

"BLACKWOOD PARK" REEDY MARSH
BOTANICAL & FAUNA HABITAT SURVEY

For ABX4 PTY LTD

18th July 2012



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CONTENTS

1.0 Introduction

1.1 Objectives

1.2 Location of Study Area

1.3 Site Description

2.0 Desktop Survey of Natural Values

2.1 Desktop Survey Results

3.0 Field Survey

3.1 Field Survey Results

4.0 Recommendations

APPENDIX 1: Vegetation Communities and Species Recorded

References

PHOTOS

1.0 Introduction: ABX4 Pty Ltd a wholly owned subsidiary of Australian Bauxite Ltd is undertaking an exploratory program in an area of the Reedy Marsh near Deloraine and is undertaking a targeted drilling program on the farming property "Blackwood Park" and adjoining property owned by Gunns Ltd.

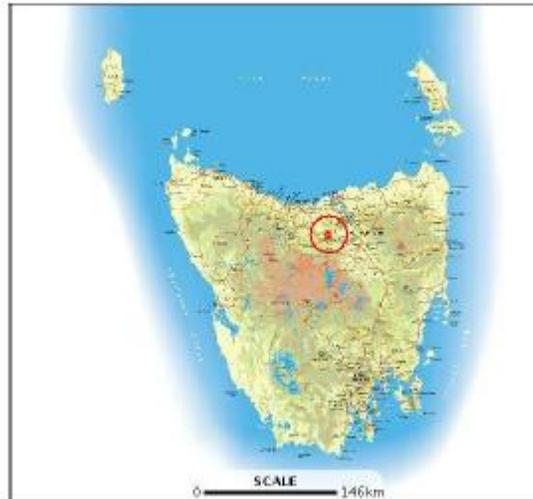
The exploration program will involve numerous shallow drill holes which will not require the clearing and/or leveling of drill pad sites and so is expected to have a minimal impact on the ground surface and adjacent vegetation.

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

1.1 Objectives: The objectives of this survey were to;

- Undertake a desktop survey to confirm the known biological records and the natural values present in the exploration area and in the vicinity.
- Undertake a field survey of the 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 minimized.

