Nimrodel contracted Southern Geoscience (SGC) to acquire process and interpret open file aeromagnetic and radiometric data flown over the Specimen Reef area by Mineral Resources Tasmania. SGC completed a geological interpretation based mainly on the aeromagnetic data with some input from Mineral Resources Tasmania 1:250 000 mapping (Roberts, 2011). They identified 5 potential Iron Oxide Copper Gold (IOCG) targets and six gold targets on the EL (Figure 2 and 3). Their full report is discussed in the previous years annual report (Callaghan, 2012).

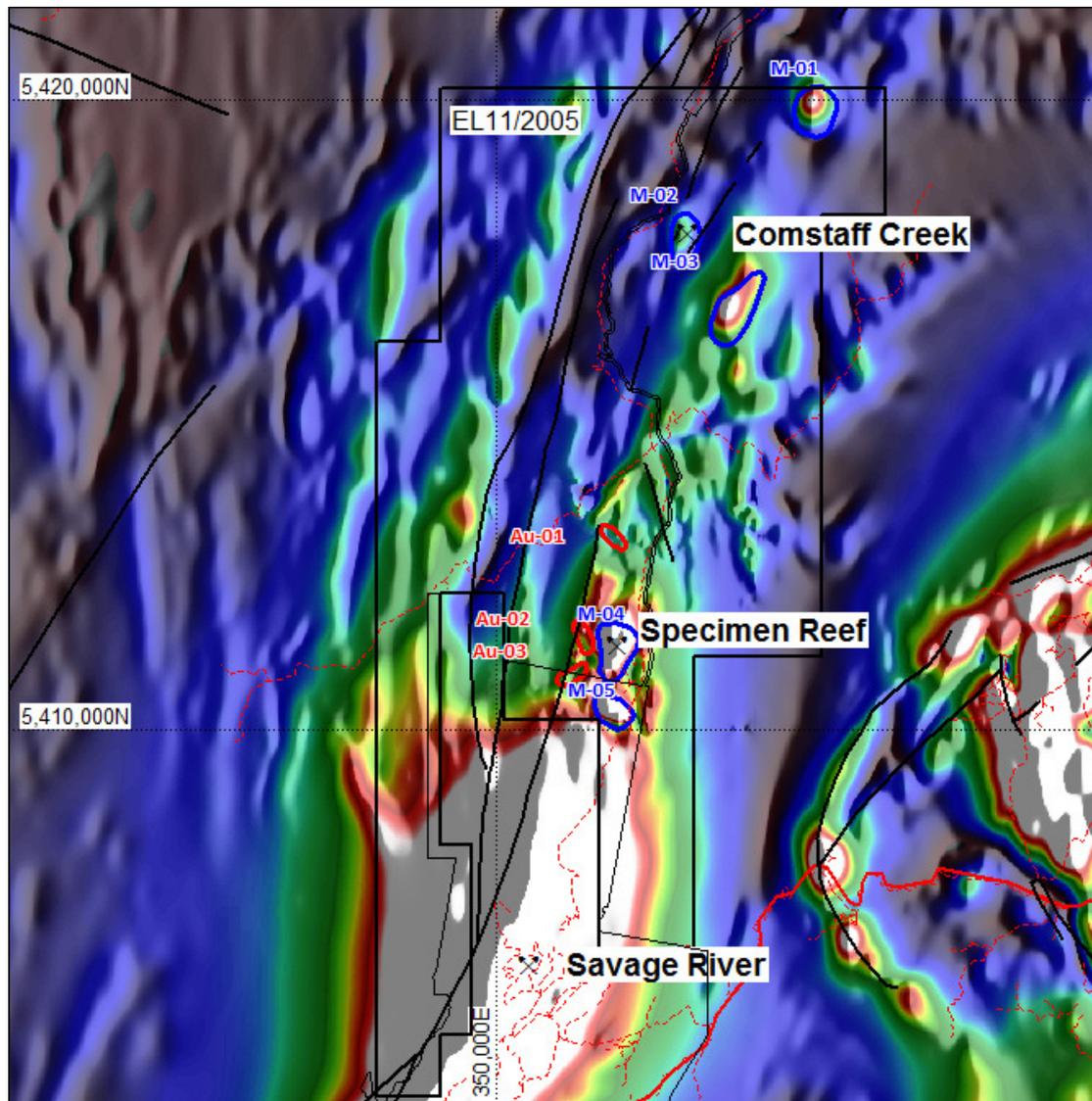


Figure 3. TMI and geophysical targets.



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

SGC considered IOCG targets M-04 and M-05 to be highest priority. They also recommended that ground validation of the anomalies be completed.

Surtees (2011) proposed an initial drilling program consisting of 5 RC holes of 250m length testing SGC's IOCG anomalies M-04 and M-02 (Figures 3, 4 and 5) and 2 testing M-02.

Target M-04 is located just north of Specimen Reef and has numerous coincident soil Cu anomalies and peripheral Au stream sediment anomalies. The source of the magnetic anomaly is unknown but is considered to be analogous to the Savage River magnetite style of mineralisation. Surtees (2011) proposed the M-04 target be tested with three RC holes.

Target M-02 is a smaller and weaker magnetic anomaly associated with a weak Au stream sediment geochemical anomaly (peak 200ppb) in the Comstaff Creek area 7km north of Specimen Reef. Two RC holes were proposed to test this target.

Surtees (2011) did comment that the terrain may be too rugged to allow RC drilling of the targets and suggested a helicopter supported program be employed as an alternative.

A brief field trip was made to the area in January 2012 by Contract Geologist Tim Callaghan and personnel from Grange Resources. The proposed drill sites were inspected and found to be unsuitable for RC drilling. A revised helicopter program was proposed and a cost estimate submitted to the board of Nimrodel. After review a 2 hole program was approved testing the targets recommended by Surtees, one hole into the centre of each anomaly.

Hole 1, located just northwest of the historic Specimen Reef Gold Mine is designed to test the M-04 magnetic anomaly where it is coincident with a 565ppm Cu soil anomaly identified from historic exploration (Figure 1). The hole has been moved 50m east of the original position and collared at -75° west to intersect the generally vertically dipping north striking geology at a higher angle from a level drilling platform on a ridge top.

Hole 2, is designed to test the northern magnetic anomaly at Comstaff Creek (Figure 2). The hole is designed to test the centre of the Southern Geoscience magnetic body, similar the original proposed Hole 5 (Surtees, 2011). The hole has been moved slightly from the original hole to a topographically better location to site a drill rig.

### **3.2 LOGISTICS**

Work completed on EL11/2005 included diamond drilling of the M04 (Specimen Reef) and M02 (Comstaff Creek) targets. Due to the sensitive location of the program in rugged terrain and temperate rainforest, a helicopter supported program was proposed.

Van Dieman Drilling were contracted to complete the drilling program with a Longyear 44 drill rig. Tasmanian Helicopters were contracted to mobilize the rig and provide support. The program was managed by contract geologist Tim Callaghan.



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

Access tracks to the two proposed drill sites were cut by Ian Rogers Track Cutters in early August 2012. Tim Callaghan and flora and Fauna specialist Phil Milner inspected both sites to allow an environmental report to be completed to finalise permitting prior to drilling the two proposed holes. The flora and fauna report is located in Appendix 2. MRT approval was granted for the program in September 2012.

The drill rig was mobilized from just outside the Savage River township on the side of the Savage River Road. The flight path was designed to avoid the Savage River Mine lease and township so as not to interfere with shift work or mine operations, principally blasting. Drilling personnel were accommodated in a field camp consisting of two caravans, a shower and a chemical toilet set up on Grange resources pipeline road. The camp was mobilized along the pipeline road from the Port Latta end. Access was not permitted via the Savage River Mine Lease for OH&S reasons. The drilling program was completed in November and December 2013 on a 5 day roster with a single shift. Drill sites were accessed on foot on a daily basis to minimize environmental disturbance.

Drill core was flown out to the Savage River Road at the end of each hole and transported to Zeehan where it was processed in Stellar Resources Core storage facilities.

### 3.3 DIAMOND DRILLING

Drill collar details are tabulated below in table 2. Drill logs are located in Appendix 1.

**Table 2. Drill Hole Details**

Hole_Id	Easting (Agd66)	Northing (Agd66)	Target	Depth	Dip	Azm
NS001	351841	5411528	NW edge area of Target M-04 on soil anomaly of 565 ppm Cu	245.8 m	-75°	270
NS002	352865	5417879	North of centre Target M-02	199.8 m	-90°	0

Drill collars were surveyed by hand held GPS with an error reading of +/-5m. Collar RL's were derived from 10m topographic contours.

Core was measured for recoveries and re-composited in Stellar Resources core shed. Logging was completed on excel spread sheets. The core was also measured for Magnetic susceptibility and radioactivity. Selected core was split with a doiamond core and half sent for analysis for Cu, U and Au by ALS Laboratories in Burnie. Cu was analysed by 4 acid digest and Atomic Absorption Spectroscopy (AAS). U was analyses by 4 acid digest and Inductively Coupled Plasma Mass Spectroscopy (ICPMS). Au was analysed by Fire Assay (FA) and AAS finish.



Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

#### 4 DISCUSSION AND RESULTS

Drillhole NS001 was designed to test the M04 coincident magnetic Cu soil anomaly.

The hole intersected strongly foliated magnetite-chlorite schist of the Proterozoic Bowry Formation. Strong Magnetite mineralisation occurring as coarse disseminations and foliation parallel stringers were intersected particularly between 50 and 150m as reflected in the downhole magnetic susceptibility (Figure 4). Minor chalcopyrite mineralisation was associated with the magnetite as coarse disseminations particularly around 195-197m.

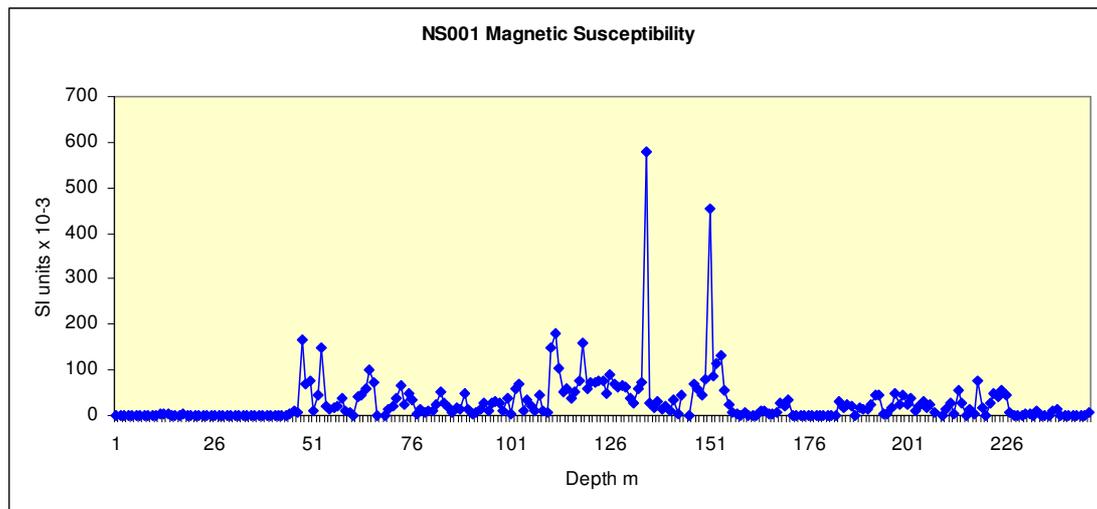


Figure 4. NS001 magnetic Susceptibility.

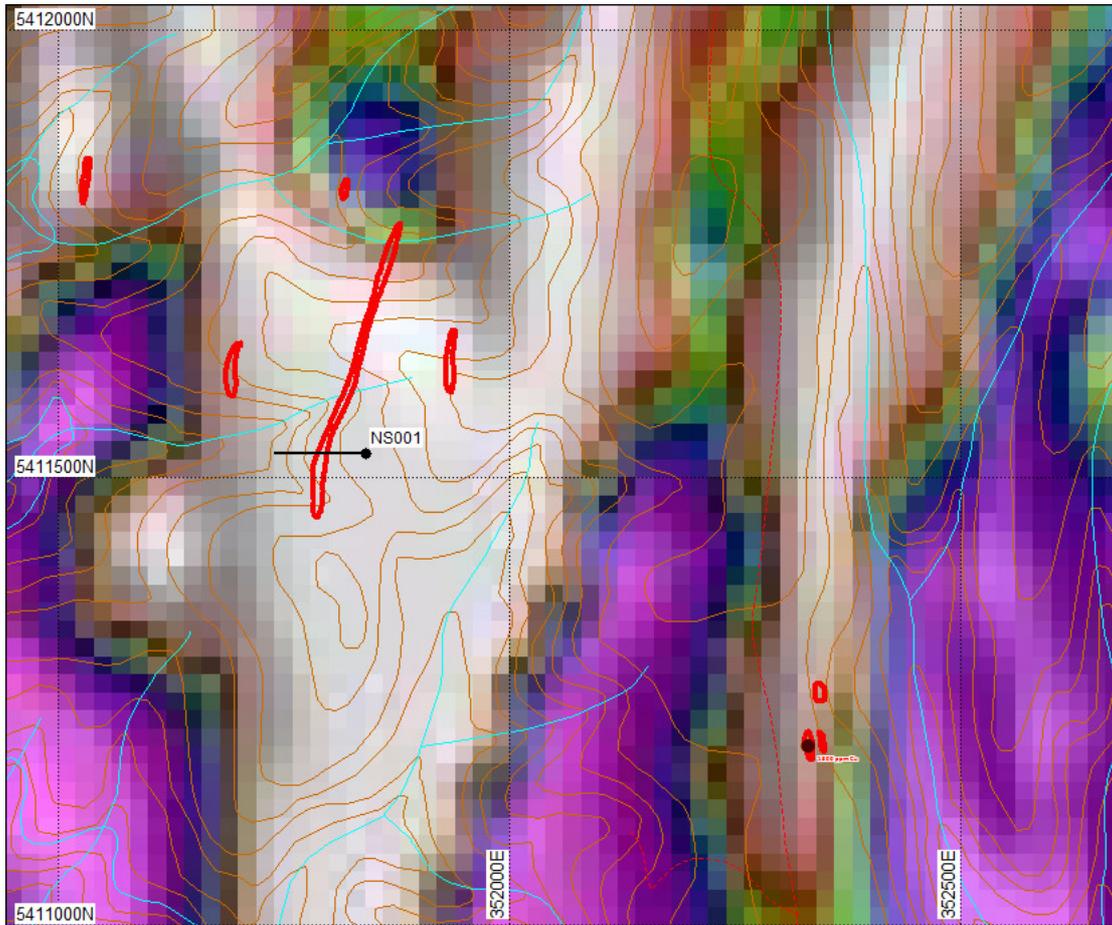
The intersected mineralisation sufficiently explains the magnetic and soil copper anomalies. The tenor of mineralisation is unlikely to be economic.



Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au



**Figure 5. DDH NS001, 400ppm Cu soil geochemistry and 1vd TMI Specimen Reef .**

Drillhole NS002 was designed to test the M04 coincident magnetic Cu soil anomaly.

The hole intersected chlorite altered basaltic volcanics and intrusives with moderate fine magnetite and hematite in the top 100m of the hole. No significant copper or gold mineralisation was present in the basalt. The hole then intersected a very large shallow thrust fault characterized by intense deformation and strong sericite-silica-pyrite alteration. There were no anomalous metals associated with the fault. The fault is possible one of the bounding faults of the Arthur Metamorphic Complex.

The drill hole adequately explains the magnetic anomaly and no further drilling is recommended.



Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

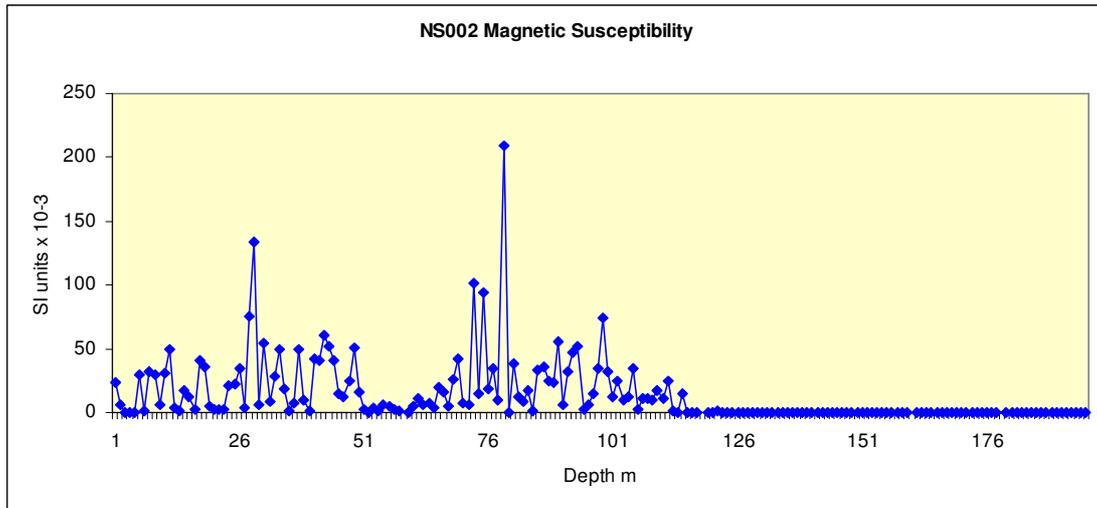


Figure 6. NS002 Magnetic Susceptibility.

