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Flora and terrestrial fauna assessment of the proposed Tarrone Gas-fired Power Station and Associated Road Reserves, Victoria

July 2009

Biosis Research

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Report to URS Australia Pty Ltd

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FINAL REPORT

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ABBREVIATIONS

AVW	Atlas of Victorian Wildlife (DSE 2007)
BA	Birds Australia
CAMBA	China – Australia Migratory Bird Agreement
DBH	Diameter at breast height (130 cm above ground surface)
DEWHA	Department of the Environment, Water, Heritage and the Arts
DSE	Department of Sustainability & Environment
EPBC	*Environment Protection and Biodiversity Conservation Act 1999*
EVC	Ecological vegetation class
FFG	*Flora and Fauna Guarantee Act 1988* (Vic.)
FIS	Flora Information System (DSE 2007)
IUCN	International Union for Conservation of Nature
JAMBA	Japan – Australia Migratory Bird Agreement
sp.	Species (one species)
spp.	Species (more than one species)

CONTENTS

SUMMARY

Biosis Research Pty. Ltd. was commissioned by URS Australia Pty Ltd to undertake a flora and terrestrial fauna assessment of the proposed site of a gas-fired power station and associated road reserves (Landers Lane, Riordans Road and Tarrone North Road) in the rural locality of Tarrone, north east of Port Fairy, in Western Victoria.

Flora and Fauna

The original vegetation over much of the study area has been almost entirely cleared, however modified remnants of several Ecological Vegetation Classes (EVCs) are present: Stony Knoll Shrubland, Plains Grassy Wetland and Basalt Shrubby Woodland.

The fauna habitat types which occur within the study area include cleared exotic grasslands; rocky rises; planted trees and shrubs; native woodland; watercourses (drainage lines) and grassy wetlands.

No flora species of national conservation significance were recorded from the study area. One flora species of state conservation significance, Wavy Swamp Wallaby-grass *Amphibromus sinuatus*, is growing in several wetland areas within the Plant Site (Figure 4). This species is vulnerable in Victoria.

No fauna species of national or state conservation significance were recorded within the study area.

The Wavy Swamp Wallaby-grass and numerous modified patches of EVC have ecological significance. The remainder of the study area is modified and of low ecological value.

Government legislation and policy

Development of the site and associated road reserves is unlikely to trigger the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.*

A permit will not be required within the Plant site from DSE to remove protected flora under the Victorian *Flora and Fauna Guarantee Act 1988* as the study area is private land. A permit will be required from DSE to remove protected flora under the Victorian *Flora and Fauna Guarantee Act 1988* for the public land along Landers Lane/Riordans Road. A permit will be required from Moyne Shire under the Victorian *Planning and Environment Act 1987* to remove native vegetation.

Removal of native vegetation is subject to state and local planning controls

including the Native Vegetation Framework (Net Gain policy). Numerous patches of native vegetation are present within the study area. Any proposed development of the site should demonstrate adherence to the three-step process of the Native Vegetation Management Framework.

Further assessment

- If required, Net Gain offsets should be located and a management plan prepared documenting how vegetation gains will be generated.
- If impacts on the areas of Plains Grassy Wetland and the wetland within Landers Lane road reserve cannot be avoided, survey for Growling Grass Frog is recommended.
- Targeted flora survey for Swamp Fireweed, Wavy Swamp Wallaby-grass and Purple Blown-grasses within areas of potential habitat within Landers Lane and Riordans Road reserve would be required if any of these areas are likely to be impacted by the proposal.
- A net gain assessment will be required if any of the areas identified as supporting an EVC or scattered trees along Landers Lane, Riordans Road reserve and Tarrone North Road reserve are likely to be impacted by the proposal.

1.0 INTRODUCTION

1.1 Project Background

Biosis Research Pty. Ltd. was commissioned by URS Australia Pty Ltd to undertake a flora and terrestrial fauna assessment of the proposed site of a gas-fired power station and associated road reserves in the rural locality of Tarrone, north east of Port Fairy, western Victoria. This report details the results of field assessments conducted on the private property where the proposed power plant site is to be located; the road reserves of Landers Lane and Riordans Road adjacent to the site; and Tarrone North Road reserve (between the site entry and Woolsthorpe-Heywood Road).

1.2 Objectives

The objectives of this investigation are to:

- Describe the vascular flora, terrestrial vertebrate fauna and habitat values of the land.
- Undertake a Net Gain assessment of any areas of native vegetation that are likely to be impacted by the proposal.
- Map any ecologically significant flora and terrestrial fauna habitats.
- Assess the likelihood of significant species to occur within the study area.
- Evaluate the conservation significance of the study area.
- Assess the implications of relevant biodiversity legislation and policy.
- Assess any potential impacts of the proposed development on the terrestrial environment.
- Identify any potential mitigation measures.
- Recommend any further assessments of the site that may be required (such as targeted searches for significant species).

1.3 Study Area

The study area is located approximately 23 kilometres north east of Port Fairy in western Victoria (Figure 1).

The study area includes three sections:

- The site of the proposed gas fired power plant (the plant site) (Figure 2);

- The road reserves of Landers Lane and Riordans Road adjacent to the site (Figure 5);
- Tarrone North Road reserve (between the site entry and Woolsthorpe-Heywood Road) (Figures 6a, 6b and 6c).

The plant site is bounded on the north and east by private farm land, on the south by Riordans Road, and on the west by Landers Lane. The site is roughly square with a narrow neck extending from the north-east corner to Tarrone North Road. It is approximately 74 hectares in area and consists of private land which supports a number of stony basalt knolls, drainage lines and low lying areas prone to inundation.

Riordans Road and Landers Lane are local gravel roads with low levels of usage and no through traffic. The road reserves support predominately remnant native woodland, shrubland and grassy wetland vegetation.

Tarrone North Road is a sealed single lane road. The road reserve supports modified patches of Basalt Shrubby Woodland as well as scattered native Blackwattle and Blackwood trees over an introduced understorey.

The study area is within the Victorian Volcanic Plain Bioregion (Department of Primary Industries, Victorian Resources online: www.dpi.vic.gov.au/dpi/vro/).

2.0 METHODS

2.1 Classification

Common and scientific names for flora and fauna follow the Flora Information System (FIS 2007 version) and the Atlas of Victorian Wildlife (AVW 2007 version) of the Department of Sustainability and Environment (DSE).

Classification of native vegetation in Victoria follows a typology in which ecological vegetation classes (EVCs) are the primary level of classification. An EVC contains one or more plant (floristic) communities, and represents a grouping of broadly similar environments. Vegetation community names follow the typology of vegetation in Victoria developed by DSE (http://www.dse.vic.gov.au/dse/nrence.nsf/).

2.2 Literature and Database Review

Information in the FIS and AVW databases was reviewed and a search of the Birds Australia database (1998–2008) was undertaken. The Department of the Environment, Water, Heritage and the Arts (DEWHA) online database for the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act Protected Matters Search Tool, hereafter referred to as the DEWHA database) was searched. The 1750 and 2005 EVCs present within the study area and their bioregional conservation status was reviewed (DSE web site: http://www.dpi.vic.gov.au/dse/nrence.nsf/).

Existing recent flora and fauna reports (Biosis Research 2006; 2008; 2009) were reviewed.

2.3 Site Visit

2.3.1 Flora and terrestrial fauna assessment

The flora and terrestrial fauna assessments took place on 29 and 30 October 2008 (plant site); 26 February 2009 (Landers Lane and Riordans Road reserves); and 25 May 2009 (Tarrone North Road reserve).

Assessment was concentrated in areas that support native vegetation remnants and other areas with potential to support threatened species. Detailed assessment and data collection was not undertaken in highly altered sections of the subject land that contain few native species.

General observations were made on the vegetation and fauna habitat of the study area. Lists of flora and incidental terrestrial fauna observations were compiled. The overall site condition and conservation significance of the study area was also documented.

Three plant species list was collected (FIS lists S1357200, S1357300, S1357400) and will be submitted to the FIS. Fauna records will be submitted to the AVW.

2.3.2 Vegetation Quality Assessment for Net Gain

Vegetation quality is assessed using a standard method contained in a manual published by the Department of Sustainability and Environment (DSE 2004). A summary of this method is provided in Appendix 1. Vegetation quality assessments contribute to the assessment of a development project against the Net Gain policy, as contained in Victoria's Native Vegetation Framework (NRE 2002).

A habitat hectare assessment was conducted for the plant site and a habitat score calculated for 62 patches of native vegetation (Figures 2 and 3). These were assigned to seven quality zones. A habitat hectare assessment was not conducted for Landers Lane and Riordans Road reserves. Figure 5 shows the location of patches of native vegetation (EVCs) and remnant trees along the road reserves.

A habitat hectare assessment was not conducted for Tarrone North Road as the assumed proposed widening of Tarrone Road by up to 2 m either side of the road will not result in the removal of native vegetation (Figures 6a, 6b and 6c).

2.4 Qualifications

The study effort, combined with information available from other sources, is considered suitable to assess the terrestrial ecological values of the site. As a result, there is no significant limitation to the study. However, the following qualifications apply:

- The present assessment includes only vascular flora (ferns, conifers and flowering plants), terrestrial vertebrate fauna (birds, mammals, reptiles, frogs,). Non-vascular flora (e.g. mosses, liverworts) were not recorded apart from their cover in net gain assessment of 'patch' vegetation.
- Aquatic habitats and fauna located within and/or in proximity to the study area are not included in this assessment. No search of the Victorian Aquatic Fauna (VAF) database was conducted. The implications of relevant biodiversity legislation (e.g. EPBC Act) cannot be fully assessed without an assessment of aquatic habitat and fauna. However, it is unlikely that any

listed fish would be present within the study area except for named water courses or possibly farm dams.

- Ecological surveys and assessments provide a sampling of the flora and fauna at a given time and season and some additional species that we did not detect may occur on the site.
- The FIS and the AVW databases currently provide data recorded up to June 2007. Data submitted since that time is not available.
- The study area is located within an area which is generally under-surveyed for flora and fauna. Therefore, the FIS and AVW database searches which usually include a buffer area of 5 km were increased to a buffer of 10 km to obtain a list of species that is more representative of the local area.
- Mapping is conducted using hand-held (uncorrected) GPS units and aerial photo interpretation. The accuracy of this mapping is therefore subject to the accuracy of the GPS units (generally ± 7 metres) and dependent on the limitations of aerial photo rectification and registration. As such, these points should not be relied on for design purposes.
- Large areas of the study area, in particular the plant site, were heavily grazed at the time of assessment, making identification of some flora species difficult due to lack of material for identification.

2.5 Defining Significant Species and Communities

A number of categories and criteria are formally applied to assess the ecological significance of flora and fauna and sites supporting flora and fauna. The definition and application of the criteria are detailed in Appendix 2.

3.0 RESULTS

3.1 Flora

3.1.1 Species

Records during present assessment

Planted species have not been recorded unless they are spreading (naturalised).

Plant site

A total of 35 indigenous and 25 introduced plant species was recorded from the proposed plant site (Appendix 3).

Landers Lane/Riordans Road reserves

A total of 32 indigenous and 23 introduced plant species was recorded from the Landers Lane and Riordan Road reserves (Appendix 3).

Tarrone North Road reserve

A total of five indigenous and 15 introduced plant species was recorded from Tarrone North Road reserve (Appendix 3).

Database records

Plant site & road reserves

There are no flora database records for any portion of the study area on the FIS.

The DSE Flora Information System contains records of 233 flora species from within 10 km of the study area, including a record of the nationally significant Basalt Peppercress *Lepidium hyssopifolium*. The DEWHA database predicts the occurrence of, or suitable habitat for, an additional seven listed flora species within 10 km of the study area.

3.1.2 Ecological Vegetation Classes

Plant site

DSE mapping of pre-1750 vegetation models the majority of the study area as previously supporting a mosaic of Stony Knoll Shrubland EVC, Plains Grassy Woodland EVC and Plains Grassy Wetland EVC. Discrete patches of Plains

Grassy Wetland EVC and Basalt Shrubby Woodland EVC are also mapped. The DSE 2005 EVC vegetation mapping indicates the study area no longer supports an EVC.

The current study, however, confirms that the study area supports two ecological vegetation classes and one predominantly introduced vegetation community (Figure 2), as follows:

***Stony Knoll Shrubland* EVC 649**

Stony Knoll Shrubland within the study area is dominated by Austral Bracken *Pteridium esculentum* and Weeping Grass *Microlaena stipoides* var. *stipoides*. The shrub layer is sparse, and limited to occasional occurrences of Tree Violet *Melicytus dentatus*.