1.2 Location of Study Area:



MAP REF: Tasmap 1:25,000, Sheet No. 4640, Deloraine

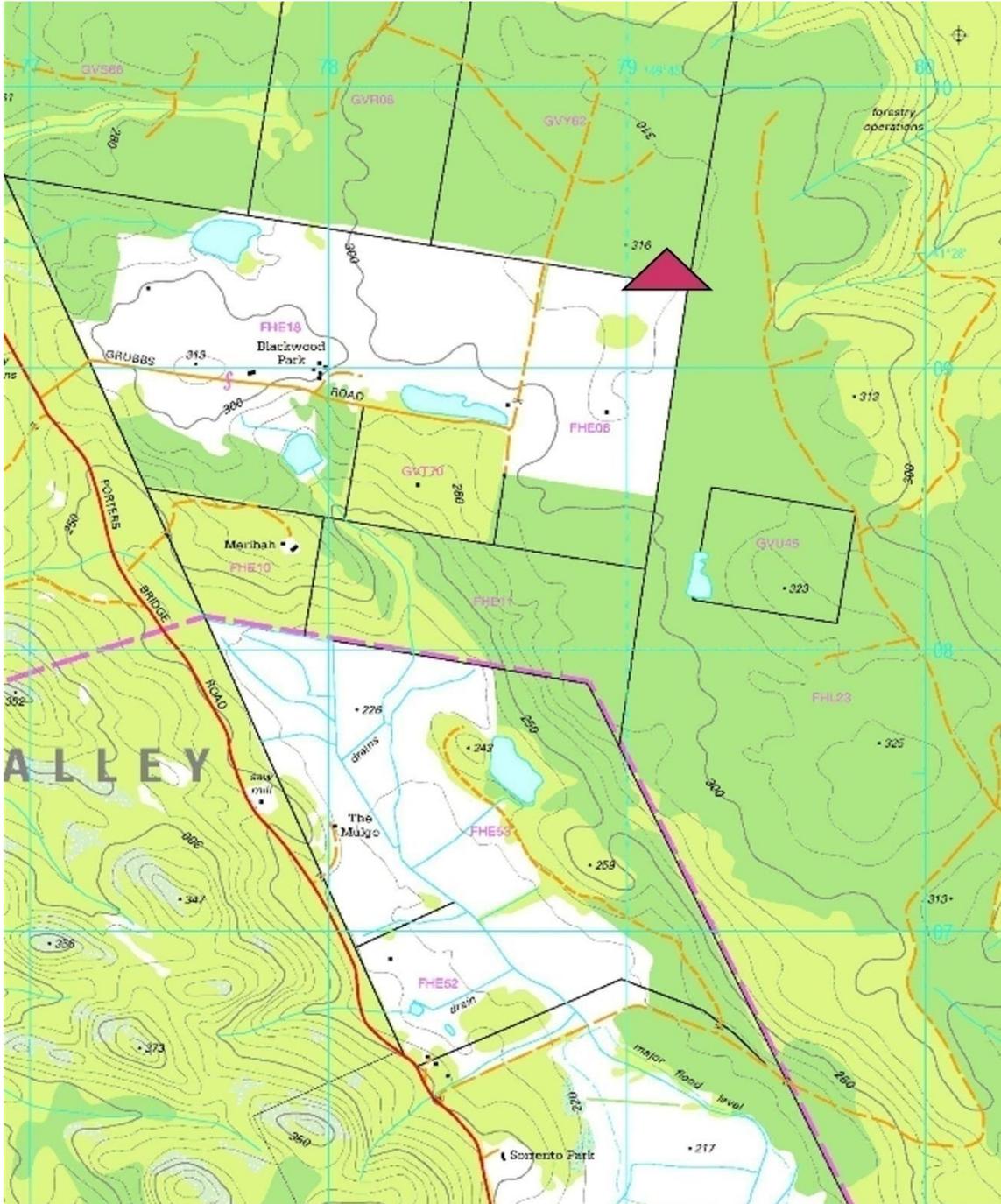
BIOREGION: Northern Slopes

GRID REF: 478556E – 5409646N

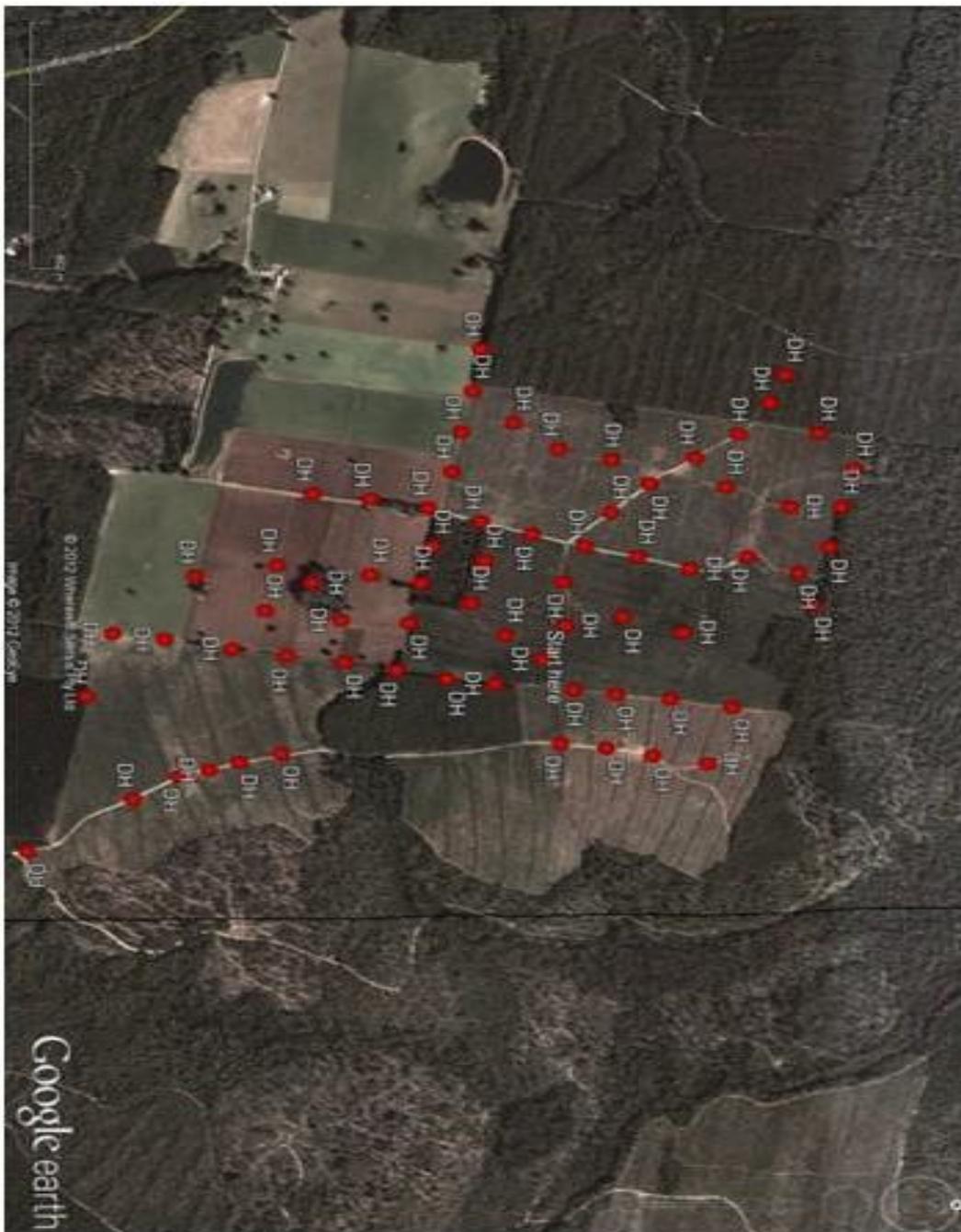
(All Grid References MGA Zone 55 GDA94)

