

NILE ROAD TARGET AREA
BOTANICAL & FAUNA HABITAT SURVEY
For ABX4 PTY LTD
5th October 2012



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Introduction:

ABX4 Pty Ltd the holder of Exploration Licences EL4/2010; EL6/2010; EL7/2010; EL9/2010; and EL37/2010; EL3/2012; EL12/2012 and EL16/2012, a wholly owned subsidiary of Australian Bauxite Ltd is undertaking a further and extended exploratory program in an area of the northern midlands to the immediate east of Nile Road on the property of Mr Donald Cameron, “Fordon” 1541 as part of their Tasmanian Bauxite Project.

The original exploration program was undertaken in late 2010 and the original botanical and fauna habitat survey was undertaken on the 14th and 18th October 2010. The report of that survey by this author is dated 25th October 2010.

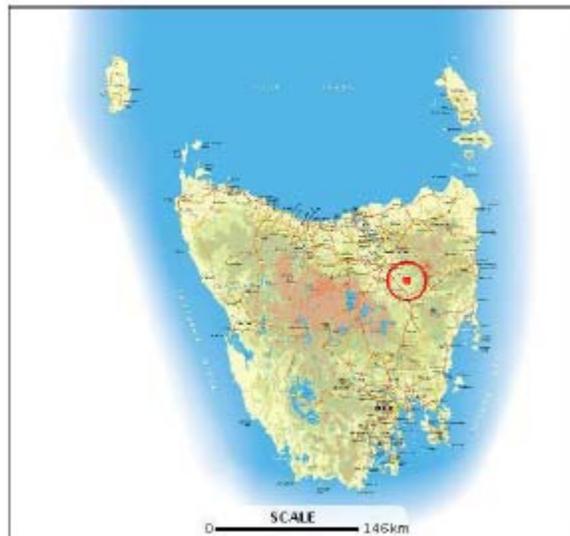
This exploration program will involve numerous shallow drill holes which will not require the clearing and/or leveling of drill pad sites and so is expected to have a minimal impact on the ground surface and adjacent vegetation.

A botanical and fauna habitat survey is required of the target areas as part of the MRT licence conditions to determine any likely impacts on threatened species or threatened vegetation communities.

Objectives: The objectives of this survey were to;

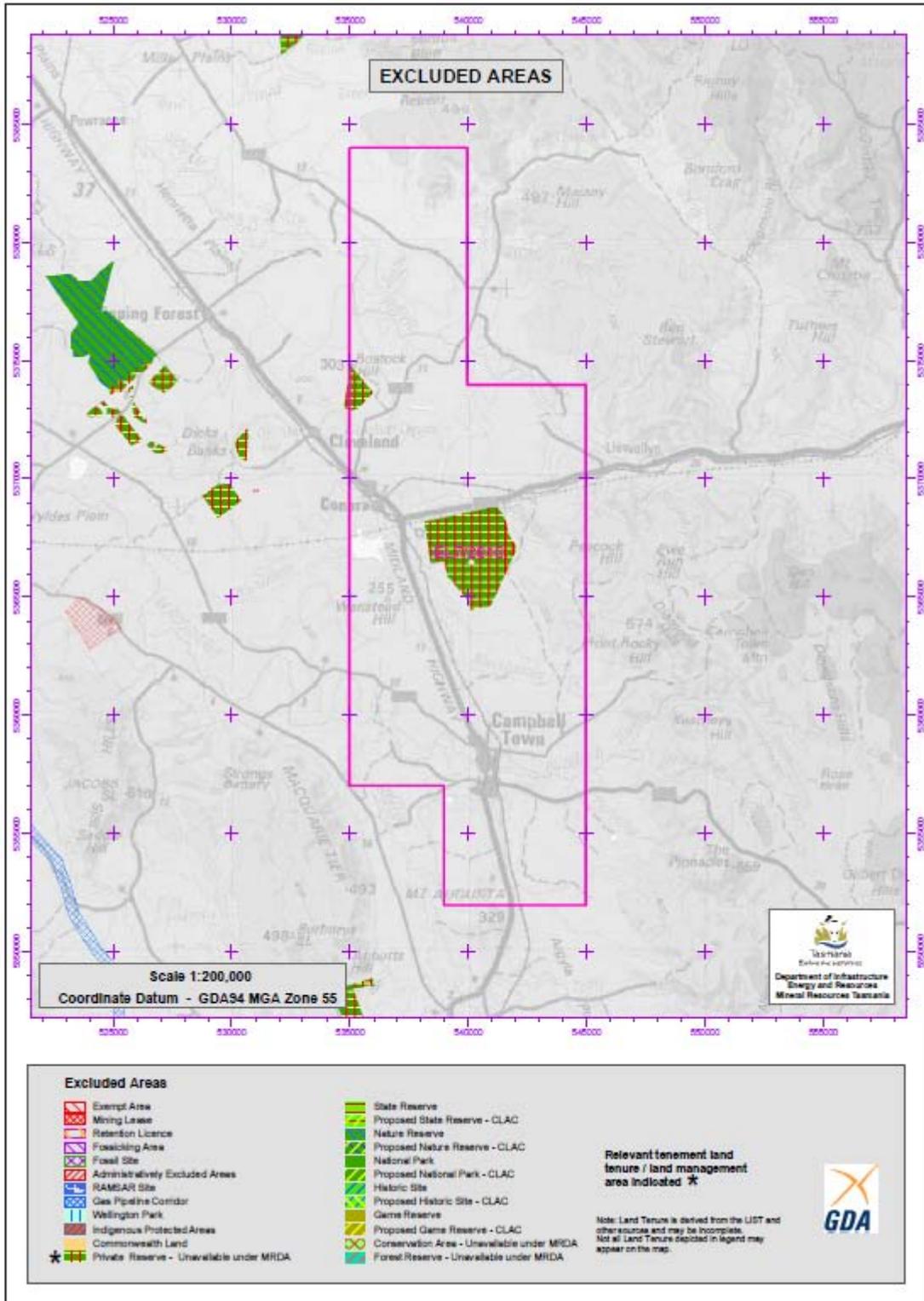
- Review the previous desktop survey to confirm the known biological records and the natural values present in the exploration target areas and in the vicinity.
- Undertake a field survey of the extended exploration target areas to observe and record the natural values present including the vegetation types and plant communities, the flora and in particular any threatened species and potential habitat for species of threatened fauna.
- Determine the possible impacts of the proposed exploration program on the natural values present and make recommendations on how those impacts can be minimised.