The herb layer contains Kidney-weed *Dichondra repens*, Grassland Crane's-bill *Geranium retrorsum*, Hairy Sheep's-burr *Acaena agnipila* and common Ivy-leaf Violet *Viola hederacea sensu* Entwisle (1996).

Introduced plants are common to abundant, especially on the margins of the knolls where they dominate the ground layer. They include Sheep Sorrel *Acetosella vulgaris*, Great Brome *Bromus diandrus*, Clover *Trifolium* spp. and Onion Grass *Romulea rosea*.

Stony Knoll Shrubland occurs on rocky rises throughout the study area and 55 patches were mapped. These patches were classified into four Quality Zones (Table 1, Figures 2 and 3). The better quality examples of Stony Knoll Shrubland EVC are Patches 28, 4 and 31 (Figure 3).

Stony Knoll Shrubland is 'endangered' in the Victorian Volcanic Plain Bioregion.

***Plains Grassy Wetland* EVC 125**

The better quality example of Plains Grassy Wetland (Patch 59) supports a diversity of native species including River Buttercup *Ranunculus inundatus*, Floating Pondweed *Potamogeton tricarinatus*, Common Spike-sedge *Eleocharis acuta*, Pale Knotweed *Persicaria lapathifolia*, Prickfoot *Eryngium vesiculosum*, Swamp Crassula *Crassula helmsii*, Common Water-ribbons *Triglochin procera* and Varied Water-milfoil *Myriophyllum variifolium*.

The remainder of the wetlands are of poor to fair quality and support a lower cover of native species. The few native species present include River Buttercup, Common Spike-sedge and Austral Sweet-grass *Glyceria australis*. Introduced species are common and include Water Buttons *Cotula coronopifolia*, Rough

Meadow-grass *Poa trivialis* subsp. *trivialis* and Watercress *Nasturtium officinale*.

Predominantly introduced vegetation

This exotic grassland is dominated by introduced grasses such as Perennial Rye-grass *Lolium perenne*, Wimmera Rye-grass *Lolium rigidum*, Brown-top Bent *Agrostis capillaris* var. *capillaris*, Sweet Vernal-grass *Anthoxanthum odoratum* and Soft Brome *Bromus hordeaceous* subsp. *hordeaceous.*

Landers Lane and Riordans Road reserves

DSE mapping of pre-1750 vegetation models the majority of the study area as previously supporting a mosaic of Stony Knoll Shrubland EVC, Plains Grassy Woodland EVC and Plains Grassy Wetland EVC.

The DSE 2005 EVC vegetation mapping indicates the study area no longer supports an EVC. The current study, however, confirms that the study area supports modified patches of Stony Knoll Shrubland, Basalt Shrubby Woodland and Plains Grassy Wetland EVCs (Figure 5).

Stony Knoll Shrubland, Basalt Shrubby Woodland and Plains Grassy Wetland EVCs are 'endangered' in the Victorian Volcanic Plain Bioregion.

The road reserves in Landers Lane contain a number of damp depressions and drainage lines that are potential habitat for Wavy Swamp Wallaby-grass *Amphibromus sinuatus* and Purple Blown-grasses *Lachnagrostis punicea* subsp. *punicea* and *Lachnagrostis punicea* subsp. *filifolia* although none of these species were recorded in the current assessment..

The vegetation along both sides of the Landers Lane is mainly comprised of remnant native vegetation, including a number of small and medium Blackwood *Acacia melanoxylon* and Black Wattle *A. mearnsii* trees. There are no shrubs present within this area. The ground layer is dominated by native grasses such as Kangaroo Grass *Themeda triandra*, Wallaby Grasses *Austrodanthonia* spp. and Tussock-grasses *Poa* spp. and native herb species including Milky Beauty-heads *Calocephalus lacteus*, Slender Dock *Rumex brownii* and Common Woodruff *Asperula conferta*.

An ephemeral wetland occurs approximately midway along Landers Lane (Figures 4 and 5), connected to the adjacent Plains Grassy Wetland EVC identified in the assessment of the proposed plant site. The wetland was dry at the time of the assessment however it supports a dense sward of Rushes and Sedges such as Tall Sedge *Carex apressa,* Common Spike-sedge and Poong'ort *Carex tereticaulus* and native herbs such as Prickfoot, Swamp Crassula and

Varied Water-milfoil.

Introduced plants are common, especially along the immediate roadside where they dominate the ground layer. Common introduced species include Ribwort *Plantago lanceolata*, Ox-tongue *Helminthotheca echioides*, Kikuyu *Pennisetum clandestinum*, Yorkshire Fog *Holcus lanatus* and Strawberry Clover *Trifolium fragiferum* var. *fragiferum*.

The immediate roadside for a width of approximately 1.5 metres on either side of the road formation in Riordans Road is dominated by a dense sward of introduced grass species, such as Great Brome *Bromus diandrus*, Toowoomba Canary-grass *Phalaris aquatica* and Wild Oat *Avena fatua*. However, the remaining vegetation across to the northern and southern fencelines is comprised of mostly native vegetation, including a number of scattered Blackwood and Black Wattle trees and Tree Violet on both sides of the road.

The area adjacent to the northern fenceline abutting Riordans Road retains a significantly higher cover of native grasses, including Basalt Tussock-grass *Poa labillardierei var.* (Volcanic Plains), Kangaroo Grass and Common Wallaby-grass *Austrodanthonia caespitosa*, and native herbs such as Grassland Wood-sorrel *Oxalis perennans*, Bidgee Widgee *Acaena novae-zelandiae*, Common Woodruff, Sheep's Burr *Acaena echinata* and Blue Devil *Eryngium ovinum*.

Rocky outcrops on the southern side of Riordans Road support a cover of Austral Bracken, Wallaby-grasses and Weeping Grass. The vegetation adjacent to the southern fenceline is comprised of fewer native species and a higher proportion of introduced species, however the cover of native vegetation throughout remains above the threshold of 25% and therefore comprises a patch of remnant vegetation.

The road reserves in Riordans Road contain a number of damp depressions and drainage lines that are potential habitat for Wavy Swamp Wallaby-grass and Purple Blown-grasses.

If native vegetation within the road reserve of Riordans Road is to be impacted by the proposed works, a Net Gain assessment would be required.

Tarrone North Road reserve

DSE mapping of pre-1750 vegetation models the majority of the study area as previously supporting a mosaic of Stony Knoll Shrubland EVC, Plains Grassy Woodland EVC and Plains Grassy Wetland EVC. A small area of Plains Sedgy Wetland EVC is also mapped. The DSE 2005 EVC vegetation mapping indicates the study area no longer supports an EVC.

The current study confirms that the study area supports one highly modified ecological vegetation class and predominantly introduced vegetation (Figures 6a, 6b and 6c), as follows:

***Basalt Shrubby Woodland* EVC 642**

Basalt Shrubby Woodland within the study area is highly modified and is dominated by an overstorey of Black Wattle and Blackwood to 8m in height. The understorey component is highly modified and consists of predominantly introduced species including Brown-top Bent, Cocksfoot *Dactylis glomerata*, Prairie Grass *Bromus catharticus* var. *catharticus*, Toowoomba Canary-grass and Carrot *Daucus carota*.

Predominantly introduced vegetation

This exotic grassland is dominated by introduced grasses such as Brown-top Bent, Barley Grass *Hordeum* spp., Rough Dog's-tail, Great Brome, Sheep Sorrel, Carrot, Toowoomba Canary-grass, Prairie Grass and Cocksfoot.

3.1.3 Condition of Native Vegetation

Plant site

The majority of the site has been modified by a history of cultivation and grazing. The majority of the wetland and shrubland remnants are in fair condition. The Plains Grassy Wetland EVC in Patch 59 (Figure 3) is in good condition.

Landers Land/Riordans Road reserve

The majority of vegetation along both Landers Lane and Riordans Roads reserve is in good condition although the edges of the roadsides are modified due to disturbance and vehicle traffic and now have a high cover of exotic vegetation.

Tarrone North Road reserve

The patches of Basalt Shrubby Woodland along Tarrone North Road are highly modified and in poor condition.

3.2 Vegetation Quality Assessment for Net Gain

The EVC benchmarks for Stony Knoll Shrubland and Plains Grassy Wetland are provided in Appendix 5.

A vegetation quality assessment for Net Gain has only been undertaken within the plant site.

3.2.1 Vegetation in Patches

Plant site

Seven vegetation quality zones were identified (Figure 3). Assessment criteria and scores, and the overall habitat score, are in Table 1.

Because both EVCs are treeless, the site condition scores are standardised to maintain the relative weighting of site condition and landscape scores (DSE 2004).

The study area contains a total of 10.1 hectares of native vegetation, which comprises **2.5 habitat hectares.**

Conservation significance

Conservation significance was assessed for this patch using the criteria in the assessment manual (DSE 2004), and is given in Table 1.

As both of these EVCs are endangered in the Victorian Volcanic Plain Bioregion, the vegetation is defined as either high (if the quality score is < 0.4) or very high (if the quality score is ≥ 0.4). The presence of threatened species or habitat for such species is also a factor that may result in very high conservation significance. The threatened species rating is applicable to the remnants of Plains Grassy Wetland EVC. Patches 56 and 59 support the state vulnerable Wavy Swamp Wallaby-grass, all other remnants of this EVC within the study area have potential to support this species. Quality Zones A, B, C and D are of 'high' conservation significance and Quality Zones E, G and H are of 'very high' conservation significance (Table 1).

The Responsible Authority response to an application to clear for vegetation of 'high' and 'very high' conservation significance is 'clearing generally not permitted' and for vegetation of 'very high' conservation significance, Ministerial approval is required.

Table 1: Quantification of native vegetation within the study area.

Quality Zone		Score out of	A	B	C	D	E	G	H	TOTALS
EVC name			**SKS**	**SKS**	**SKS**	**SKS**	**PGW**	**PGW**	**PGW**	
EVC number			**649**	**649**	**649**	**649**	**125**	**125**	**125**	
Site Condition	**Large Old Trees**	**10**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Canopy Cover	**5**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Lack of Weeds	**15**	7	4	0	0	13	7	7	
	Understorey	**25**	15	15	10	5	15	10	10	
	Recruitment	**10**	0	0	0	0	6	6	0	
	Organic Matter	**5**	2	2	4	2	5	3	0	
	Logs	**5**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Landscape	**Patch Size**	**10**	1	1	1	1	1	1	1	
	Neighbourhood	**10**	0	0	0	0	0	0	0	
	Distance to Core	**5**	0	0	0	0	0	0	0	
Site Condition Score			24	21	14	7	39	26	17	
Standardiser			1.36	1.36	1.36	1.36	1.36	1.36	1.36	
Site Condition Score (standardised)			32.64	28.56	19.04	9.52	53.04	35.36	23.12	
Landscape Score			1	1	1	1	1	1	1	
HABITAT SCORE (/100)			**0.34**	**0.30**	**0.20**	**0.11**	**0.54**	**0.36**	**0.24**	
Area of the Quality Zone (Hectares)			0.30	0.21	7.74	0.16	1.00	0.28	0.37	**10.1**
HABITAT HECTARES			0.10	0.06	1.55	0.02	0.54	0.10	0.09	**2.5**
Bioregion			VVP	VVP	VVP	VVP	VVP	VVP	VVP	
EVC Conservation Status			E	E	E	E	E	E	E	
Conservation Significance	Conservation Status x Hab Score		High	High	High	High	Very High	High	High	
	Threatened Species Rating		n/a	n/a	n/a	n/a	Very High	Very High	Very High	
	Other Site Attribute Rating		n/a	n/a	n/a	n/a	n/a	n/a	n/a	
	Overall Conservation Significance		High	High	High	High	Very High	Very High	Very High	
Net Outcome Ratio			1.5	1.5	1.5	1.5	2	2	2	

E = Endangered

VVP=Victorian Volcanic Plain

* Whilst the area of Quality Zone C is 7.74 hectares, it should be noted that it is comprised of 49 patches, all of which are less than two hectares. Hence the Patch Score of 1 in the Landscape component.

^ Threatened Species Rating is determined as per the table on the following page which addresses the question: does the site provide 'the best 50%' of habitat?

The answer is used in Framework Table 5 (NRE 2002) to determine Conservation Significance.