1.3 Site Description:

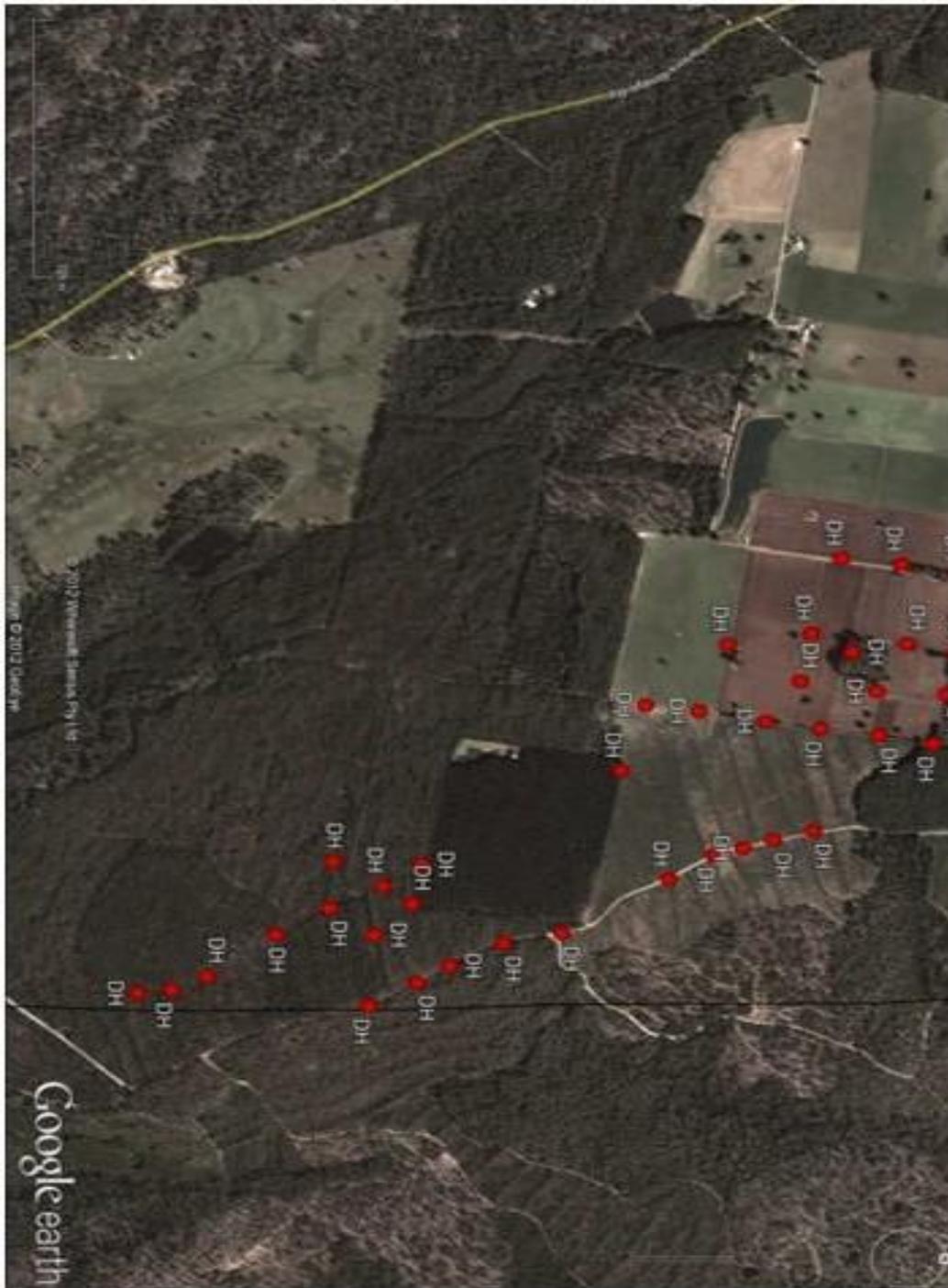
The location subject to this survey consists largely of Eucalypt plantations on the properties owned by Gunns Ltd and cleared farming land, some plantation and with pockets of natural forest vegetation on the Blackwood Park property. Remnant vegetation within the survey area is now mainly restricted to creek-lines and watercourses and along the boundary of the Brushy Rivulet Forest Reserve which adjoins the northern boundary of the survey area.