Location of Study Area:



MAP REF: Tasmap 1:25,000, Sheet No. 5238, Nile
BIOREGION: Northern Midlands
All Grid References MGA Zone 55 GDA94

BOTANICAL AND FAUNA HABITAT SURVEY FOR ABX4 PTY LTD: NILE ROAD TARGET AREA



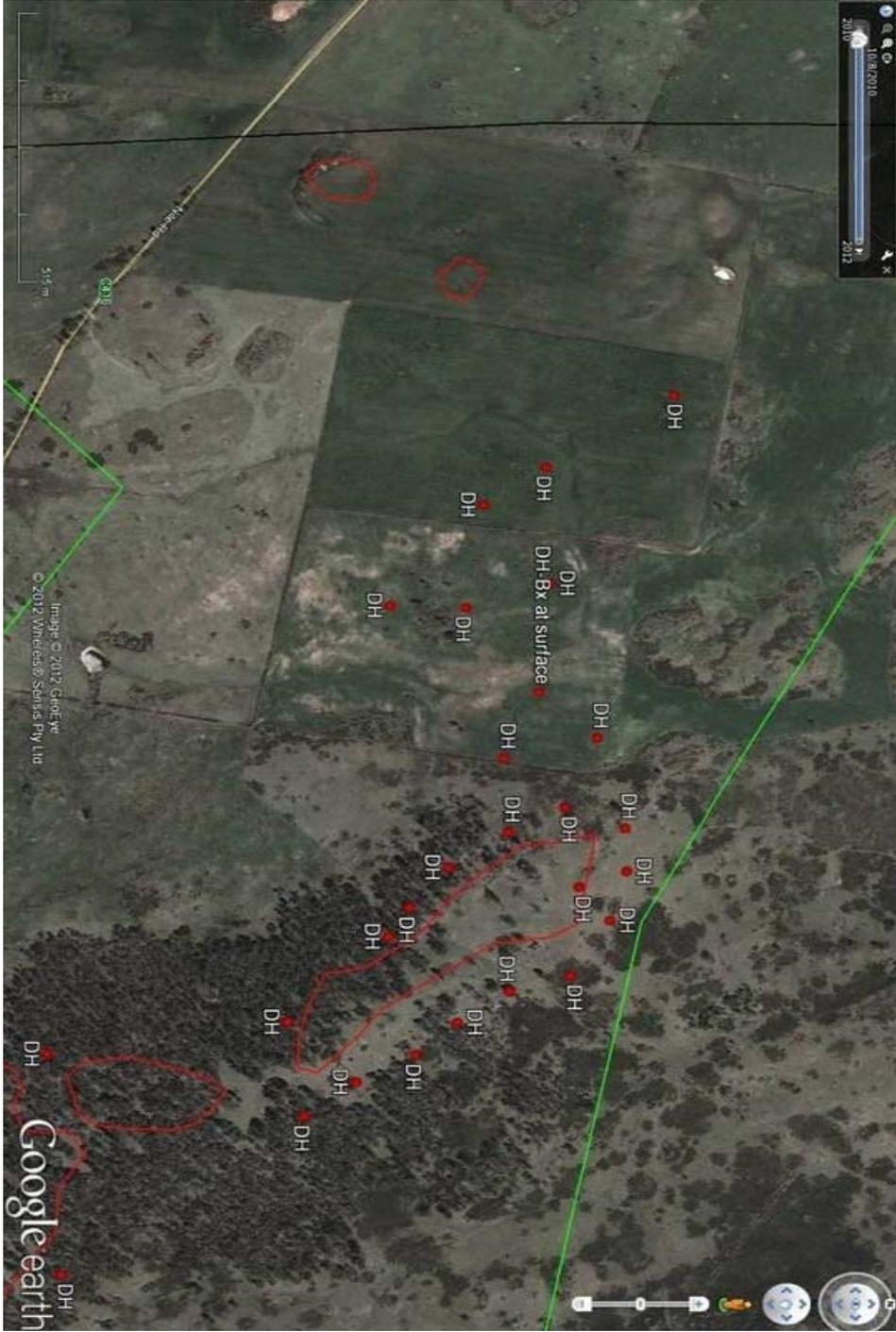
MAP No.1: Exploration Licence Area which includes the Nile Road Target Area.

Site Description:

The targeted exploration area covers three low hills on the “Fordon” property to the east of Nile Road. The northern most hill was subject to the previous drilling program and further drilling is proposed to be undertaken on and around this hill as part of the program. Ref: Map No.2, Nile Road North Target Area. The drilling program will also target the two low hills located to the immediate south which were not part of the previous exploration program. Ref: Map No.3 Nile Road South Target Area.

Not all drill sites marked on the attached maps are proposed to be drilled and site locations are flexible allowing for the varying of individual drill sites if required.

The exploration target area is within an area of remnant mature forest which has an open understorey and a grassy ground stratum. The three low hills are surrounded on three sides by cleared farmland utilized for grazing. Parts of the surrounding area are heavily infested with Gorse and the weed is also present within the target areas.



MAP No.2: Nile Road North Target Area



MAP No.3: Nile Road South Target Area

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 fauna known or expected to occur in the vicinity. The desktop survey information detailed in this report was extracted from the previous report dated October 25th 2010.

REFERENCE POINT for the locality: GRID REF: 536545E – 5381685N

Desktop Survey Results:

VEGETATION COMMUNITIES:

The following vegetation communities are mapped under the TasVeg mapping program as occurring within 1,000 metres of the study area reference point.

VEGETATION COMMUNITY	TasVeg Code / Map colour	EXTENT IN STUDY AREA
<i>Eucalyptus amygdalina</i> Inland Forest & Woodland on Cainozoic Deposits	DAZ / bright green with “x”	From the centre of the survey area and to the south-east.
<i>Eucalyptus amygdalina</i> Forest & Woodland on Dolerite	DAD / bright green with horizontal lines	From the centre of the survey area and to the south-east.
Lowland <i>Poa labillardierei</i> Grassland	GPH / yellow with diagonal lines	One localized area along a creek-line in the south-west quadrat.
Lowland Grassland Complex	GCL / yellow	Forms a mosaic with the weed infestation and improved pasture across the survey area
Agricultural Land	FAG / cream	As above but mainly in the west and s.w quadrats, and surrounding Ref point 1
Weed Infestation	FWU / cream with “x”	Extensive in the north and east quadrats.

