

**HEEMSKIRK TIN PROJECT: QUEENS HILL**  
**TASMANIAN DEVIL: POTENTIAL DEN SITE SURVEY**  
**HORNERD ORCHID: HABITAT SURVEY**  
**For STELLAR RESOURCES LTD**

**20<sup>th</sup> March 2016**



**PHILIP MILNER LANDSCAPE CONSULTANT PTY LTD**

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

144 Allison's Road, LOWER BARRINGTON  
POSTAL: P.O.Box 2065, SPREYTON, 7310  
TASMANIA

**A.B.N.No. 32 068 906 258**

## CONTENTS

<b>1.0</b>	<b>INTRODUCTION .....</b>	<b>3</b>
<b>1.1</b>	<b>Objectives .....</b>	<b>3</b>
<b>1.2</b>	<b>Location of Study Area .....</b>	<b>3</b>
<b>1.3</b>	<b>Site Description .....</b>	<b>4</b>
<b>2.0</b>	<b>HORNED ORCHID.....</b>	<b>6</b>
<b>2.1</b>	<b>Background .....</b>	<b>6</b>
<b>2.2</b>	<b>Survey Results &amp; Discussion .....</b>	<b>7</b>
<b>2.3</b>	<b>Conclusions .....</b>	<b>8</b>
<b>3.0</b>	<b>TASMANIAN DEVIL .....</b>	<b>9</b>
<b>3.1</b>	<b>Background .....</b>	<b>9</b>
<b>3.1</b>	<b>Field Survey Results &amp; Discussion .....</b>	<b>9</b>
<b>3.2</b>	<b>Conclusions .....</b>	<b>13</b>
<b>4.0</b>	<b>RECOMMENDATIONS .....</b>	<b>14</b>
<b>4.1</b>	<b>Horned Orchid .....</b>	<b>14</b>
<b>4.2</b>	<b>Tasmanian Devil .....</b>	<b>14</b>
	<b>REFERENCES .....</b>	<b>15</b>
	<b>PHOTOS .....</b>	<b>16</b>

## 1.0 INTRODUCTION:

Stellar Resources Ltd is developing the Heemskirk Tin Project located in the historic mine field of Zeehan. It will involve an underground mine on the Queens Hill ore body and located in a “brownfield” site which has a long history of mining dated back to the 1800’s and as a consequence has been extensively cleared and disturbed in the past.

The mine site and proposed location of the waste dump and associated mine facilities near Queens Hill are within the area of disturbance of the previous mining and processing operations.

As part of the DPEMP requirements a targeted survey for the Horned Orchid *Orthoceras strictum* and a further survey of potential denning habitat within the development footprint was required.

A desktop natural values survey of the area was undertaken and reported on in March 2014 and was followed by a flora and fauna habitat field survey on the 6<sup>th</sup> May 2014.

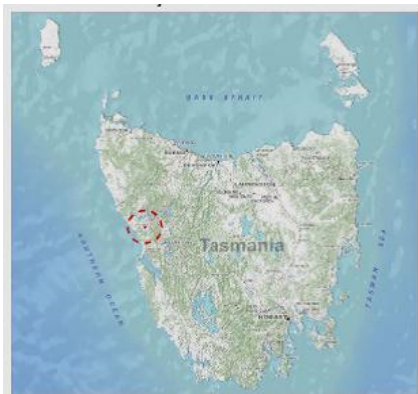
This report should be read in conjunction with the reported results from those previous surveys.

This report details the results of a targeted survey of potential den sites for Tasmanian Devils, specifically in disused adits in the area of Queens Hill which will be affected by the proposed development and a targeted survey for the Horned Orchid was also undertaken in any potential habitat present in the location.

**1.1 Objectives:** The objectives of this survey were to:

- Undertake a survey of the area proposed for the development on and adjacent to Queens Hill for evidence of the presence of Tasmanian Devils.
- Undertake a targeted survey for potential den sites of Tasmanian Devils including the old disused adits in the area of Queens Hill which will be affected by the proposed development.
- Determine the possible presence of potential habitat and vegetation types in the location for the Horned Orchid.