MAP 1: Survey area located on the "Blackwood Park" property and adjoining Gunns Ltd property.



MAP 2: Google Earth Image of northern section of survey area showing proposed drill sites.



MAP 3: Google Earth Image of southern section of survey area showing proposed drill sites.

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 fauna known or expected to occur in the vicinity.

REFERENCE POINT for the locality: 478556E – 5409646N

Desktop Survey Results:

VEGETATION COMMUNITIES:

The following vegetation communities are mapped under the TasVeg mapping program as occurring within 1,200 metres of the study area reference point.

VEGETATION COMMUNITY	TasVeg Code / Map colour	EXTENT IN STUDY AREA
<i>Eucalyptus amygdalina</i> – <i>Eucalyptus obliqua</i> Damp Sclerophyll Forest	DSC / mid green with horizontal lines	Small remnants within plantation area and larger area on adjoining property to the north of the survey area.
<i>Eucalyptus ovata</i> Forest & Woodland	DOV / Dark green with vertical white lines	Small retained patches around periphery in north and west of survey area.
Agricultural Land	FAG / cream	Most of the Blackwood Park property.
Plantations	FPL / FPU / cream with zig zag lines	Almost all of the survey area within the Gunns Ltd owned property

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

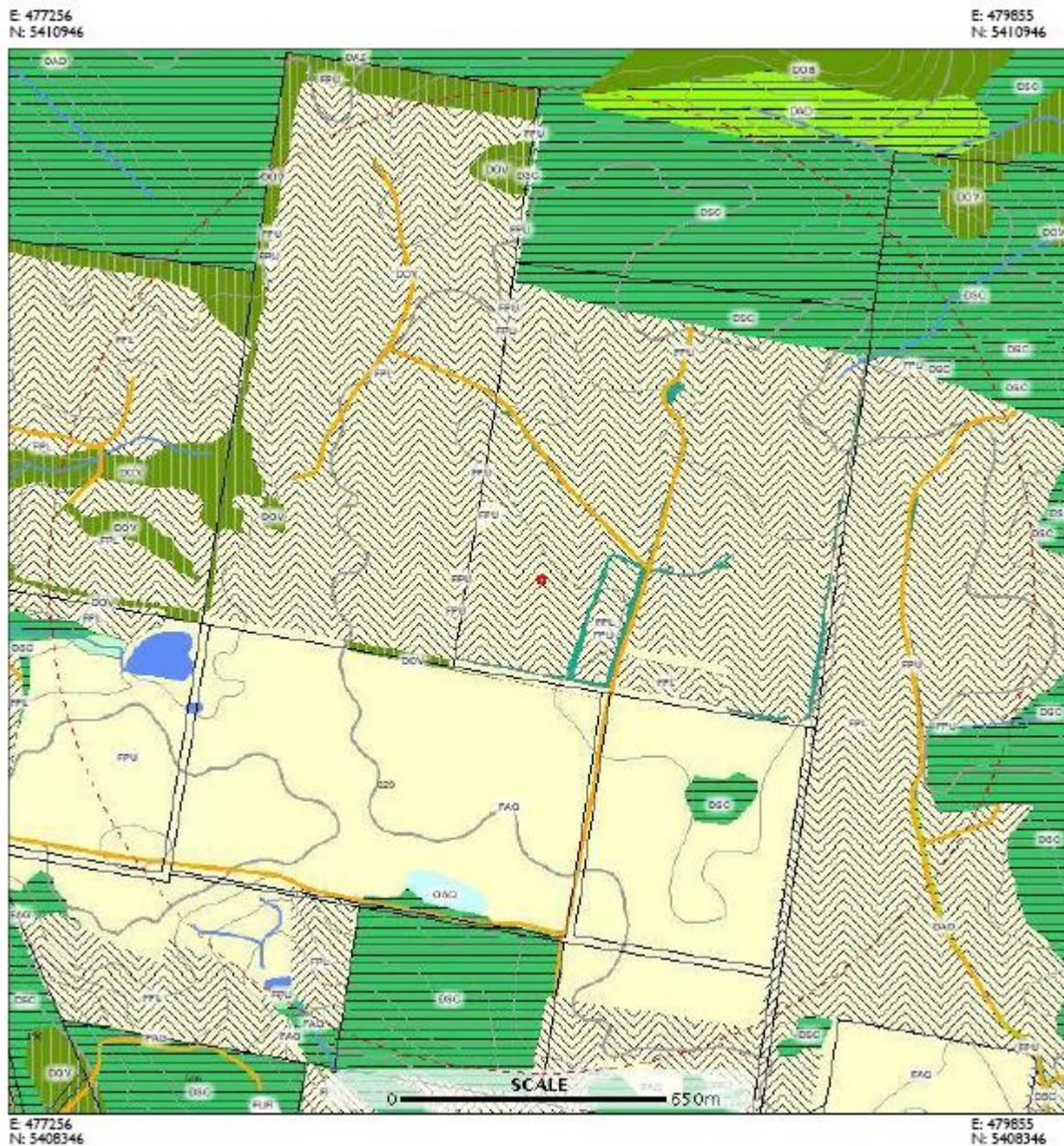


FIGURE 1: Vegetation Communities as per TasVeg mapping program within 1,200 metres of Survey Area Reference Point. GRID REF: 478556E – 5409646N

CODE: DSC *Eucalyptus amygdalina* – *Eucalyptus obliqua* Damp Sclerophyll Forest
 DOV *Eucalyptus ovata* Forest & Woodland
 FAG Agricultural Land
 FPL / FPU Plantations

DSC *Eucalyptus amygdalina* – *Eucalyptus obliqua* Damp Sclerophyll Forest is distinguished from other forest types by the lack of a clearly dominant Eucalypt species. *Eucalyptus ovata* and/or *Eucalyptus viminalis* may also be present in the community depending on location and drainage conditions. The stronghold of this community is in this area of the state, on the undulating terrain between the Tamar and Mersey Rivers on soils derived from basalt, dolerite, sandstone or alluviums. The understorey can vary from open and heathy to dense scrub depending on soil type, fire-frequency, slope and aspect. This community is sometimes close in structure and appearance to *Eucalyptus amygdalina* Forest and Woodland on Cainozoic Deposits (DAZ). This community would have been more prevalent in the location prior to forestry activities and subsequent conversion to plantation.