Source: DSE (2007, habitat assessment for threatened species, p 13)

A	Is the species, or has the species been recorded as 'resident' on site?, or If the species is not 'resident' has it been recorded regularly (eg. annually) on site?	Yes – go to B No – go to D
B	Is it possible to discriminate between the importance of different populations of the species? For example, can numbers be reasonably estimated and is there available knowledge on what are typical population sizes?	Yes – go to C No – go to E
C	Does the site contain a population that is above average size or importance for the bioregion?	Yes – Best 50% of habitat No – remaining 50% of habitat
D	Does the habitat on site clearly meet one or more of the habitat requirements of the species? Is it reasonable to expect that the species is present or would make significant use of the site in the medium term (e.g. within the next 10 years)?	Yes to both – go to F No to either – no further consideration required for that species
E	Has some form of habitat modelling been undertaken for the species in the bioregion?	Yes – use this information to determine Best 50% of habitat or Remaining 50% of habitat No – go to F
F	Does the site represent above-average condition and landscape context for the relevant EVC or habitat type in the bioregion?	Yes – best 50% of habitat No – remaining 50% of habitat

Note: For species known from only one or a few sites within the bioregion, a precautionary approach to the link between occurrences and likely habitat should be applied, and all currently-known occurrences should be assigned 'best 50%' of habitat for the species.

The standardised habitat score for the vegetation ranges from 11 to 54. Quality Zone E (consisting of Patch 59) represents the most intact area of native vegetation.

3.3 Terrestrial Fauna

3.3.1 Species

Records from the study area

Plant site

A total of 19 indigenous terrestrial fauna species (16 birds, two reptiles and one frog) and four introduced fauna species (one mammal and three birds) were recorded from the study area during the site assessment (Appendix 6).

Landers Lane/Riordans Road reserves

A total of seven indigenous terrestrial fauna species (all birds) and one introduced fauna species (mammal) were recorded from the study area during the assessment (Appendix 6).

Tarrone North Road reserve

A total of 12 indigenous terrestrial fauna species (10 birds, one mammal and one frog) and one introduced fauna species (one bird) were recorded from the study area during the assessment (Appendix 6).

Database records

Plant site & road reserves

There are no records of terrestrial fauna species from the study area in the DSE Atlas of Victorian Wildlife.

The AVW contains records of 77 vertebrate terrestrial fauna species from within 10 km of the study area: 56 birds (52 native), eight mammals (six native), eight native reptiles and five native frogs. The Birds Australia database contains records of 75 species of birds (69 native) within 10 km of the study area.

The DEWHA database lists 18 terrestrial fauna species whose geographic range includes the study area. Of these species, eight (five mammals, two birds and one frog) are listed as threatened and ten bird species are listed under the migratory provisions of the EPBC Act, as discussed in Section 5.1.

Some of the species listed on the databases may inhabit, or visit the study area. However, the study area is highly modified and does not have suitable habitat for many of the species listed on these databases.

3.3.2 Terrestrial Habitats

Plant site

The large paddock on the north-east corner of Riordan's Road and Landers Lane is dominated by pasture grasses and is currently grazed by stock. A few scattered trees have been planted throughout the paddock. The site is undulating with numerous rocky rises and low lying wet areas. Native fauna species common in this environment include Australian Magpie *Gymnorhina tibicen*, Brown Falcon *Falco berigora* and Australasian Pipit *Anthus novaeseelandiae*.

The rocky rises contain a high density of embedded and surface basalt boulders and are mostly vegetated with bracken. The western boundary fence consists of remnants of an old stone wall. These areas provide good habitat for reptiles, including snakes and skinks, and potential habitat for the Fat-tailed Dunnart *Sminthopsis crassicaudata*. A large population of White's Skink *Egernia whitii* was resident at the site during the present assessment.

Shallow drainage lines occur throughout the paddock; however, most consist of little more than wet, grassy depressions that offer limited habitat for native fauna. A few areas have been excavated to form small deep pools and are used as a water source for stock. The stock disturbance has degraded the vegetation and water quality of these pools, thereby reducing their value as habitat for native animals.

A low-lying area (Figure 2, Patch 59) on the western boundary formed a shallow wetland at the time of the assessment. This grassy wetland provides habitat for frogs and a range of water birds including ducks, ibis and White-faced Herons *Ardea pacifica*. A drainage line within the Landers Lane road reserve connects to this wetland and consists of small, deep, open pools of water. The wetland site within the study area has potential to support the nationally significant Growling Grass Frog *Litoria raniformis*, however, the extent of potential habitat for this nationally significant species within the local area is unknown.

Landers Lane/Riordans Road reserves

The fauna habitat within the study area mostly consists of tussock grassland. The grassland is dominated by native flora species which were tall and rank at the time of the assessment. Scattered basalt rocks occur throughout the road reserves, although they are mainly concentrated on several rocky rises. A stone wall also extends along the fence to the east of Landers Lane.

The dense tussock grasses and rocky areas provide cover and foraging habitat for native fauna such as birds, reptiles and small mammals such as Fat-tailed

Dunnart.

A seasonally inundated wetland area is present on the eastern side of the Landers Lane road reserve, adjacent to the proposed power station site. This drainage line contains scattered boulders and a dense cover of submerged, emergent and fringing vegetation, which provides good habitat for frogs such as Common Froglet *Crinia signifera* and Growling Grass Frog, and some water birds during wet seasons.

Tarrone North Road reserve

The Tarrone North Road reserve is comprised of sections of planted Cypress and Radiata Pines, open exotic grassland, and patches of native trees (Blackwoods and Black Wattles). Throughout, the understorey consists of exotic grasses which are regularly slashed approximately 2-3 m from the road edge. Several shallow drainage lines, mostly dry at the time of the assessment and infested with weeds, intercept with the road reserve.

The native and exotic trees along this linear patch of habitat are utilised by a variety of bird species for foraging, nesting and roosting. Species including lorikeets, Australian Magpie and thornbills were relatively abundant as they are likely to use the road reserve as a habitat corridor for movements within the local area. Due to their degraded condition, the drainage lines offer low habitat values for native fauna and are mostly used by common frog species such as Common Froglet and Southern Brown Tree Frog *Litoria ewingii*.

4.0 ECOLOGICAL SIGNIFICANCE

The following section discusses the terrestrial ecological significance of the site and species within a local, regional, state and national context. The criteria for these significance levels are outlined in Appendix 2. Note that this assessment is independent from 'conservation significance' as defined in the Native Vegetation Management Framework (Section 3.2). The Framework assessment (low, medium, high, very high) applies at the bioregional level.

4.1 Significance of the study area

Plant site

The majority of the study area supports Predominantly Introduced Vegetation and has negligible significance for nature conservation due to the substantial modification of the original vegetation and habitats.

On the basis of the available flora and terrestrial fauna information, Patch 59 of Plains Grassy Wetland EVC has **state** significance for biodiversity. This patch represents a good quality example of an EVC which is endangered in all 15 bioregions in which it occurs. The patch also supports a large population of Wavy Swamp Wallaby-grass *Amphibromus sinuatus*.

The remainder of native vegetation within the study area has **regional** significance for biodiversity in the Victorian Volcanic Plain Bioregion (Appendix 2).

Reasons for the significance ratings are as follows:

- Presence of many remnants of the endangered Stony Knoll Shrubland EVC and Plains Grassy Wetland EVC.
- Potential habitat for the nationally significant Growling Grass Frog.
- Presence of 14 flora species of regional significance.
- Habitat for a diversity of wetland flora and fauna species, including state significant species.

The areas of predominantly introduced vegetation within the study area have negligible significance for biodiversity conservation.

The biodiversity values of the study area are discussed further below.

Landers Lane/Riordans Road reserves

The study area supports narrow linear patches of remnant native vegetation in good condition, including a number of native acacia trees, and areas of

Predominantly Introduced Vegetation. The native trees have some value as fauna habitat as they provide resources for native birds and mammals, particularly when the trees are old and have developed hollows although none were observed during the current assessment. The wetland within Landers Lane provides potential habitat for the nationally significant Growling Grass Frog as well as potential habitat for Wavy Swamp Wallaby-grass and Purple Blown-grasses.

The areas of Predominantly Introduced Vegetation have negligible significance for nature conservation due to the substantial modification of the original vegetation and habitats.

Tarrone North Road reserve

The majority of the study area supports introduced vegetation and highly modified patches of native vegetation. The modified patches of Basalt Shrubby Woodland and scattered native trees have some value as fauna habitat as they provide resources for native birds and mammals, particularly when the trees are old and have developed hollows although none were observed during the current assessment. The areas of predominantly introduced vegetation within the study area have negligible significance for biodiversity conservation.

4.2 Previous assessments of significance

Plant site & road reserves

There appear to have been no previous environmental assessments of the study area.

4.3 Significant Flora Species

Significant flora species recorded during the present assessment, recorded in the local area (FIS) or predicted to occur in the local area (DEWHA database) are discussed in the following section and listed in Appendix 3. Significant species are defined in Appendix 2.

4.3.1 National significance

Plant site & road reserves

No species of national significance are recorded from the study area.

Database records

Plant site & road reserves

The FIS database contains a record of Basalt Peppercress *Lepidium hyssopifolium* from within 10 km (Appendix 3). The closest record is an old record (undated but presumably pre-1950) from just south of Hawkesdale approximately 10km from the current study area. It is unlikely that this species would occur within the study area.

The DEWHA database predicts the occurrence of, or suitable habitat for, seven additional species listed under the EPBC Act. Within ***Landers Lane/Riordans Road reserves*** there is suitable habitat for Swamp Fireweed *Senecio psilocarpus* which occurs in wet marshes and depressions across the Victorian Volcanic Plain. There is no suitable habitat for any of the remaining six species within any of the three study areas (Appendix 3).

4.3.2 State significance

Plant site

One flora species of state conservation significance was recorded from the study area during the present assessment. Wavy Swamp Wallaby-grass is growing abundantly in two wetlands within the study area. The FIS contains 50 site records of Wavy Swamp Wallaby-grass in Victoria, 33 of which occur in the Victorian Volcanic Plain.

Database records

Plant site & road reserves

The FIS database contains recent records (within the last 20 years) of two species of state significance from within 10km of the study area. Both species, which are subspecies of Purple Blown-grass *Lachnagrostis punicea* (subsp. *filifolia* and subsp. *punicea*), have potential to occur in the areas of Plains Grassy Wetland EVC within the study area.

Landers Lane/Riordans Road reserves

The road reserves in Landers Lane contain a number of damp depressions and drainage lines that are potential habitat for Wavy Swamp Wallaby-grass and Purple Blown-grasses.

Tarrone North Road reserve

It is unlikely any predicted species would occur due to the highly modified nature of the vegetation and a lack of suitable habitat.

4.3.3 Regional significance

Plant site

Seventeen recorded species have regional significance within the Victorian Volcanic Plain Bioregion (Appendix 3).

Landers Lane/Riordans Road reserves

Nine recorded species have regional significance within the Victorian Volcanic Plain Bioregion (Appendix 3).

Tarrone North Road reserve

Two recorded species have regional significance within the Victorian Volcanic Plain Bioregion (Appendix 3).

4.4 Significant Vegetation Communities

Plant site & road reserves

Stony Knoll Shrubland, Plains Grassy Wetland and Basalt Shrubby Woodland EVCs have state significance for biodiversity conservation due to their high level of depletion in Victoria. Little of these EVCs remain despite their original distribution, mainly due to agricultural development. Vegetation clearance is continuing and many remnants are degrading due to inappropriate management practices.

Stony Knoll Shrubland EVC occurs within two bioregions in the state and is endangered within the Victorian Volcanic Plain Bioregion and vulnerable in the Dundas Tablelands Bioregion. Basalt Shrubby Woodland EVC is endangered in all 5 bioregions in which it occurs. Plains Grassy Wetland EVC is endangered in all 15 bioregions in which it occurs.

Plant Site

High quality examples of Stony Knoll Shrubland EVC would have state significance, but all remnant patches within the study area are modified and are considered to be of regional significance. Patch 59 (Figure 3) is the only patch of

Plains Grassy Wetland EVC within the *Plant Site* considered to be of sufficient quality to be considered as state significant.

Tarrone North Road reserve

Basalt Shrubby Woodland EVC has state significance for biodiversity conservation due its high level of depletion in Victoria. Little of this EVC remains despite its original distribution, mainly due to agricultural development and grazing. Vegetation clearance is continuing and many remnants are degrading due to inappropriate management practices.

Patches of Basalt Shrubby Woodland within the study area are highly modified and are considered to be of local significance.

4.5 Significant Terrestrial Fauna Species

Significant terrestrial fauna species recorded during the present assessment, recorded in the local area (AVW and/or BA database) or predicted to occur in the local area (DEWHA database) are discussed in the following section and listed in Appendix 6. Species listed under migratory and marine provisions of the EPBC Act are addressed in Section 5.1.

4.5.1 National significance

Species of national significance are discussed in this section. Those species listed under the EPBC Act are further summarised in Section 5.1 and the status of all nationally significant species is given in Table A.6.2 in Appendix 6.