**1.2 Location of Study Area:**

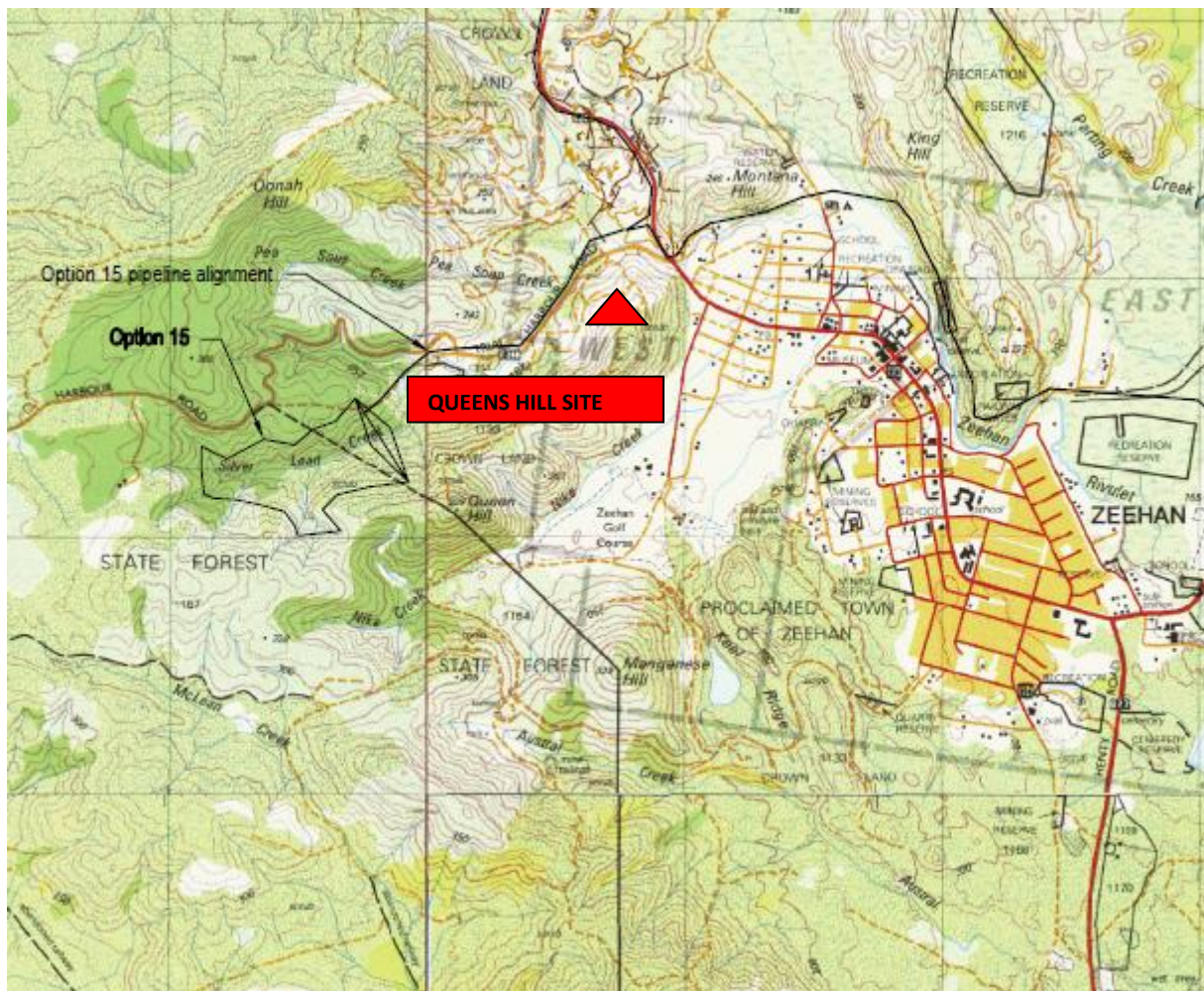


MAP REF: Tasmap 1:25,000 Dundas, Sheet No. 3636.

BIOREGION: West

GRID REFERENCE Queens Hill: 360800E – 5362000N (REF: MGA Zone 55 GDA94)





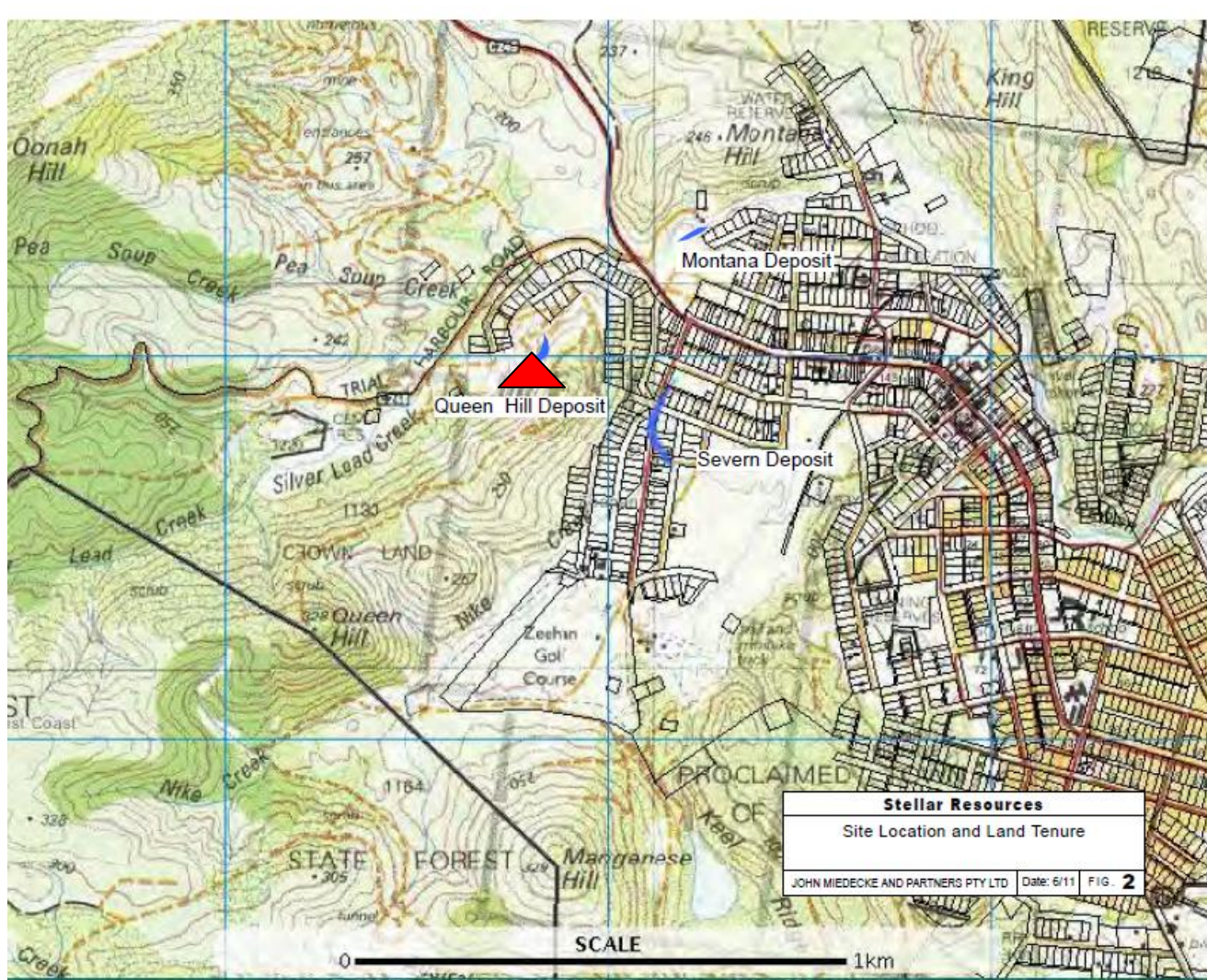
**MAP No. 1. Location of the Queens Hill proposed mine development site to the west/ north-west of the Zeehan township.**