DOV *Eucalyptus ovata* Forest and Woodland is usually associated with poorly drained situations, such as along creek lines and flood plains, adjacent to swamps and other soakage areas. The size and density of the dominant tree can vary considerably and the understorey vegetation can range from grassy, sedgy, shrubby or scrubby although more typically made up of sedgy and shrubby species tolerant of poor drainage. Most patches are relatively small, less than 10ha in area with only a few large patches greater than 50 ha remaining in the state. Old-growth stands are extremely rare. Since European settlement the community has been extensively cleared from river valleys and flats for agriculture particularly in the northern Midlands, and as a consequence it is now listed as a threatened vegetation community.

THREATENED VEGETATION COMMUNITIES:

One natural vegetation community mapped within the study area is listed as threatened under the Tasmania *Nature Conservation Act 2002*.

- *Eucalyptus ovata* Forest & Woodland is listed as an endangered native vegetation community under the Act as it has been subject to extensive clearing and fragmentation for agriculture across the state but particularly so in the northern Midlands. Its current stronghold is around the West Tamar region. There are small patches of this community to the north and west of the survey area which have been retained both within and around the periphery of the plantations. The remnant patches however are outside of the locations being targeted by this exploration program and will not be affected.

VEGETATION COMMUNITIES OF CONSERVATION SIGNIFICANCE

- *Eucalyptus amygdalina* – *Eucalyptus obliqua* Damp Sclerophyll Forest is mainly distributed in the central north of the state between the Tamar and Mersey Rivers. The community has been extensively cleared for plantation development over the last 30 years and is considered to be under-reserved in the state, particularly in its old-growth state. Almost all of the community on the Gunns Ltd property has been replaced with plantations although a narrow band has been retained along the northern boundary of property with the Brushy Rivulet Forest Reserve.

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 3,000 metres of the

study area reference point. No threatened species are mapped as occurring within 1,000 metres of the reference point.

- *Stellaria multiflora* the Rayless Starwort is listed as being rare in Tasmania. There are 2 1995 records of this species from within and adjacent to the Brushy Rivulet Forest Reserve about 2km to the north of the study area reference point. The plant is a small herb of the ground layer vegetation.

The following three species of threatened flora have been recorded from between 3,000 and 5,000 metres from the study area reference point.

- *Glycine microphylla* the Small-leafed Glycine is listed as being vulnerable in Tasmania. It is a small climbing pea plant with one record from 2009.
- *Pimelea curviflora* the Curved Riceflower is a small shrub which is listed as being rare in Tasmania. There are 5 records from 2001 (x2), 2008 (x1) and 2009 (x2).
- *Senecio squarrosa* the Leafy Fireweed is listed as being rare in Tasmania. There is a single 1978 record on the database. It is a tall perennial leafy herb which responds to fire.