Records from the study area

Plant site & road reserves

No fauna species of national significance were recorded within *any sections* of the study area during the assessments.

Database records

Plant site & road reserves

No fauna species of national significance are recorded from the local area in the AVW and/or BA database.

Eight threatened fauna species listed under the EPBC Act on the DEWHA database are predicted to occur, or their habitat is predicted to occur, within five

kilometres of the study area (Appendix 6).

The ***plant site*** and ***Landers Lane road reserve*** contains potential habitat for one of these species:

- **Growling Grass Frog** *Litoria raniformis* prefers wetlands or flooded waterways, which contain abundant emergent vegetation. Individuals will disperse long distances, often through seemingly inhospitable habitats, in search of new wetland habitats. The wetlands within Landers Lane and Patch 59 of the plant site provide potential habitat for this species. However, it should be noted that the extent of available and suitable habitat within the local area is unknown and this may reduce the likelihood of this species occurring within the study area.

4.5.2 State significance

The status of all state significant species is given in Table A.6.2 in Appendix 6.

Records from the study area

Plant site & road reserves

No state significant fauna species were recorded in the study area during the present assessments.

Database records

Plant site & road reserves

Six species of state conservation significance are recorded from the local area in the AVW and/or BA database (Appendix 6). Two of these species have potential to occur within the study area. These are:

- **Brolga** *Grus rubicunda* inhabits grasslands, terrestrial wetlands and woodlands. In Victoria the species is most commonly found in the south-west, the Northern Plans and associated parts of the Murray River. Brolga predominantly feed on wetland plants, but also forage in grain and potato crops and improved pasture. During the wet seasons, the grassy wetland area of Patch 59 within the ***plant site*** provides potential foraging habitat for Brolga and the species may visit the site on occasions.

- **Eastern Great Egret** *Ardea alba* is usually found in terrestrial wetland, estuarine and moist grassland habitats. They prefer permanent well-vegetated waterbodies but also use freshwater meadows, channels and farm dams. On occasions, this species may utilise the wetland areas of the ***plant***

site and ***Landers Lane road reserve*** to forage.

Plant site & road reserves

In addition, two state significant species, Magpie Goose *Anseranas semipalmata* and White-bellied Sea-Eagle *Haliaeetus leucogaster*, or their habitat, are predicted to occur within 5km of the study area by the DEWHA database. However, it is unlikely these species would occur in within any sections of the study area.

4.5.3 Regional Significance

Species of regional significance include those species that are listed as near threatened in the *Advisory List of the Threatened Vertebrate Fauna in Victoria - 2007* (DSE 2007b).

Records from the study area

Plant site & road reserves

No regionally significant fauna species were recorded in the study area during the present assessments.

Database records

Plant site & road reserves

Six species of regional conservation significance are recorded from the local area in the AVW Database (Appendix 6).

5.0 BIODIVERSITY LEGISLATION AND GOVERNMENT POLICY

Biodiversity legislation and government policy that is potentially relevant to the proposed development is discussed below.

5.1 Commonwealth

5.1.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) applies to developments and associated activities that have the potential to significantly impact on matters protected under the Act.

Under the Act, unless exempt, actions require approval from the Australian Government Minister for Environment, Heritage and the Arts (the Minister) if they are likely to significantly impact on a 'matter of national environmental significance'. There are currently seven matters of national environmental significance (NES):

- World Heritage properties;
- National Heritage places;
- nationally listed threatened species and ecological communities;
- listed migratory species;
- Ramsar wetlands of international importance;
- Commonwealth marine areas; and
- nuclear actions (including uranium mining).

The EPBC Act also applies to the environment in general if actions are taken on Commonwealth land, or if actions that are taken outside Commonwealth land will impact on the environment on Commonwealth land.

Any person proposing to take an action that may, or will, have a significant impact on a matter of national environmental significance must refer the action to the Minister for determination as to whether the action is a 'controlled action' or is not approved. 'Significant impacts' are defined in *EPBC Act Policy Statement 1.1 Significant Impact Guidelines: Matters of National Environmental Significance* (DEH 2006).

NES matters relevant to the proposed gas-fired power station and associated road reserves

There are two matters of national significance that are of relevance to the

proposed development:

- listed threatened species and ecological communities; and
- listed migratory species.

These are summarised below.

Listed threatened species and/or ecological communities

Ecological communities: No listed ecological communities occur within the study area.

Listed flora species: Flora species listed under the Act are discussed in Section 4.3.1 and listed in Appendix 3. In summary, no listed species were recorded in the study area. Seven species are predicted to occur, however none of these are likely to occur within the study area due to the lack of suitable habitat.

Listed fauna species: Fauna species listed under the Act are discussed in Section 4.5.1 and listed in Appendix 6. In summary, Growling Grass Frog has some potential to occur in the wetland areas of the ***plant site*** and ***Landers Lane road reserve*** within the study area.

Listed migratory species

The list of migratory species under the EPBC Act is a compilation of species listed under four international conventions: China-Australia Migratory Bird Agreement (CAMBA), Japan-Australia Migratory Bird Agreement (JAMBA), Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA) and the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention).

Species listed under the 'migratory' provisions of the EPBC Act are listed in Appendix 6 and summarised below:

- No species recorded during the present assessment.
- Three species are recorded from the local area (AVW and/or BA database).
- Eight additional species are predicted to occur, or their habitat is predicted to occur, within 5 km of the study area (DEWHA database).

Some of the migratory species listed in Appendix 6 are expected to use the study area on occasions; however, it does not provide important habitat for an ecologically significant proportion of any of these species.

Implications for the proposed gas-fired power station and associated road reserves

Plant site & road reserves

The proposed development is considered unlikely to significantly impact on any terrestrial matters of national environmental significance.

The ***plant site*** and ***Landers Lane road reserve*** contain potential habitat for Growling Grass Frog. Further survey would be required to determine the presence of this species on site.

It is not known whether the development is likely to impact on any aquatic matters of national environmental significance. Without an aquatic assessment, the potential for the development to trigger the provisions of the Act cannot be fully determined.

5.2 State

5.2.1 Flora and Fauna Guarantee Act 1988

The *Flora and Fauna Guarantee Act 1988* (FFG Act) is the key piece of Victorian legislation for the conservation of threatened species and communities and for the management of potentially threatening processes.

A permit is required from DSE to 'take' protected flora species from public land. Taking protected flora from private land requires the permission of the landowner and not DSE unless the land is declared 'critical habitat'.
Most native vegetation contains some protected flora species.

Protected flora are native plants or communities of native plants that have legal protection under the FFG Act. The protected flora list has three sources:

- plant taxa (species, subspecies or varieties) listed as threatened under the Flora and Fauna Guarantee Act 1988;
- plant taxa belonging to communities listed as threatened under the Flora and Fauna Guarantee Act 1988;
- plant taxa which are not threatened but require protection for other reasons.

Some species which are attractive or highly sought after, such as orchids and grass-trees, are protected so that removal of these species from the wild can be controlled. Not all of these species are rare in the wild or highly significant. Protection includes living (e.g. flowers, seeds, shoots, roots) and non-living

(e.g. bark, leaves, other litter) plant material (DSE website).

A permit is also required for the taking, trading or keeping of fish that are members of taxa or communities of flora and fauna on the Threatened List. The controls mean that authorisation under the FFG Act is required to catch, possess, keep or sell listed fish (DSE website).

Implications for the proposed gas-fired power station and associated road reserves

Plant site

The land is privately owned and is not declared 'critical habitat'. Therefore a permit to 'take' listed flora species is not required under the FFG Act.

Landers Lane/Riordans Road reserves and Tarrone North Road reserve

The study consists of public land. Landers Lane and Riordans Road reserve, contain Stony Knoll Shrubland, a component of the FFG listed community Western (Basalt) Plains Grasslands Community. Therefore an FFG permit from DSE is required.

The proposed development should have regard to the Action Statement prepared under the FFG Act for Western (Basalt) Plains Grassland.

5.2.2 Planning and Environment Act 1987

A planning permit is required under the *Planning and Environment Act 1987* to remove, destroy or lop native vegetation on a property of more than 0.4 hectares with exceptions given in Clause 52.17 of the local planning scheme.

The Department of Sustainability and Environment (DSE) is a mandatory referral authority in some circumstances involving native vegetation removal. Under Clause 66.02 of the planning scheme, the removal of more than 0.5 hectares of an endangered vegetation type must be referred to the Department. DSE is also a mandatory referral authority where there is likely to be a loss of native vegetation on public land (eg. road reserves).

Implications for the proposed gas-fired power station and associated road reserves

Plant site & road reserves

A planning permit is required from Moyne Shire to remove, destroy or lop native vegetation unless the proposal is exempt as set out in Clause 52.17, and/or within

any other provision of the planning scheme that requires a permit to remove or destroy the vegetation (DSE 2007a).

If the proposed development requires the removal of more than 0.5 hectares of endangered native vegetation, the planning permit application would need to be referred by the Responsible Authority (Moyne Shire) to DSE. Referral to DSE would also be required if there is likely to be a loss of native vegetation on public land.

5.2.3 Native Vegetation Management Framework

The Native Vegetation Management Framework (the Framework) is State Government policy for the protection, enhancement and revegetation of native vegetation in Victoria (NRE 2002). Native vegetation provisions were introduced to all planning schemes in 1989 and the Framework was incorporated into the Victoria Planning Provisions in 2003. The primary goal of the Framework is:

> *a reversal, across the whole landscape, of the long-term decline in the extent and quality of native vegetation, leading to a Net Gain* (NRE 2002).

In association with the regional Native Vegetation Plans, the Framework provides decision-making tools for native vegetation management.

Where an application is made to remove native vegetation, a proponent for a development must explain the steps that have been taken to:

- Avoid the removal of native vegetation, where possible.
- Minimise the removal of native vegetation.
- Appropriately offset the loss of native vegetation, if required.

A proponent for a development must demonstrate that the option to avoid and minimise vegetation clearance has been fully explored before considering offsets.

An offset may be achieved by improvements in the quality or extent of native vegetation in a selected 'offset area', either within a project area or off-site. An area that is revegetated and protected or set aside for natural regeneration may provide some, or all, of the required offset. The conservation significance of vegetation to be removed is also taken into account when offsets are determined.

Plant site

In the event that a permit is granted for removal of any Stony Knoll Shrubland EVC, all of which is 'high' conservation significance) a multiplier of 1.5 times the habitat hectare loss would apply when calculating offset requirements. If a

permit was granted for removal of any Plains Grassy Wetland EVC (all of which is 'very high' conservation significance), a multiplier of 2 times the habitat hectare loss would apply when calculating offset requirements.

Managing an area of remnant vegetation on private land as an offset will generally yield a gain in habitat score of 20 % (approximately) over the nominated 10 years.

Implications for the proposed gas-fired power station and associated road reserves

Plant site

A proponent must demonstrate that the option to avoid vegetation clearance has been fully explored. If a property were bought post-1989 for development in the knowledge that native vegetation is present, the proponent could be expected to allow for retention of that vegetation in the design process, as the native vegetation controls have been in place since 1989.

Native vegetation remnants within the study area meet the definition of 'high' and 'very high' conservation significance under the Framework, in which case clearing is generally not permitted unless exceptional circumstances apply, with Ministerial approval required in the case of 'very high' conservation significance vegetation.

At the time of planning application, the Net Gain assessment for the project will need to identify any offset obligations, and identify how these will be met, to a level of detail that satisfies Moyne Shire.

Landers Lane/Riordans Road reserves

The proposed road widening would result in the loss of native vegetation and therefore the proposed works should be assessed against the provisions of Victoria's Native Vegetation Management: A Framework for Action (NRE 2002).

Tarrone North Road reserve

At present the proposed road widening of Tarrone North Road by up to 2 m either side of Tarrone North Road will not require the removal of native vegetation. If at any stage areas of native vegetation are proposed for removal then the proposed works should be assessed against the provisions of Victoria's Native Vegetation Management: A Framework for Action (NRE 2002).

5.2.4 Wildlife Act 1975 and associated Regulations

The *Wildlife Act 1975* is the primary legislation in Victoria providing for protection and management of wildlife. For the purposes of the Act, wildlife means indigenous vertebrate species (except those declared as pest animals), invertebrate species listed under the FFG Act, and some introduced game species.

The Wildlife Regulations 2002 of the Act prescribe penalties for the purposes of the Wildlife Act. These include penalties for persons who wilfully damage, disturb or destroy any wildlife habitat without appropriate authorisation (Section 9 of the Wildlife Regulations 2002). Authorisation for habitat removal may be obtained under the Wildlife Act; through a licence granted under the *Forests Act* 1958; or under any other Act.