### **1.3 Site Description:**

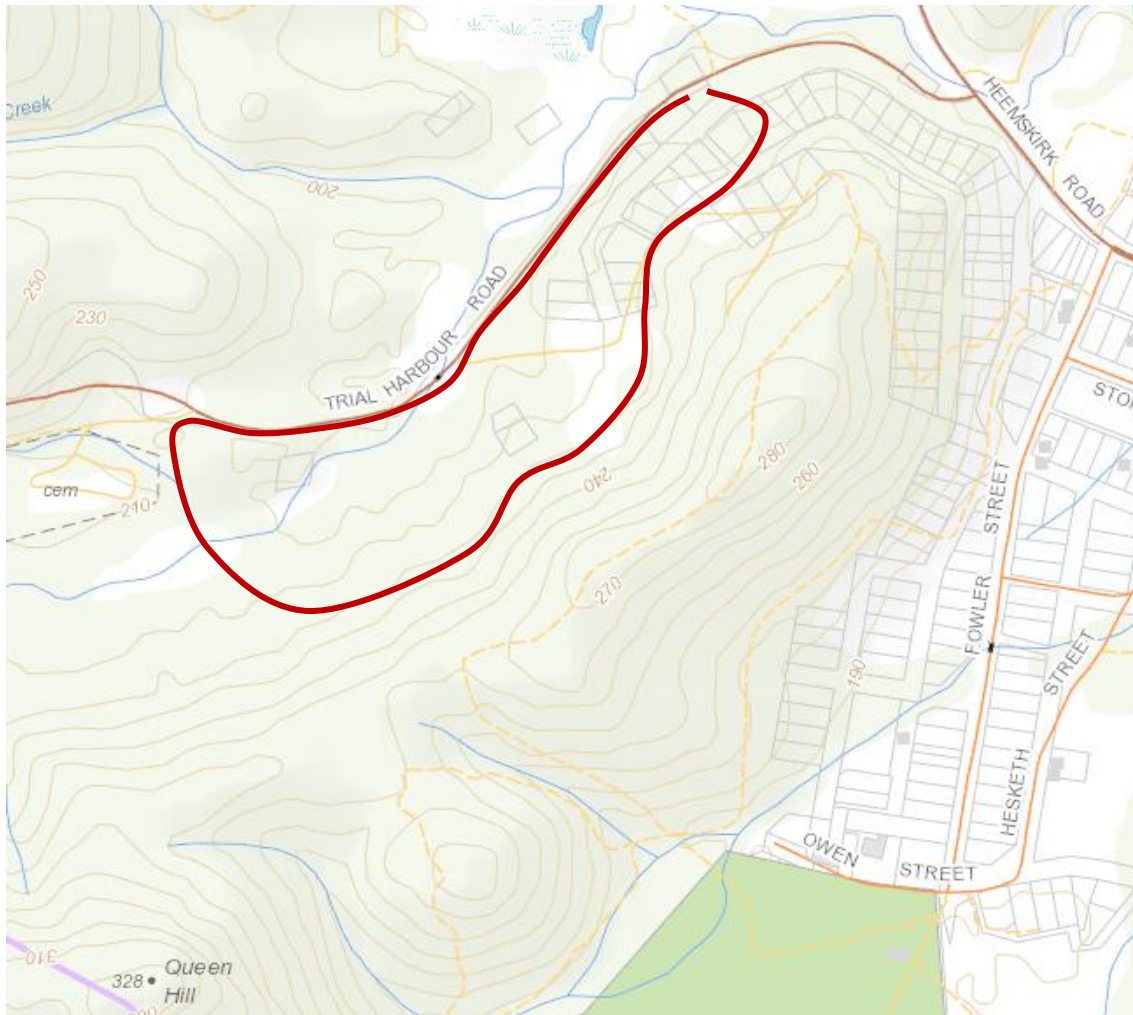
Queens Hill is a prominent hill located in close proximity and to the immediate west, north-west of the Zeehan township. The land on and around Queens Hill has been determined to be crown land, having reverted back to the Crown following abandonment. The area around Queens Hill has been subject to extensive clearing and mining activities dating from the 1800's and is drained by a number of creeks including the Silver Lead Creek and Oonah Creek to the north and Pea Soup Creek and its associated wetlands, the latter creek joins the Zeehan Rivulet to the east and just north of the township and then flows into the Little Henty River some 2.5 km to the south-east. Each of these creeks and streams are known to be affected by acid mine drainage from the earlier mining activities in the vicinity of Queens Hill.