THREATENED FAUNA:

Two species of threatened fauna listed under the above Acts are recorded on the database as occurring within 3,000 metres of the study area. No species have been recorded from within 1,000 metres of the study area reference point. No raptor nests including the Wedgetail Eagle is known from within 3,000 metres.

- The Tasmanian Devil *Sarcophilus harrisii* is listed as being endangered under both State and Commonwealth Acts. There are 2 sight records on the database from within 3,000 metres, one from 1994 and the other from 2009 from 3km to the north and 2.5km north-west of the reference point.
- Eastern-barred Bandicoot *Paramelops gunnii* is relatively widespread in Tasmania but is rare on the mainland and is listed as being vulnerable under the Commonwealth Act. There is a single record on the database dated from about 1985 to the south-west of the reference point.

The following three species of threatened fauna have been recorded on the database as occurring from between 3,000 and 5,000 metres from the study area reference point.

- The Tasmanian Devil *Sarcophilus harrisii*. A further four sight records. All of the records of the species date from the early 1990's (x2) and 2003 – 2010 (x4).
- 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. There are 5 known nest trees for this species in the wider locality, the nearest two being just over 3,000 metres west south-west, and just over 3,000 metres east south-east of the reference point.
- The Spotted-tailed Quoll, *Dasyurus maculatus* subsp *maculatus* is listed as a rare species under the Tasmanian Act and vulnerable under the Commonwealth Act. There is one record from 1992 on the database.

The following eight 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 the Masked Owl *Tyto novaehollandiae* subsp *castinops* is listed as being endangered in Tasmania and considered to be vulnerable under the Commonwealth Act.
This bird requires large tree hollows for nesting, usually in White Gums and prefers mature forest as habitat.
- The White (Grey) Goshawk *Accipiter novaehollandiae* is endangered in Tasmania. The species requires mature wet forest with Blackwoods as habitat, and old-growth trees for nesting.
- 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 a grassland species which is considered to be vulnerable in Tasmania. It inhabits some types of native grasslands.
- The Swan Galaxia *Galaxias fontanus* is considered to be endangered in Tasmania and nationally. The species is endemic to Tasmania. It occurs within the catchments of the Esk Rivers.
- The Australian Grayling *Prototroctes mareana* is a fish which moves between fresh and salt water habitats. The species is listed as being vulnerable both in Tasmania and Nationally.
- The Green and Gold Frog *Litoria raniformis* is considered to be vulnerable in Tasmania and Nationally. It is found mainly in the north of the state.
- The Green-lined Ground Beetle *Catadromus lacordairei* is listed as being vulnerable in Tasmania.

3.0 Field Survey:

The field survey was undertaken on Monday the 2nd July 2012.

Methodology: The survey followed existing vehicular tracks throughout the survey area and along sections of property boundary where drilling is proposed as detailed on Maps No.2 and No.3.

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 winter when many species are dormant and not flowering, particularly the ground layer flora. 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.

3.1 Field Survey Results:

Gunn Ltd. Property Almost all of the property owned by Gunns Ltd and subject to this exploration program has been previously cleared and converted to Eucalypt plantation. The ages and stages of establishment of the plantation trees varies with the location from semi-established and starting to close canopy to areas with young trees with associated regrowth of understorey and groundlayer vegetation. One block of semi mature Radiata plantation is also present. The proposed drilling program is to occur along existing vehicular tracks and cleared property boundary lines and will not impact on any areas of natural vegetation.

"Blackwood Park" is a farming property with established pasture and arable crops in the area subject to the drilling program except for a small patch of remnant forest which has been heavily impacted by stock and is in decline. The proposed drilling program will have minimal impact on any remnant vegetation on the property.

VEGETATION COMMUNITIES:

A small linear area of *Eucalyptus amygdalina* – *Eucalyptus obliqua* Damp Sclerophyll Forest (DSC) has been retained along the northern boundary of the Gunns Ltd property adjacent to the Brushy Rivulet Forest Reserve. It is in a good natural condition and in effect forms part of the forest reserve. The drilling program will not intrude into this patch of vegetation.

A second patch of this community was present as a paddock remnant in the area of the Blackwood Park property where drilling is to occur. Although a number of mature trees were present the remnant is in decline with a number of dead trees and canopy die-back, most likely the result of soil compaction, nutrient enrichment, browsing and bark stripping by domestic stock over an extended period of time.

THREATENED VEGETATION COMMUNITIES:

One vegetation community listed under the Tasmanian *Nature Conservation Act 2002* is known to occur in the location.