Authorisation to destroy or possess wildlife may be required under Sections 41– 47 of the *Wildlife Act 1975*. Permits under the Act may be needed where it is expected that wildlife will need to be destroyed or moved.

Implications for the proposed gas-fired power station and associated road reserves

Plant site & road reserves

A permit will be required for removal of habitat at the site, such as rocky areas. It may be that removal of habitat will be covered by a permit to remove native vegetation, therefore a separate permit under the Wildlife Act would not be required.

If construction activities are likely to result in the death of wildlife or the need to move wildlife short distances, permits will be required.

5.2.5 Glenelg Hopkins CMA Draft Native Vegetation Plan

This document (GHCMA 2000) has been prepared to develop a strategic and co-ordinated approach to the management of native vegetation within the region. The plan is designed to complement the Native Vegetation Management Framework and contains specific information and objectives relating to the region.

The information in the plan is centred on four strategic directions:

- Retain the quantity of native vegetation by minimising clearing;
- Protect native vegetation with reservation and management agreements;

- Maintain and improve the quality of native vegetation; and
- Increase the quantity of native vegetation.

Responses and offset requirements for clearing native vegetation are outlined in Appendix 3.4 of the document (page 52).

Implications for the proposed gas-fired power station and associated road reserves

Plant site & road reserves

The objectives of the Native Vegetation Plan are similar to those of the Native Vegetation Management Framework and should be met if the three step approach to achieving a Net Gain outcome is followed.

5.2.6 Environment Protection Act 1970: State Environmental Protection Policy (Waters of Victoria) 2003

This policy provides a legal framework for state and local government agencies, businesses and communities to work together to protect and rehabilitate Victoria's surface water environments.

Beneficial uses of the waterways need to be protected. Uses to be protected include:

- Maintenance of natural aquatic ecosystems and aquatic wildlife.
- Passage of indigenous fish.
- Maintenance of indigenous riparian vegetation.
- Water based recreation.
- Commercial and recreational use of edible fish and crustacea.
- Agricultural water supply.
- Other commercial purposes.

Impacts to surface water quality must not exceed water quality objectives specified to protect beneficial uses. Relevant clauses must be adhered to. Of particular relevance are:

- 43 - surface water management and works.
- 53 - vegetation protection and rehabilitation.
- 56 - construction activities.

Implications for the proposed gas-fired power station and associated road reserves

Plant site & road reserves

Construction managers need to monitor affected surface waters to assess if beneficial uses are being protected. URS Australia may need to consult with EPA and Glenelg Hopkins CMA with regard to establishing appropriate water quality objectives and monitoring requirements.

5.3 Local

5.3.1 Local Government Planning Scheme (Moyne Shire)

There are no Environmental Significance Overlays or Significant Landscape Overlays (http://www.dse.vic.gov.au/planningschemes/) covering the study area.

The study area is within the Farming Zone (FZ).

Implications for the proposed gas-fired power station and associated road reserves

Plant site & road reserves

There are no further permit requirements under the local planning scheme. However, a permit to remove native vegetation is still required under the Planning and Environment Act 1987 (Section 5.2.2).

6.0 POTENTIAL IMPACTS AND MITIGATION MEASURES

6.1 Potential impacts

Development of the study area is likely to have ecological impacts on flora and fauna values. Depending on final design of the proposed gas-fired power station and associated road reserves, the level and type of impacts cannot be determined.

6.1.1 Direct Impacts

Plant site & road reserves

The primary source of direct impacts to flora and fauna would occur as a result of vegetation and habitat removal required by the gas-fired power station and associated road reserves.

Whilst these direct impacts cannot be quantified until the design is finalised and the whole of the proposed pipeline route is assessed, it is intended that this report be used to guide design of the proposed development so as to minimise direct impacts to flora and fauna.

The primary source of direct impacts to flora and fauna would occur as a result of vegetation and habitat removal required by the proposed development footprint. These potentially include:

- Removal or reduction in the extent of native vegetation.
- Removal of rocky areas that provide habitat for a range of native fauna.
- Removal of Stony Knoll Shrubland EVC and Plains Grassy Wetland EVC.
- Reductions in population size of a state significant flora species, Wavy Swamp Wallaby-grass *Amphibromus sinuatus*.
- Reductions in population size of regionally significant flora species.

6.1.2 Indirect Impacts

Plant site & road reserves

Indirect impacts of development typically involve the modification and degradation of adjacent vegetation and habitat (terrestrial and aquatic) not removed by the development footprint. They potentially include the following:

- Loss of any vegetation that survives construction process as a result of changed environmental conditions.

- Loss of populations of some fauna species from the site.
- Accidental loss of or damage to retained vegetation during the construction phase.
- Degradation of habitat values in the local area due to incremental loss of remnant vegetation.

6.2 Potential Mitigation Measures

There may be opportunities to reduce (mitigate) potential impacts through alterations to the design or management following review of this assessment.

Plant site

The vegetation, especially the areas of Plains Grassy Wetland and better quality examples of Stony Knoll Shrubland, indicated in the current survey should be considered during the detailed design phase of the project. Impacts on vegetation and habitats should be avoided and minimised, in accordance with Net Gain policy.

Landers Lane/Riordans Road reserves

Avoid impacts to native vegetation within Landers Lane, Riordans Road and the access point in Tarrone North Road by limiting road widening where possible or by considering an alternative route through exotic areas of vegetation.

Tarrone North Road reserve

Widening of Tarrone North Road and the associated development footprint should be kept to within 2 m either side of Tarrone North Road to avoid impacts to native vegetation.

6.2.1 Net Gain

Plant site

The primary mechanism for mitigating ecological impacts is through adherence to Net Gain policy.

The 3-step process to achieving Net Gain should be followed: (1) first attempt to avoid any native vegetation loss, (2) minimise any unavoidable loss of native vegetation, and (3) offset any native vegetation losses.

Step 1: Avoid

Native vegetation within the study site could be avoided by restricting development to the highly modified and cleared areas that support no native

vegetation.

Step 2: Minimise

If removal of native vegetation cannot be avoided, it should be minimised so that areas of lower quality and lower conservation significance are impacted in preference to higher conservation significance or better quality vegetation.

Step 3: Offset

Any native vegetation losses should be offset as per *Victoria's Native Vegetation Management – A Framework for Action* or Net Gain policy (NRE 2002).

A full Net Gain assessment will be required for any unavoidable vegetation losses.

6.2.2 Other Mitigation Measures

Plant site & road reserves

There are a number of options to mitigate potential ecological impacts of the proposed development. Potential measures to minimise the ecological impact of development of the land are as follows:

Further survey

- If required, Net Gain offsets should be located and a management plan prepared documenting how vegetation gains will be generated.
- If impacts on the areas of Plains Grassy Wetland and the wetland within the ***plant site*** and ***Landers Lane road reserve*** cannot be avoided, survey for Growling Grass Frog is recommended.
- Targeted flora survey for Swamp Fireweed, Wavy Swamp Wallaby-grass and Purple Blown-grasses within areas of potential habitat within ***Landers Lane/Riordans Road reserve*** would be required if any of these areas are likely to be impacted.
- For ***Landers Lane/Riordans Road reserve*** and ***Tarrone North Road reserve*** a net gain assessment should be undertaken if any of the areas identified as supporting an EVC or scattered trees are likely to be impacted by the proposal.

Pre-construction

- All areas of retained native vegetation should be protected by temporary fencing during construction.
- A Construction Environmental Management Plan should be developed prior

to commencement of construction, and environmental management issues should be incorporated into the workforce induction program.

- Signage, induction and careful supervision of contractors should be implemented.

Construction

- Disturbance of native vegetation should be kept to a minimum.
- Any trees which are removed or lopped as part of the proposed development should be incorporated into areas of existing vegetation, where they can continue to provide fauna habitats.
- Ensure equipment storage, and stockpiles of waste materials are not located in areas of remnant vegetation.
- Follow appropriate hygiene measures for all machinery to ensure removal of weed seeds before entering the site.
- Control all noxious and woody environmental weeds arising from the proposed works.

Post-construction

- Use of site indigenous native species for landscape plantings will enhance the natural values of the study site. Plantings should contain species of local provenance and appropriate for Stony Knoll Shrubland EVC, Plains Grassy Wetland EVC and Basalt Shrubby Woodland EVC in the Victorian Volcanic Plain Bioregion. If native vegetation is to be removed, seeds could be collected from these plants in advance and propagated for use in site rehabilitation.

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APPENDICES

APPENDIX 1
DSE Vegetation Assessment Methodology

A1.1 Habitat hectares

Habitat hectares are calculated where indigenous understorey plant cover is at least 25% of total understorey plant cover, or where a group of trees (at least 3 trees) has a tree canopy cover of at least 20% (DSE 2007a, p 10). Such sites are termed 'patches'.

Each vegetation patch has one or more habitat quality zones. Each habitat zone consists of one ecological vegetation class (EVC) and has uniform quality within limits.

The assessment process compares the vegetation of the habitat zone against a DSE 'benchmark' description of the EVC, using methods described in the DSE assessment manual (DSE 2004). A habitat score for the habitat zone is calculated by this method.

Each habitat zone has a habitat score of between 0 and 100, with extensive intact vegetation having a theoretical score of 100. Habitat score is calculated using ten components: large trees, tree canopy cover, understorey, weediness, recruitment, organic litter, logs, patch size, neighbourhood context and distance to core area. In naturally treeless vegetation, or vegetation that can exist in different structural forms, the score is standardised to account for the absence of some or all 'woody' criteria.

The habitat hectare value of a habitat zone is given by its habitat score (expressed as a decimal between 0 and 1) multiplied by its land area in hectares. For example, 4 hectares of vegetation with a habitat score of 50 contain 2.0 habitat hectares.

Habitat hectares are used to measure losses arising from clearing, and also gains obtained through protection measures and active management of existing vegetation.

A1.2 Indigenous canopy trees

The following information on indigenous canopy trees does not apply if the subject land contains only treeless vegetation types.

Large Old Trees within patches

'Large Old Trees' within native vegetation patches are subject to offset requirements, as outlined in the Native Vegetation Management Framework (NRE 2002: Table 6, p 55). Large Old Trees have a minimum stem diameter specified in the relevant EVC benchmark. Trees smaller than this benchmark size within patches are not included in this assessment, as they are addressed in the habitat hectare analysis.

Scattered trees outside patches

Trees over predominantly introduced understoreys are offset through tree protection/replacement ratios.

Trees in areas where less than 25% of the understorey cover is indigenous are assessed as 'scattered old trees'. Trees are offset by the protection of other old trees and/or recruitment of new trees.

For land parcels (usually a title boundary) where tree density is greater than eight per hectare, the offset ratios are outlined in the Native Vegetation Management Framework (NRE 2002, p 55). For areas where tree density is less, the offset ratios are specified in the regional Native Vegetation Plan. Offsets for small trees are also included in the Native Vegetation Plan.

APPENDIX 2
Significance Assessment

The common language meaning of significance is 'importance; consequence' (Macquarie Dictionary). While the general meaning of this is clear, in natural resource assessment and management this meaning needs to be defined in scientific terms.

A2.1 Significant Species and Communities

Species and community conservation significance is defined as follows:

A taxon or community is significant at a particular geographic level (national, state, regional, local) when it is considered to be rare or threatened at that level.

A taxon is an officially recognised species, subspecies or variety of a species.
The significance of a taxon or community is a function of its rarity within a specified geographic context: nation, state, region, local area. In each context a taxon or community has a conservation status: not rare, rare, vulnerable, endangered, extinct. 'Threatened' is a combination of the 'vulnerable' and 'endangered' categories.

The significance of the taxon or community is the largest geographic context in which it is at least rare. For example, if a species is uncommon in a state and rare within a region of that state, it has regional significance within that region.

Species listed as 'poorly known' are not considered rare or threatened at present and are assigned an intermediate rating. For example, a species listed as poorly known in a state list has potential state significance and is assigned 'regional/state' significance.

A2.2 Sites

Site conservation significance is defined as follows:

A site is significant at a particular geographic level (national, state, regional, local) when it is considered to make a substantial contribution to biodiversity at that level.

As a guideline, one per cent of the total extant population of a significant species within a specified geographic area or of the total extant area of a significant ecological community within a specified geographic area is a threshold for 'substantial contribution'. Comprehensive data are not always available for such assessments and interpretation of available data and information is usually required.

In some cases a site may be small when viewed in isolation but it forms an integral and functional part of a larger site of significance. If there is no ecological reason to divide the larger site, then the rating that applies to the larger site applies to the smaller site.

Sites with a particularly high level of local or regional significance are assigned 'high local' or 'high regional' significance, respectively. These terms are not applied to state and national levels of significance or to species and communities.