TARGETED SURVEY OF TASMANIAN DEVIL DEN SITES & HORNED ORCHID HABITAT ON QUEENS HILL FOR  
STELLAR RESOURCES LTD



MAP No. 3. Location of the ore bodies in blue and proposed mine operations at Queens Hill.



MAP No.3. Approximate extent of the proposed development footprint adjacent to Queens Hill and the area covered by this survey

## 2.0 THE HORNED ORCHID, *Orthoceras strictum*.

### 2.1 Background information:

#### PREVIOUS RECORDS

The "Natural Values Atlas" has one record of the Horned Orchid from the Zeehan area.

- *Orthoceras strictum* the Horned Orchid has one undated record from within the Zeehan township. This record is attributed to Leonard Rodway who lived and worked in Tasmania between 1880 until his death in 1936. The record therefore was sometime prior to 1936 and as there are no more recent records of the species in the locality it is unlikely that the species is now present in the location. It should also be noted however that the degree of accuracy of the recorded location is 10km.





#### KNOWN HABITATS AND VEGETATION TYPES OF THE HORNED ORCHID:

*Orthoceras strictum* is known to occur in Tasmania in a range of vegetation types including buttongrass moorland, sedgeland, scrubby heathland and sedgy eucalypt shrublands, usually on poorly to moderately drained peaty, sandy and clay soils that are at least seasonally moist. It can also occur on thin mossy soils at soaks on and below rock faces.

## 2.2 Survey Results and Discussion:

This survey was undertaken on 17th February 2016.

#### VEGETATION COMMUNITIES IN THE PROPOSED DEVELOPMENT AREA:

The vegetation communities as mapped by the TASVEG mapping program within the area of the proposed development footprint is *Leptospermum* - *Acacia mucronata* Forest (NLA), and this vegetation type was confirmed to be present during this field survey and the previous May 2014 survey. This vegetation is largely a regrowth community following the severe fires of the early 1980's, but it is now reaching a stage of maturity with a component of rainforest species such as *Nothofagus cunninghamii* and *Atherosperma moschatum* now becoming established, specifically on the lower slopes.

This vegetation type is not known to support the Horned Orchid.

The nearest sedgeland with potential for the orchid to occur is located along Silver Lead Creek on the northern side of the Trial Harbour Road, outside of and opposite the development site as shown in Map No.3 and Figure 1. When ground truthed this area has been subject to land-fill in the past and has been invaded by weeds. The remaining natural vegetation consisted of a valley floor sedgeland dominated by dense *Baloskion tetraphyllum* about 2.5 metres in height. There is a further small patch of this community outside of and to the west, south-west of the development site.

The density of this vegetation and the impeded drainage conditions would most likely preclude any occurrence of the Horned Orchid within this vegetation community and none were found.