TABLE 1: Vegetation Communities and extent within the study area as per TasVeg mapping program.

Eucalyptus amygdalina Inland Forest and Woodland on Cainozoic Deposits is a community usually dominated by the Black Peppermint *Eucalyptus amygdalina* although other species such as *Eucalyptus viminalis*, *E. pauciflora* or occasionally *E. ovata* are present and can sometime form the dominant canopy species. Dry sclerophyll shrubs, often low or prostrate species, Bracken *Pteridium esculentum* or grassland with graminoids and forb species can dominate the ground stratum depending on the soil type, fertility and depth and the drainage conditions, as well as the additional historical factors of firing and land use. There can be a high diversity of species in the ground layer vegetation although many of the remnants are now degraded.

This community is strongly associated with lateritic sediments in the northern Midlands and in the Fingal Valley and its main area of distribution is in the northern Midlands. Some outlying localities include the West Tamar, Bridgenorth and Westbury, between Cranbrook and Swansea on the east coast and in the Cressy – Blackwood Creek area.

The community was much more extensive in the northern Midlands at the time of white settlement however much of it has been cleared for agriculture. Large areas of the northern midlands on the less fertile soils were cleared in the 1960's following the introduction and widespread use of superphosphate.

The community is of high conservation value and is listed as a threatened native vegetation community under the Tasmanian *Nature Conservation Act 2002*.

Eucalyptus amygdalina Forest and Woodland on Dolerite is more widespread than the former community and is often located on rocky sites in low rainfall areas. The community typically is dominated by uneven aged Black Peppermint less than 25metres in height and with a variable understorey ranging from grassy to shrubby. In this location the two Eucalypt communities occur side by side and each has a similar structure with the dominant trees and a similar composition of species in the ground stratum. It is principally the underlying geology which separates them.

All native grasslands in Tasmania are of high conservation value although just two of the grassland communities are listed as threatened under the Commonwealth Act, namely Lowland *Poa labillardierei* Grassland, and Lowland *Themeda* Grassland, the latter usually having a higher diversity of inter-tussock herbs and forbs. The *Poa* Grassland is mapped as occurring in the locality along with the grassland community Lowland Grassland Complex. Most of the native and semi-improved pastures through the midlands are mapped as this community.

BOTANICAL AND FAUNA HABITAT SURVEY FOR ABX4 PTY LTD: NILE ROAD TARGET AREA

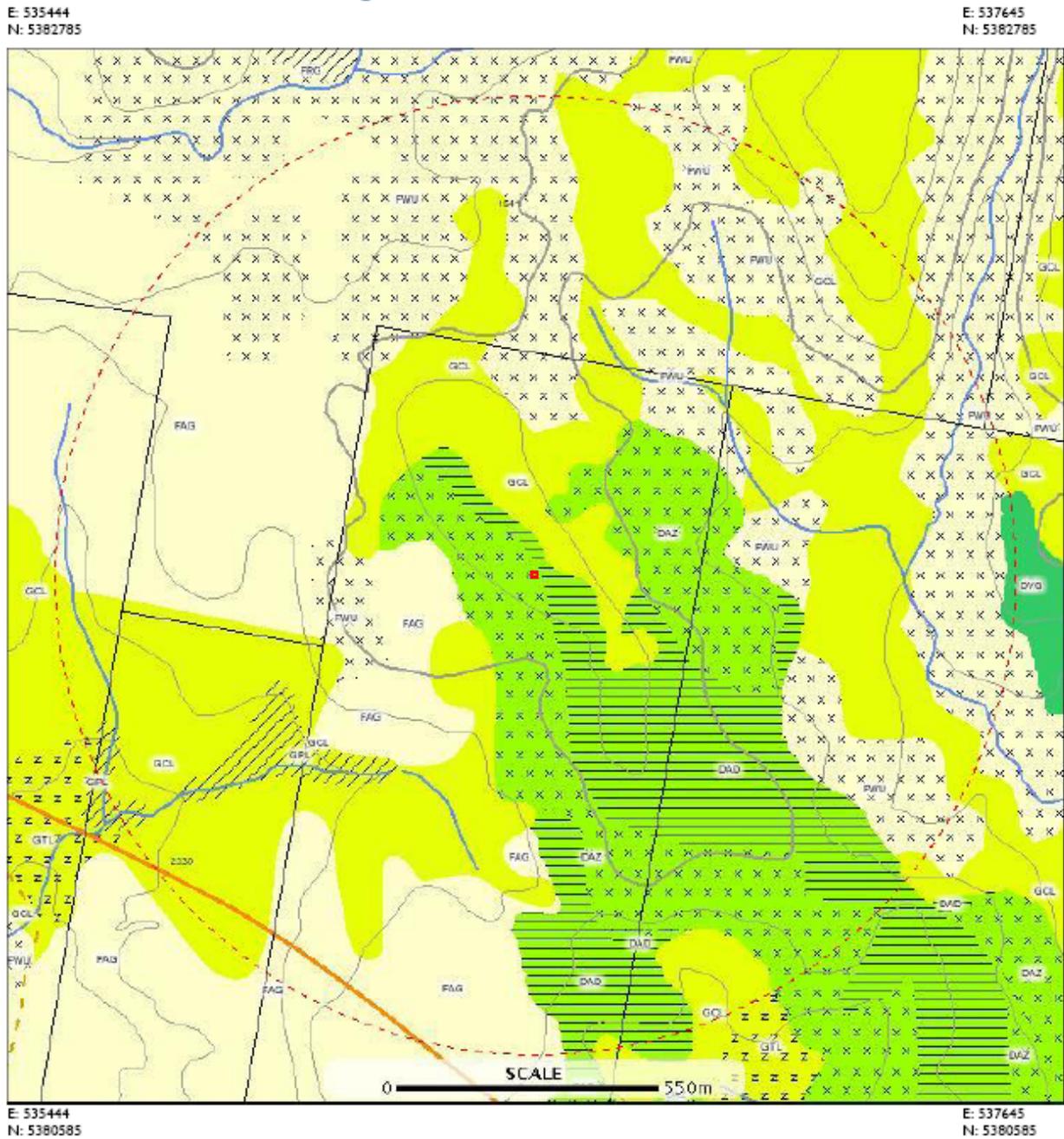


FIGURE 1: Vegetation communities as per TasVeg mapping program within 1,000 metres of reference point: GRID REF: 536545E – 5381685N

- CODE: DAZ *Eucalyptus amygdalina* Inland Forest & Woodland on Cainozoic Deposits,
 DAD *Eucalyptus amygdalina* Forest & Woodland on Dolerite
 GPL Lowland *Poa labillardierei* Grassland
 GCL Lowland Grassland Complex
 FAG Agricultural Land
 FWU Weed Infestation

THREATENED VEGETATION COMMUNITIES:

One of the two forest communities mapped within the study area is listed as threatened under the Tasmanian *Nature Conservation Act 2002*.