Sites documented in state government databases, such as the Victorian biosite database, are accepted along with their significance ratings by Biosis Research.

To determine whether a site makes a 'substantial contribution' to biological conservation, it is assessed against the following criteria:

- Size – overall size of site or habitats/vegetation communities within the site.
- Significant species and populations – number of significant species or populations known or likely to occur on the site.
- Significant habitat or vegetation communities – presence and extensiveness of significant habitats and vegetation communities on the site.
- Ecological integrity – degree of intactness, level of past disturbance (such as weed invasion) and overall condition of vegetation communities on the site.
- Richness and diversity – quantity of species, vegetation communities and habitats.
- Connectivity – Quality and quantity of linkages between site and adjacent areas of native vegetation/habitat (wildlife corridor value).
- Viability – level of existing and/or future disturbances, degree of existing and/or future fragmentation.
- Distribution – proximity of the site to known distribution limits for significant species, populations, habitats and/or vegetation communities.
- Level of conservation – representation of site attributes in conservation reserves.

As a guideline, *one per cent* of the total extant population of a significant species within a specified geographic area or of the total extant area of a significant ecological community within a specified geographic area is a threshold for 'substantial contribution'. Comprehensive data are seldom available and interpretation of limited available data and information is usually required.

A2.3 Scale: Geographic Context

Significance is determined within specified geographic contexts:

- Australia
- State Victoria
- Region Victorian Volcanic Plain Bioregion (DSE Flora Information System)
- Local area Tarrone area (within 10 km of the study area)

A2.4 Conservation Status: Degree of Threat

Official government lists define species and communities that are rare or threatened (and thus significant) at *national* and/or *state* levels. Most of these lists appear as schedules under legislation and are followed unless further evidence is available.

Species and communities that are rare or threatened at *regional* and *local* levels are determined from the available literature, data and information, and consultation with relevant individuals where relevant reports and government listings are not available.

National Significance

Species

Species of national significance are either:

- Flora or fauna listed as extinct, extinct in the wild, critically endangered, endangered or vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999*.

- Flora listed as rare in Australia in *Rare or Threatened Australian Plants* (Briggs and Leigh 1996).
- Fauna listed as extinct, endangered or vulnerable in Australia in an Action Plan published by Environment Australia.
- Species considered to be rare or threatened in Australia by Biosis Research using IUCN criteria where applicable (IUCN 2001).

Communities

Ecological communities of national significance are either:

- Listed as critically endangered, endangered or vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999*.
- Considered to be rare or threatened in Australia by Biosis Research using IUCN criteria where applicable (IUCN 2001).

Ecological communities include flora and/or fauna communities.

State Significance

Species

Species of state significance in Victoria are either:

- Flora or fauna listed as threatened under the *Flora and Fauna Guarantee Act 1988.*
- Flora listed as extinct, endangered, vulnerable or rare in Victoria in the DSE Flora Information System 2007 Version.
- Flora listed as poorly known in Australia in *Rare or Threatened Australian Plants* (Briggs and Leigh 1996).
- Fauna listed as extinct, critically endangered, endangered or vulnerable in the *Advisory List of Threatened Vertebrate Fauna in Victoria, 2007* (DSE 2007b) or fauna listed as conservation dependent under the *Environment Protection and* Biodiversity Conservation Act 1999.
- Fauna listed as rare/near-threatened in Australia in an Action Plan published by Environment Australia.
- Species considered to be rare or threatened in Victoria by Biosis Research using IUCN criteria where applicable (IUCN 2001).

Communities

Ecological communities of state significance in Victoria are either:

- Listed as threatened under the *Flora and Fauna Guarantee Act 1988.*
- Considered to be rare or threatened in Victoria by Biosis Research using IUCN criteria where applicable (IUCN 2001).

Regional Significance

Species

Species of regional significance are:

- Flora recorded from less than 5% of documented sites (quadrats/defined area lists) from the Victorian Volcanic Plain Bioregion in the DSE Flora Information System unless there is reason to believe they are undersampled in the available data.
- Fauna considered to be rare or threatened at the bioregional level by Biosis Research using IUCN criteria where applicable (IUCN 2001) or fauna considered to be near-threatened in the *Advisory List of Threatened Vertebrate Fauna in Victoria,*

2007 (DSE 2007b).

Communities

Ecological communities of regional significance in Victoria are:

- Listed as an endangered, vulnerable or depleted ecological vegetation class within a particular bioregion in a Draft Native Vegetation Plan.
- Considered to be rare or threatened at the bioregional level by Biosis Research using IUCN criteria where applicable (IUCN 2001).

Local Significance

Species

Species of local significance are:

- Flora or fauna considered to be rare or threatened at the local level by Biosis Research using IUCN criteria where applicable (IUCN 2001).

Communities

Ecological communities of local significance are:

- Considered to be rare or threatened at the local level by Biosis Research using IUCN criteria where applicable (IUCN 2001).

No Significance

Species and ecological communities are not significant when they are considered not to be rare or threatened at any geographic level by Biosis Research using IUCN criteria where applicable (IUCN 2001). Species that are not indigenous to a given study area are not significant. Plantings are generally not significant.

APPENDIX 3
Flora Results

A3.1 Flora species recorded from study area

Table A3.1. Flora species recorded from the study area (Plant Site FIS lists S1357200, S1357300 and S1357400), Riordans Road/Landers Lane and Tarrone North Road.

Victorian status (DSE Flora Information System, 2007 Version):
- v Vulnerable
- P Protected flora under FFG Act (applies to public land only)

Species of regional significance are highlighted in **bold**

All indigenous species have at least local significance

Status	Scientific Name	Common Name	Plant Site	Riordans Road and Landers Lane	Tarrone North Road
	Native species				
P	*Acacia mearnsii*	Black Wattle		+	+
	Acacia melanoxylon	Blackwood		+	+
	Acaena agnipila	**Hairy Sheep's Burr**	+		
	Acaena echinata	Sheep's Burr		+	
	Acaena novae-zelandiae	Bidgee-widgee		+	
P	***Adiantum aethiopicum***	**Common Maidenhair**	+		
v	***Amphibromus sinuatus***	**Wavy Swamp Wallaby-grass**	+		
	Asperula conferta	Common Woodruff	+	+	
	Austrodanthonia caespitosa	Common Wallaby-grass	+		
	Austrodanthonia spp.	Wallaby Grass		+	
	Austrostipa pubinodis	**Tall Spear-grass**	+		
P	***Calocephalus lacteus***	**Milky Beauty-heads**		+	
	Carex appressa	Tall Sedge	+	+	
	Carex breviculmis	Common Grass-sedge		+	
	Carex tereticaulis	**Poong'ort**		+	
	Crassula helmsii	**Swamp Crassula**	+	+	
	Crassula sieberiana s.l.	Sieber Crassula	+		
	Dichondra repens	Kidney-weed	+		
	Eleocharis acuta	Common Spike-sedge	+	+	
	Epilobium billardierianum subsp. *cinereum*	Grey Willow-herb	+		
	Eryngium ovinum	Blue Devil		+	
	Eryngium vesiculosum	**Prickfoot**	+	+	
	Geranium retrorsum s.l.	Grassland Crane's-bill	+		
	Glyceria australis	**Australian Sweet-grass**	+		
	Isolepis cernua* var. *cernua	**Nodding Club-sedge**	+		
	Juncus bufonius	Toad Rush	+		
	Juncus subsecundus	Finger Rush	+		
	Lachnagrostis filiformis* var. *1	**Common Blown-grass**		+	

Status	Scientific Name	Common Name	Plant Site	Riordans Road and Landers Lane	Tarrone North Road
	Lachnagrostis filiformis* var. *2	**Wetland Blown-grass**		+	
	Lemna disperma	**Common Duckweed**	+		
	Lomandra filiformis	Wattle Mat-rush		+	
	Lythrum hyssopifolia	Small Loosestrife	+	+	
	***Melicytus dentatus* s.s.**	**Tree Violet**	+	+	+
	Microlaena stipoides var. *stipoides*	Weeping Grass	+	+	
	Myriophyllum variifolium	**Varied Water-milfoil**	+	+	
	Neopaxia australasica	**White Purslane**	+		
	Oxalis perennans	Grassland Wood-sorrel	+	+	
	Persicaria lapathifolia	**Pale Knotweed**	+		
	Phragmites australis	**Common Reed**	+		+
	Poa labillardierei* var. *(Volcanic Plains)	**Basalt Tussock-grass**	+	+	
	Poa sieberiana	Grey Tussock-grass		+	
	Potamogeton spp.	Pondweed		+	
	Potamogeton tricarinatus s.l.	**Floating Pondweed**	+		
	Pteridium esculentum	Austral Bracken	+	+	+
	Ranunculus inundatus	**River Buttercup**	+		
	Rumex brownii	Slender Dock		+	
P	*Solenogyne dominii*	Smooth Solenogyne	+		
	Themeda triandra	Kangaroo Grass	+	+	
	Triglochin procera s.s.	Common Water-ribbons	+		
	Viola hederacea sensu Entwisle (1996)	**Ivy-leaf Violet**	+		
	Introduced species				
	Acetosella vulgaris	Sheep Sorrel	+	+	+
	Agrostis capillaris var. *capillaris*	Brown-top Bent	+		
	Anthoxanthum odoratum	Sweet Vernal-grass	+	+	+
	Arctotheca calendula	Cape Weed	+		+
	Avena fatua	Wild Oat		+	
	Bromus diandrus	Great Brome	+	+	+
	Bromus hordeaceus subsp. *hordeaceus*	Soft Brome	+		
	Cirsium vulgare	Spear Thistle	+	+	+
	Cotula coronopifolia	Water Buttons	+		
	Daucus carota	Carrot			+
	Erodium moschatum	Musky Heron's-bill	+		
	Geranium dissectum	Cut-leaf Crane's-bill	+		
	Helminthotheca echioides	Ox-tongue		+	+
	Holcus lanatus	Yorkshire Fog	+	+	+
	Hordeum hystrix	Mediterranean Barley-grass	+		
	Hypochoeris radicata	Flatweed	+	+	+
	Leontodon taraxacoides subsp. *taraxacoides*	Hairy Hawkbit	+		
	Lolium perenne var. *perenne*	Perennial Rye-grass	+		
	Lolium rigidum	Wimmera Rye-grass	+		
	Malva nicaeensis	Mallow of Nice		+	
	Moenchia erecta	Erect Chickweed	+		
	Nasturtium officinale	Watercress	+		
	Pennisetum clandestinum	Kikuyu		+	+
	Phalaris aquatica	Toowoomba Canary-grass		+	+

Status	Scientific Name	Common Name	Plant Site	Riordans Road and Landers Lane	Tarrone North Road
	Plantago lanceolata	Ribwort		+	+
	Poa annua	Annual Meadow-grass	+		
	Poa trivialis subsp. *trivialis*	Rough Meadow-grass	+		
	Polycarpon tetraphyllum	Four-leaved Allseed		+	
	Polygonum aviculare s.s.	Hogweed		+	
	Romulea rosea	Onion Grass	+		
	Rosa rubiginosa	Sweet Briar		+	
	Rumex crispus	Curled Dock		+	
	Silybum marianum	Variegated Thistle	+		
	Sisymbrium officinale	Hedge Mustard		+	
	Sonchus oleraceus	Common Sow-thistle		+	+
	Trifolium arvense var. *arvense*	Hare's-foot Clover		+	
	Trifolium campestre var. *campestre*	Hop Clover		+	
	Trifolium fragiferum var. *fragiferum*	Strawberry Clover	+	+	
	Trifolium subterraneum	Subterranean Clover	+	+	+
	Vulpia bromoides	Squirrel-tail Fescue	+	+	+

A3.2 Significant flora species

Table A3.2 Flora of national or state significance recorded or predicted to occur within 5 km of the study area

Australian status:

- E Listed under EPBC Act as endangered
- V Listed under EPBC Act as vulnerable
- R Rare (Walsh & Stajsic 2007)

Victorian status (DSE Flora Information System, 2007 Version):

- e Endangered
- v Vulnerable
- r Rare
- f Listed as threatened under FFG Act

Source of record:

- FIS: Recorded within 5 km of centre of study area within last 20 years, DSE Flora Information System
- DEWHA: Predicted to occur in local area, EPBC Act Protected Matters Search Tool

Likelihood scale:

	No habitat present	Habitat poorly represented	Habitat moderately well represented	Habitat well represented
No records from bioregion (terrestrial) or neighbouring basin (aquatic)	Negligible	Negligible	Low	Medium
Records from bioregion (terrestrial) or basin/neighbouring basin (aquatic)	Negligible	Low	Medium	High
Records from within 5 km (terrestrial) or from catchment (aquatic)	Negligible	Medium	High	High