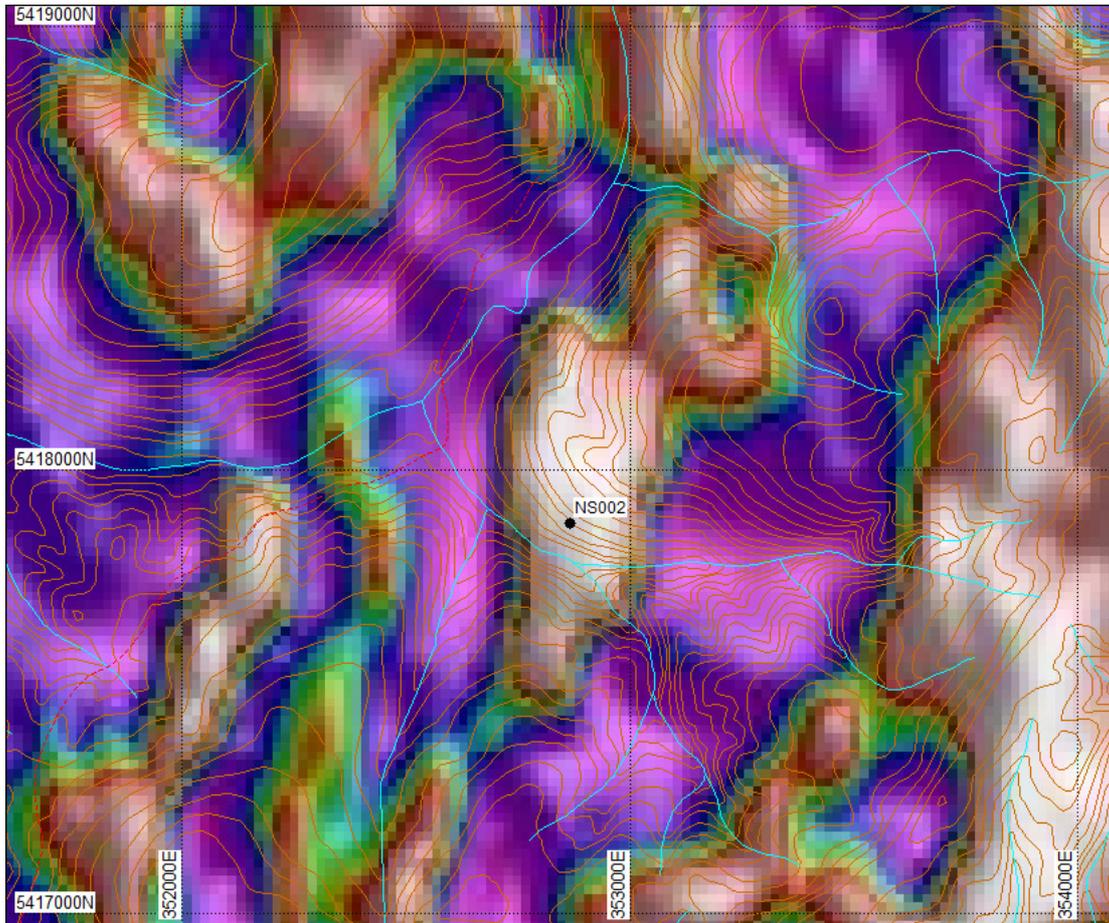


Figure 6. DDH NS001 and 1vd TMI Specimen Reef .



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

## **5 PROPOSED WORK 2012-2013**

No further work is proposed for the EL.

This is the final report for this EL as it is to be relinquished.

### **ADDITIONAL NOTES**

#### ***STATEMENT OF INDEPENDENCE***

Tim Callaghan has no material interest or entitlement in the securities or assets of Nimrodel Mining Ltd or any associated companies.

#### ***LIMITATIONS AND CONSENT***

The report has been prepared for Nimrodel Mining Ltd using information provide by Nimrodel Mining and open file information available to the Author at the time of writing. The opinions stated herein are given in good faith and with the belief that the basic assumptions are factual and correct and the interpretations reasonable.

This report is not intended for the use as a public document nor, in whole or in part, in a public document without written consent to the form and context in which it appears.

**All coordinates in this report are recorded in AMG66 Zone 55**



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

**REFERENCES**

- Bottrill, R and Taheri, JR, 2007. Petrology of the host rocks, including mineralisation and adjacent rock sequences, Savage River Mine. Tasmanian Geological Survey Record 2007/05.
- Roberts, A, 2011. Walkabout Resources Ltd, Specimen Reef Project Tasmania, Airborne Magnetic Survey: Data Processing and Interpretation. Unpublished consultants report for Walkabout Resources Ltd by Southern Geoscience Consultants. SGC2213
- Surtees, AM, 1011a. Collation of Exploration Data for Specimen Reef. Unpublished consultants memorandum for Nimrodel Mining ltd.
- Surtees, AM, 1011b. Proposal for phase 1 drilling to test the Iron Oxide-Copper-Gold -. (Uranium) potential of Specimen Reef Tenement EL11/2005. Unpublished consultants memorandum for Nimrodel Mining ltd.
- Turner NJ and Bottrill R, 1993. Blue amphibole in the Proterozoic to Cambrian Arthur Metamorphic Complex, NW Tasmania. *MRT report 1993/26*.



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: [timcallaghan@netspace.net.au](mailto:timcallaghan@netspace.net.au)

## **Appendix 1**

### **Drill logs**



# Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

## NIMRODEL LTD DRILL HOLE LOGGING CODES

**STRATIGRAPHY** Mineral Resources Tasmania Digital Geological Atlas  
1:25,000 Series Parrawe Sheet 3842

Qha	Quaternary : alluvium and colluvium
Qptb	Quaternary : basalt-derived scree
Tb	Tertiary : basalt
Ts	Tertiary : sand/gravel (including sub-basaltic gravel)
Dsk	Devonian - skarn
Pbf	Proterozoic bowry Creek Formation

### LITHOLOGY

Volcanic rock types are assigned a four character code. Description hierarchy is as follows :  
**STYLE** (intrusive, volcanoclastic etc); **COMPOSITION** (basaltic, rhyolitic etc);  
**MAJOR COMPONENT** (quartz phyrlic, lithic rich etc); **TEXTURE** (fine-grained, brecciated etc).  
Example : **IUPC** describes an intrusive, pyroxene phyrlic, coarse grained ultramafic rock.

#### Style codes

I	Intrusive
L	Lava
V	Volcanoclastic
E	Epiclastic

#### Composition codes

U	Ultramafic
B	Basaltic (mafic)
A	Andesitic
D	Dacitic
R	Rhyolitic

#### Component codes

Q	Quartz phyrlic (ie quartz crystal rich)
F	Feldspar phyrlic
H	Hornblende phyrlic
P	Pyroxene phyrlic
L	Lithic rich
X	Crystal rich
V	Vitric (ie glassy)

#### Texture codes

F	Fine-grained
M	Medium-grained
C	Coarse-grained
B	Breccia

#### Other rock type codes

ARKS	Arkose
CAVE	Cavity (caving ground)
CHRT	Chert
CLAY	Clay
CONG	Conglomerate
GABB	Gabbro
GRAD	Granodiorite
GRAN	Granite
GRAV	Gravel (unconsolidated/poorly consolidated)
GWAC	Greywacke
HEVC	Hematitic volcanoclastic
HORN	Hornfels
LMST	Limestone
LOSS	No core recovery
MMAG	Massive magnetite
MDST	Mudstone
QZIT	Quartzite
RUBB	Rubble
SAND	Sandstone
SHAL	Shale
SKRN	Skarn
SKCS	Skarn : calc-silicate facies
SKGT	Skarn : garnet facies
SKMG	Skarn : magnetite facies
SKPX	Skarn : pyroxene facies
SSLT	Siltstone
SMSX	Semi-massive sulphide

## NIMRODEL LTD DRILL HOLE LOGGING CODES

### ALTERATION

Ac	Actinolite
Ax	Axinite
Cb	Carbonate
Ch	Chlorite
Di	Diopside
Ep	Epidote
Ht	Hematitic
Ka	Kaolinite
Mg	Magnetite
Ph	Phlogopite
Po	Pyrrhotitic
Py	Pyritic
Qz	Quartz
Sc	Serpentine-chrysotile
Se	Sericite
Si	Silica
So	Schorl
Sp	Serpentine
Sx	Sulphidic
To	Tourmaline

### GRAINSIZE

UF	Ultra fine-grained
VF	Very fine-grained
FG	Fine-grained
MG	Medium-grained
CG	Coarse-grained
VC	Very coarse-grained

### Weathering

X	Extreme Weathering and Loss
W	Weathered
Y	Partially weathered
F	Fresh

### COLOUR/SHADE

Colours can be further qualified by shade, using a 1 to 5 (lightest to darkest) scale.

Example : B1 = lightest brown; B5 = very dark brown

B	Brown	R	Red	Metallic	K	Gold
C	Cream	T	Tan		S	Silver
G	Green	W	White		X	Brass
M	Mottled	Y	Yellow		Z	Bronze
N	Black					
O	Orange					
P	Purple					

### DOWN HOLE CONTACT

Nature of down hole contact of geological unit	
BD	Brecciated
BR	Broken
CM	Chilled margin
DF	Diffuse
FT	Faulted
GC	Gradational colour change
GD	Gradational
GL	Gradational lithological change
IN	Intrusive
NR	Not recovered (core loss zone)
SI	Sharp irregular
SP	Sharp planar
UN	Unconformity

### CRYSTAL FORM

Crystal form of dominant minerals	
AM	Amorphous (no crystalline structure)
XD	Crystallised (well developed crystals)
XL	Crystalline (imperfect crystal grain aggregates)
CX	Crypto-crystalline (traces of crystal structure only)
PX	Partly crystalline





## Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

### Nimrodel Mines Ltd - Drill Hole Log

Project	Prospect	BHID	From	To	Stratigraphy	Lithology	Alteration	Weathering	Crystal form	Grainsize	Colour	Visual S%	DH Contact	Structure	BCA	geocode	Vis_mag	Description/comments
Tas	Specimen	NS001	0.0	6.0		LOSS		X										No Core recovery, Clay.
Tas	Specimen	NS001	6.0	16.0	Pbf	VBLM	Cy	X		MG	O		Gd					Weathered and clay altered foliated mafic schist. Broken. Strongly foliated. Disrupted and broken quartz veins. Minor limonite.
Tas	Specimen	NS001	16.0	22.9	Pbf	VBLM	Cy	X		MG	O		Gd	Fo	10			Weathered and clay altered foliated mafic schist. Broken. Strongly foliated. Low foliation angle to core axis.
Tas	Specimen	NS001	22.9	34.0	Pbf	VBLM	ChCb	F		MG	G3		Sp	Fo	5			Massive, finely foliated mafic schist. Fine 2-3mm bands of green chlorite (after amphibole) and pale grey calcite/magnesite.
Tas	Specimen	NS001	34.0	47.9	Pbf	VBLM	ChCb	F		MG	G3		Sp	Fo	5			Massive, finely foliated mafic schist. Fine 2-3mm bands of green chlorite (after amphibole) and pale grey calcite/magnesite. Brecciated and dismembered quartz veining.
Tas	Specimen	NS001	47.9	52.6	Pbf	VBLM	ChCb	F		MG	G3		Ft	Fo	20			Massive, finely foliated mafic schist. Fine 2-3mm bands of green chlorite (after amphibole) and pale grey calcite/magnesite.
Tas	Specimen	NS001	52.6	69.0	Pbf	VBLM	ChCb	F		MG	G3		Ft	Fo	20			Massive, finely foliated mafic schist. Fine 2-3mm bands of green chlorite (after amphibole) and dark grey magnetite. Strongly magnetic with magnetite as foliation bands.
Tas	Specimen	NS001	69.0	77.0	Pbf	VBLM	ChMt	F		MG	G3	2.0	Ft	Fo	20	20		Massive, finely foliated mafic schist. Fine 2-3mm bands of green chlorite (after amphibole) and dark grey magnetite. Strongly magnetic with magnetite as foliation bands. Brecciated vein quartz. Minor disseminated pyrite. Late siderite veining.
Tas	Specimen	NS001	77.0	103.6	Pbf	VBLM	ChMt	F		MG	G3	0.1	Vn	Fo	20	20		Massive, finely foliated mafic schist. Fine 2-3mm bands of green chlorite (after amphibole) and dark grey magnetite. Strongly magnetic with magnetite as foliation bands. Brecciated vein quartz.
Tas	Specimen	NS001	103.6	103.8		VEIN	CbQz	F	XL	CG	W	5.0	Vn	Vn	80	10		Crystalline quartz-siderite-calcite vein with coarse pyrite. Cross cuts foliation at high angle.
Tas	Specimen	NS001	103.8	109.7	Pbf	VBLM	ChMt	F		MG	G3	0.1	Vn	Fo	20	20		Massive, finely foliated mafic schist. Fine 2-3mm bands of green chlorite (after amphibole) and dark grey magnetite. Strongly magnetic with magnetite as foliation bands. Brecciated vein quartz.
Tas	Specimen	NS001	109.7	111.3		VEIN	CbQz	F	XL	CG	W	5.0	Vn	Vn	80	15		Crystalline quartz-siderite-calcite vein with coarse pyrite. Cross cuts foliation at high angle.



Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

Nimrodel Ltd - Drill Hole Log

Project	Prospect	BHID	From	To	Stratigraphy	Lithology	Alteration	Weathering	Crystal form	Grainsize	Colour	Visual S%	DH Contact	Structure	BCA	geocode	Vis_mag	Description/comments
Tas	Specimen	NS001	111.3	114.7	Pbf	VBLM	ChMt	F		MG	G3	0.1	Gd	Fo	20		20	Massive, finely foliated mafic schist. Fine 2-3mm bands of green chlorite (after amphibole) and dark grey magnetite. Strongly magnetic with magnetite as foliation bands. Brecciated vein quartz.
Tas	Specimen	NS001	114.7	122.6	Pbf	VBLM	SiMt	F	XL	CG	A4	3.0	Gd	Fo	45		20	Massive dark grey magnetite-silica schist with quartz veining and 2-3% disseminated pyrite.
Tas	Specimen	NS001	122.6	126.8	Pbf	VBLM	ChMt	F		MG	G3	0.1	Gd	Fo	35		20	Massive, finely foliated mafic schist. Fine 2-3mm bands of green chlorite (after amphibole) and dark grey magnetite. Strongly magnetic with magnetite as foliation bands. Brecciated vein quartz.
Tas	Specimen	NS001	126.8	150.0	Pbf	VBLM	ChMt	F		MG	G3	0.1	Gd	Fo	35		20	Massive, finely foliated mafic schist. Fine 2-3mm bands of green chlorite (after amphibole) and dark grey magnetite. Strongly magnetic with magnetite as foliation bands.
Tas	Specimen	NS001	150.0	155.0	Pbf	VBLM	ChMt	F		MG	G3	1.0	Gd	Fo	45		20	Massive dark grey magnetite-silica schist with quartz veining and 2-3% disseminated pyrite. Minor massive magnetite bands
Tas	Specimen	NS001	155.0	184.0	Pbf	VBLM	ChSe	F		MG	A3	0.1	Ft	Fo	10		5	Foliated chlorite-sericite-silica schist. Minor magnetite. Sporadic qtz-carb veining.
Tas	Specimen	NS001	184.0	184.6		FALT	ChMt	F		MG	G4	0.0	Ft	Fo	25		10	Puggy, chloritic fault. Broken core and pug. Core loss.
Tas	Specimen	NS001	184.6	191.0	Pbf	VBLM	ChMt	F		MG	G3	0.1	Gd	Fo	35		20	Massive, finely foliated mafic schist. Fine 2-3mm bands of green chlorite (after amphibole) and dark grey magnetite. Strongly magnetic with magnetite as foliation bands. Brecciated vein quartz.
Tas	Specimen	NS001	191.0	193.7		FALT	ChMt	F		MG	G4	0.0	Ft	Fo	25		10	Puggy, chloritic fault. Broken core and pug. Core loss.
Tas	Specimen	NS001	193.7	197.0	Pbf	VBLM	ChMt	F		MG	G3	1.0	Gd	Fo	45		20	Massive dark grey magnetite-silica schist with quartz veining and 2-3% disseminated pyrite. Massive magnetite bands. Trace Cpy.
Tas	Specimen	NS001	197.0	215.0	Pbf	VBLM	ChMt	F		MG	G3	0.1	Gd	Fo	35		20	Massive, finely foliated mafic schist. Fine 2-3mm bands of green chlorite (after amphibole) and dark grey magnetite. Strongly magnetic with magnetite as foliation bands.
Tas	Specimen	NS001	215.0	217.0	Pbf	VBLM	ChMt	F		MG	G3	1.0	Gd	Fo	45		20	Massive dark grey magnetite-silica schist with quartz veining and 1-2% disseminated pyrite. Massive magnetite bands. Trace Cpy.
Tas	Specimen	NS001	217.0	224.0	Pbf	VBLM	ChMt	F		MG	G3	0.1	Gd	Fo	35		20	Massive, finely foliated mafic schist. Fine 2-3mm bands of green chlorite (after amphibole) and dark grey magnetite. Strongly magnetic with magnetite as foliation bands.