- *Eucalyptus ovata* Forest and Woodland (DOV) was not observed within the areas surveyed and will not be impacted by the proposed drilling program. The possible impacts on this community will need to be reviewed should the drilling program be extended onto the adjoining westwards property where remnants of this community have been retained.

VEGETATION COMMUNITIES OF CONSERVATION SIGNIFICANCE:

No vegetation community of conservation significance was observed within the areas surveyed.

THREATENED FLORA:

No plant species listed under the Tasmanian *Threatened Species Conservation Act 1995* and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* was observed and recorded during the field survey.

None of the four threatened species of plants which have been previously recorded from within 5,000 metres of the study area reference point, and referred to in the desktop survey section of this report was observed during the field survey.

THREATENED FAUNA:

No species of fauna listed under the above Acts was observed during the field survey.

- A Tasmanian Devil scat was observed at GRID REF: 478761E – 5410293N near the northern boundary of the Gunns Ltd property with the Brushy Rivulet Forest Reserve which confirms the species presence in the locality. The species would utilize the areas of plantation and the Blackwood Park property for hunting and foraging.

THREATENED FAUNA HABITAT:

Almost all of the survey area has either been previously cleared and converted to plantation (Gunns Ltd property) or cleared land with established pasture or arable crops (Blackwood Park property). Potential habitat for native fauna was observed on the adjoining Brushy Rivulet Forest Reserve to the immediate north of the study area which was a mixed age forest with a proportion of mature and old-growth trees which potentially would possess suitable hollows as habitat. The forest within the Forest Reserve also had a diversity of understorey and ground layer vegetation. Species such as the Tasmanian Devil and Spotted-tailed Quoll with home territories within the Brushy Rivulet Forest Reserve would utilize the plantation areas and the Blackwood Park property for hunting and foraging. It is also likely that the properties are within the hunting and foraging territory of at least one pair of Wedge-tailed Eagles, considering that five nest trees are known within the wider locality. The survey area is sufficiently distant from the known nest trees of the eagles that the exploration program as proposed will not have an impact either direct or indirect on their critical habitat.

No potential habitat for the remaining species of threatened fauna which are known or expected to occur in the locality as discussed in the desktop section of this report was observed within the study area or in locations subject to the proposed drilling program.

ENVIRONMENTAL WEEDS:

Two significant environmental weeds were observed during the field survey however both were in small numbers and not considered to be a management issue for the exploration program.

- Spear Thistle *Cirsium vulgare* is a widespread weed of pasture and disturbed ground throughout Tasmania. It was observed occasionally during the survey in locations of localized ground disturbance.
- Blackberry *Rubus fruticosus* Observed only occasionally during the survey.

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

4.0 Recommendations:

VEGETATION COMMUNITIES:

- No mature trees will need to be felled to accommodate any of the drill sites. Ensure the adequate containment within each drill pad site of all silt, dust, sediment and other contaminants resulting from the drilling program to avoid impacting on adjacent soils and ground stratum vegetation.

THREATENED VEGETATION COMMUNITIES:

- No vegetation communities listed under the *Tasmanian Nature Conservation Act 2002* will be impacted by the proposed drilling program and no specific action is required.

THREATENED FLORA:

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

THREATENED FAUNA:

- No species of threatened fauna was observed or recorded during the field survey although evidence of the presence of the Tasmanian Devil was observed. No specific action is required.

THREATENED FAUNA HABITAT:

- As the proposed drilling program is to be undertaken along existing vehicular tracks and cleared boundary lines there will be no direct impact on the habitat of threatened species of fauna known to occur in the wider area. No specific action is required.
- No drilling should occur within the retained strip of remnant forest along the northern boundary of the Gunns Ltd property where it adjoins the Brushy Rivulet Forest Reserve. Mature trees with upper trunk hollows, and basal hollows which are potential habitat for fauna, including threatened species were observed in this location.
- There are no known nest trees of Wedge-tailed Eagles within 3,000 metres of the site reference point and the proposed exploration program will have no direct or indirect impact on this species.
- No specific action is required.

ENVIRONMENTAL WEEDS:

- No significant infestations of environmental weeds were present in the areas surveyed. As a precautionary measure and 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 and out of the exploration area.

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.

Philip Milner

Vegetation Consultant

**Appendix 1:
Vegetation Communities and Species Recorded**

**1. *Eucalyptus amygdalina*- *Eucalyptus obliqua* Damp Sclerophyll Forest
(TasVeg Code DSC)**

This community was present only as two isolated remnants, one on the Gunns Ltd property adjacent to the Brushy Rivulet Forest Reserve and one on the Blackwood Park property which is in decline. Larger areas were present on the adjoining Brushy Rivulet Forest Reserve to the north of the Gunns Ltd property. Understorey remnants of the community is present within the plantation areas on the Gunns Ltd land, particularly along vehicular tracks and within the younger plantations which are yet to close canopy and shade out underlying plants. The understorey species observed within the plantations have been recorded in this plant list. The stronghold of this community is found on the undulating topography between the Tamar and Mersey Rivers. It has been subject to extensive clearing for plantation development within this area.