- *Eucalyptus amygdalina* Inland Forest & Woodland on Cainozoic Deposits is listed as a vulnerable community under the Act as it has been subject to extensive clearing and fragmentation throughout the northern midlands and in particular since the 1960's. This community occurs within the exploration target area.

Native grassland communities mapped within the study area are listed as nationally threatened ecological communities under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

- Lowland *Poa labillardierei* Grassland was declared a critically endangered ecological community in Tasmania under the EPBC Act in June 2009. This community follows the lower slopes and creek-line outside of and to the south-west of the target area.

VEGETATION COMMUNITIES OF CONSERVATION SIGNIFICANCE

- *Eucalyptus amygdalina* Forest and Woodland on Dolerite is relatively widespread in the drier areas of eastern Tasmania and the midlands.
- Lowland Grassland Complex is considered to be relatively widespread in the midlands however it is often considered to be disturbance induced and the diversity of species particularly herbs and other forbs can be greatly influenced by the disturbance history of a location. Areas of this community which have a high diversity of herbs and forbs are of high conservation significance.

THREATENED FLORA:

One species of threatened flora listed under the Tasmanian *Threatened Species Protection Act 1995* and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* is recorded on the "Natural Values Atlas" database as occurring within 500 metres of the study area reference point.

- *Glycine latrobeana* the Clover Glycine is listed as being vulnerable under both State and Commonwealth Acts. There is one 1984 record of the species from within the target area. There is a further single record from the same year within 5,000 metres of the locality.

One further species of threatened flora is recorded on the data base from within 1,000 metres of the site.

- *Arthropodium strictum* the Chocolate Lily is listed as being rare under the Tasmanian Act with two records from 1985 and a further single record from within 3,000 metres.

A further three species of threatened flora are recorded within 3,000 metres of the locality.

- *Caesia calliantha* the Blue Grasslily is listed as being rare under the State Act with a single 1984 record.
- *Colobanthus curtisiae* the Grassland Cupflower is listed as being rare in Tasmania and vulnerable nationally. There are 3 records on the data base from 1984, 1990 and 1994. There are a further four records within 5,000 metres.

- *Lachnagrostis punicea* subsp *punicea* the Bristle Blowngrass is listed as being rare in Tasmania. There is one 1984 record.

A further 15 species of listed threatened flora are recorded on the data base within 5,000 metres of the locality.

- *Alternanthera denticulata* the Lesser Joyweed is considered to be endangered in Tasmania. There are three very early records on the database, one undated and from 1877 and 1878.
- *Austrostipa nodosa* the Knotty Speargrass is rare in Tasmania. One 1984 record.
- *Austrostipa scabra* subsp *scabra* Rough Speargrass is provisionally listed as being rare in Tasmania with 2 records from the locality.
- *Glossostigma elatinoides* the Small Mudmat is rare in Tasmania with one early 1878 record.
- *Hyalosperma demissum* the Moss Sunray is an endangered species in Tasmania with six records from the locality all dated from 2005.
- *Hypoxis vaginata* var *vaginata* the Sheathing Yellowstar is provisionally listed as being rare in Tasmania. There is four records on the database and all from 2005
- *Juncus amabilis* the Gentle Rush is rare in Tasmania with a single record from 1984.
- *Lythrum salicaria* Purple Loosestrife is listed as being vulnerable under the State Act. There are two very early records from 1877 and 1878.
- *Persicaria decipiens* Slender Waterpepper is vulnerable in Tasmania. A single early but undated record.
- *Pterostylis commutata* the Midlands Greenhood orchid is considered to be endangered in Tasmania and critically endangered nationally with a single record from 2000.
- *Pterostylis ziegleri* the Grassland Greenhood (orchid) is considered to be vulnerable both within Tasmania and nationally. There is one very early record from 1882.
- *Scleranthus fasciculatus* the Spreading Knawel is listed as being vulnerable in Tasmania with a single 2006 record from the locality.
- *Teucrium corymbosa* the Forest Germander is rare in Tasmania. One very early record from 1877.
- *Tricoryne elatior* Yellow Rushlily is listed as being vulnerable under the Tasmanian Act with two early records from the locality, one undated and the other from 1881.
- *Triptilodiscus pygmaeus* (syn *Helipterum australe*) the Dwarf Sunray is considered to be vulnerable in Tasmania. There are six 2005 records from the locality.

THREATENED FAUNA:

One species of threatened fauna listed under the above Acts is recorded on the database as occurring within 1,000 metres of the study area. No species have been recorded from within 500 metres of the study area reference point

- The Tasmanian Devil *Sarcophilus harrisii* is now listed as being endangered under both State and Commonwealth Acts. There are three records of the species from within 1,000 metres from the study area reference point, from 1975 and 1985. The accuracy of the recorded locations are +/- 1850 and 5,000 metres. There are a further 8 records from within 5,000 metres dated between 1974 and 1993.

Two further species have been recorded within 5,000 metres of the locality.

- The Eastern-barred Bandicoot *Parameles gunnii* is relatively widespread in Tasmania but considered to be vulnerable nationally. One record from 1977.
- The Spotted-tailed Quoll *Dasyurus maculatus* subsp *maculatus* is considered to be rare in Tasmania and vulnerable nationally. One record from 1990.

The following 8 species of threatened fauna could occur in the locality based on habitat mapping and on the known geographical range of each.