**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

**Nimrodel Mines Ltd - radiometrics**

Project	Prospect	BHID	From	To	µSv/h
Tas	Specimen_Ck	NS001	0	5	0.08
Tas	Specimen_Ck	NS001	5	10	0.08
Tas	Specimen_Ck	NS001	10	15	0.07
Tas	Specimen_Ck	NS001	15	20	0.07
Tas	Specimen_Ck	NS001	20	25	0.08
Tas	Specimen_Ck	NS001	25	30	0.06
Tas	Specimen_Ck	NS001	30	35	0.06
Tas	Specimen_Ck	NS001	35	40	0.07
Tas	Specimen_Ck	NS001	40	45	0.08
Tas	Specimen_Ck	NS001	45	50	0.09
Tas	Specimen_Ck	NS001	50	55	0.08
Tas	Specimen_Ck	NS001	55	60	0.08
Tas	Specimen_Ck	NS001	60	65	0.1
Tas	Specimen_Ck	NS001	65	70	0.11
Tas	Specimen_Ck	NS001	70	75	0.1
Tas	Specimen_Ck	NS001	75	80	0.09
Tas	Specimen_Ck	NS001	80	85	0.09
Tas	Specimen_Ck	NS001	85	90	0.11
Tas	Specimen_Ck	NS001	90	95	0.1
Tas	Specimen_Ck	NS001	95	100	0.1
Tas	Specimen_Ck	NS001	100	105	0.11
Tas	Specimen_Ck	NS001	105	110	0.11
Tas	Specimen_Ck	NS001	110	115	0.11
Tas	Specimen_Ck	NS001	115	120	0.1
Tas	Specimen_Ck	NS001	120	125	0.09
Tas	Specimen_Ck	NS001	125	130	0.07
Tas	Specimen_Ck	NS001	130	135	0.07
Tas	Specimen_Ck	NS001	135	140	0.07
Tas	Specimen_Ck	NS001	140	145	0.09
Tas	Specimen_Ck	NS001	145	150	0.08
Tas	Specimen_Ck	NS001	150	155	0.07
Tas	Specimen_Ck	NS001	155	160	0.08
Tas	Specimen_Ck	NS001	160	165	0.01
Tas	Specimen_Ck	NS001	165	170	0.01
Tas	Specimen_Ck	NS001	170	175	0.09
Tas	Specimen_Ck	NS001	175	180	0.09
Tas	Specimen_Ck	NS001	180	185	0.09
Tas	Specimen_Ck	NS001	185	190	0.1
Tas	Specimen_Ck	NS001	190	195	0.1
Tas	Specimen_Ck	NS001	195	200	0.12
Tas	Specimen_Ck	NS001	200	205	0.09
Tas	Specimen_Ck	NS001	205	210	0.1
Tas	Specimen_Ck	NS001	210	215	0.11
Tas	Specimen_Ck	NS001	215	220	0.12
Tas	Specimen_Ck	NS001	220	225	0.11
Tas	Specimen_Ck	NS001	225	230	0.09
Tas	Specimen_Ck	NS001	230	235	0.09
Tas	Specimen_Ck	NS001	235	240	0.09
Tas	Specimen_Ck	NS001	240	245	0.08
Tas	Specimen_Ck	NS001	245	250	0.08



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

**Nimrodel Mines Ltd - Magnetic Susceptibility**

Project	Prospect	BHID	From	To	SI x 10-3
Tas	Specimen Ck	NS001	0	6	0
Tas	Specimen Ck	NS001	6	7	0.11
Tas	Specimen Ck	NS001	7	8	0.1
Tas	Specimen Ck	NS001	8	9	0.06
Tas	Specimen Ck	NS001	9	10	0.22
Tas	Specimen Ck	NS001	10	11	0.11
Tas	Specimen Ck	NS001	11	12	0.04
Tas	Specimen Ck	NS001	12	13	0
Tas	Specimen Ck	NS001	13	14	0
Tas	Specimen Ck	NS001	14	15	0.1
Tas	Specimen Ck	NS001	15	16	0
Tas	Specimen Ck	NS001	16	17	2.38
Tas	Specimen Ck	NS001	17	18	2.19
Tas	Specimen Ck	NS001	18	19	2.37
Tas	Specimen Ck	NS001	19	20	1.45
Tas	Specimen Ck	NS001	20	21	1.62
Tas	Specimen Ck	NS001	21	22	1.58
Tas	Specimen Ck	NS001	22	23	3.11
Tas	Specimen Ck	NS001	23	24	0.09
Tas	Specimen Ck	NS001	24	25	0.17
Tas	Specimen Ck	NS001	25	26	0.12
Tas	Specimen Ck	NS001	26	27	0.04
Tas	Specimen Ck	NS001	27	28	0.06
Tas	Specimen Ck	NS001	28	29	0.07
Tas	Specimen Ck	NS001	29	30	0.09
Tas	Specimen Ck	NS001	30	31	0.11
Tas	Specimen Ck	NS001	31	32	0.13
Tas	Specimen Ck	NS001	32	33	0
Tas	Specimen Ck	NS001	33	34	0.03
Tas	Specimen Ck	NS001	34	35	0.1
Tas	Specimen Ck	NS001	35	36	0.16
Tas	Specimen Ck	NS001	36	37	0.07
Tas	Specimen Ck	NS001	37	38	0.04
Tas	Specimen Ck	NS001	38	39	0.16
Tas	Specimen Ck	NS001	39	40	0.16
Tas	Specimen Ck	NS001	40	41	0.08
Tas	Specimen Ck	NS001	41	42	0.08
Tas	Specimen Ck	NS001	42	43	0.13
Tas	Specimen Ck	NS001	43	44	0.13
Tas	Specimen Ck	NS001	44	45	0.12
Tas	Specimen Ck	NS001	45	46	0.23
Tas	Specimen Ck	NS001	46	47	0
Tas	Specimen Ck	NS001	47	48	0.07
Tas	Specimen Ck	NS001	48	49	0.06
Tas	Specimen Ck	NS001	49	50	5.13
Tas	Specimen Ck	NS001	50	51	10.48
Tas	Specimen Ck	NS001	51	52	6.61
Tas	Specimen Ck	NS001	52	53	167.9
Tas	Specimen Ck	NS001	53	54	68.73
Tas	Specimen Ck	NS001	54	55	76.52
Tas	Specimen Ck	NS001	55	56	11.18
Tas	Specimen Ck	NS001	56	57	46.1
Tas	Specimen Ck	NS001	57	58	150.4
Tas	Specimen Ck	NS001	58	59	21.7
Tas	Specimen Ck	NS001	59	60	12.88
Tas	Specimen Ck	NS001	60	61	17.31
Tas	Specimen Ck	NS001	61	62	21.08
Tas	Specimen Ck	NS001	62	63	38.22
Tas	Specimen Ck	NS001	63	64	11.14
Tas	Specimen Ck	NS001	64	65	5.2
Tas	Specimen Ck	NS001	65	66	0.22
Tas	Specimen Ck	NS001	66	67	40.85
Tas	Specimen Ck	NS001	67	68	46.53
Tas	Specimen Ck	NS001	68	69	60.36
Tas	Specimen Ck	NS001	69	70	101.1
Tas	Specimen Ck	NS001	70	71	72.2
Tas	Specimen Ck	NS001	71	72	0.32



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

**Nimrodel Mines Ltd - Magnetic Susceptibility**

Project	Prospect	BHID	From	To	SI x 10-3
Tas	Specimen Ck	NS001	72	73	13.43
Tas	Specimen Ck	NS001	73	74	19.86
Tas	Specimen Ck	NS001	74	75	36.85
Tas	Specimen Ck	NS001	75	76	64.52
Tas	Specimen Ck	NS001	76	77	22.92
Tas	Specimen Ck	NS001	77	78	47.6
Tas	Specimen Ck	NS001	78	79	32.95
Tas	Specimen Ck	NS001	79	80	3.18
Tas	Specimen Ck	NS001	80	81	15.32
Tas	Specimen Ck	NS001	81	82	8.29
Tas	Specimen Ck	NS001	82	83	10.8
Tas	Specimen Ck	NS001	83	84	11.11
Tas	Specimen Ck	NS001	84	85	25.33
Tas	Specimen Ck	NS001	85	86	52.61
Tas	Specimen Ck	NS001	86	87	28.71
Tas	Specimen Ck	NS001	87	88	18.25
Tas	Specimen Ck	NS001	88	89	6.14
Tas	Specimen Ck	NS001	89	90	16.37
Tas	Specimen Ck	NS001	90	91	15.57
Tas	Specimen Ck	NS001	91	92	49.41
Tas	Specimen Ck	NS001	92	93	13.1
Tas	Specimen Ck	NS001	93	94	4.2
Tas	Specimen Ck	NS001	94	95	6.91
Tas	Specimen Ck	NS001	95	96	14.54
Tas	Specimen Ck	NS001	96	97	26.29
Tas	Specimen Ck	NS001	97	98	10.44
Tas	Specimen Ck	NS001	98	99	29
Tas	Specimen Ck	NS001	99	100	32.32
Tas	Specimen Ck	NS001	100	101	26.95
Tas	Specimen Ck	NS001	101	102	9.67
Tas	Specimen Ck	NS001	102	103	39.27
Tas	Specimen Ck	NS001	103	104	3.41
Tas	Specimen Ck	NS001	104	105	58.5
Tas	Specimen Ck	NS001	105	106	68.6
Tas	Specimen Ck	NS001	106	107	12.08
Tas	Specimen Ck	NS001	107	108	35.62
Tas	Specimen Ck	NS001	108	109	21.23
Tas	Specimen Ck	NS001	109	110	10.01
Tas	Specimen Ck	NS001	110	111	44.63
Tas	Specimen Ck	NS001	111	112	10.59
Tas	Specimen Ck	NS001	112	113	6.95
Tas	Specimen Ck	NS001	113	114	150.6
Tas	Specimen Ck	NS001	114	115	181
Tas	Specimen Ck	NS001	115	116	103.2
Tas	Specimen Ck	NS001	116	117	50.99
Tas	Specimen Ck	NS001	117	118	59.23
Tas	Specimen Ck	NS001	118	119	39.81
Tas	Specimen Ck	NS001	119	120	50.78
Tas	Specimen Ck	NS001	120	121	76.74
Tas	Specimen Ck	NS001	121	122	160.9
Tas	Specimen Ck	NS001	122	123	58.72
Tas	Specimen Ck	NS001	123	124	71.44
Tas	Specimen Ck	NS001	124	125	71.15
Tas	Specimen Ck	NS001	125	126	77.52
Tas	Specimen Ck	NS001	126	127	77.13
Tas	Specimen Ck	NS001	127	128	48.83
Tas	Specimen Ck	NS001	128	129	89.32
Tas	Specimen Ck	NS001	129	130	68.98
Tas	Specimen Ck	NS001	130	131	63.39
Tas	Specimen Ck	NS001	131	132	66.98
Tas	Specimen Ck	NS001	132	133	63.63
Tas	Specimen Ck	NS001	133	134	38.54
Tas	Specimen Ck	NS001	134	135	26.59
Tas	Specimen Ck	NS001	135	136	58.4
Tas	Specimen Ck	NS001	136	137	74.31
Tas	Specimen Ck	NS001	137	138	577.8
Tas	Specimen Ck	NS001	138	139	28.8
Tas	Specimen Ck	NS001	139	140	17.15
Tas	Specimen Ck	NS001	140	141	30.71
Tas	Specimen Ck	NS001	141	142	12.52
Tas	Specimen Ck	NS001	142	143	19.18
Tas	Specimen Ck	NS001	143	144	11.96
Tas	Specimen Ck	NS001	144	145	36.03
Tas	Specimen Ck	NS001	145	146	2.58
Tas	Specimen Ck	NS001	146	147	45.96



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

**Nimrod Mines Ltd - Magnetic Susceptibility**

Project	Prospect	BHID	From	To	SI x 10 <sup>-3</sup>
Tas	Specimen_Ck	NS001	147	148	68.83
Tas	Specimen_Ck	NS001	148	149	59.98
Tas	Specimen_Ck	NS001	149	150	46.73
Tas	Specimen_Ck	NS001	150	151	79.4
Tas	Specimen_Ck	NS001	151	152	452.5
Tas	Specimen_Ck	NS001	152	153	87.07
Tas	Specimen_Ck	NS001	153	154	115.8
Tas	Specimen_Ck	NS001	154	155	131.7
Tas	Specimen_Ck	NS001	155	156	54.74
Tas	Specimen_Ck	NS001	156	157	23.96
Tas	Specimen_Ck	NS001	157	158	8.21
Tas	Specimen_Ck	NS001	158	159	2.53
Tas	Specimen_Ck	NS001	159	160	0.51
Tas	Specimen_Ck	NS001	160	161	6.16
Tas	Specimen_Ck	NS001	161	162	0.11
Tas	Specimen_Ck	NS001	162	163	0.11
Tas	Specimen_Ck	NS001	163	164	0.41
Tas	Specimen_Ck	NS001	164	165	9.3
Tas	Specimen_Ck	NS001	165	166	10.99
Tas	Specimen_Ck	NS001	166	167	5.16
Tas	Specimen_Ck	NS001	167	168	1.81
Tas	Specimen_Ck	NS001	168	169	7.84
Tas	Specimen_Ck	NS001	169	170	26.53
Tas	Specimen_Ck	NS001	170	171	21.01
Tas	Specimen_Ck	NS001	171	172	33.9
Tas	Specimen_Ck	NS001	172	173	0.48
Tas	Specimen_Ck	NS001	173	174	0.18
Tas	Specimen_Ck	NS001	174	175	0.24
Tas	Specimen_Ck	NS001	175	176	0
Tas	Specimen_Ck	NS001	176	177	0
Tas	Specimen_Ck	NS001	177	178	0.23
Tas	Specimen_Ck	NS001	178	179	0.27
Tas	Specimen_Ck	NS001	179	180	0.22
Tas	Specimen_Ck	NS001	180	181	0.25
Tas	Specimen_Ck	NS001	181	182	0.16
Tas	Specimen_Ck	NS001	182	183	0.24
Tas	Specimen_Ck	NS001	183	184	0.24
Tas	Specimen_Ck	NS001	184	185	31.97
Tas	Specimen_Ck	NS001	185	186	16.32
Tas	Specimen_Ck	NS001	186	187	25.26
Tas	Specimen_Ck	NS001	187	188	19.38
Tas	Specimen_Ck	NS001	188	189	0.82
Tas	Specimen_Ck	NS001	189	190	16.95
Tas	Specimen_Ck	NS001	190	191	13.44
Tas	Specimen_Ck	NS001	191	192	12.98
Tas	Specimen_Ck	NS001	192	193	23.94
Tas	Specimen_Ck	NS001	193	194	45.21
Tas	Specimen_Ck	NS001	194	195	45.99
Tas	Specimen_Ck	NS001	195	196	3.65
Tas	Specimen_Ck	NS001	196	197	2.65
Tas	Specimen_Ck	NS001	197	198	16.92
Tas	Specimen_Ck	NS001	198	199	48.52
Tas	Specimen_Ck	NS001	199	200	24.84
Tas	Specimen_Ck	NS001	200	201	45.07
Tas	Specimen_Ck	NS001	201	202	23.16
Tas	Specimen_Ck	NS001	202	203	37.85
Tas	Specimen_Ck	NS001	203	204	9.28
Tas	Specimen_Ck	NS001	204	205	20.98
Tas	Specimen_Ck	NS001	205	206	30.53
Tas	Specimen_Ck	NS001	206	207	17.68
Tas	Specimen_Ck	NS001	207	208	22.61
Tas	Specimen_Ck	NS001	208	209	7.39



Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

**Nimrodel Mines Ltd - Magnetic Susceptibility**

Project	Prospect	BHID	From	To	SI x 10-3
Tas	Specimen_Ck	NS001	209	210	13.86
Tas	Specimen_Ck	NS001	210	211	27.18
Tas	Specimen_Ck	NS001	211	212	3.36
Tas	Specimen_Ck	NS001	212	213	56.77
Tas	Specimen_Ck	NS001	213	214	26
Tas	Specimen_Ck	NS001	214	215	0.55
Tas	Specimen_Ck	NS001	215	216	15.35
Tas	Specimen_Ck	NS001	216	217	1.9
Tas	Specimen_Ck	NS001	217	218	74.56
Tas	Specimen_Ck	NS001	218	219	17.11
Tas	Specimen_Ck	NS001	219	220	1.28
Tas	Specimen_Ck	NS001	220	221	27.65
Tas	Specimen_Ck	NS001	221	222	48.38
Tas	Specimen_Ck	NS001	222	223	42.45
Tas	Specimen_Ck	NS001	223	224	56.79
Tas	Specimen_Ck	NS001	224	225	43.73
Tas	Specimen_Ck	NS001	225	226	5.82
Tas	Specimen_Ck	NS001	226	227	0.42
Tas	Specimen_Ck	NS001	227	228	0.17
Tas	Specimen_Ck	NS001	228	229	0.19
Tas	Specimen_Ck	NS001	229	230	4.26
Tas	Specimen_Ck	NS001	230	231	2.78
Tas	Specimen_Ck	NS001	231	232	0.18
Tas	Specimen_Ck	NS001	232	233	10.74
Tas	Specimen_Ck	NS001	233	234	0.2
Tas	Specimen_Ck	NS001	234	235	0.29
Tas	Specimen_Ck	NS001	235	236	0.18
Tas	Specimen_Ck	NS001	236	237	9.78
Tas	Specimen_Ck	NS001	237	238	13.25
Tas	Specimen_Ck	NS001	238	239	0.33
Tas	Specimen_Ck	NS001	239	240	1.22
Tas	Specimen_Ck	NS001	240	241	0.36
Tas	Specimen_Ck	NS001	241	242	0.2
Tas	Specimen_Ck	NS001	242	243	0.1
Tas	Specimen_Ck	NS001	243	244	1.24
Tas	Specimen_Ck	NS001	244	245	0.01
Tas	Specimen_Ck	NS001	245	245.8	8.43







**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

**Nimrodel Mines Ltd - Drill Hole Log**

Project	Prospect	BHID	From	To	Stratigraphy	Lithology	Alteration	Weathering	Crystal form	Grainsize	Colour	Visual S%	DH Contact	Structure	BCA	geocode	Vis_mag	Description/comments
Tas	Comstaff C	NS002	0.0	9.5		LOSS		X										No Core recovery, Clay.
Tas	Comstaff C	NS002	9.5	13.3	Pbf	QZIT	SiCh	M		FG	A3		Gd					Weakly weathered, extremely broken and disrupted massive quartzite? Intense pervasive silicification and weak chlorite alteration. Jointed and broken. Minor hematite on Joint surfaces.
Tas	Comstaff C	NS002	13.3	21.3	Pbf	LBAF	SiCh	F		FG	A3		Ft					Massive moderate grey to green basalt? Intense pervasive silicification and chlorite alteration. Hematite and chlorite on joint surfaces. Very broken. Pervasive fine grained magnetite.
Tas	Comstaff C	NS002	21.3	21.6		FALT	SiCy	F		FG	A3		Ft					Puggy brittle fault. Clay and silicified basalt rubble.
Tas	Comstaff C	NS002	21.6	29.6	Pbf	LBAF	SiCh	F		FG	A3		Sp					Massive moderate grey to green basalt? Intense pervasive albite - silica and chlorite alteration. Hematite and chlorite on joint surfaces. Very hard. Minor quartz-albite veins with trace euhedral py. Pervasive fine grained magnetite.
Tas	Comstaff C	NS002	29.6	32.1	Pbf	IBPM	ChAc	F		MG	G5		Sp	Bd	70			Massive, dark green, medium grained actinolite-chlorite altered dolerite with intense silicification. Massive with sharp intrusive contacts. Fine crystalline granophyric texture.
Tas	Comstaff C	NS002	32.1	33.5	Pbf	LBAF	SiCh	F		FG	A3		Sp					Massive moderate grey to green basalt? Intense pervasive albite - silica and chlorite alteration. Red hematite and chlorite on joint surfaces. Very hard. Minor quartz-albite veins with trace euhedral py and red hematite.
Tas	Comstaff C	NS002	33.5	34.0		FALT	SiCy	F		FG	A3		Ft					Puggy brittle fault. Clay and silicified basalt rubble.
Tas	Comstaff C	NS002	34.0	52.0	Pbf	LBAF	SiCh	F		FG	A3		Gd					Massive moderate grey to green basalt? Intense pervasive albite - silica and chlorite alteration. Red hematite and chlorite on joint surfaces. Very hard. Minor quartz-albite veins with trace euhedral py and red hematite.
Tas	Comstaff C	NS002	52.0	84.5	Pbf	LBAF	SiCh	F		FG	A3		Sp					Massive moderate grey to green basalt? Intense pervasive albite - silica and chlorite alteration. Red hematite and chlorite on joint surfaces decreasing downhole. Very hard. Minor quartz-albite veins with trace euhedral py and hematite. Pervasive fine grained magnetite.
Tas	Comstaff C	NS002	84.5	91.2	Pbf	IBPM	ChAc	F		MG	G5		Sp	Bd	70			Massive, dark green, medium grained actinolite-chlorite altered dolerite with intense silicification. Massive with sharp intrusive contacts. Fine crystalline granophyric texture (Plagioclase and actinolite?). Minor magnetite veining.