Scientific Name	Common Name	Source	Status	Likelihood of occurrence		
				Plant Site	Riordans Road and Landers Lane	Tarrone North Road
National Significance						
Carex tasmanica	Curly Sedge	DEWHA	Vvf	Low	Low	Low
Senecio psilocarpus	Swamp Fireweed	DEWHA	Vv	Low	Medium	Low
Taraxacum cygnorum	Coast Dandelion	DEWHA	Vef	Negligible	Negligible	Negligible
Thelymitra matthewsii	Spiral Sun-orchid	DEWHA	Vvf	Low	Low	Low
Glycine latrobeana	Clover Glycine	DEWHA	Vvf	Low	Low	Low
Thelymitra epipactoides	Metallic Sun-orchid	DEWHA	Eef	Negligible	Negligible	Negligible
Lepidium hyssopifolium	Basalt Peppercress	FIS	Eef	Low	Low	Low
Prasophyllum frenchii	Maroon Leek-orchid	DEWHA	Eef	Low	Low	Low
State Significance						
Amphibromus sinuatus	Wavy Swamp Wallaby-grass	this study	v	Recorded	High	Low
Lachnagrostis punicea subsp. *filifolia*	Purple Blown-grass	FIS	Rrf	High	High	Low
Lachnagrostis punicea subsp. *punicea*	Purple Blown-grass	FIS	Rr	High	High	Low

APPENDIX 4
Plant site : Native vegetation in patches

A4.1 Native vegetation in patches within the Plant Site

Table A4.1 Patches of native vegetation recorded within the Plant Site

Patch Number	Ecological Vegetation Class	Quality Zone	Area (Ha)
1	Stony Knoll Shrubland	C	0.10
2	Stony Knoll Shrubland	C	0.04
3	Stony Knoll Shrubland	C	0.07
4	Stony Knoll Shrubland	B	0.11
5	Stony Knoll Shrubland	D	0.07
6	Stony Knoll Shrubland	C	0.05
7	Stony Knoll Shrubland	C	0.03
8	Stony Knoll Shrubland	C	0.08
9	Stony Knoll Shrubland	C	0.06
10	Stony Knoll Shrubland	C	0.36
11	Stony Knoll Shrubland	C	0.26
12	Stony Knoll Shrubland	C	0.28
13	Stony Knoll Shrubland	D	0.03
14	Stony Knoll Shrubland	D	0.05
15	Stony Knoll Shrubland	C	0.20
16	Stony Knoll Shrubland	C	0.02
17	Stony Knoll Shrubland	C	0.18
18	Stony Knoll Shrubland	C	0.02
19	Stony Knoll Shrubland	C	0.04
20	Stony Knoll Shrubland	C	0.03
21	Stony Knoll Shrubland	C	0.03
22	Stony Knoll Shrubland	C	0.02
23	Stony Knoll Shrubland	C	0.06
24	Stony Knoll Shrubland	C	0.03
25	Stony Knoll Shrubland	C	0.02
26	Stony Knoll Shrubland	C	0.25
27	Stony Knoll Shrubland	C	0.30
28	Stony Knoll Shrubland	A	0.30
29	Stony Knoll Shrubland	C	0.27
30	Stony Knoll Shrubland	C	0.56
31	Stony Knoll Shrubland	B	0.10
32	Stony Knoll Shrubland	C	0.11
33	Stony Knoll Shrubland	C	0.07
34	Stony Knoll Shrubland	C	0.44
35	Stony Knoll Shrubland	C	0.16
36	Stony Knoll Shrubland	C	0.12
37	Stony Knoll Shrubland	C	0.16
38	Stony Knoll Shrubland	C	0.11
39	Stony Knoll Shrubland	C	0.05
40	Stony Knoll Shrubland	C	0.22

Patch Number	Ecological Vegetation Class	Quality Zone	Area (Ha)
41	Stony Knoll Shrubland	C	0.43
42	Stony Knoll Shrubland	C	0.03
43	Stony Knoll Shrubland	C	0.02
44	Stony Knoll Shrubland	C	0.57
45	Stony Knoll Shrubland	C	0.09
46	Stony Knoll Shrubland	C	0.10
47	Stony Knoll Shrubland	C	1.03
48	Stony Knoll Shrubland	C	0.03
49	Stony Knoll Shrubland	C	0.02
50	Stony Knoll Shrubland	C	0.20
51	Stony Knoll Shrubland	C	0.13
52	Stony Knoll Shrubland	C	0.08
53	Stony Knoll Shrubland	C	0.01
54	Stony Knoll Shrubland	C	0.07
55	Stony Knoll Shrubland	C	0.14
56	Plains Grassy Wetland	G	0.06
57	Plains Grassy Wetland	G	0.05
58	Plains Grassy Wetland	G	0.07
59	Plains Grassy Wetland	E	1.00
60	Plains Grassy Wetland	G	0.02
61	Plains Grassy Wetland	G	0.09
63	Plains Grassy Wetland	H	0.37

APPENDIX 5
EVC Benchmarks

(http://www.dse.vic.gov.au/dse/nrence.nsf/)

Department of Sustainability and Environment

EVC/Bioregion Benchmark for Vegetation Quality Assessment

Victorian Volcanic Plain bioregion

EVC 125: Plains Grassy Wetland

Description:
This EVC is usually treeless, but in some instances can include sparse River Red Gum *Eucalyptus camaldulensis* or Swamp Gum *Eucalyptus ovata*. A sparse shrub component may also be present. The characteristic ground cover is dominated by grasses and small sedges and herbs. The vegetation is typically species-rich on the outer verges but is usually species-poor in the wetter central areas.

Life Forms:

Life form	#Spp	%Cover	LF code
Large Herb	5	5%	LH
Medium Herb	6	10%	MH
Small or Prostrate Herb	3	10%	SH
Large Tufted Graminoid	3	15%	LTG
Large Non-tufted Graminoid	1	5%	LNG
Medium to Small Tufted Graminoid	8	30%	MTG
Medium to Tiny Non-tufted Graminoid	2	10%	MNG
Bryophytes/Lichens	na	10%	BL

LF Code	Species typical of at least part of EVC range	Common Name
LH	*Epilobium billardierianum*	Variable Willow-herb
LH	*Villarsia reniformis*	Running Marsh-flower
LH	*Epilobium billardierianum ssp. cinereum*	Grey Willow-herb
MH	*Potamogeton tricarinatus s.l.*	Floating Pondweed
MH	*Lilaeopsis polyantha*	Australian Lilaeopsis
MH	*Utricularia dichotoma s.l.*	Fairies' Aprons
SH	*Eryngium vesiculosum*	Prickfoot
SH	*Neopaxia australasica*	White Purslane
SH	*Lobelia pratioides*	Poison Lobelia
LTG	*Juncus flavidus*	Gold Rush
LTG	*Deyeuxia quadriseta*	Reed Bent-grass
LTG	*Amphibromus nervosus*	Common Swamp Wallaby-grass
LTG	*Poa labillardierei*	Common Tussock-grass
MTG	*Triglochin procerum s.l.*	Water Ribbons
MTG	*Glyceria australis*	Australian Sweet-grass
MTG	*Juncus holoschoenus*	Joint-leaf Rush
MTG	*Austrodanthonia duttoniana*	Brown-back Wallaby-grass
MNG	*Eleocharis acuta*	Common Spike-sedge
MNG	*Eleocharis pusilla*	Small Spike-sedge

Recruitment:
Episodic/Flood. Desirable period between disturbances is 5 years.

Organic Litter:
20% cover

Logs:
5 m/0.1 ha.(where trees are overhanging the wetland)

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Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
LH	*Cirsium vulgare*	Spear Thistle	high	high
MH	*Leontodon taraxacoides ssp. taraxacoides*	Hairy Hawkbit	high	low
MH	*Hypochoeris radicata*	Cat's Ear	high	low
LTG	*Phalaris aquatica*	Toowoomba Canary-grass	high	high
LNG	*Holcus lanatus*	Yorkshire Fog	high	high
MTG	*Briza minor*	Lesser Quaking-grass	high	low
MTG	*Romulea rosea*	Onion Grass	high	low
TTG	*Cyperus tenellus*	Tiny Flat-sedge	high	low

Published by the Victorian Government Department of Sustainability and Environment May 2004

Department of Sustainability and Environment

EVC/Bioregion Benchmark for Vegetation Quality Assessment

Victorian Volcanic Plain bioregion

EVC 642: Basalt Shrubby Woodland

Description:
Eucalypt-dominated woodland to 15 m tall with an understorey of shrubs and grasses, presumed originally quite species-rich. Occurs on well-drained to seasonally damp fertile soils in higher rainfall areas of volcanic plain.

Large trees:

Species	DBH(cm)	#/ha
Eucalyptus spp.	70 cm	15 / ha

Tree Canopy Cover:

%cover	Character Species	Common Name
15%	*Eucalyptus ovata*	Swamp Gum
	Eucalyptus viminalis	Manna Gum

Understorey:

Life form	#Spp	%Cover	LF code
Immature Canopy Tree		5%	IT
Understorey Tree or Large Shrub	2	10%	T
Medium Shrub	2	5%	MS
Prostrate Shrub	2	1%	PS
Large Herb	2	1%	LH
Medium Herb	10	15%	MH
Small or Prostrate Herb	5	10%	SH
Large Tufted Graminoid	3	5%	LTG
Large Non-tufted Graminoid	1	5%	LNG
Medium to Small Tufted Graminoid	10	25%	MTG
Medium to Tiny Non-tufted Graminoid	3	10%	MNG
Ground Fern	1	15%	GF
Bryophytes/Lichens	na	10%	BL
Soil Crust	na	10%	S/C

LF Code	Species typical of at least part of EVC range	Common Name
T	*Acacia melanoxylon*	Blackwood
T	*Acacia mearnsii*	Black Wattle
MS	*Leptospermum continentale*	Prickly Tea-tree
MS	*Acacia verticillata*	Prickly Moses
PS	*Bossiaea prostrata*	Creeping Bossiaea
PS	*Astroloma humifusum*	Cranberry Heath
LH	*Senecio glomeratus*	Annual Fireweed
MH	*Drosera peltata ssp. auriculata*	Tall Sundew
MH	*Lagenophora stipitata*	Common Bottle-daisy
SH	*Oxalis exilis*	Shady Wood-sorrel
SH	*Kennedia prostrata*	Running Postman
SH	*Lobelia pedunculata s.l.*	Matted Pratia
SH	*Leptostigma reptans*	Dwarf Nertera
LTG	*Austrostipa pubinodis*	Tall Spear-grass
LTG	*Lepidosperma elatius*	Tall Sword-sedge
LTG	*Deyeuxia quadriseta*	Reed Bent-grass
MTG	*Dichelachne rara*	Common Plume-grass
MTG	*Lomandra filiformis ssp. filiformis*	Wattle Mat-rush
MTG	*Dichelachne crinita*	Long-hair Plume-grass
MTG	*Austrodanthonia pilosa*	Velvet Wallaby-grass
MNG	*Poa tenera*	Slender Tussock-grass
MNG	*Microlaena stipoides var. stipoides*	Weeping Grass
GF	*Pteridium esculentum*	Austral Bracken

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Recruitment:
Continuous

Organic Litter:
20 % cover

Logs:
15 m/0.1 ha.

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
T	*Pinus radiata*	Radiata Pine	high	high
LH	*Centaurium tenuiflorum*	Slender Centaury	high	low
LH	*Plantago lanceolata*	Ribwort	high	low
LH	*Sonchus oleraceus*	Common Sow-thistle	high	low
LH	*Cirsium vulgare*	Spear Thistle	high	high
MH	*Hypochoeris radicata*	Cat's Ear	high	low
MH	*Centaurium erythraea*	Common Centaury	high	low
MH	*Gamochaeta purpurea s.s.*	Spiked Cudweed	high	low
MH	*Leontodon taraxacoides ssp. taraxacoides*	Hairy Hawkbit	high	low
LNG	*Holcus lanatus*	Yorkshire Fog	high	high
MTG	*Vulpia bromoides*	Squirrel-tail Fescue	high	low
MTG	*Briza minor*	Lesser Quaking-grass	high	low
MTG	*Briza maxima*	Large Quaking-grass	high	low
MTG	*Anthoxanthum odoratum*	Sweet Vernal-grass	high	high
MNG	*Aira elegantissima*	Delicate Hair-grass	high	low
MNG	*Cynosurus echinatus*	Rough Dog's-tail	high	low
SNG	*Sisyrinchium iridifolium*	Blue Pigroot	high	low

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EVC/Bioregion Benchmark for Vegetation Quality Assessment

Victorian Volcanic Plain bioregion

EVC 649: Stony Knoll Shrubland

Description:
Stony Knoll Shrubland is a shrubland to 3 m tall or low non-eucalypt woodland to 8 m tall with a grassy understorey. It occurs on low stony rises on basalt flows. The soils are fertile and well drained but shallow with out cropping rock, causing severe summer dryness.