- The Tasmanian subspecies of Wedge-tailed Eagle *Aquila audax* subsp *fleayi*. The bird is listed as being endangered under both State and Commonwealth Acts and requires large trees within tracts of old-growth forest for nesting.
- The Tasmanian subspecies of the Masked Owl *Tyto novaehollandiae* subsp *castinops* is listed as being endangered in Tasmania and considered to be vulnerable under the Commonwealth Act. There is one record from 1995 and one from 1996 from the locality. This bird requires large tree hollows for nesting and old-growth forest as habitat.
- The White (Grey) Goshawk *Accipiter novae hollandiae* is endangered in Tasmania. The species requires mature wet forest as habitat.
- The Swift Parrot *Lathamus discolor* is listed as endangered both in Tasmania and nationally and inhabits mature Blue Gum forests (*Eucalyptus globulus*) and *Eucalyptus ovata* Forest and requires tree hollows for nesting.
- The Tussock Skink *Pseudemoia pagenstecheri* is considered to be vulnerable in Tasmania.
- The Swan Galaxia *Galaxias fontanus* is considered to be endangered in Tasmania and nationally. The species is endemic to Tasmania.
- The Green and Gold Frog *Litoria raniformis* is considered to be vulnerable in Tasmania and Nationally.
- The Catadromus Carabid Beetle *Catadromus lacordairei* is listed as a vulnerable species under the Tasmanian Act.

ENVIRONMENTAL WEEDS:

One significant environmental weed is mapped as occurring within 500 metres and 5,000 metres of the locality.

- Gorse *Ulex europaeus* is considered to be a weed of national significance (WONS) under commonwealth legislation and a declared weed in Tasmania. Extensive infestations of Gorse are mapped across the study area and particularly so in the native grasslands and in areas of improved but long established pasture in the north and east of the study area.

Field Survey:

The field survey was undertaken on Wednesday 3rd of October 2012.

Methodology: The random meander was used to survey across the target areas proposed for the extended drilling program.

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

Limitations: This survey was conducted in early spring when many grassland species are just beginning to flower. There are numerous species which flower later in the spring and summer such as most of the grasses and annual herbs. 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.

Field Survey Results:

NILE ROAD NORTH TARGET AREA: REF: Map No.2.

This survey area covered the northern most hill and its surrounds which extend along a low ridgeline from a north-west to south-east direction and through a relatively small area of remnant open forest and native grassland which is surrounded on three sides by open paddocks of improved pasture which are infested to a degree by gorse. Gorse is also present within the remnant forest and native grassland.

NILE ROAD SOUTH TARGET AREA: REF: Map No.3.

This survey area covered the two small adjoining hills located to the south of the previous target area. This area was also covered in mature forest which had an open understorey and a grassy ground stratum vegetation. Gorse was also present in this location. The area is bounded by cleared pasture on two sides and a large dam is located to the north-east. The adjoining remnant forest outside of the target area continues along a series of low hills towards the south and to Nile Road.

VEGETATION COMMUNITIES:

The predominant vegetation community observed throughout both the Nile Road North and the Nile Road South Target Areas . is a relatively low and open but mature forest of predominantly *Eucalyptus amygdalina*, the Black Peppermint. The White Gum *Eucalyptus viminalis* was also relatively common tree within the canopy. The two forest communities present were located according to the underlying geology and as mapped under the TasVeg program. *Eucalyptus amygdalina* Inland Forest and Woodland on Cainozoic Deposits extended in a linear zone mainly along the upper slopes either side of the ridgelines and this was the target geology of the exploration program. *Eucalyptus amygdalina* Forest and Woodland on Dolerite also extended along the ridgelines and alongside the previous community. The ground stratum vegetation throughout consisted of native grasslands of a non-tussock formation. Two localised areas of short native grassland with a relatively open sward extended between the open forest and along the ridge within the Nile Road North Target area on quite shallow soil which in places would be described as a rock-plate grassland.

The grassland and the grassy ground stratum vegetation had a high diversity of species including grasses, herbs and other forbs, including a number of threatened species and is considered to be of high conservation value. The areas of grassland are mapped under TasVeg as Lowland Grassland Complex (GCL) although the more limited areas of rock-plate vegetation would have been too small in area to have been mapped under TasVeg.

THREATENED VEGETATION COMMUNITIES:

One threatened native vegetation community listed under the Tasmanian *Nature Conservation Act 2002* was the observed during the survey. *Eucalyptus amygdalina* Inland Forest on Cainozoic Deposits was the predominant community within Target area No.1. as the underlying geology of this community is the target of this exploration program.

Neither of the two grassland communities which are listed as threatened under the Commonwealth legislation was present in either of the two target areas, but were observed in the general locality.

VEGETATION COMMUNITIES OF CONSERVATION SIGNIFICANCE:

The area of low open native grassland (Lowland Grassland Complex, GCL) including the small areas of rock-plate vegetation (Rock-plate Grassland GRP) which is present within target area No.1 and extends into and forms the ground stratum understorey of the two forest communities has a high diversity of species, including herbs, forbs, grasses and orchids, including some threatened species.

The community in this location is considered to be of high conservation value.

THREATENED FLORA:

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

- *Triptilodiscus pygmaeus* the Common Sunray is considered to be vulnerable in Tasmania but is not listed under the Commonwealth Act. It is a tiny annual daisy which does benefit from a degree of soil disturbance.

This tiny annual plant tends to occur in colonies of many individuals however each plant is quite small and just up to 20mm tall in this location with open yellow flowers only 5mm across.

Colonies of the species were observed within the rock-plate grassland. Two exclusion zones were suggested in the previous report in order to limit the level of disturbance where the species occurs and are repeated here.

1. Within a 15 metre radius of GRID REF: 536627E – 5381692N
2. Within a 10 metre radius of GRID REF: 536643E – 5381678N



PHOTO 1: Rock-plate grassland community with *Triptilodiscus pygmaeus*



PHOTO 2: *Triptilodiscus pygmaeus*, Common Sunray

- *Arthropodium strictum* the Chocolate Lily was also observed in the vicinity of the location for the *Triplodiscus pygmaeus*. The Chocolate Lily is listed as being rare under the Tasmanian Act although it is relatively widespread in suitable habitats and vegetation types. The plant was only just beginning to send up flower spikes so it was not easily observed during this survey. The species was observed during the 2010 survey in a number of locations across the survey area and is more prevalent in the location than this field survey indicated. Note that the following photos were taken during a different field survey.