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

**Nimrodel Ltd - Drill Hole Log**

Project	Prospect	BHID	From	To	Stratigraphy	Lithology	Alteration	Weathering	Crystal form	Grainsize	Colour	Visual S%	DH Contact	Structure	BCA	geocode	Vis_mag	Description/comments
Tas	Comstaff	NS002	91.2	98.3	Pbf	LBAF	SiCh	F		FG	A3		Sp					Massive moderate grey to green basalt? Intense pervasive albite - silica and chlorite alteration. Chlorite on joint surfaces. Pervasive fine grained magnetite. Very hard. Minor quartz-albite veins with trace euhedral py.
Tas	Comstaff	NS002	98.3	103.4	Pbf	IBPM	ChAc	F		MG	G5	0.1	Sp	Bd	70			Massive, dark green, medium grained actinolite-chlorite altered dolerite with intense silicification. Massive with sharp intrusive contacts. Fine crystalline granophyric texture (Plagioclase and actinolite?). Minor magnetite veining.
Tas	Comstaff	NS002	103.4	113.4	Pbf	LBAF	SiCh	F		FG	A3		Sp					Massive moderate grey to green basalt? Intense pervasive albite - silica and chlorite alteration. Chlorite on joint surfaces. Pervasive fine grained magnetite. Very hard. Minor quartz-albite veins with trace euhedral py.
Tas	Comstaff	NS002	113.4	114.0		FALT	SiCy	F		CG	G4		Ft					Intensely brecciated puggy brittle fault.
Tas	Comstaff	NS002	114.0	117.1	Pbf	LBAF	SiCh	F		FG	A3		Sp					Massive moderate grey to green basalt? Intense pervasive albite - silica and chlorite alteration. Chlorite on joint surfaces. Pervasive fine grained magnetite. Very hard. Increasing brittle fracturing.
Tas	Comstaff	NS002	117.1	117.5		FALT	SiCy	F		CG	G4		Ft					Intensely brecciated puggy brittle fault.
Tas	Comstaff	NS002	117.5	121.8	Pbf	LBAF	SiCh	F		FG	A3		Sp					Massive moderate grey to green basalt? Intense pervasive albite - silica and chlorite alteration. Chlorite on joint surfaces. Pervasive fine grained magnetite. Very hard. Increasing brittle fracturing.
Tas	Comstaff	NS002	121.8	122.3		QZIT	Si	F		FG	A2			Fo	30			Massive pale grey intensely silicified sandstone/conglomerate?
Tas	Comstaff	NS002	122.3	129.0		FALT	SiCy	F		CG	G2		Ft	Fo	25			Intensely sheared and brecciated fault zone. Puggy clay and intense sericite-quartz veining.
Tas	Comstaff	NS002	129.0	132.4		FALT	SiCy	F		CG	G2	2.0	Ft	Fo	25			Intensely sheared and brecciated fault zone. Puggy clay and intense sericite-quartz veining. Disseminated and banded Py to 2%.
Tas	Comstaff	NS002	132.4	140.5		FALT	SiCy	F		CG	G2	1.0	Ft	Fo	25			Intensely sheared and brecciated fault zone. Puggy clay and intense sericite-quartz veining. Very broken. Py to 1% as disseminations.
Tas	Comstaff	NS002	140.5	143.7		FALT	Si	F		FG	B3	5.0	Ft	Fo	30			Intensely silicified and foliated basalt?. Brown fine biotite? 5% Py banding.
Tas	Comstaff	NS002	143.7	169.0		FALT	SiCy	F		CG	G2	1.0	Ft	Fo	25			Intensely sheared and brecciated fault zone. Puggy clay and intense sericite-quartz veining. Very broken. Py to 1% as disseminations.





**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

**Nimrodel Mines Ltd -Magnetic Susceptibility**

Project	Prospect	BHID	From	To	Rec	Rec %	Magsus x 10-3
Tas	Comstaff Ck.	NS002	10	11	0.3	30	23.6
Tas	Comstaff Ck.	NS002	11	12	0.6	60	5.68
Tas	Comstaff Ck.	NS002	12	13	0.2	20	0.103
Tas	Comstaff Ck.	NS002	13	14	1	100	0.263
Tas	Comstaff Ck.	NS002	14	15	1	100	0.537
Tas	Comstaff Ck.	NS002	15	16	1	100	29.43
Tas	Comstaff Ck.	NS002	16	17	0.7	70	0.95
Tas	Comstaff Ck.	NS002	17	18	0.7	70	31.7
Tas	Comstaff Ck.	NS002	18	19	0.8	80	30.14
Tas	Comstaff Ck.	NS002	19	20	0.9	90	6.66
Tas	Comstaff Ck.	NS002	20	21	0.6	60	31.08
Tas	Comstaff Ck.	NS002	21	22	1	100	49.29
Tas	Comstaff Ck.	NS002	22	23	0.9	90	3.65
Tas	Comstaff Ck.	NS002	23	24	1	100	1.71
Tas	Comstaff Ck.	NS002	24	25	1	100	16.8
Tas	Comstaff Ck.	NS002	25	26	1	100	12.25
Tas	Comstaff Ck.	NS002	26	27	1	100	3.08
Tas	Comstaff Ck.	NS002	27	28	1	100	40.62
Tas	Comstaff Ck.	NS002	28	29	1	100	35.76
Tas	Comstaff Ck.	NS002	29	30	1	100	4.93
Tas	Comstaff Ck.	NS002	30	31	1	100	2.06
Tas	Comstaff Ck.	NS002	31	32	1	100	2.49
Tas	Comstaff Ck.	NS002	32	33	1	100	2.49
Tas	Comstaff Ck.	NS002	33	34	1	100	20.91
Tas	Comstaff Ck.	NS002	34	35	1	100	22.57
Tas	Comstaff Ck.	NS002	35	36	1	100	34.27
Tas	Comstaff Ck.	NS002	36	37	1	100	3.62
Tas	Comstaff Ck.	NS002	37	38	1	100	75.73
Tas	Comstaff Ck.	NS002	38	39	1	100	133.1
Tas	Comstaff Ck.	NS002	39	40	1	100	5.68
Tas	Comstaff Ck.	NS002	40	41	1	100	54.95
Tas	Comstaff Ck.	NS002	41	42	1	100	8.91
Tas	Comstaff Ck.	NS002	42	43	1	100	28.43
Tas	Comstaff Ck.	NS002	43	44	1	100	49.62
Tas	Comstaff Ck.	NS002	44	45	1	100	19.06
Tas	Comstaff Ck.	NS002	45	46	1	100	1.03
Tas	Comstaff Ck.	NS002	46	47	1	100	8.02
Tas	Comstaff Ck.	NS002	47	48	1	100	49.26
Tas	Comstaff Ck.	NS002	48	49	1	100	9.59
Tas	Comstaff Ck.	NS002	49	50	1	100	0.66
Tas	Comstaff Ck.	NS002	50	51	1	100	42.44
Tas	Comstaff Ck.	NS002	51	52	1	100	40.36
Tas	Comstaff Ck.	NS002	52	53	1	100	60.06
Tas	Comstaff Ck.	NS002	53	54	1	100	51.98
Tas	Comstaff Ck.	NS002	54	55	1	100	40.37
Tas	Comstaff Ck.	NS002	55	56	1	100	14.46
Tas	Comstaff Ck.	NS002	56	57	0.9	90	12.92
Tas	Comstaff Ck.	NS002	57	58	1	100	24.47
Tas	Comstaff Ck.	NS002	58	59	0.8	80	50.54
Tas	Comstaff Ck.	NS002	59	60	1	100	16
Tas	Comstaff Ck.	NS002	60	61	1	100	1.95
Tas	Comstaff Ck.	NS002	61	62	1	100	0.47
Tas	Comstaff Ck.	NS002	62	63	1	100	3.54
Tas	Comstaff Ck.	NS002	63	64	1	100	1.26
Tas	Comstaff Ck.	NS002	64	65	0.9	90	6.79
Tas	Comstaff Ck.	NS002	65	66	1	100	5.2
Tas	Comstaff Ck.	NS002	66	67	1	100	1.98
Tas	Comstaff Ck.	NS002	67	68	1	100	0.66



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

**Nimrodel Mines Ltd -Magnetic Susceptibility**

Project	Prospect	BHID	From	To	Rec	Rec %	Magsus x 10-3
Tas	Comstaff Ck.	NS002	68	69	1	100	5.16
Tas	Comstaff Ck.	NS002	69	70	1	100	10.76
Tas	Comstaff Ck.	NS002	70	71	1	100	6.7
Tas	Comstaff Ck.	NS002	71	72	1	100	7.17
Tas	Comstaff Ck.	NS002	72	73	1	100	3.58
Tas	Comstaff Ck.	NS002	73	74	1	100	19.75
Tas	Comstaff Ck.	NS002	74	75	1	100	16.06
Tas	Comstaff Ck.	NS002	75	76	1	100	4.58
Tas	Comstaff Ck.	NS002	76	77	1	100	25.87
Tas	Comstaff Ck.	NS002	77	78	1	100	42.52
Tas	Comstaff Ck.	NS002	78	79	1	100	7.6
Tas	Comstaff Ck.	NS002	79	80	1	100	6.57
Tas	Comstaff Ck.	NS002	80	81	1	100	101.7
Tas	Comstaff Ck.	NS002	81	82	1	100	14.31
Tas	Comstaff Ck.	NS002	82	83	1	100	94.56
Tas	Comstaff Ck.	NS002	83	84	1	100	18.75
Tas	Comstaff Ck.	NS002	84	85	1	100	34.17
Tas	Comstaff Ck.	NS002	85	86	1	100	9.45
Tas	Comstaff Ck.	NS002	86	87	1	100	208.9
Tas	Comstaff Ck.	NS002	87	88	1	100	0.32
Tas	Comstaff Ck.	NS002	88	89	1	100	38.02
Tas	Comstaff Ck.	NS002	89	90	1	100	11.79
Tas	Comstaff Ck.	NS002	90	91	1	100	9.15
Tas	Comstaff Ck.	NS002	91	92	1	100	17.79
Tas	Comstaff Ck.	NS002	92	93	1	100	1.49
Tas	Comstaff Ck.	NS002	93	94	1	100	33.53
Tas	Comstaff Ck.	NS002	94	95	1	100	35.68
Tas	Comstaff Ck.	NS002	95	96	1	100	24.43
Tas	Comstaff Ck.	NS002	96	97	1	100	23.74
Tas	Comstaff Ck.	NS002	97	98	1	100	55.71
Tas	Comstaff Ck.	NS002	98	99	1	100	6.02
Tas	Comstaff Ck.	NS002	99	100	1	100	32.55
Tas	Comstaff Ck.	NS002	100	101	1	100	47.09
Tas	Comstaff Ck.	NS002	101	102	1	100	52.42
Tas	Comstaff Ck.	NS002	102	103	1	100	2.06
Tas	Comstaff Ck.	NS002	103	104	1	100	6.11
Tas	Comstaff Ck.	NS002	104	105	1	100	15.37
Tas	Comstaff Ck.	NS002	105	106	1	100	34.42
Tas	Comstaff Ck.	NS002	106	107	1	100	74.22
Tas	Comstaff Ck.	NS002	107	108	1	100	32.12
Tas	Comstaff Ck.	NS002	108	109	1	100	11.79
Tas	Comstaff Ck.	NS002	109	110	1	100	24.26
Tas	Comstaff Ck.	NS002	110	111	1	100	9.95
Tas	Comstaff Ck.	NS002	111	112	1	100	11.85
Tas	Comstaff Ck.	NS002	112	113	1	100	34.13
Tas	Comstaff Ck.	NS002	113	114	1	100	1.88
Tas	Comstaff Ck.	NS002	114	115	1	100	10.92
Tas	Comstaff Ck.	NS002	115	116	1	100	11.17
Tas	Comstaff Ck.	NS002	116	117	1	100	9.56
Tas	Comstaff Ck.	NS002	117	118	1	100	17.45
Tas	Comstaff Ck.	NS002	118	119	1	100	11.33
Tas	Comstaff Ck.	NS002	119	120	1	100	24.97
Tas	Comstaff Ck.	NS002	120	121	1	100	0.67
Tas	Comstaff Ck.	NS002	121	122	1	100	0.2
Tas	Comstaff Ck.	NS002	122	123	1	100	15.12
Tas	Comstaff Ck.	NS002	123	124	1	100	0.07
Tas	Comstaff Ck.	NS002	124	125	0.5	50	0
Tas	Comstaff Ck.	NS002	125	126	1	100	0



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

**Nimrodel Mines Ltd -Magnetic Susceptibility**

Project	Prospect	BHID	From	To	Rec	Rec %	Magsus x 10-3
Tas	Comstaff Ck.	NS002	126	127	1	100	0.06
Tas	Comstaff Ck.	NS002	127	128	1	100	0.88
Tas	Comstaff Ck.	NS002	128	129	1	100	0.08
Tas	Comstaff Ck.	NS002	129	130	1	100	0.23
Tas	Comstaff Ck.	NS002	130	131	1	100	0.11
Tas	Comstaff Ck.	NS002	131	132	1	100	0.17
Tas	Comstaff Ck.	NS002	132	133	1	100	0.07
Tas	Comstaff Ck.	NS002	133	134	1	100	0.13
Tas	Comstaff Ck.	NS002	134	135	1	100	0.1
Tas	Comstaff Ck.	NS002	135	136	0.8	80	0.06
Tas	Comstaff Ck.	NS002	136	137	1	100	0.01
Tas	Comstaff Ck.	NS002	137	138	1	100	0.01
Tas	Comstaff Ck.	NS002	138	139	1	100	0.12
Tas	Comstaff Ck.	NS002	139	140	1	100	0.08
Tas	Comstaff Ck.	NS002	140	141	1	100	0.06
Tas	Comstaff Ck.	NS002	141	142	1	100	0.01
Tas	Comstaff Ck.	NS002	142	143	1	100	0.06
Tas	Comstaff Ck.	NS002	143	144	1	100	0.11
Tas	Comstaff Ck.	NS002	144	145	0.7	70	0.12
Tas	Comstaff Ck.	NS002	145	146	1	100	0
Tas	Comstaff Ck.	NS002	146	147	1	100	0.03
Tas	Comstaff Ck.	NS002	147	148	1	100	0.06
Tas	Comstaff Ck.	NS002	148	149	1	100	0
Tas	Comstaff Ck.	NS002	149	150	1	100	0.05
Tas	Comstaff Ck.	NS002	150	151	1	100	0
Tas	Comstaff Ck.	NS002	151	152	1	100	0
Tas	Comstaff Ck.	NS002	152	153	1	100	0
Tas	Comstaff Ck.	NS002	153	154	1	100	0.55
Tas	Comstaff Ck.	NS002	154	155	1	100	0.07
Tas	Comstaff Ck.	NS002	155	156	1	100	0.07
Tas	Comstaff Ck.	NS002	156	157	1	100	0.1
Tas	Comstaff Ck.	NS002	157	158	1	100	0.04
Tas	Comstaff Ck.	NS002	158	159	0.7	70	0.04
Tas	Comstaff Ck.	NS002	159	160	0.5	50	0.02
Tas	Comstaff Ck.	NS002	160	161	0.6	60	0.12
Tas	Comstaff Ck.	NS002	161	162	0.7	70	0.06
Tas	Comstaff Ck.	NS002	162	163	0.5	50	0.05
Tas	Comstaff Ck.	NS002	163	164	0.6	60	0.08
Tas	Comstaff Ck.	NS002	164	165	0.8	80	0.07
Tas	Comstaff Ck.	NS002	165	166	0.4	40	0.06
Tas	Comstaff Ck.	NS002	166	167	0	0	
Tas	Comstaff Ck.	NS002	167	168	0.3	30	0.11
Tas	Comstaff Ck.	NS002	168	169	0.2	20	0.12
Tas	Comstaff Ck.	NS002	169	170	1	100	0.16
Tas	Comstaff Ck.	NS002	170	171	1	100	0.25
Tas	Comstaff Ck.	NS002	171	172	1	100	0.11
Tas	Comstaff Ck.	NS002	172	173	1	100	0.09
Tas	Comstaff Ck.	NS002	173	174	1	100	0.07
Tas	Comstaff Ck.	NS002	174	175	1	100	0.06
Tas	Comstaff Ck.	NS002	175	176	1	100	0.14
Tas	Comstaff Ck.	NS002	176	177	1	100	0.06
Tas	Comstaff Ck.	NS002	177	178	1	100	0.06
Tas	Comstaff Ck.	NS002	178	179	1	100	0.13
Tas	Comstaff Ck.	NS002	179	180	1	100	0.08
Tas	Comstaff Ck.	NS002	180	181	1	100	0.26
Tas	Comstaff Ck.	NS002	181	182	1	100	0.08
Tas	Comstaff Ck.	NS002	182	183	1	100	0.12
Tas	Comstaff Ck.	NS002	183	184	1	100	0.24