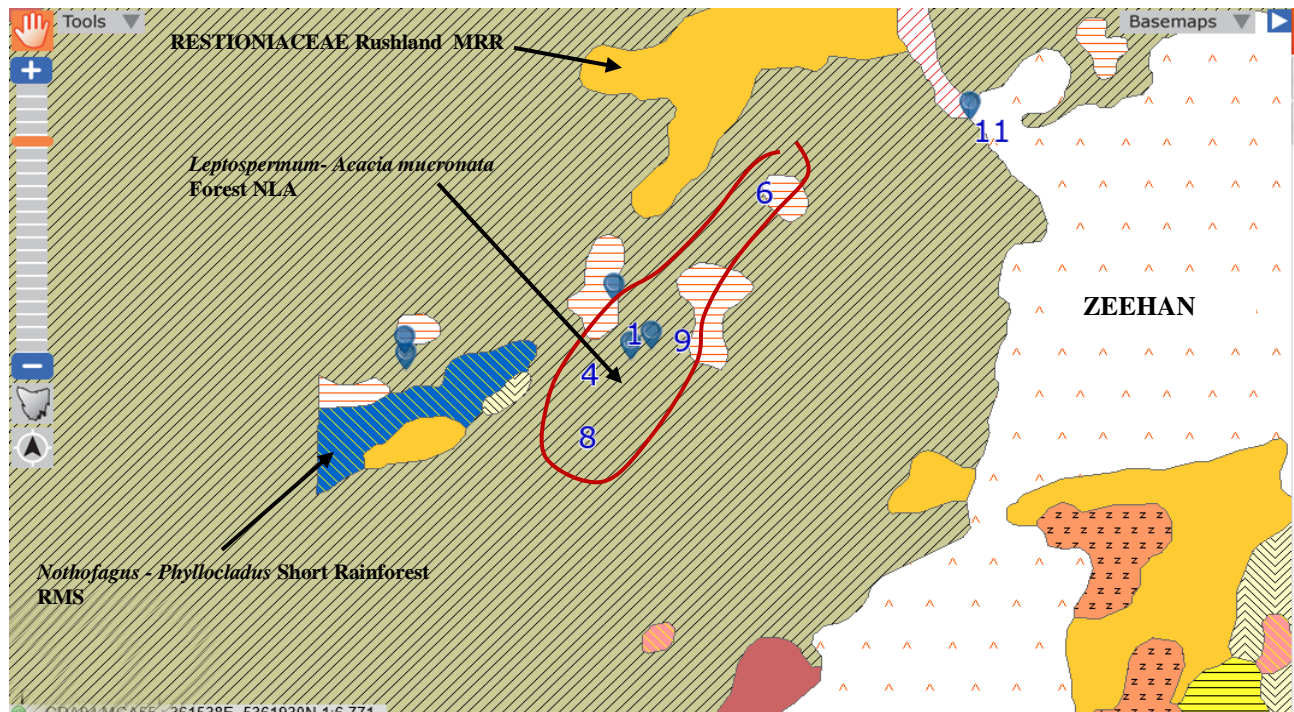


FIGURE 1. Vegetation communities as per TASVEG within the proposed development footprint adjacent to Queens Hill. (numbers refer to adits surveyed)

### 2.3 Horned Orchid: Conclusions:

No Horned Orchids were observed during the survey of the proposed development footprint.

No suitable habitat was present within the proposed development footprint for the Horned Orchid.

The proposed development will not impact on any potential habitat for the Horned Orchid.



### 3.0 THE TASMANIAN DEVIL *Sarcophilus harrisii*

#### 3.1 Background Information:

##### PREVIOUS RECORDS:

- The Tasmanian Devil *Sarcophilus harrisii*. The species is now listed as being endangered under both State and Commonwealth Acts 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 is a single record on the database about 450 metres to the north-west of the proposed development site along Trial Harbour Road dated from 2013.

Scats of Tasmanian Devil have been observed in recent times in the area around Queens Hill (J Miedeke, pers.comm).

Scats were observed in the previous survey of this location by this author on 6<sup>th</sup> May 2014

- There is a further record dated 2013 from between 2,000 and 3,000 metres of the location and another single record from within 5,000 metres dated 2013. .

#### 3.2 Survey Results and Discussion:

This survey was undertaken on 17th February 2016.

The proposed development footprint was surveyed for evidence of the presence of Tasmanian Devils (scats or tracks), and for potential den habitats including disused adits, wombat and other burrows, hollow logs and basal hollows within any larger trees

Eleven adits were located, surveyed and plotted, two disused burrows, possibly of wombats were observed, but no large hollow logs, or mature trees with basal hollows were found.

The absence of large hollow logs and larger mature trees with basal hollows is attributed to the vegetation in the location being regrowth following earlier mining activities and the more recent fires of the early 1980's which threatened the Zeehan township at the time and destroyed most of the surrounding forest and vegetation.

Eight of the eleven adits located were open and accessible, one was collapsed No.7, one was partially collapsed No.2, all were relatively dry except for No.5. which was wet at the entrance, and the entrance to No.6. was completely overgrown with ferns and covered in fallen debris.

Adits No.10 and 11 were located within a roadside cutting and were partially boarded up to restrict access.

Two burrows were found but both appeared old and disused. They may have originally been wombat burrows although the diameter was of a minimum diameter for wombats. The collapsed adit No.2. also had evidence of excavation by an animal but it was not a recent disturbance.

Eight or nine of the adits would have been accessible to Tasmanian Devils however no evidence of use of any of the adits by Tasmanian Devils was observed.

Although evidence of the presence of devils was observed in the previous survey undertaken in May 2014 with scats along the lower track, no scats or tracks of Tasmanian Devils was observed in the locality during this current survey.

There were also much fewer scats observed of Pademelons during this survey when compared to the previous survey and as an important prey species for the Devil it is reasonable to consider some correlation between the two.

Tasmanian Devils are known to have a large home range, particularly in non-coastal locations where the density of prey animals is considerably less. Devils are also known to travel over 20km in a single night so it is not surprising that they are absent from parts of their home ranges for considerable periods of time.