PHOTO 3 and 4: *Arthropodium strictum* The Chocolate Lily

- *Scleranthus fasciculatus* the Spreading Knawell is considered to be vulnerable in Tasmania. The species was observed in a single location during the survey, within a patch of approximately 2.5 x 2.5 metres next to a rotten log and the base of a small tree, at GRID REF: 536466E – 5381833N (3m+/-). A 20 metre radius exclusion zone should be observed around this point.



PHOTO 5 and 6: *Scleranthus fascicularis* the Spreading Knawell

- *Hypoxis vaginata* var. *vaginata*, the Sheathed Yellowstar. This species was observed as small patches within moist pockets in a number of locations within the target areas. It was also present downslope in moister locations outside of the target areas. Drill sites should be varied to avoid patches of this species where it is observed. It is a rare species in Tasmania.



PHOTO No. 7: *Hypoxis vaginata* var. *vaginata*

- *Stackhousia subterranea* (syn *S. gunnii*) Grassland Candles is considered to be an endangered species in Tasmania. Five patches of this plant were observed in addition to the patch recorded during the previous survey. The plant is a small suckering perennial herb which produces scattered upright flowering stems or spikes over a patch of ground. The flowers are cream to dusky yellow in colour and produced during the spring.
 - (a) About 20 stems (plants) were observed within a 15 metre radius of GRID REF: 536851E – 5381088N and a 30 metre radius exclusion zone should be flagged from this reference point to avoid impacting on this population. (Previous survey)
 - (b) About 20 stems were observed within a 3m x 3m patch at GRID REF: 536398E – 5381819N (4m+/-). An exclusion zone of a 30m radius from this point is required.
 - (c) A few stems were observed at GRID REF: 536395E – 5381815N (4m +/-). A 10 metre radius exclusion zone is required.
 - (d) In excess of 100 stems were observed in the vicinity of GRID REF: 537107E – 5381044N. A 30 radius exclusion zone is required from this point.
 - (e) In excess of 200 stems were observed in an area around GRID REF: 537132E – 5381039N. A 30 metre radius exclusion zone is also required from this point.
 - (f) About 20 stems were observed in a small area around GRID REF: 537145E – 5380908N (3m +/-). A 10 metre radius exclusion zone is required from this point.

****NOTE:** It is an offence to collect, disturb, damage or destroy this species unless under permit.



PHOTO 8 and 9: *Stackhousia subterranea* Grassland Candles

None of the other four species of threatened flora known to occur within 3,000 metres of the study area and referred to in this report under the desktop survey section were observed during the survey.

THREATENED FAUNA:

No species of threatened fauna listed under the above Acts, which have been recorded in the locality or have the potential to occur in this geographical area were observed during the field survey. No field evidence of the presence of Tasmanian Devils such as scats or tracks were observed during the survey.

THREATENED FAUNA HABITAT:

The mature old-growth Eucalypts and particularly those possessing hollows which occur as frequent trees throughout the survey area are important potential habitat for many species of fauna including a number of threatened species. Such trees are critical habitat for mammals and birds which mature trees or trees with hollows for part of their life cycle and includes threatened species such as the Masked Owl (requires large hollows) and the Wedge-tailed Eagle which requires large trees for nest support. Tasmanian Devils and Spotted-tailed Quolls can also utilize basal tree hollows as dens. Suitable habitat was observed for the Eastern-barred Bandicoot and the area was considered to be potential habitat for the Masked Owl. There were no wetlands or streams within the exploration target areas and so no potential habitat for threatened species of fish or frogs.

The exploration program as proposed will not impact on any standing trees or threaten any such potential fauna habitat.

- Wedge-tailed Eagle *Aquila audax* subsp. *fleayi*. No trees suitable for nesting were observed although the general area would be suitable hunting and foraging habitat.
- White (Grey) Goshawk *Accipiter novaehollandiae*. No suitable habitat present in the location.
- Masked Owl *Tyto novaehollandiae* subsp. *castinops*. The presence of mature old-growth trees some with significant hollows indicated the possibility that the Masked Owl could be present in the location. A targeted survey would be required to confirm.
- Swift Parrot *Lathamus discolor*. *Eucalyptus amygdalina* Forest or Woodland is not considered to be the preferred habitat for this parrot although there would be suitable nesting hollows present in the location. The species presence would therefore be dependent on the proximity of suitable feeding habitat such as forests and woodlands composed of *Eucalyptus ovata* or *Eucalyptus globulus*.
- Tasmanian Devil *Sarcophilus harrisii* has been recorded previously within 3,000 metres of the location however no evidence of the species presence was observed during the field survey, such as potential den sites or scats.
- The Spotted-tailed Quoll *Dasyurus maculatus* subsp. *maculatus* could potentially occur in the location however no evidence of the species presence was observed during the survey.
- The Eastern-barred Bandicoot *Paramelotes gunnii*. Suitable habitat for the Bandicoot was present in the location however no evidence of the species presence such as their distinctive scratching in the soil were observed.

- The Tussock Skink *Pseudemoia pagen stecheri* As a grassland species there was potential habitat in the location although most of the species preferred tussock-type grassland was located on the moister lower slopes outside of the target areas.

NON-THREATENED FAUNA:

The following species of non-threatened fauna were observed or heard during the field survey. This area of mature grassy forest with many trees possessing hollows was relatively rich in forest and woodland birds and many would be nesting during this month of October.

Green Rosella, *Platycercus caledonicus*

Sulphur Crested Cockatoo, *Cacatua galerita*

Striated Pardalote, *Pardalotus striatus*

Dusky Woodswallow, *Artamus cyanopterus*. Woodswallows are considered to be in decline across Tasmania and the Australian mainland.

Welcome Swallow, *Hirundo neoxena*.

Grey Fantail, *Rhipidura fuliginosa*.

Fan-tailed Cuckoo, *Cacomantis flabelliformis*.

Pallid Cuckoo, *Cuculus pallidus*.

Flame Robin, *Petroica phoenicea* Most species of Robins are considered to be in decline in Tasmania and on mainland Australia.

Black-faced Cuckoo-shrike, *Coracina novaehollandiae*.

Echidna, *Trachyglossus aculeatus*.

ENVIRONMENTAL WEEDS:

The principal environmental weed observed during the field survey was Gorse *Ulex europeaus*. Gorse was observed as scattered plants and as larger patches throughout the survey area and is having an impact by out-competing and shading out the ground stratum vegetation in those locations.