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

**Nimrodel Mines Ltd -Magnetic Susceptibility**

<b>Project</b>	<b>Prospect</b>	<b>BHID</b>	<b>From</b>	<b>To</b>	<b>Rec</b>	<b>Rec %</b>	<b>Magsus x 10-3</b>
Tas	Comstaff Ck.	NS002	184	185	1	100	0.2
Tas	Comstaff Ck.	NS002	185	186	1	100	0.16
Tas	Comstaff Ck.	NS002	186	187	1	100	0.08
Tas	Comstaff Ck.	NS002	187	188	1	100	0.05
Tas	Comstaff Ck.	NS002	188	189	1	100	0.13
Tas	Comstaff Ck.	NS002	189	190	1	100	0.05
Tas	Comstaff Ck.	NS002	190	191	1	100	0.11
Tas	Comstaff Ck.	NS002	191	192	1	100	0.22
Tas	Comstaff Ck.	NS002	192	193	1	100	0.51
Tas	Comstaff Ck.	NS002	193	194	1	100	0
Tas	Comstaff Ck.	NS002	194	195	1	100	0.09
Tas	Comstaff Ck.	NS002	195	196	1	100	0.03
Tas	Comstaff Ck.	NS002	196	197	1	100	0.12
Tas	Comstaff Ck.	NS002	197	198	1	100	0.08
Tas	Comstaff Ck.	NS002	198	199	1	100	0.12
Tas	Comstaff Ck.	NS002	199	199.8	0.6	60	0.11



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

<b>Nimrodel Mines Ltd - radiometrics</b>					
<b>Project</b>	<b>Prospect</b>	<b>BHID</b>	<b>From</b>	<b>To</b>	<b>µSv/h</b>
Tas	Specimen_Ck	NS002	40	45	0.09
Tas	Specimen_Ck	NS002	45	50	0.09
Tas	Specimen_Ck	NS002	50	55	0.1
Tas	Specimen_Ck	NS002	55	60	0.11
Tas	Specimen_Ck	NS002	60	65	0.12
Tas	Specimen_Ck	NS002	65	70	0.12
Tas	Specimen_Ck	NS002	70	75	0.12
Tas	Specimen_Ck	NS002	75	80	0.14
Tas	Specimen_Ck	NS002	80	85	0.11
Tas	Specimen_Ck	NS002	85	90	0.11
Tas	Specimen_Ck	NS002	90	95	0.1
Tas	Specimen_Ck	NS002	95	100	0.12
Tas	Specimen_Ck	NS002	100	105	0.12
Tas	Specimen_Ck	NS002	105	110	0.12
Tas	Specimen_Ck	NS002	110	115	0.11
Tas	Specimen_Ck	NS002	115	120	0.11
Tas	Specimen_Ck	NS002	120	125	0.1
Tas	Specimen_Ck	NS002	125	130	0.08
Tas	Specimen_Ck	NS002	130	135	0.09
Tas	Specimen_Ck	NS002	135	140	0.07
Tas	Specimen_Ck	NS002	140	145	0.08
Tas	Specimen_Ck	NS002	145	150	0.08
Tas	Specimen_Ck	NS002	150	155	0.07
Tas	Specimen_Ck	NS002	155	160	0.08
Tas	Specimen_Ck	NS002	160	165	0.09
Tas	Specimen_Ck	NS002	165	170	0.1
Tas	Specimen_Ck	NS002	170	175	0.09
Tas	Specimen_Ck	NS002	175	180	0.1
Tas	Specimen_Ck	NS002	180	185	0.11
Tas	Specimen_Ck	NS002	185	190	0.14
Tas	Specimen_Ck	NS002	190	195	0.15
Tas	Specimen_Ck	NS002	195	200	0.12
Tas	Specimen_Ck	NS002	200	205	0.1





**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

## **Appendix 2.**

**Botanical and Flora Review, Specimen Creek and Comstaff Creek.**



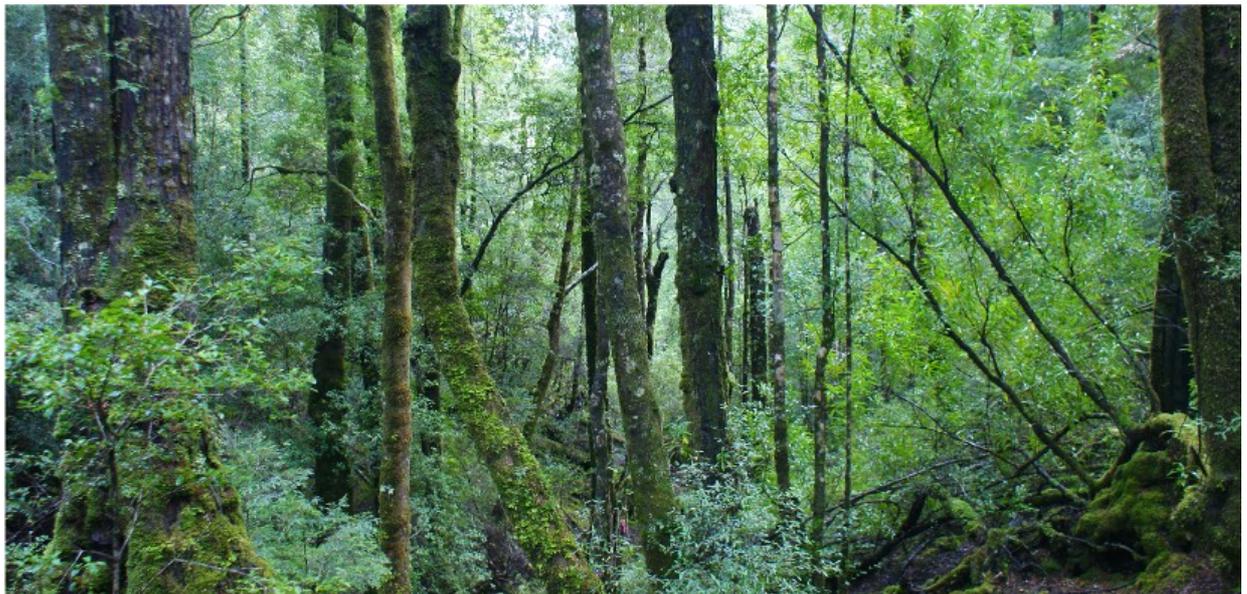
Tim Callaghan – Resource and Exploration Geology  
3 Main Rd Penguin 7318  
ph. 0428 888 896 email: timcallaghan@netspace.net.au

**EXPLORATION PROGRAM EL11/2005**  
**PROPOSED DRILL SITES OFF SAVAGE RIVER PIPELINE  
ROAD**

**BOTANICAL AND FAUNA HABITAT SURVEY**

**For NIMRODEL RESOURCES LTD**

**5<sup>th</sup> September 2012**



**PHILIP MILNER LANDSCAPE CONSULTANT PTY LTD**

144 Allison's Road, LOWER BARRINGTON  
POSTAL: C/O Post Office, BARRINGTON, 7306  
TASMANIA

Mobile: 0417 052 605  
Home Phone: (03) 6492 3201  
Email: [philip.milner@bigpond.com](mailto:philip.milner@bigpond.com)  
258

**A.B.N.No. 32 068 906**



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

## **CONTENTS**

### **1.0 INTRODUCTION**

#### **1.1 Background**

#### **1.2 Objectives**

#### **1.3 Location of Study Area**

#### **1.4 Site Description**

### **2.0 DESKTOP SURVEY OF NATURAL VALUES**

#### **2.1 Desktop Survey Results**

### **3.0 FIELD SURVEY**

#### **3.1 Methodology**

#### **3.2 Limitations**

#### **3.3 Field Survey Results**

### **4.0 CONCLUSIONS**

### **5.0 RECOMMENDATIONS**

### **APPENDIX 1**

### **References**

### **PHOTOS**



## Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

### 1.0 Introduction:

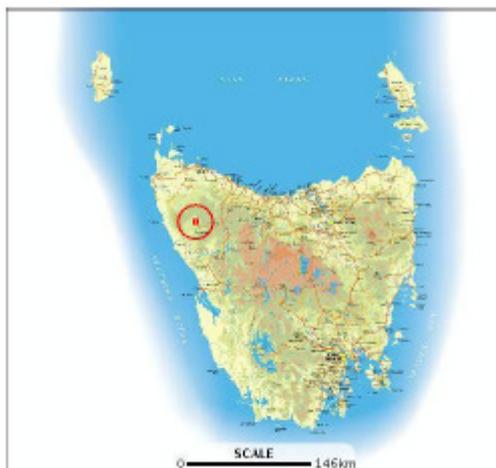
#### 1.1 Background

Nimrodel Resources Ltd is planning an exploratory drilling program to the north of Savage River, off the service road which follows the slurry pipeline easement between Savage River and Port Latta. The program will involve the clearing for two drill pad sites to enable helicopter access. A botanical and fauna habitat survey as well as a targeted survey for den sites of Tasmanian Devils and potential nest trees for Wedge-tailed Eagles is required of each drill pad site as part of the MRT licence conditions in order to determine any likely impacts on threatened species, threatened vegetation communities or potential fauna habitat.

#### 1.2 Objectives: The objectives of this survey were to:

- Undertake a desktop survey to confirm the known biological records and the natural values which may be present in the exploration target area and in the vicinity, and in particular records of threatened species and threatened vegetation communities.
- Undertake a field survey of the proposed drill pad sites and surrounds to observe and record the natural values present including the vegetation types and plant communities, the flora and in particular any threatened plant species, and of potential habitat for threatened species of fauna.
- Survey each location for potential den sites for Tasmanian Devils and potential nest trees for Wedge-tailed Eagles.
- Determine the possible impacts of the proposed exploration program on the natural values present and make recommendations on how those impacts can be minimized.

#### 1.3 Location of Study Area:



MAP REF: Tasmap 1:25,000 Donaldson, 3441

BIOREGION: West

Target Area GRID REFERENCES MGA Zone 55 GDA94.

DDH1: 351900E – 5411700N

(351788E – 5411517N

Agd66)



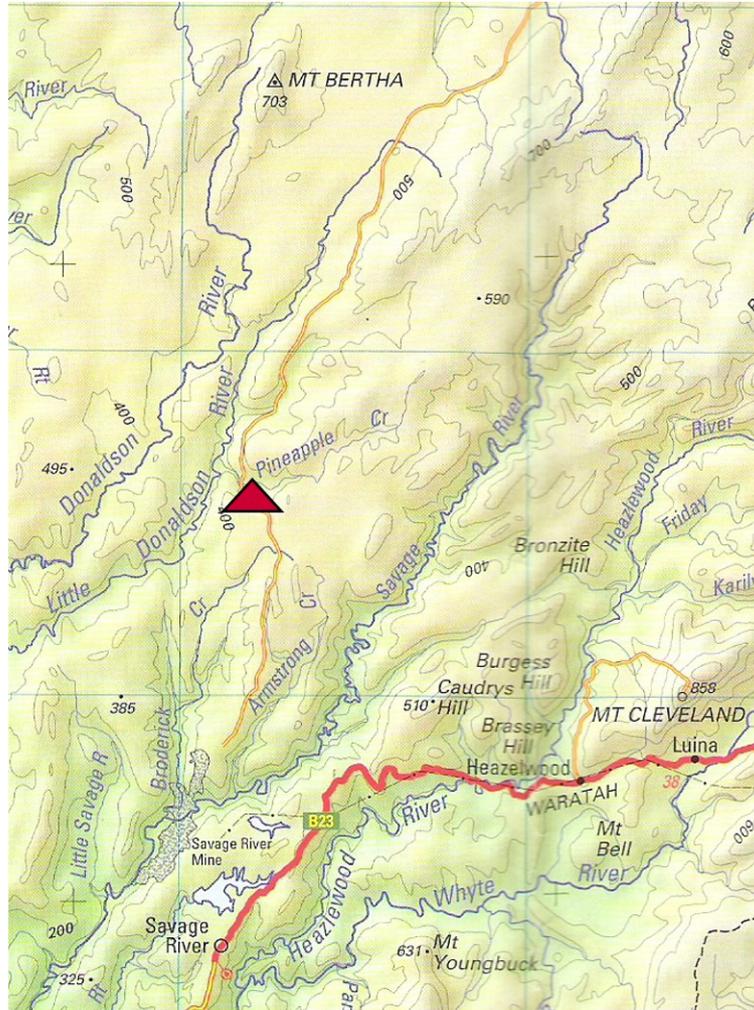
Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

DDH2: 353020E – 5418200N  
Agd66)

(352908E – 5418017N



MAP No.1: Location of study area north of Savage River township and mine site.

#### 1.4 Site Description:

The two exploration target areas are located approximately 10 to 15 km to the north of the Savage River township and are to be accessed from the service road which follows the slurry pipeline between the Savage River mine and Port Latta on the north-west coast.

Proposed drill site DDH1 is located about 500 metres to the west of this road and DDH2 is located about 300 metres to the east of the road and about 6 km to the north of DDH1.

The landform of the location is the undulating terrain between 300 and 500 metres altitude typical of the lowlands of the west coastal hinterlands. Both target locations are within the catchment of the Little Donaldson and Donaldson Rivers which flow



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: [timcallaghan@netspace.net.au](mailto:timcallaghan@netspace.net.au)

north to south and into the Pieman River and are located to the west of the Pipeline Road. Savage River itself is located 3 to 8 km to the east of the Pipeline Road. The road in this location appears to largely follow the ridgelines which divide the two catchments. The land tenure in the area is the forest reserve known as the Savage River Pipeline Forest Reserve and the easement which follows the service road and the pipeline itself is managed as an informal reserve within state forest.



Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au



MAP 2. Target Areas DDH1 west of Pipeline Road and DDH2 east of the Pipeline Road.



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

**2.0 Desktop Survey of Natural Values:** The DPIW database “The Natural Values Atlas” was accessed for the known biological records of the locality and environs. Records of threatened species of flora and fauna known to occur within a 5,000 metre radius of the location were also accessed. Data sourced included the vegetation types and plant communities, the occurrence of any threatened vegetation communities, the recorded locations of any threatened species of plants and threatened species of fauna known or with potential to occur in the vicinity.

GRID REFERENCE POINT for the two target areas: DDH1. 351900E – 5411700N.

DDH2. 353020E – 5418200N.

(GDA94)

**2.1 Desktop Survey Results:**

**VEGETATION COMMUNITIES:**

The following vegetation communities are mapped under the TasVeg mapping program as occurring within 1,000 metres of each of the two reference points.

VEGETATION COMMUNITY	TasVeg Code / Map colour	EXTENT IN STUDY AREA
<i>Nothofagus – Atherosperma</i> Rainforest	RMT / RMU Dark Blue	Not differentiated from RMU on map but widespread in both localities.
<i>Nothofagus – Phyllocladus</i> Short Rainforest	RMS / RMU Dark Blue	Not differentiated from RMU on map but widespread in both localities.
<i>Leptospermum</i> with Rainforest Scrub	RLS / Dark blue with diagonal lines	Mainly adjacent to the road easement north of DDH2.
<i>Acacia melanoxylon</i> on Rises	NAR / Olive green with diagonal white lines	A single patch about 800 metres south of DDH1.