#### DEFINITION OF A TYPICAL DEN: (Nick Mooney Report March 2013)

Devils will at times lay up in dense vegetation, but more usually in burrows, usually dug by wombats, small diameter but deep caves, in hollow logs, amongst log or bark piles or under buildings. Dispersing young use a wider variety of lay-ups since they are often on unfamiliar ground and must be more opportunistic.

A natal den has quite specific requirements. A dry, structurally stable inner chamber at least several times the size of the mother, and an inner chamber that is defendable from like-sized predators. Typically the mouth of the inner chamber is a tight squeeze for the mother, usually a horizontal slit or crack. It ideally also includes bolt holes and crannies for imps to hide in if threatened when the mother is not home.

Other preferable requirements is a sunny aspect with direct sun for at least part of the day, shelter from avian predators around the den entrance, and a dearth of predators other than devils (eg dogs).

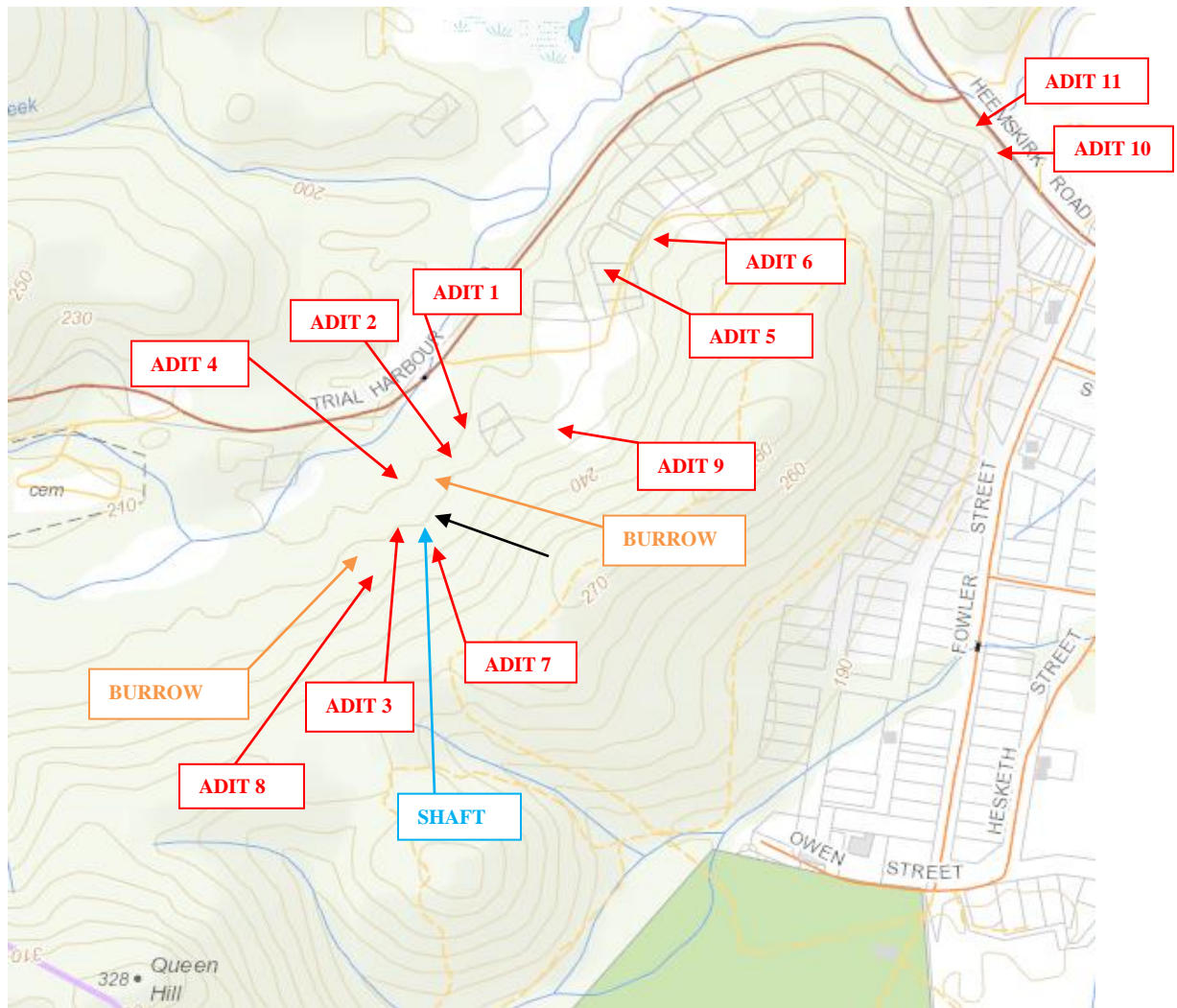
The very best natal dens are narrow, deep, dry caves facing east or north with a complex of small entrances and a scattering of scrub growing along the openings, typically the base of some cliffs.

Most hollow logs have a crudely conical shaped hollow core, widest at the entrance and with no inner chamber. Most trees tend to fall downhill so the hollow base is somewhat exposed to rain and therefore damp, as are most holes around tree roots.