It is a widespread and extensive weed throughout the district and is having a serious impact on both agricultural land and remnant natural vegetation.

Gorse is recognized as being a weed of national significance (WONS).

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

Survey Conclusions:

The exploration target area is located within a significant area of mature remnant forest comprising two forest vegetation communities, one of which is listed as a threatened native vegetation community in Tasmania. There is a high diversity of grassland species and forbs within the ground stratum vegetation and numerous mature old-growth trees including trees with hollows are present in the tree canopy.

The area of native grassland within the target area is not listed as a threatened community however it is of high conservation value due to the diversity of ground stratum species, including a number of listed threatened species, such as the endangered *Stackhousia subterranea*.

The vegetation of the northern midlands bioregion has been subject to extensive land clearance in the past mainly for agriculture and the remaining remnants of natural vegetation are now of

high conservation value and is often the last remaining refuge for numerous species of flora and fauna and particularly so for the ground stratum flora.

The proposed exploratory drilling program is of a low impact nature involving shallow drill holes. This is demonstrated by the absence of any visible disturbance from the previous drilling program undertaken during 2010. The drilling program as proposed will have a minimal impact of the ground layer vegetation providing a number of key areas with threatened species are avoided. There will be no impact on the standing trees.

Recommendations:

VEGETATION COMMUNITIES:

The proposed drilling program is located within vegetation with an open understorey so no clearing of woody vegetation will be necessary. The drilling method being used will ensure that there will be minimal impact on the native vegetation community present and a minimal and localized impact on the ground stratum vegetation. No mature trees will need to be felled to allow access to any of the drill sites.

- 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 adjacent soils and ground stratum vegetation.
- Ensure the thorough reinstatement of each drill site.

THREATENED VEGETATION COMMUNITIES:

The threatened vegetation community, *Eucalyptus amygdalina* Inland Forest & Woodland on Cainozoic Deposits is present across the survey and exploration target area.

- There will be minimal impact on this community with the proposed exploration program and no specific action is required in addition to the recommendations made under vegetation communities (above) and threatened flora (below).

THREATENED FLORA:

Five species of threatened flora were observed during the field survey.

- The following exclusion areas should be plotted, flagged and observed by the field crew in order to avoid known populations of the threatened species.
- For the Common Sunray *Triptilodiscus pygmaeus*
 - (a) Within 15 metre radius of GRID REF: 536627E – 5381692N
 - (b) Within 10 metre radius of GRID REF: 536643E – 5381678N
- For the Grassland Candles *Stackhousia subterranea*.
 - (a) Within 30 metre radius of GRID REF: 536851E – 5381088N
 - (b) Within 30 metre radius of GRID REF: 536398E – 5381819N
 - (c) Within 10 metre radius of GRID REF: 536395E – 5381815N.
 - (d) Within 30 metre radius of GRID REF: 537107E – 5381044N
 - (e) Within 30 metre radius of GRID REF: 537132E – 5381039N.
 - (f) Within 10 metre radius of GRID REF: 537145E – 5380908N.

***NOTE: Grassland Candles is an endangered species under the Tasmanian Act and it is an offence to disturb, damage or destroy this plant.

- For the Chocolate Lily *Arthropodium strictum* (As for the Common Sunray)
 - (a) Within 15 metres of GRID REF: 536627E – 5381692N
 - (b) Within 10 metres of GRID REF: 536643E – 5381678N
- For *Scleranthus fascicularis* the Spreading Knawell
 - (a) Within 20 metre radius of GRID REF: 536466E – 5381833N.
- For *Hypoxis vaginata* the Sheathing Yellowstar. Avoid where observed.
- The field crew staff should be instructed in the recognition of the five threatened species, and in particular *Stackhousia subterranea*. Drill site locations should be varied if necessary to avoid any of the four threatened species.

THREATENED FAUNA:

- No species of threatened fauna was observed or recorded during the field survey and no specific action is required.

THREATENED FAUNA HABITAT:

The key potential habitat for threatened species in the target area are the mature old-growth Eucalypts which possess hollows.

- The exploration program will not impact on any established trees and so will not impact on potential habitat for threatened species of fauna.
The proposed drilling program will have minimal impact to the ground stratum vegetation and will have little impact on terrestrial species of fauna.

ENVIRONMENTAL WEEDS:

- In order to prevent 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 area.
Ensure that all machinery and equipment is cleaned of extraneous soil before leaving this property and moving to a new exploration target area.
Gorse is widespread within the target area as well as in the wider area.
- Care should be taken with drill sites in the vicinity of existing gorse infestations to minimize ground disturbance and to avoid moving potentially contaminated soil to sites which are clear of the weed. Drill sites in close proximity to Gorse patches should be undertaken last in the drilling program.
- Reinstate each drill site sequentially in order to limit the risk of transferring soil borne seed of Gorse.

PHYTOPHTHORA:

- Accepted protocols in regard to hygiene and wash-down procedures for all machinery and equipment, 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 tyres, work-boots and equipment.

FUTURE SURVEY REQUIREMENTS:

- Should the Nile Road exploration program confirm a viable deposit of bauxite and the company proceeds with an application for a mining lease over the target then a more thorough botanical survey over an extended season will be necessary in order to more fully determine the conservation value of the ground stratum vegetation, particularly with continued mapping of the locations and extent of the threatened species of plants observed in the locality.

Philip Milner

Vegetation Consultant

APPENDIX 1:

Vegetation Communities and Species Recorded within the exploration target areas.

1. *Eucalyptus amygdalina* Inland Forest and Woodland on Cainozoic Deposits (TasVeg Code DAZ)

The underlying geology of the community is the target of this drilling program. Both forest communities in the location are mature and in an old-growth condition with numerous trees possessing hollows. The understorey of both communities is very open with few woody small trees or shrubs being present. The ground stratum is composed of native non-tussock type grassland with a high diversity of grass, herb and forb species. A number of terrestrial orchids were also observed.

2. *Eucalyptus amygdalina* Forest & Woodland on Dolerite (TasVeg Code DAD)

Except for the different underlying geology this community has a very similar structure, age and species composition to the previous community.