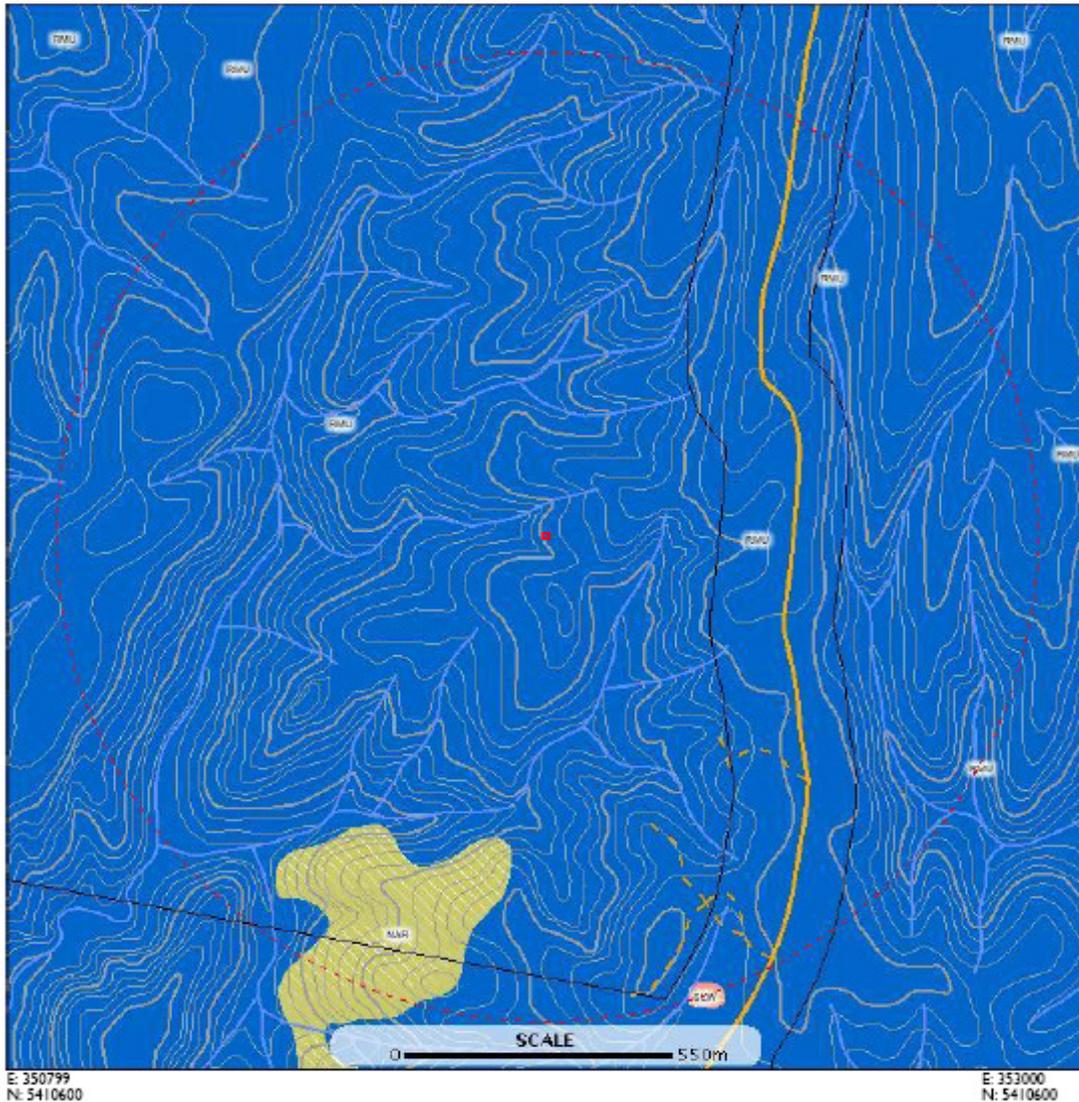
Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

E: 350799  
N: 5412800

E: 353000  
N: 5412800



**FIGURE 1: Vegetation communities as per TasVeg mapping program within 1,000 metres of reference point DDH1: 3351900E – 541170N .**

**CODE OF VEGETATION COMMUNITIES:**

- RMS / RMU** ..... *Nothofagus – Phyllocladus* Short Rainforest
- RMT / RMU** ..... *Nothofagus – Atherosperma* Rainforest
- NAR** ..... *Acacia melanoxylon* on Rises



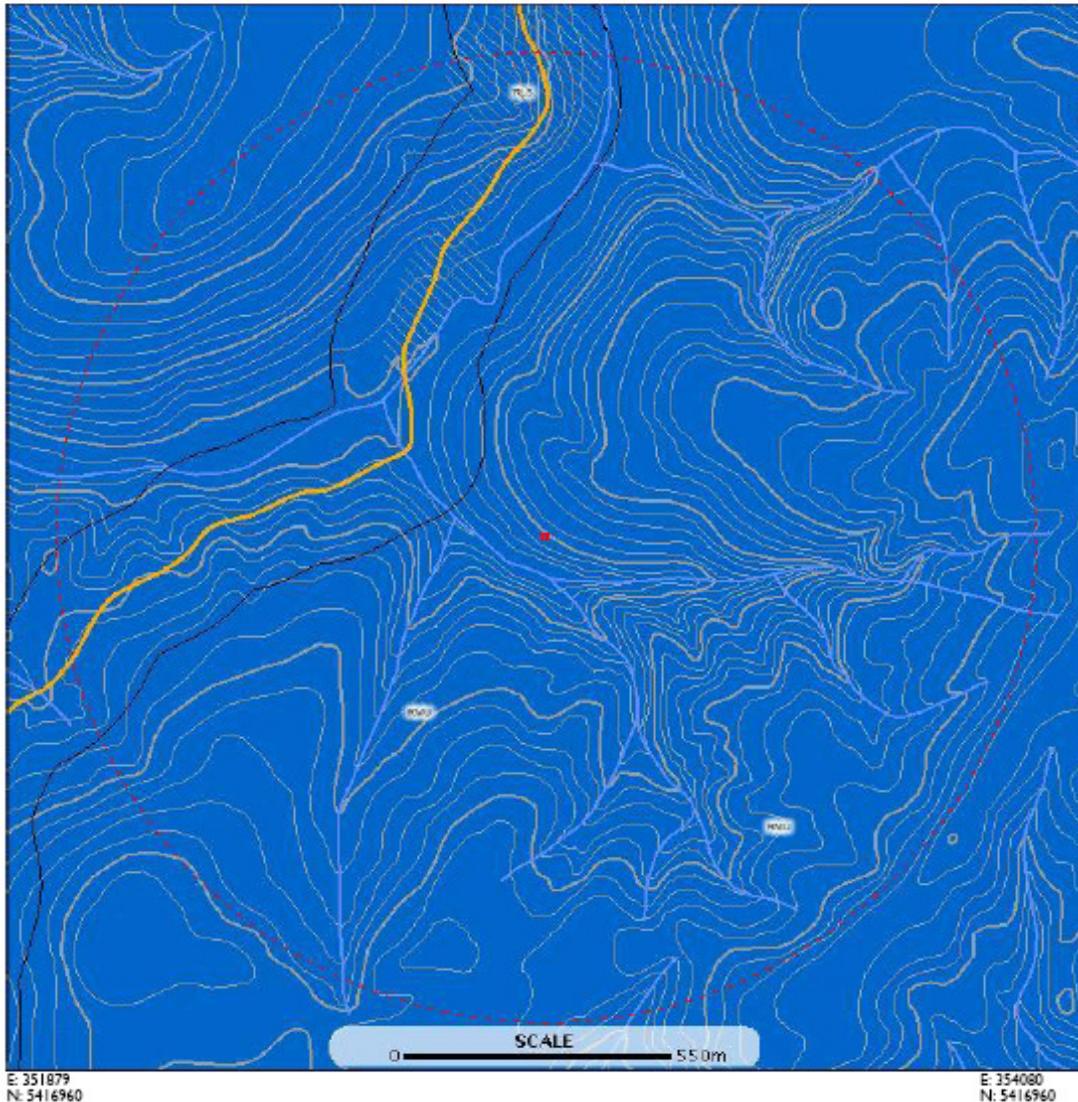
Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

E: 351879  
N: 5419160

E: 354080  
N: 5419160



**FIGURE 2: Vegetation communities as per TasVeg mapping program within 1,000 metres of reference**

**Point DDH2: 353020E – 5418200N**

**CODE OF VEGETATION COMMUNITIES:**

**RMS / RMU .....*Nothofagus* / *Phyllocladus* Short Rainforest**

**RMT / RMU ... *Nothofagus* / *Atherosperma* Rainforest**

**RLS ..... *Leptospermum* with Rainforest Scrub**

**THREATENED VEGETATION COMMUNITIES:**

None of the vegetation communities as mapped within the two study areas are listed as threatened under the *Nature Conservation Act 2002*.



## Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

### VEGETATION COMMUNITIES:

- *Nothofagus / Atherosperma* Rainforest (RMT) is usually dominated by Myrtle particularly in western Tasmania and can be either callidendrous in form with tall trees and an open understorey or thamnic of medium height and with a more shrubby understorey. Sassafras can sometimes be codominant in the canopy and Leatherwood can also be common. This rainforest is generally well reserved in western Tasmania, with old-growth forest having high conservation value. The catchment of the Savage River has the largest area of retained mature rainforest in Tasmania.
- *Nothofagus- Phyllocladus* Short Rainforest (RMS) is distinguished from RMT by its higher floral diversity, its shorter stature and canopy, the presence of Celerytop Pine as a codominant in the canopy, and a more dense and often tangled understorey. The community is generally widespread in north-west Tasmania and the southern ranges and usually occurs on soils of low to moderate fertility in fire protected sites. It is well reserved in the west of the state however in some bioregions it is inadequately reserved particularly in its old-growth condition.
- *Leptospermum* with Rainforest Scrub (RLS) is distinguished from the previous two rainforest types by the presence of species of *Leptospermum* comprising 15 to 50% of the canopy. In structure and floral diversity it is similar to RMS and is found throughout rainforest communities in the State but mainly in the west and south-west and usually on the poorer soils and often along ridgelines. The community may be fire induced and an early successional stage of *Nothofagus – Leptospermum* Short Rainforest (RML) or mature rainforest.
- *Acacia melanoxylon* on Rises (NAR) predominantly occurs in the north-western third of the state where it is relatively widespread. It is a closed community, usually fire induced in locations which were previously rainforest and so is usually found within larger tracts of rainforest, and usually on the more fertile substrates. The long viability of Blackwood seed enables the tree to regenerate following disturbance within rainforest where no living Blackwoods were present. It usually takes in excess of 200 years for the Blackwood community to again succeed into pure rainforest.

### THREATENED FLORA:

The following three species of threatened flora which are listed under the Tasmanian *Threatened Species Protection Act 1995* and /or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* are recorded on the Natural Values Atlas database as occurring within 3,000 metres of reference point DDH2.

No species of threatened flora are recorded on the database within 3,000 metres of reference point DDH1.

- *Persoonia muelleri* subsp. *angustifolia* Narrowleaf Geebung is a bushy shrub up to 4 metres in height. It is distinct from other subspecies of *Persoonia muelleri* by its narrower leaves and the usually dense covering of greyish or tawny coloured hairs of the new leaves and immature stems. The species is often found around the margins of rainforest where it meets scrub



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

communities, and largely in western Tasmania. This species is listed as being rare under the Tasmanian Act.

- *Erioderma solediatum* is an epiphytic lichen which grows on the upper trunk of mature trees within intact and extensive stands of rainforest although the ecology of the species is poorly understood. In Tasmania it is only known from three sites along the Savage River Pipeline Road and at Tayatea Road near the Arthur River. The species is listed as being endangered under the Tasmanian Act due to its limited and restricted distribution in the state.
- *Roccellinastrum neglectum* is an erect, bushy or shrub-like epiphytic lichen which appears to favour shaded conditions on the lower parts of tree trunks within mature rainforest. The species has only been recorded twice in Tasmania and both sites are located along the Savage River Pipeline Road. The site of the main occurrence was logged in the early 1980's as part of a rainforest logging trial. Extensive searches have failed to find any further occurrences of the species and it is now listed as being endangered under the Tasmanian Act.



Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

#### THREATENED FAUNA:

Four species of threatened fauna are recorded on the database as occurring within 5,000 metres of one or both of the reference points.

- The Wedge-tailed Eagle *Aquila audax* subsp *fleayi*. The Tasmanian subspecies is listed as endangered under both State and Commonwealth Acts. The bird requires large Eucalypts within tracts of old-growth forest for nesting and is extremely sensitive to disturbance while nesting.

There is a known nest tree recorded on the database about 3,500 metres due east of DDH1, Nest ID No.112. The nest tree was first recorded during the 1980's and was last recorded as being active in 1993. Nesting activity since that time is not known.

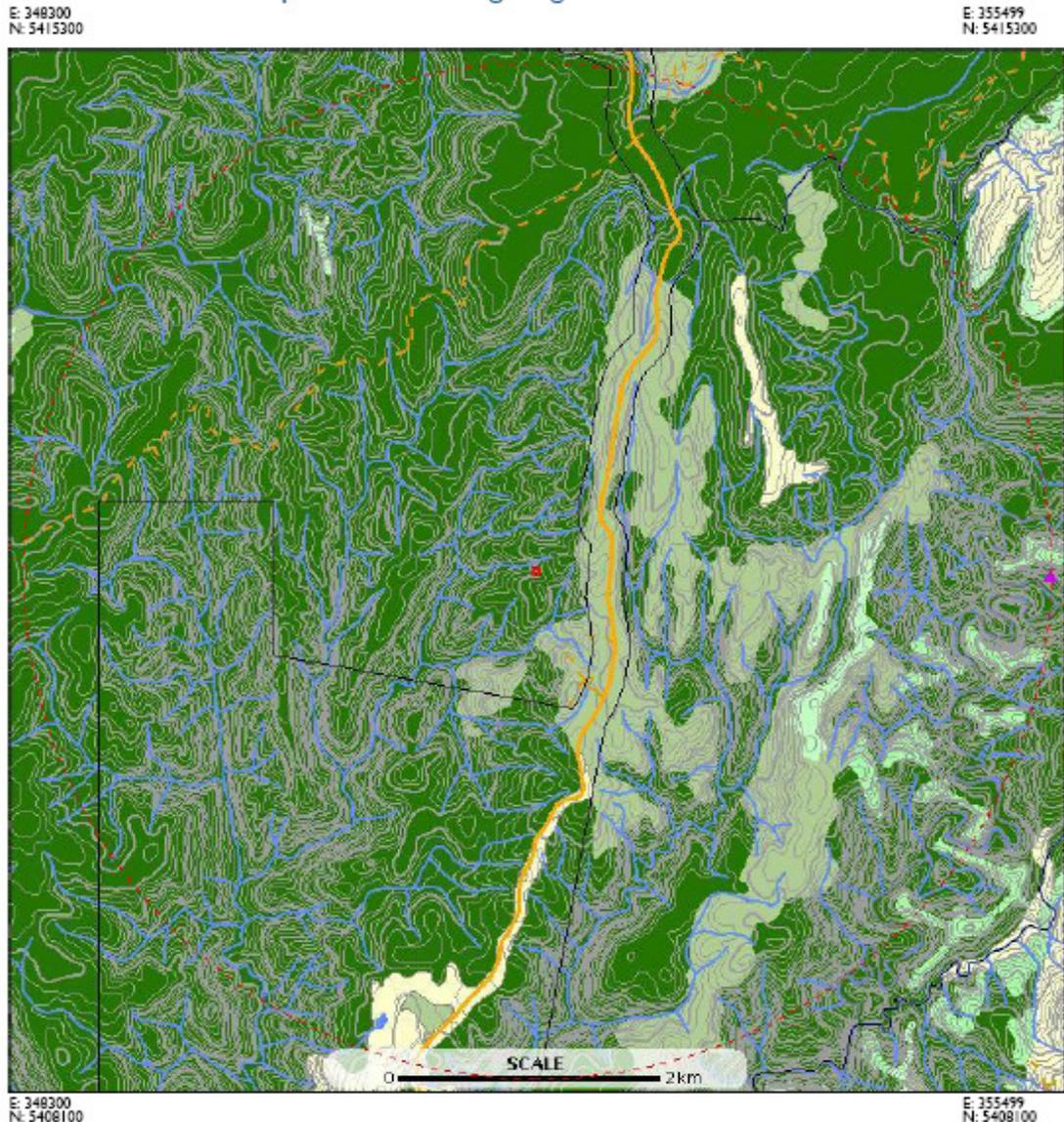
No other nest trees for the Eagle are known from within 5,000 metres of either reference point. There is also a single sight record on the database from 1996.



Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au



**FIGURE 3: Known nest tree of Wedge-tailed Eagle 3,500 metres east of DDH1 reference point.**

- The Tasmanian Devil *Sarcophilus harrisii*. The Savage River Pipeline Road is utilized for the regular monitoring of the western populations of the Tasmanian Devil. The Devil is now listed as endangered under both State and Commonwealth Acts due to the severe decline of the species as a result of the disease DFT with the disease front now extending into western Tasmania. There are three records within 1,000 metres of DDH1 and 3 records within 1,000 metres of DDH2. Within 3,000 metres of DDH1 there are a further 270 records and an additional 18 within 5,000 metres. Within 5,000 metres of DDH2 there are 284 records of the Tasmanian Devil although there is likely to be some overlap in records between the two reference points.



Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

All records are dated from between 2006 and 2008 and almost all are recorded from regular monitoring points along the Pipeline Road.

- The Spotted-tailed Quoll, *Dasyurus maculatus* subsp *maculatus* is listed as a rare species under the Tasmanian Act and vulnerable under the Commonwealth Act. It inhabits a range of forest types and will hunt and forage on farmland and pasture, travelling up to 20km at night. The animal will shelter in dens located in rocks, logs or thick vegetation. There is a single record of this species from 2007 associated with the Tasmanian Devil surveys.
- The White (Grey) Goshawk *Accipiter novaehollandiae* is listed as being endangered in Tasmania. The bird requires mature wet forest as habitat and often nests within dense riparian canopy vegetation and trees such as mature Blackwoods *Acacia melanoxylon*, Myrtle *Nothofagus cunninghamii* or Sassafras *Atherosperma moschatum*.

There is a single 1978 sighting record on the database from within the wider survey area. No nesting records are known from the locality.

The following six species of threatened fauna have the potential to occur in the locality based on habitat mapping within the known geographical range of each species.

- The Masked owl *Tyto novaehollandiae* subsp *castanops*. The Tasmanian subspecies of the Masked Owl is listed as endangered under the state Act. The bird requires large tree hollows for nesting, usually preferring Eucalypts such as White Gum *Eucalyptus viminalis* and mature dryer open forest as habitat for hunting and foraging.
- The White-bellied Sea-eagle, *Haliaeetus leucogaster* is considered to be vulnerable in Tasmania and is listed under the State Act. It is mainly a coastal bird but will also follow rivers inland and can be found over inland waterways, lakes and hydroelectric impoundments.
- The Tasmanian Azure Kingfisher *Alcedo azurea* subsp *diemenensis* is endangered in Tasmania and is restricted to riparian habitat along western and north-western rivers. It could possibly occur along the larger rivers in the wider locality such as the Donaldson River or the Savage River.
- The Tussock Skink, *Pseudemoia pagenstecheri* is a grassland species which is listed as being vulnerable under the Tasmanian Act. The lizard inhabits some types of native grasslands.
- Australian Grayling *Prototroctes mareana* is a fish which moves between fresh and salt water localities. The species is listed as being vulnerable both in Tasmania and nationally.
- Heazlewood River Freshwater Snail, *Phrantela marginata* is one of about 13 species of *Phrantela* within the family Hydrobiidae which have localized occurrences in west and south-western Tasmania. This species is listed as being rare under the Tasmanian Act due to its limited geographic range and because most species are intolerant of environmental disturbance.