Hollow stumps and tree bases rarely have the attributes required for natal dens although in specific locations where sassafras has thickly overgrown old logs or stumps which have rotted away may be an exception. (Nick Mooney report March 2013)

The conclusion from this definition is that disused mine adits may be used by adult or dispersing young as shelter and lay-ups at times, but are not generally preferred den habitat and typical disused adits are unsuitable and very unlikely to be used as natal dens by Tasmanian Devils.

TARGETED SURVEY OF TASMANIAN DEVIL DEN SITES & HORNED ORCHID HABITAT ON QUEENS HILL FOR  
STELLAR RESOURCES LTD



**MAP No.4 . Recorded locations of disused adits and burrows, as potential devil den sites.**



TARGETED SURVEY OF TASMANIAN DEVIL DEN SITES & HORNED ORCHID HABITAT ON QUEENS HILL FOR  
STELLAR RESOURCES LTD

ID No.	EASTING	NORTHING	ACCURACY
Adit No.1.	360570	5361867	5m
Adit No.2.	360566	5361852	10m
Adit No.3.	360503	5361775	14m
Adit No.4.	360512	5361825	8m
Adit No.5.	360706	5362056	8m
Adit No.6.	360756	5362080	9m
Adit No.7.	360553	5361760	7m
Adit No.8.	360511	5361735	5m
Adit No.9.	360649	5361882	11m
Adit No.10.	361111	5362189	5m
Adit No.11.	361100	5362210	6m
Shaft	360523	5361747	6m
Disused Burrow	360511	5361752	6m
Disused Burrow	360543	5361804	7m

**TABLE No.1. Adit and Burrow locations within the area surveyed REF. Map No.4.**

ADIT No.1. GRID REF: 360570E - 5361867N. (5m+/-)

Dry and open, some potential but no evidence of use by animals.

ADIT No.2. GRID REF: 360566E - 5361852N (10m +/-)

Dry although the main section of the adit has collapsed. It has been partially excavated in the past, most probably by a wombat. It had good potential but there was no evidence of recent use.

ADIT No.3. GRID REF: 360503E - 5361775N (14m +/-)

Open and dry but no evidence of use.

ADIT No.4. GRID REF: 360512E - 5361825N (8m +/-)

Located on the lower slopes. Dry and open but no evidence of use with cobwebs over the entrance

ADIT No.5. GRID REF: 360706E - 5362056N (8m +/-)

A large open adit located above the old disused track which heads towards Zeehan. Wet at the entrance but otherwise dry. Some potential but no evidence of use.

ADIT No.6. GRID REF: 360756E - 5362080N (9m +/-)

Also located along this old track heading towards Zeehan. Completely overgrown with ferns and covered in fallen debris. No evidence of use.

ADIT No.7. GRID REF: 360553E - 5361760N (7m +/-)

Located on the slope above the proposed processing plant site. Collapsed adit. No potential.

ADIT No.8. GRID REF: 360511E - 5361735N (5m +/-)

Also located on the slope above the proposed processing plant.

A dry adit but no evidence of use.

ADIT No.9. GRID REF: 360649E - 5361882N (11m +/-)

Dry and open but no evidence of use.

ADIT No.10. GRID REF: 361111E - 5362189N (5m +/-)

Located in the cutting beside the Heemskirk Road. Dry and open but no evidence of use. Boarded up to prevent people access.

ADIT No.11. GRID REF: 361100E - 5362210N (6m +/-)

Also located in the road cutting. Dry and open but no evidence of use. Boarded up to prevent people access.

SHAFT. GRID REF: 360523E - 5361747N (6m +/-)

Vertical uncovered shaft. No potential den habitat.

DISUSED BURROW. GRID REF: 360511E - 5361752N (6m +/-)

Most likely a disused wombat burrow located in an old spoil heap. There was no evidence of use.

DISUSED BURROW. GRID REF: 360543E - 5361804N (7m +/-)

Possibly a disused wombat burrow, but no evidence of use.

### **3.3. Conclusions: Tasmanian Devil**

No evidence was observed of the presence of Tasmanian Devils within the area proposed for the development, in particular scats or paw prints in wet ground along tracks. It should be noted however that the previous survey in May 2014 did identify a number of scats of Tasmanian Devils along the lower track which heads back towards Zeehan.

None of the adits located, plotted and assessed within the area showed evidence of use by any native animals, including devils, however there is some potential for at least some of the adits to be utilized as periodic dens or lay-ups by devils. No potential natal devil den sites were observed in the location. The two burrows observed showed no sign of recent use by any animal, including devils.

No hollow logs or basal hollows in old-growth trees as potential den habitat were observed within the survey area.

It is therefore most unlikely that there are resident devils in the area of the proposed development, but there is a high probability that the area forms part of the home range of one or more individual devils. As evidence of the presence of Tasmanian Devils was observed during the previous survey it is probable that devils either frequent the area periodically/randomly or possibly seasonally.

With this consideration there is probably sufficient grounds to justify the undertaking of some on-going monitoring of the area with remote sensing cameras in the lead-up period until the development commences in order to confirm the frequency of devils in the area and possibly the number of individual animals in the locality.

#### **4.0 RECOMMENDATIONS:**

##### **4.1 Horned Orchid: *Orthoceras strictum***

- No potential habitat for this orchid was observed within the survey area or within the area of the proposed development footprint and this species was not observed during the survey, therefore no specific recommendations are presented.