3. Lowland Grassland Complex (TasVeg Code GCL)

The grasslands within the target areas also form the ground stratum vegetation of the above forest communities. The grasslands and the ground stratum beneath the forest communities within the target areas are all non-tussock type grasslands however tussock grasslands are present on the moister lower slopes outside of but adjacent to the target areas.

4. Rockplate Grasslands (TasVeg Code GRP)

Two small localized areas of rockplate grassland was present in the vicinity of GRID REF:536627E – 5381692N and 536643E – 5381678N and is characterized by the presence of the threatened species *Triptilodiscus pygmaeus* which requires a location free of competition from grasses.

Note: Threatened species are highlighted

DOMINANT TREES	COMMON NAME	FREQUENCY
<i>Eucalyptus amygdalina</i>	Black Peppermint	abundant
<i>Eucalyptus viminalis</i>	White-gum	common
UNDERSTOREY TREES		
<i>Acacia dealbata</i>	Silver Wattle	occasional
<i>Allocasuarina verticillata</i>	Drooping Sheoak	localized
<i>Allocasuarina littoralis</i>	Black Sheoak	localized
MEDIUM SHRUBS		
<i>Bursaria spinosa</i>	Prickly Box	occasional
<i>Meliccytis dentatus</i>	Violet Bush	occasional

APPENDIX 1 (cont)

SMALL SHRUBS

<i>Astroloma humifusa</i>	Cranberry Heath	occasional
<i>Bossiaea prostrata</i>	Creeping Bossia	common
<i>Gonocarpus tetragynus</i>	Common Raspwort	occasional
<i>Goodenia lanata</i>	Trailing Native-primrose	common
<i>Hibbertia humifusa</i>	Hairy Guineaflower	occasional
<i>Lissanthe strigosa</i>	Peachberry Heath	common
<i>Pimelea humilis</i>	Dwarf Riceflower	occasional

CLIMBING PLANTS

<i>Comesperma volubile</i>	Blue Love Creeper	uncommon
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HERBS & HERB-LIKE PLANTS

<i>Acaena echinata</i>	Sheeps Burr	occasional
<i>Ajuga australis</i>	Austral Bugle	localized
<i>Asperula conferta</i>	Common Woodruff	uncommon
<i>Chrysocephalum apiculatum</i>	Common Everlasting	occasional
<i>Crassula sieberiana</i>	Rock Stonecrop	occasional
<i>Cymbonotus priessianus</i>	Southern Bears-ears	occasional
<i>Daucus glochidia</i>	Australian Carrot	uncommon
<i>Dichondra repens</i>	Kidneyweed	common
<i>Drosera peltata</i> subsp <i>peltata</i>	Pale Sundew	common
<i>Euchiton</i> sp.	A Cudweed	occasional
<i>Geranium solanderi</i>	Southern Cranesbill	occasional
<i>Hydrocotyle callicarpa</i>	Tiny Pennywort	occasional
<i>Hypericum gramineum</i>	Small StJohns Wort	occasional
<i>Lagenophora stipitata</i>	Bluebottle Daisy	occasional
<i>Oxalis perennans</i>	Grassland Woodsorrel	common
<i>Plantago varia</i>	Variable Plantain	occasional
<i>Poranthera microphylla</i>	Small Poranthera	common
<i>Sebaea ovata</i>	Yellow Sebae	uncommon
<i>Stackhousia subterranea</i>	Midlands Candles	localized
<i>Triptilodiscus pygmaeus</i>	Common Sunray	localized
<i>Veronica calycina</i>	Hairy Speedwell	localized
<i>Viola betonicifolia</i>	Showy Violet	common
<i>Viola hederaceae</i>	Ivy-leafed Violet	occasional
<i>Wahlenbergia</i> sp.	A Native Bluebell	occasional

ORCHIDS

<i>Caladenia carnea</i>	Pink Fingers	common
<i>Caladenia</i> spp.	Caladenia Orchids	occasional in bud
<i>Chiloglottis triceratops</i>	Three-horned Bird Orchid	occasional
<i>Cyrtostylis reniformis</i>	Small Gnat-orchid	occasional
<i>Diuris pardina</i>	Leopard Orchid	one plant only

APPENDIX 1 (cont)

ORCHIDS (cont)

<i>Glossodia major</i>	Waxlip	occasional
<i>Microtis sp.</i>	An Onion Orchid	occasional in bud
<i>Pterostylis pedunculata</i>	Maroonhood	common
<i>Thelymitra spp.</i>	Sun Orchids	occasional in bud

GRASSES & GRAMINOIDS

<i>Arthropodium strictum</i>	Chocolate Lily	occasional
<i>Austrodanthonia spp.</i>	Wallaby Grasses	common
<i>Hypoxis vaginata</i>	Sheathing Yellow-star	localized
<i>Lepidosperma sp.</i>	A Swordsedge	occasional
<i>Lomandra longifolia</i>	Mat-rush	common
<i>Luzula meridionalis</i>	Southern Woodrush	occasional
<i>Poa rodwayi</i>	Velvet Tussockgrass	common
<i>Poa labillardierei</i>	Silver Tussockgrass	occasional
<i>Themeda triandra</i>	Kangaroo Grass	occasional
<i>Wurmbea dioica</i>	Early Nancy	common

FERNS & ALLIED PLANTS

<i>Pteridium esculentum</i>	Bracken	common
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ENVIRONMENTAL WEEDS

<i>Arctotheca calendula</i>	Capeweed	common
<i>Cirsium vulgare</i>	Spear Thistle	occasional
<i>Centaureum erythraea</i>	Centaury	occasional
<i>Ulex europaeus</i>	Gorse	abundant
<i>Reseda luteola</i>	Wild Mignonette	occasional
<i>Silybum marianum</i>	Variegated Thistle	occasional
<i>Taraxacum officinale</i>	Common Dandelion	occasional



PHOTO No.10: Area of rockplate community adjacent to *Eucalyptus amygdalina* Forest



PHOTO No.11: Rockplate Grassland community within location above.



PHOTO No.12: *Eucalyptus amygdalina* Inland Forest on Cainozoic Deposits with grassy ground stratum in study area.



PHOTO No.13 : *Eucalyptus amygdalina* Inland Forest on Cainozoic Deposits with grassy ground stratum and Gorse patches within study area.



PHOTO No.14: Grassy ground stratum, Gorse and fallen branches.



PHOTO No.15: Community of *Stackhousia subterranea*.