ENVIRONMENTAL WEEDS:

No environmental weeds are recorded on the database as occurring within 5,000 metres of either of the two study area reference points.



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

#### **RESERVE ESTATE:**

Both of the target areas are located within the Savage River Pipeline Forest Reserve and the pipeline and service road easement is managed as an informal reserve on state forest.

### **3.0 Field Survey:**

#### **3.1 Background:**

Each of the two proposed drill sites was accessed on foot from the Pipeline Road. The actual drilling of the exploratory drill holes will be undertaken by a portable drill rig brought in by helicopter which will necessitate the clearing of an area of vegetation about 25 x 25 metres around each drill pad site.

The field survey focused on the two proposed drill pad sites but included the foot access track to each site and the adjacent sections of the Pipeline Road.

Vascular plant species were recorded, vegetation communities were observed and cross-referenced with the TasVeg map sourced from the Natural Values Atlas database.

The field survey was conducted on the Thursday 23<sup>rd</sup> August 2012.



Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

**3.2 Limitations:** This survey was conducted in winter when few species are in flower. No botanical survey can guarantee that all flora will be observed and recorded in a single survey in one year due to seasonal and annual variation in abundance and the possible absence of flowers and fertile material for identification. Ephemeral species which may have been present includes species of orchids, lilies, herbs grasses and other graminoids. However all significant species known to occur in the study areas and their environs have been considered in this report.

### **3.3 Field Survey Results:**

DRILL SITE BW DDH1: GRID REF: 351907E – 5411699N. (North-west corner of proposed pad) (10m +/-)

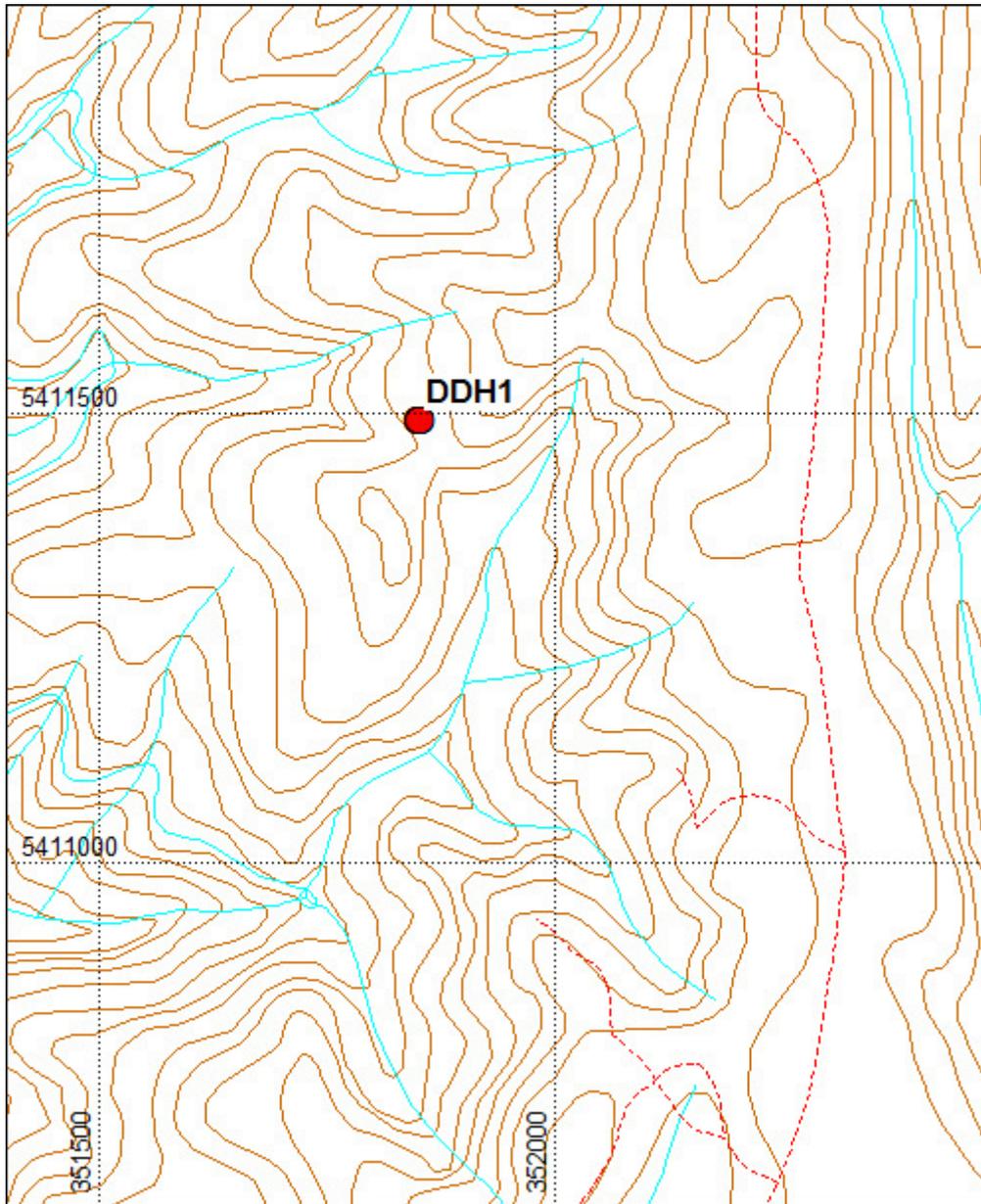
The walking track to this drill site commenced on the verge of the Pipeline Road at GRID REF: 352398E – 5411694N (4m +/-) and followed a ridgeline and minor creek to the site, about 500 metres from the road.



Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au



**MAP 3: Proposed drill site DDH1 near Specimen Reef.**

The vegetation along the verge and road easement of Pipeline Road was shrubby regrowth which contained a rainforest component which fits broadly within the definition of the community *Leptospermum* with Rainforest Scrub (RLS). There was a higher level of floral diversity along the road easement than within the undisturbed vegetation of the adjacent forest.

The vegetation along the cut track and in the vicinity of the proposed drill pad site was *Nothofagus – Atherosperma* Rainforest (RMT) with the canopy dominated by the Myrtle *Nothofagus cunninghamii*. The rainforest was of a thamnic form with



Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

Horizontal *Anodopetalum biglandulosum* predominant in the understorey. Although the forest in the location was relatively mature it was not in an old-growth state and few large old-growth trees were observed in the vicinity which is probably indicative of the low fertility of the substrate and soil in the area.

The area selected for the proposed drill pad site was located on a sloping bench which consisted mainly of understorey trees. A mature Myrtle plotted adjacent to the north-west corner of the proposed drill pad should be retained and regarded as the outside edge of the pad. A slender semi-mature Celery-top Pine *Phyllocladus asplenifolius* was also located within the area of the drill pad and this tree should also be retained if at all possible.

A large mature old-growth Myrtle was also recorded at GRID REF: 351929E – 5411710N

(15m +/-), however it is well outside the proposed drill pad area.

Three plants of the threatened species *Persoonia muelleri* subsp. *angustifolia* were observed along the verge of Pipeline Road on the bushline edge within 30 metres and adjacent to the start of the cut access track to DDH1. Care will need to be taken to ensure these plants are not inadvertently impacted by activities along the roadside associated with the drilling operation.

The area along the access track and around the proposed drill pad site was surveyed for hollow logs and mature trees possessing basal hollows which may be potential den sites for Tasmanian Devils. No potential den sites were observed in the locality. A 400 metre length of Pipeline Road from the start of the drill site access track was surveyed for Tasmanian Devil scats in order to gauge the species presence in the locality. Only one old scat was observed in the location.

The vegetation in the area was pure rainforest and there were no emergent old-growth Eucalypts present which may have presented potential nest trees for the Wedge-tailed Eagle.

No old-growth trees with significant upper trunk or branch hollows which may be potential nesting hollows for Masked Owls were observed in the area surveyed.

Evidence of the presence of Burrowing Crayfish, most likely an *Engaeus* sp. was observed adjacent to the creek along the access track. The location is well outside the known range of any of the five known threatened species of *Engaeus*.

No species of threatened fauna were observed during the survey and no evidence of the presence of other species of threatened fauna which are known from or could occur in the locality was observed.

DRILL SITE DDH2: GRID REF: 352977E- 5418062N

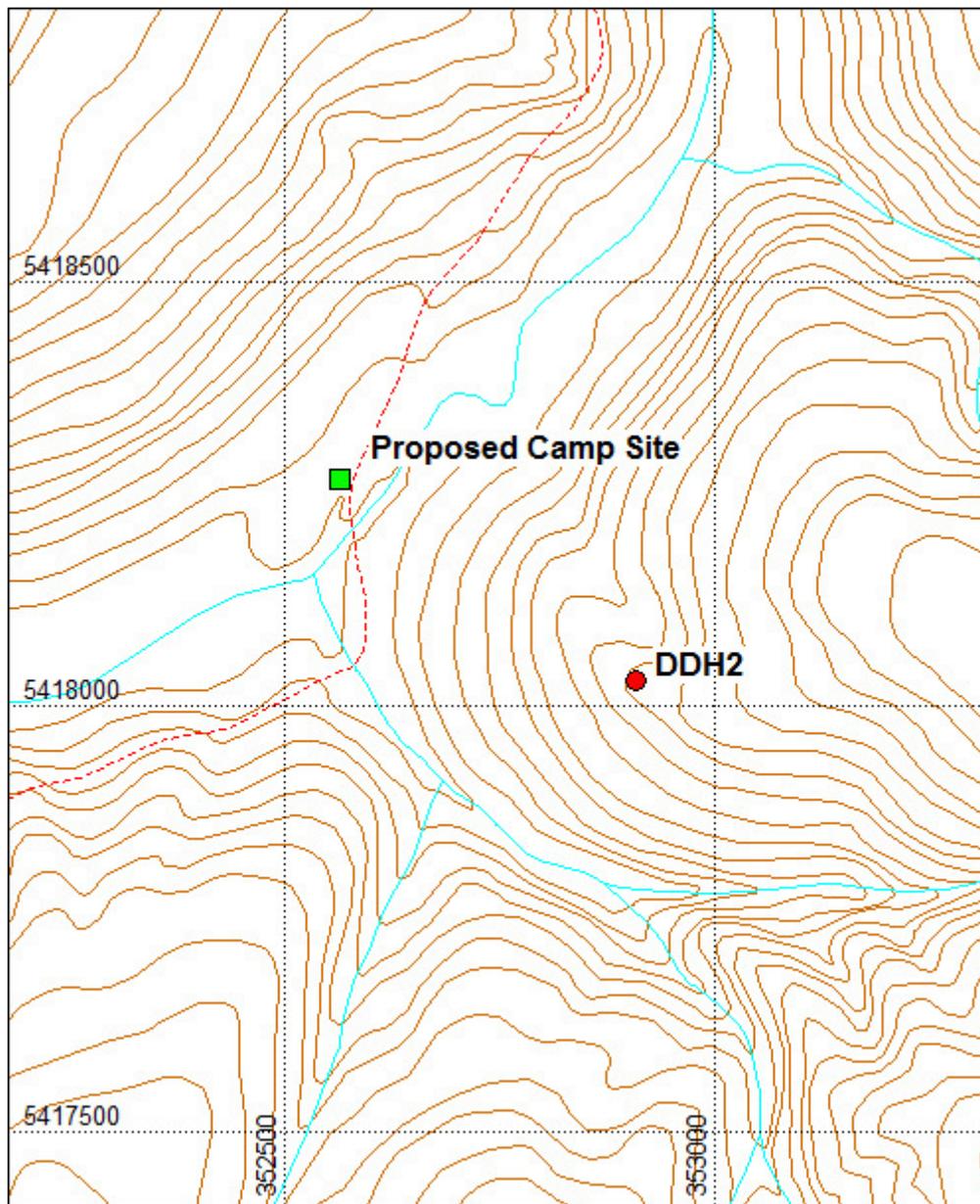


Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

Proposed drill pad site DDH2 is located about 6 kilometres to the north of DDH1, on a southern facing slope of a hill about 300 metres to the east of the Pipeline Road. The cut access track followed the adjacent minor creek-line (to the south of the proposed drill pad site) from the Pipeline Road before extending up-slope to the proposed drill pad site. The creek is a minor tributary of the nearby Comstaff Creek.



MAP 4: Proposed drill site DDH2 south-east of Comstaff Creek.

The vegetation in the location was mature, old-growth *Nothofagus – Atherosperma* Rainforest (RMT) dominated by large and mature *Nothofagus cunninghamii*. The Myrtle Rainforest community tended to be thamnisc in structure with a dense and leafy understorey along the creek but became callidendrous in structure with large mature old-growth trees of Myrtle and with a more open understorey up-slope and in the



## Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

vicinity of the proposed drill pad site. The stature of the trees is probably indicative of a relatively fertile soil in the location. The dense canopy and moist environment contributed to an abundance of mosses and leafy liverworts in the ground layer and the epiphytic zone of the tree trunks, and ferns were also relatively common.

The site selected for the proposed 25 metre square drill pad is located on the mid south-western facing slope and is clear of significant trees although it is almost surrounded by large old-growth Myrtles which will provide challenges for helicopter access. Four large trees were located about 50 metres to the south and downslope of the site, one tree 50 metres to the south-east, four trees about 100 metres to the east and five about 100 metres upslope towards the north and north-east.

However none of these trees will require falling to clear the drill pad site.

The area along the cut access track and around the pad site was surveyed for hollow logs and large trees with basal hollows which may be potential den sites for Tasmanian Devils. The first section of track follows the creek-line and was too wet and marshy for dens however once the track extended upslope a number of larger trees with basal hollows were observed. No evidence of use as dens by Devils (or Quolls) was observed in any of the basal hollows inspected in trees along the access track and in the vicinity of the drill pad site. A 400 metre length of Pipeline Road from the start of the drill pad access track was surveyed for Tasmanian Devil scats in order to gauge the animal's presence in the locality. About 20 scats were observed which indicates that devils are quite active in this area.

The vegetation in this location is pure old-growth rainforest dominated by Myrtles and there were no Eucalypt trees observed which may provide potential nest trees for the Wedge-tailed Eagle within about 1,000 metres of the location.

A number of old-growth trees of Myrtle observed in the on the hill slopes in the vicinity of the drill pad site had upper trunk and branch hollows which would provide potential habitat for a range of fauna. None of the hollows observed however were considered large enough for nesting sites for Masked Owls although larger hollows are likely to be present in the wider area. Pure rainforest is also considered not to be optimum habitat for Masked Owls.

Evidence of the presence of Burrowing Crayfish, most likely an *Engaeus sp.* was observed adjacent to the creek along the access track. The location is well outside the known range of any of the five known threatened species of *Engaeus*.

No species of threatened fauna were observed during the survey and no evidence of the presence of other species of threatened fauna which are known from or could occur in the locality was observed.

### VEGETATION COMMUNITIES:

The following vegetation communities were observed during the field survey.

#### DDH1:

- *Nothofagus – Atherosperma* Rainforest (RMT) was thamnian in form and habit, of moderate stature and mature but not old-growth. The understorey tree *Horizontal* was common and an occasional semi-mature tree of *Celerytop Pine* was also observed.
- *Leptospermum* with Rainforest Scrub (RLS) was observed along the verge and easement of the Pipeline Road and is most likely a man-induced vegetation type following the original clearing of the road easement. It had a higher floral



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

diversity than the adjacent rainforest and tended to be low in height, mainly less than 8 metres.

**DDH2:**

- *Nothofagus – Atherosperma* Rainforest (RMT) was thamnic in form with a bushy and leafy understorey along the creek-line but became callidrenrous in form with very large and mature old-growth Myrtle trees and a more open understorey on the hill slopes.

**THREATENED VEGETATION COMMUNITIES:**

No vegetation community listed under the Tasmanian *Nature Conservation Act 2002* was observed during the field survey.

**VEGETATION COMMUNITIES OF CONSERVATION SIGNIFICANCE:**

- The *Nothofagus – Atherosperma* Rainforest dominated by the Myrtle *Nothofagus cunninghamii* in the vicinity of the proposed drill pad site DDH2 is considered to be of conservation significance due to the presence of very large and mature old-growth trees.



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

**THREATENED FLORA:**

One species of plant listed under the Tasmanian *Threatened Species Protection Act 1995* and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* was observed during the field survey.

- *Persoonia muelleri* subsp. *angustifolia*, the Narrow-leafed Geebung. Three plants of this species were observed on the bushline edge of the scrub community which extends along the easement of the Pipeline Road in the vicinity of proposed drill pad DDH1. One plant were observed adjacent to the start of the cut access track to the drill pad site (GRID REF: 352398E – 5411694N 4m+/-) and a further two within 30 metres. Care will need to be taken to ensure that these plants are not inadvertently impacted by activities along the roadside associated with the drilling program. The plants should be flagged and the field crew made aware of their locations and how to recognize the plant.



Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au



**PHOTO 1 & 2: *Persoonia muelleri* subsp. *angustifolia* within easement of Pipeline Road near DDH1.**

**THREATENED FAUNA:**



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

No species of threatened fauna listed under the State or Commonwealth Acts was observed during the field survey however evidence of the presence of Tasmanian Devils was observed in the vicinity of both sites but mainly DDH2. See the paragraph below under Tasmanian Devil habitat survey.