DOMINANT TREES	COMMON NAME	FREQUENCY
<i>Eucalyptus amygdalina</i>	Black Peppermint	common
<i>Eucalyptus obliqua</i>	Stringybark	common
SECONDARY TREES		
<i>Eucalyptus viminalis</i>	White Gum	occasional
UNDERSTOREY TREES AND TALL SHRUBS		
<i>Acacia dealbata</i>	Silver wattle	(j) very common
<i>Acacia melanoxylon</i>	Blackwood	occasional
<i>Acacia verticillata</i>	Prickly Moses	occasional
<i>Exocarpus cupressiformis</i>	Native Cherry	common
MEDIUM SHRUBS		
<i>Acacia stricta</i>	Hop Wattle	uncommon
<i>Bursaria spinosa</i>	Prickly Box	uncommon
<i>Bedfordia salicina</i>	Blanketleaf	uncommon
<i>Cassinia aculeata</i>	Dollybush	occasional
<i>Davesia latifolia</i>	Hop Bitterpea	occasional
<i>Leptomeria drupaceae</i>	Currantbush	occasional
<i>Olearia lirata</i>	Forest Daisybush	occasional
<i>Pomaderris apetala</i>	Dogwood	occasional
<i>Pultenaea daphnoides</i>	Heartleaf Bushpea	uncommon
<i>Ziera arborescens</i>	Stinkwood	uncommon
SMALL SHRUBS		
<i>Epacris impressa</i>	Common Heath	occasional
<i>Hibbertia empetrifolia</i>	Scrambling Guineaflower	uncommon
<i>Hibbertia riparia</i>	Erect Guineaflower	occasional

APPENDIX 1 (cont)

Eucalyptus amygdalina – *Eucalyptus obliqua* Damp Sclerophyll Forest (cont)

SMALL SHRUBS (cont)

<i>Indigofera australis</i>	Native Indigo	occasional
<i>Lomatia tinctoria</i>	Guitarplant	occasional
<i>Pimelea nivea</i>	Bushmans Bootlace	occasional
<i>Persoonia juniperina</i>	Prickly Geebung	occasional
<i>Pultenaea gunnii</i>	Golden Bushpea	occasional
<i>Pultenaea juniperina</i>	Prickly Beauty	occasional

CLIMBING PLANTS

<i>Billardiera longiflora</i>	Climbing Blueberry	uncommon
<i>Billardiera mutabilis</i>	Green Appleberry	uncommon

HERBS & HERB-LIKE PLANTS

<i>Acaena novaezelandiae</i>	Buzzy	occasional
<i>Goodenia lanata</i>	Trailing Native-primrose	uncommon
<i>Helichrysum scorpioides</i>	Curling Everlasting	occasional
<i>Senecio linearifolia</i>	Fireweed	common
<i>Viola hederaceae</i>	Ivy-leafed Violet	occasional

ORCHIDS

<i>Acianthus sp.</i>	A Gnat Orchid	localised
<i>Pterostylis sp.</i>	A Greenhood Orchid	localised

GRASSES & GRAMINOIDS

<i>Dianella tasmanica</i>	Tasman Flax-lily	occasional
<i>Diplarrena moraea</i>	White Flag-iris	occasional
<i>Echinopogon ovatus</i>	Porcupine Grass	uncommon
<i>Lomandra longifolia</i>	Mat-rush	common
<i>Themeda triandra</i>	Kangaroo Grass	localised

FERNS & ALLIED PLANTS

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

<i>Rubus fruticosus</i>	Blackberry	occasional
<i>Cirsium vulgare</i>	Spears Thistle	occasional

REFERENCES

1. DPIPWE Website 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_fauna))
3. Harris s, & Kitchener A, (2005), *From Forest to Fjaeldmark*, DPIW Tasmania
4. Wapstra H, A & M, Gilfedder L, *The Little Book of Common Names for Tasmanian Plants*



PHOTO 1: Established Eucalypt Plantation on Gunns Ltd Property



PHOTO 2: Young plantation trees with Silver Wattle regrowth and block of Radiata Pine plantation in background.



PHOTO 3: Blackwood Park property and remnant patch of forest.



PHOTO 4: Young plantation with regrowth of native understorey and groundlayer plants.



PHOTO 5: Young plantation with adjoining Brushy Creek Forest Reserve in background.



PHOTO 6: Northern boundary of Gunns Ltd property with Brushy Creek Forest Reserve.