##### **4.2 Tasmanian Devil: *Sarcophilus harrisii***

- No evidence of the presence of Tasmanian Devils was observed during this survey, but observations of scats were made during the previous survey. On this basis it is recommended that some on-going monitoring be undertaken using remote sensing cameras in the lead-up period to the commencement of the development in order to determine the frequency and patterns of use of the area by the devils.

Philip Milner

Vegetation Consultant



## REFERENCES

1. DPIPWE Website ..... [www.naturalvaluesatlas.tas.gov.au](http://www.naturalvaluesatlas.tas.gov.au)
2. DPIPWE Website ..... [www.dpipwe.tas.gov.au/threatenedflora/fauna](http://www.dpipwe.tas.gov.au/threatenedflora/fauna)
3. Harris S, & Kitchener A, (2005), *From Forest to Fjaeldmark*, DPIWE Tasmania
4. Burns D, (2012) *Pathfinders in Tasmanian Botany*. Tasmanian Arboretum Inc.
5. Bryant S, Jackson J. (1999) *Tasmania's Threatened Fauna Handbook*. Threatened Species Unit, Parks & Wildlife, Hobart.
6. Jones D, Wapstra H, Tonelli P & Harris S. (1999). *The Orchids of Tasmania*
7. Garret M, (1996) *The Ferns of Tasmania, Their Ecology & Distribution*, Tasmanian Forest Research Council Inc.
8. Mooney. N. Report March 2013. *Pre-clearance Survey of Phase 1 at Shree Minerals Nelson River Mine for Select Fauna*.
9. *Tasmanian Threatened Species Listing Statement: Orthoceras strictum, Horned Orchid*. Threatened Species Section, DPIPWE.
10. John Miedecke & Partners PL, (Sept 2011), *Heemskirk Tin Project, Preliminary Environmental Assessment*. Stellar Resources Ltd.
11. Wapstra H, A & M, Gilfedder L. *The Little Book of Common Names for Tasmanian Plants*

TARGETED SURVEY OF TASMANIAN DEVIL DEN SITES & HORNED ORCHID HABITAT ON QUEENS HILL FOR  
STELLAR RESOURCES LTD



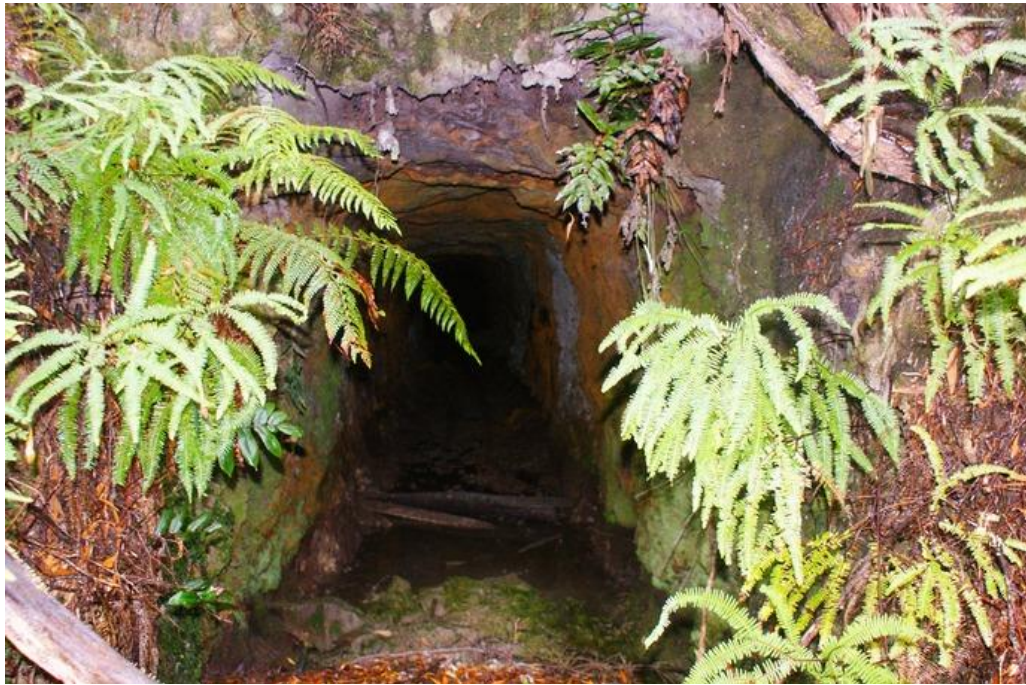
**PHOTO No.1. The main access road onto Queens Hill and the associated vegetation of *Leptospermum scoparium* – *Acacia mucronata* Forest (NLA).**



**PHOTO No.2. Proposed development site on the lower slopes of Queens Hill.**



TARGETED SURVEY OF TASMANIAN DEVIL DEN SITES & HORNED ORCHID HABITAT ON QUEENS HILL FOR  
STELLAR RESOURCES LTD



**PHOTO No.3. Adit No.5. entrance.**



**PHOTO No.4. Adit No.10 alongside Trial Harbour Road.**