**THREATENED FAUNA HABITAT:**

The tall, mature old-growth Myrtle Rainforest in the vicinity of DDH2 presents potential habitat for fauna including a number of threatened species. Many of the mature trees in the area would contain significant upper trunk and branch hollows and possibly potential habitat for species such as the Masked Owl, although pure rainforest is not considered to be the preferred habitat for this species. The mature forest is also potential habitat for the White (Grey) Goshawk, and the vegetation along the creeks and streams with greater canopy density would be favoured nesting habitat for that species, however there is only one sighting record for this bird in the wider area.

No actual den sites for Tasmanian Devils or Spotted-tailed Quolls were observed during the survey although a number of basal hollows with den potential were observed in the vicinity of site DDH2. The presence of Tasmanian Devils was confirmed by the scats observed along the Pipeline Road, mainly in the vicinity of DDH2.

No potential habitat was observed in the vicinity of either drill pad site for the White-bellied Sea-eagle although the species is known to be present on the Pieman River and the bird could follow the Donaldson River upstream which is a few kilometers to the west, while hunting. The Tussock Skink inhabits native grasslands, none of which was observed in the area and the species would not be present. The creeks in the vicinity are not considered large enough to support the Azure Kingfisher although potential habitat is most likely to be present in the lower reaches of the catchment of the Donaldson River. This river flows into the lower reaches of the Pieman River to the west of Corinna so the connection of the catchment to the sea is not impeded by a dam. It is therefore possible that the Grayling migrates into the upper reaches of the catchment. The creeks in the vicinity of both proposed drill pad sites may also be potential habitat for the Heazlewood River Freshwater Snail.

**WEDGE-TAILED EAGLE:**

Wedge-tailed Eagles usually build their nest on the larger branches and close to the trunk of large old-growth Eucalypts, however there were no emergent Eucalypts observed in the vicinity of either of the proposed drill pad sites, and no potential nest trees were evident. Both proposed drill pad sites are located within extensive tracts of pure rainforest and no emergent Eucalypts were observed within an approximated 1,000 metres of either location.

No Wedge-tailed Eagles were observed on the day of the survey.

**TASMANIAN DEVIL:**



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

DDH1: The mature trees observed along the cut access track and in the vicinity of the drill pad were not large enough or old enough to present significant basal hollows which could be potential den sites for Tasmanian Devils and no significant hollow logs were observed. No potential den sites were observed in this locality.

A scat survey was undertaken for a distance of 400 metres along the Pipeline Road, either side of the start of the cut access track. Only one old scat (ie covered in mossy growth) was observed at GRID REF: 352416E – 5411784N which would indicate a low level of activity of the devil in this location.

DDH2: The vegetation on the hill and slopes in the vicinity of this drill pad site includes numerous large old-growth Myrtle trees, a number of which possessed basal hollows. Given the age and stature of the trees it is most likely that there are many more trees with basal hollows in the vicinity, some of which would present as potential sites for Devil dens. However none of the basal hollows inspected in the vicinity of DDH2 showed signs of habitation or use as dens. A number of fallen trees were also checked for hollows and potential den sites however no dens were found.

A scat survey was undertaken for a distance of about 400 metres along the Pipeline Road, either side of the start of the cut access track. Five scats were recorded to the south and 20 scats were recorded to the north as far as the bridge over Comstaff Creek. The scats were of varying ages, a few relatively fresh, which overall is indicative of regular activity by an indeterminate number of devils in the locality. This may be due to the availability of food with the proximity of the large Comstaff Creek and/or the availability of potential den sites in the basal hollows of the old-growth Myrtles within the adjacent forest.

The clearing for the drill pad however will not directly impact on any mature old-growth trees so there should be no disturbance to potential den sites in the location.

**WHITE (GREY) GOSHAWK:**

Although potential habitat for the species was observed in the wider location no evidence of the species presence was observed. The bird may be present in low numbers in the wider area and the proposed exploration program therefore is very unlikely to have any impact on this species.

**MASKED OWL:**

No evidence of the presence of the Masked Owl was observed during the field survey. The largest trees which may contain large suitable hollows were Myrtles in the vicinity of DDH2. It is generally considered however that the owl prefers large hollows in Eucalypts which were not present in the location. It is considered most unlikely that the Masked Owl is present in the vicinity of either proposed drill site location. No large old-growth tree which may contain upper trunk or branch hollows is required to be felled in the clearing of either drill pad.

**ENVIRONMENTAL WEEDS:**

No environmental weeds were observed during the field survey.

**PHYTOPHTHORA:**

There was no symptomatic field evidence observed of the root pathogen *Phytophthora cinnamomi* during this field survey.



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

#### **4.0 Survey Conclusions:**

Both of the proposed drill pad sites are located within extensive stands of pure rainforest which have not been subject to forestry activities. DDH2 is located within a stand of large old-growth trees of Myrtle. Both sites are within 500 metres of the Pipeline Road easement.

No threatened vegetation communities were observed during the field survey.

One threatened species of plant was observed along Pipeline Road in the vicinity of DDH1

No devil dens were found at either site however there was ample evidence of the presence of devils along Pipeline Road in the vicinity of DDH2 and there is considered to be a relatively high probability that there are dens within the basal hollows of the old-growth trees in the wider area around DDH2.

No potential nest trees for Wedge-tailed Eagles were observed in the vicinity of either locality as there were no emergent or old-growth Eucalypts observed in either location. Some potential habitat was observed for the White (Grey) Goshawk however there was no evidence of the species presence in either location.

No large trunk or upper branch hollows which may be potential nest site for Masked Owls were observed in the vicinity of either drill pad site and pure rainforest is not considered to be the preferred habitat of the owl. However it is likely that large hollows are present in the old-growth Myrtles in the wider area around DDH2.

#### **5.0 Recommendations:**

- Adjust the position of the drill pad site DDH1 to position the large Myrtle near to the north-west corner but outside of the 25 metre square clearing for the drill pad as determined on site.  
TREE GRID REF: 351907E – 5411699N (12m +/-).
- Position drill pad site DDH2 as determined on site to avoid and keep clear of the large old-growth trees of Myrtle which were noted around the location.

#### **VEGETATION COMMUNITIES:**

- Limit clearing for each drill pad to the minimum specification for safe access and field operations in order to minimize environmental impact to the surrounding vegetation. Ensure that there is no impact to the large mature trees in the vicinity of each drill pad site, particularly DDH2.
- Ensure the adequate containment within each drill pad site of all silt, sediment and other contaminants resulting from the drilling program to avoid impacting on the adjacent creeks, and creek-side vegetation.

#### **THREATENED VEGETATION COMMUNITIES:**

- No threatened vegetation community was observed during the field survey and no specific action is required in addition to the recommendations under vegetation communities.

#### **THREATENED FLORA:**

- One species of threatened flora was observed or recorded during the field survey on the verge of the Pipeline Road in the vicinity of DDH1. Flag the



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

three plants near the beginning of the access track and adjacent verge and inform the field crew to ensure there is no inadvertent damage to the plants during the drilling program.

**FLORA OF CONSERVATION SIGNIFICANCE:**

- The mature old-growth trees of Myrtle in the vicinity of DDH2 and the single tree adjacent to DDH1 are considered to be of conservation significance and care should be taken during the clearing of the pad sites and with management of the drilling operation to ensure that there is no impact on these trees.
- The single slender tree of Celerytop Pine within the drill pad area of DDH1 should be retained if possible. However its retention could pose OH&S issues which will need to take precedence.

**THREATENED FAUNA:**

- No species of threatened fauna were observed during the field survey although traces of Tasmanian Devils were observed along the adjacent lengths of Pipeline Road. One scat only near DDH1 and 20+ near DDH2. No specific actions are required in addition to those detailed above.

**THREATENED FAUNA HABITAT:**

- The proposed exploration program will not impact on any known or potential habitat of threatened fauna providing the recommendations detailed above in regard to the retention of the mature and old-growth trees, and the limitations of impacts on the creeks adjacent to each of the drill pad sites are adhered to. No specific actions are required in addition to the recommendations under vegetation communities detailed above.

**ENVIRONMENTAL WEEDS:**

- No environmental weeds were observed during the survey, however in order to limit the risk of the introduction of weeds into weed free areas all equipment and machinery should be subject to a wash-down procedure to remove any soil or mud which could contain weed seeds before being transported into the exploration sites.

**PHYTOPHTHORA:**

- Accepted protocols in regard to hygiene and wash-down procedures for all machinery, equipment, tools and work boots, including the drill rig itself should be followed, to ensure that the pathogen is not inadvertently introduced into disease free locations by way of extraneous soil, mud and gravel adhered to machinery, work-boots and equipment.

Philip Milner

Vegetation Consultant



## Appendix 1: Vegetation Communities and Species Recorded

### 1. *Nothofagus cunninghamii* – *Atherosperma moschatum* Rainforest, Callidendrous Form (TasVeg Code RMT)

The callidrenous form of this community which was observed on the hill slopes in the vicinity of drill pad site DDH2 was composed of large old-growth trees of Myrtle and a few secondary and understorey trees consisting mainly of Sassafras and Horizontal. There was a low diversity of woody species within the community in this location although the area was rich in terms of lower plants such as ferns, mosses and leafy liverworts, both epiphytic and terrestrial.

DOMINANT TREES FREQUENCY	COMMON NAME	
<i>Nothofagus cunninghamii</i>	Myrtle	common
SECONDARY TREES		
<i>Atherosperma moschatum</i>	Sassafras	occasional
<i>Eucryphia lucida</i>	Leatherwood	uncommon
UNDERSTOREY TREES		
<i>Anodopetalum biglandulosum</i>	Horizontal	common
TALL SHRUBS		
<i>Prostantherus lasianthos</i> plant only	Christmas Mintbush	single
<i>Anopterus glandulosus</i> creek only	Tasmanian Laurel	along
SMALL SHRUBS		



Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

<i>Trochocarpa cunninghamii</i>	Stragglng Purpleberry	occasional
<b>GRASSES &amp; GRAMINOIDS</b>		
<i>Libertia pulchella</i> creek only	Pretty Grassflag	along
<b>FERNS &amp; ALLIED PLANTS</b>		
<i>Crepidomanes venosum</i>	Bristle Filmyfern	occasional
<i>Dicksonia antarctica</i>	Soft Treefern	occasional
<i>Grammitis billardierei</i>	Common Fingerfern	occasional
<i>Histiopteris incisa</i> roadside	Bat's wing Fern	along
<i>Hypolepis rugulosus</i> roadside	Ruddy Groundfern	along
<i>Microsorium pustulatum</i>	Kangaroo Fern	occasional
<i>Polystichum proliferum</i>	Mother Shieldfern	occasional
<i>Rumohra adiantiformis</i>	Leathery Shieldfern	occasional

**2. *Nothofagus – Atherosperma* Rainforest, Thamnic Form, (TasVEg Code RMT)**

Thamnic forms of the community which typically had a higher level of species diversity and a more leafy and bushy understorey was present in the vicinity of drill pad site DDH1. The vegetation along the cut access track which followed the minor creek-line towards drill pad site DDH2 also tended to be thamnic in form with a leafy understorey however the species diversity was less than the community in the area of DDH2. Epiphytic ferns and mosses were also prevalent in the location but terrestrial ferns less so.

DOMINANT TREES FREQUENCY	COMMON NAME	
<i>Nothofagus cunninghamii</i>	Myrtle	common
<i>Atherosperma moschatum</i>	Sassafras	occasional
<b>SECONDARY TREES</b>		
<i>Eucryphia lucida</i>	Leatherwood	occasional
<b>UNDERSTOREY TREES</b>		
<i>Anodopetalum biglandulosum</i>	Horizontal	common
<i>Phyllocladus asplenifolius</i>	Celerytop Pine	uncommon
<b>LARGE SHRUBS</b>		



Tim Callaghan – Resource and Exploration Geology

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

<i>Anopterus glandulosus</i>	Tasmanian Laurel	occasional
<i>Cenarrhenes nitida</i>	Native Plum	occasional
<b>SMALL SHRUBS</b>		
<i>Trochocarpa cunninghamii</i>	Straggling Purpleberry	occasional
<b>CLIMBING PLANTS</b>		
<i>Prionotes cerinthoides</i> occurrence	Climbing Heath	single
<b>GRASSES &amp; GRAMINOIDS</b>		
<i>Dianella tasmanica</i>	Tasman Flaxlily	occasional
<i>Gahnia grandis</i>	Cutting Grass	occasional
<b>FERNS &amp; ALLIED PLANTS</b>		
<i>Crepidomanes venulosum</i>	Bristle Filmy Fern	occasional
<i>Grammitis billardieri</i>	Common Fingerfern	occasional
<i>Polystichum proliferum</i>	Mother Shieldfern	uncommon
<i>Rumohra adiantiformis</i>	Leathery Shieldfern	occasional

### 3. *Leptospermum* with Rainforest Scrub (RLS)

This community was observed only along the verge and easement of Pipeline Road in the vicinity of DDH1 however it is also mapped by TasVeg as occurring in other nearby locations adjacent to the road. The vegetation may be the remnants of a natural occurrence or it could have grown and developed following the original clearing for the pipeline and associated service road. There was a greater diversity of woody and shrubby species along the road verge than in the adjacent closed forest and all species were shrubby in form.

TALL SHRUBS	COMMON NAME	
FREQUENCY		
<i>Acacia melanoxylon</i>	Blackwood	occasional
<i>Cenarrhenes nitida</i>	Native Plum	occasional
<i>Eucryphia lucida</i>	Leatherwood	occasional
<i>Leptospermum lanigerum</i>	Woolly Teatree	occasional
<i>Nematolepis squamea</i>	Satinwood	occasional
<i>Phyllocladus asplenifolius</i>	Celery-top Pine	uncommon
<b>MEDIUM SHRUBS</b>		
<i>Leptecophylla juniperina</i>	Pinkberry	occasional



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au

<i>Telopea truncata</i>	Waratah	occasional
* <i>Persoonia muelleri</i> subsp <i>angustifolia</i>	Narrowleaf Geebung	uncommon

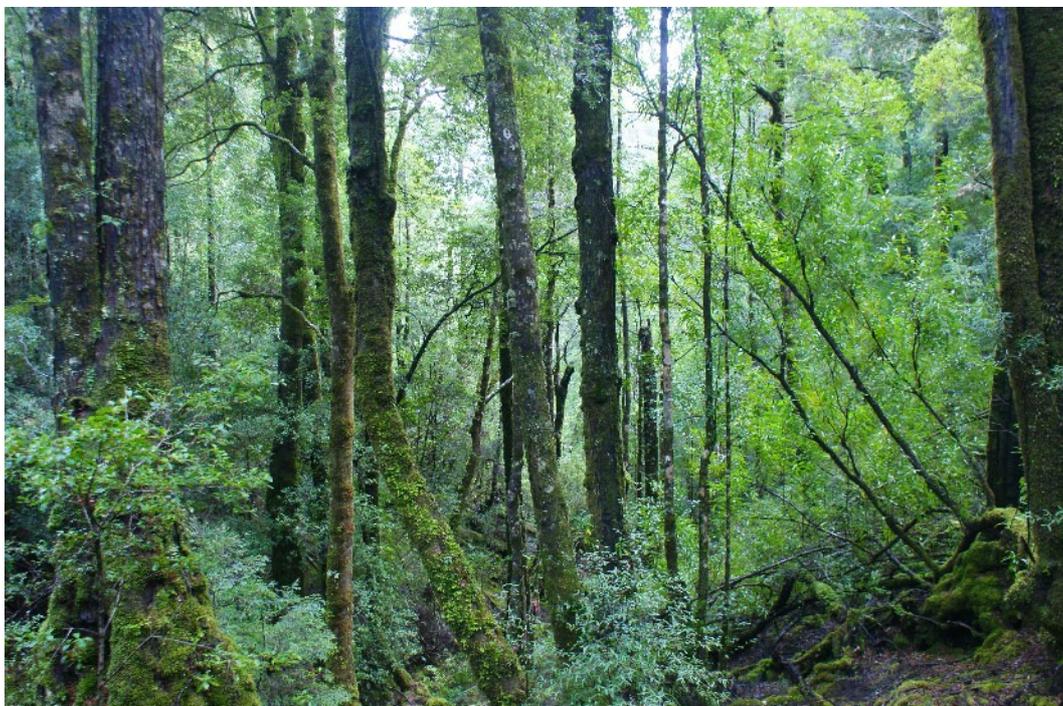
**GRASSES & GRAMINOIDS**

<i>Dianella tasmanica</i>	Tasman Flaxlily	occasional
<i>Gahnia grandis</i>	Cutting Grass	occasional

\* Listed threatened species

**REFERENCES**

1. DPIPWE Website .....  
[www.naturalvaluesatlas.dpiw.tas.gov.au](http://www.naturalvaluesatlas.dpiw.tas.gov.au)
2. DPIPWE Website .....  
[www.dpipwe.tas.gov.au/threatenedflora\(and fauna\)](http://www.dpipwe.tas.gov.au/threatenedflora(and%20fauna))
3. DPIPWE Website ..... [www.parks.tas.gov.au](http://www.parks.tas.gov.au)
4. Harris s, & Kitchener A, (2005), *From Forest to Fjaeldmark*, DPIW Tasmania
5. Wapstra H, A & M, Gilfedder L, *The Little Book of Common Names for Tasmanian Plants*
6. *Fauna Handbook* extract



**PHOTO No.3: *Nothofagus – Atherosperma* Rainforest vicinity of DDH1.**



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au



**PHOTO No.4: *Nothofagus – Atherosperma* Rainforest vicinity of DDH1.**



**PHOTO No.5: *Nothofagus – Atherosperma* Rainforest vicinity of DDH2.**



**Tim Callaghan – Resource and Exploration Geology**

3 Main Rd Penguin 7318

ph. 0428 888 896 email: timcallaghan@netspace.net.au



**PHOTO No.6: *Nothofagus – Atherosperma* Rainforest along creek vicinity of DDH2.**