[+] woodland only components (ignore when assessing treeless areas and standardise final score as appropriate)

Canopy Cover[+]:

%cover	Character Species	Common Name
15%	*Allocasuarina verticillata*	Drooping Sheoak
	Bursaria spinosa	Sweet Bursaria

Understorey:

Life form	#Spp	%Cover	LF code
Medium Shrub	3	10%	MS
Prostrate Shrub	1	1%	PS
Large Herb	2	1%	LH
Medium Herb	11	10%	MH
Small or Prostrate Herb	4	5%	SH
Medium to Small Tufted Graminoid	10	25%	MTG
Tiny Tufted Graminoid	2	5%	TTG
Medium to Tiny Non-tufted Graminoid	2	5%	MNG
Ground Fern	2	5%	GF
Bryophytes/Lichens	na	10%	BL
Soil Crust	na	10%	S/C
Total understorey projective foliage cover		**85%**	

LF Code	Species typical of at least part of EVC range	Common Name
MS	*Hymenanthera dentata* s.l.	Tree Violet
MS	*Acacia paradoxa*	Hedge Wattle
PS	*Kennedia prostrata*	Running Postman
LH	*Senecio quadridentatus*	Cotton Fireweed
LH	*Senecio glomeratus*	Annual Fireweed
MH	*Oxalis perennans*	Grassland Wood-sorrel
MH	*Rumex brownii*	Slender Dock
MH	*Hypericum gramineum*	Small St John's Wort
MH	*Acaena ovina*	Australian Sheep's Burr
SH	*Dichondra repens*	Kidneyweed
SH	*Hydrocotyle laxiflora*	Stinking Pennywort
SH	*Crassula sieberiana*	Sieber Crassula
MTG	*Themeda triandra*	Kangaroo Grass
MTG	*Poa sieberiana*	Grey Tussock-grass
MTG	*Austrodanthonia caespitosa*	Common Wallaby-grass
MTG	*Austrodanthonia setacea*	Bristly Wallaby-grass
TTG	*Carex breviculmis*	Short-stem Sedge
MNG	*Microlaena stipoides* var. *stipoides*	Weeping Grass
GF	*Pteridium esculentum*	Austral Bracken
GF	*Adiantum aethiopicum*	Common Maidenhair
SC	*Convolvulus erubescens* spp. agg.	Pink Bindweed

Recruitment:
Continuous

Organic Litter:
20 % cover

Logs[+]:
5 m/0.1 ha. (note: large log class does not apply)

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
T	*Schinus molle*	Pepper Tree	high	high
MS	*Lycium ferocissimum*	African Box-thorn	high	high
MS	*Genista monspessulana*	Montpellier Broom	high	high
SS	*Marrubium vulgare*	Horehound	high	high
LH	*Sonchus oleraceus*	Common Sow-thistle	high	low
LH	*Helminthotheca echioides*	Ox-tongue	high	low
LH	*Lactuca serriola*	Prickly Lettuce	high	low
LH	*Sisymbrium officinale*	Hedge Mustard	high	low
LH	*Sonchus asper* s.l.	Rough Sow-thistle	high	low
LH	*Verbascum thapsus* ssp. *thapsus*	Great Mullein	high	high
LH	*Echium plantagineum*	Paterson's Curse	high	high
LH	*Centaurium tenuiflorum*	Slender Centaury	high	low
LH	*Foeniculum vulgare*	Fennel	high	high
MH	*Hypochoeris radicata*	Cat's Ear	high	low
MH	*Trifolium arvense* var. *arvense*	Hare's-foot Clover	high	low
MH	*Trifolium subterraneum*	Subterranean Clover	high	low
MH	*Trifolium campestre* var. *campestre*	Hop Clover	high	low
MH	*Trifolium angustifolium* var. *angustifolium*	Narrow-leaf Clover	high	low
MH	*Lotus suaveolens*	Hairy Bird's-foot Trefoil	high	low
MH	*Cerastium glomeratum* s.l.	Common Mouse-ear Chickweed	high	low
SH	*Medicago polymorpha*	Burr Medic	high	low
SH	*Trifolium glomeratum*	Cluster Clover	high	low
SH	*Modiola caroliniana*	Red-flower Mallow	high	low
SH	*Aptenia cordifolia*	Heart-leaf Ice-plant	high	high
LTG	*Phalaris aquatica*	Toowoomba Canary-grass	high	high
LNG	*Holcus lanatus*	Yorkshire Fog	high	high
LNG	*Avena fatua*	Wild Oat	high	low
MTG	*Nassella trichotoma*	Serrated Tussock	high	high
MTG	*Ehrharta longiflora*	Annual Veldt-grass	high	low
MTG	*Briza maxima*	Large Quaking-grass	high	low
MTG	*Bromus hordeaceus* ssp. *hordeaceus*	Soft Brome	high	low
MTG	*Sporobolus africanus*	Rat-tail Grass	high	high
MTG	*Vulpia bromoides*	Squirrel-tail Fescue	high	low
MTG	*Romulea rosea*	Onion Grass	high	low
MTG	*Pentaschistis airoides* ssp. *airoides*	False Hair-grass	high	low
MTG	*Lolium perenne*	Perennial Rye-grass	high	low
MTG	*Dactylis glomerata*	Cocksfoot	high	high
MTG	*Vulpia myuros*	Rat's-tail Fescue	high	low
MTG	*Bromus rubens*	Red Brome	high	low
MTG	*Avena barbata*	Bearded Oat	high	low
MTG	*Aira caryophyllea*	Silvery Hair-grass	high	low
SC	*Vicia sativa* ssp. *sativa*	Common Vetch	low	low

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APPENDIX 6
Fauna Results

A6.1 Fauna species recorded from study area

Table A6.1. Vertebrate fauna recorded from the study area during the present assessment

Key:
* introduced species

Scientific name	Common name	Plant Site	Landers/ Riordans Road Reserve	Tarrone North Road Reserve
Birds				
Gallinago hardwickii	Latham's Snipe	✯		
Threskiornis molucca	Australian White Ibis	✯		
Threskiornis spinicollis	Straw-necked Ibis	✯		
Egretta novaehollandiae	White-faced Heron	✯		
Anas superciliosa	Pacific Black Duck	✯		
Falco berigora	Brown Falcon	✯	✯	
Falco cenchroides	Nankeen Kestrel		✯	
Trichoglossus haematodus	Rainbow Lorikeet			✯
Glossopsitta concinna	Musk Lorikeet			✯
Calyptorhynchus funereus	Yellow-tailed Black-Cockatoo	✯		✯
Platycercus elegans elegans	Crimson Rosella			✯
Hirundo neoxena	Welcome Swallow	✯		
Rhipidura leucophrys	Willie Wagtail	✯	✯	✯
Colluricincla harmonica	Grey Shrike-thrush			✯
Grallina cyanoleuca	Magpie-lark	✯	✯	✯
Acanthiza chrysorrhoa	Yellow-rumped Thornbill	✯	✯	✯
Malurus cyaneus	Superb Fairy-wren			✯
Calamanthus fuliginosus	Striated Fieldwren	✯		
Cincloramphus cruralis	Brown Songlark	✯		
Anthus novaeseelandiae	Australasian Pipit	✯		
Gymnorhina tibicen	Australian Magpie	✯	✯	✯
Corvus coronoides	Australian Raven	✯	✯	
Alauda arvensis	European Skylark*	✯		
Carduelis carduelis	European Goldfinch*	✯		✯
Sturnus vulgaris	Common Starling*	✯		
Mammals				
Wallabia bicolor	Black Wallaby			✯
Oryctolagus cuniculus	European Rabbit*		✯	
Vulpes vulpes	Red Fox*	✯		

Scientific name	Common name	Plant Site	Landers/ Riordans Road Reserve	Tarrone North Road Reserve
Reptiles				
Egernia whitii (group)	White's Skink	✯		
Bassiana duperreyi	Eastern Three-lined Skink	✯		
Frogs				
Crinia signifera	Common Froglet	✯		✯

A6.2 Significant fauna species

Table A6.2. Fauna of national or state significance recorded, or predicted to occur, within the local area (10 km radius)

Source: DSE Atlas of Victorian Wildlife, DEWHA database, BA database (1998-2008)

- AVW data search encompassed a 10 km radius (fish removed)
- DEWHA and BA data search encompassed a 10 km radius

- **Status of species:**

CR critically endangered
EN endangered
VU vulnerable
CD conservation dependent
NT near threatened
DD data deficient (insufficient known)
R rare or insufficient known
L listed under Flora and Fauna Guarantee Act

Sources used to derive species status:
EPBC *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
DSE Advisory List of Threatened Vertebrate Fauna in Victoria (DSE 2007b)
FFG *Flora and Fauna Guarantee Act 1988* (Vic.)

# denotes species predicted to occur or with habitat predicted to occur in the local area (DEWHA database)

Likelihood scale:

	No habitat present	Habitat poorly represented	Habitat moderately well represented	Habitat well represented
No records from bioregion (terrestrial) or neighbouring basin (aquatic)	Negligible	Negligible	Low	Medium
Records from bioregion (terrestrial) or basin/neighbouring basin (aquatic)	Negligible	Low	Medium	High
Records from within 5 km (terrestrial) or from catchment (aquatic)	Negligible	Medium	High	High

Scientific name	Common name	Last record	EPBC Act	DSE 2007	FFG Act	Occurrence in study area		
						Plant Site	Landers/Riordans Rd Reserve	Tarrone Nth Rd Reserve
National significance:								
Rostratula australis	Australian Painted Snipe	#	VU	CR	L	Negligible	Negligible	Negligible
Lathamus discolor	Swift Parrot	#	EN	EN	L	Negligible	Negligible	Negligible
Dasyurus maculatus	Spot-tailed Quoll	#	EN	EN	L	Negligible	Negligible	Negligible
Potorous tridactylus	Long-nosed Potoroo	#	VU	EN	L	Negligible	Negligible	Negligible
Pteropus poliocephalus	Grey-headed Flying-fox	#	VU	VU	L	Negligible	Negligible	Negligible
Miniopterus schreibersii bassanii	Common Bent-wing Bat (southern subspecies)	#	CR	EN	L	Negligible	Negligible	Negligible
Pseudomys fumeus	Smoky Mouse	#	EN	CR	L	Negligible	Negligible	Negligible
Litoria raniformis	Growling Grass Frog	#	VU	EN	L	Medium	Medium	Negligible
Prototroctes maraena	Australian Grayling	#	VU	VU	L	Not assessed	Not assessed	Not assessed
Galaxiella pusilla	Dwarf Galaxias	#	VU	VU	L	Not assessed	Not assessed	Not assessed

Scientific name	Common name	Last record	EPBC Act	DSE 2007	FFG Act	Occurrence in study area		
						Plant Site	Landers/Riordans Rd Reserve	Tarrone Nth Rd Reserve
State significance:								
Grus rubicunda	Brolga	1995		VU	L	Medium	Negligible	Negligible
Ardea modesta	Eastern Great Egret	2000/#		VU	L	Medium	Medium	Negligible
Anseranas semipalmata	Magpie Goose	#		NT	L	Negligible	Negligible	Negligible
Anas rhynchotis	Australasian Shoveler	2000		VU		Negligible	Negligible	Negligible
Aythya australis	Hardhead	2000		VU		Negligible	Negligible	Negligible
Biziura lobata	Musk Duck	2000		VU		Negligible	Negligible	Negligible
Haliaeetus leucogaster	White-bellied Sea-Eagle	#		VU	L	Negligible	Negligible	Negligible
Pseudophryne bibronii	Brown Toadlet	1976		EN	L	Negligible	Negligible	Negligible
Regional significance:								
Phalacrocorax fuscescens	Black-faced Cormorant	1960		NT		Negligible	Negligible	Negligible
Phalacrocorax varius	Pied Cormorant	2006		NT		Negligible	Negligible	Negligible
Chlidonias hybridus	Whiskered Tern	2000		NT		Medium	Medium	Negligible
Gallinago hardwickii	Latham's Snipe	2003/#		NT		Negligible	Negligible	Negligible
Nycticorax caledonicus	Nankeen Night Heron	2000		NT		Negligible	Negligible	Negligible
Sminthopsis crassicaudata	Fat-tailed Dunnart	2003		NT		High	High	Medium

A6.3. Migratory species

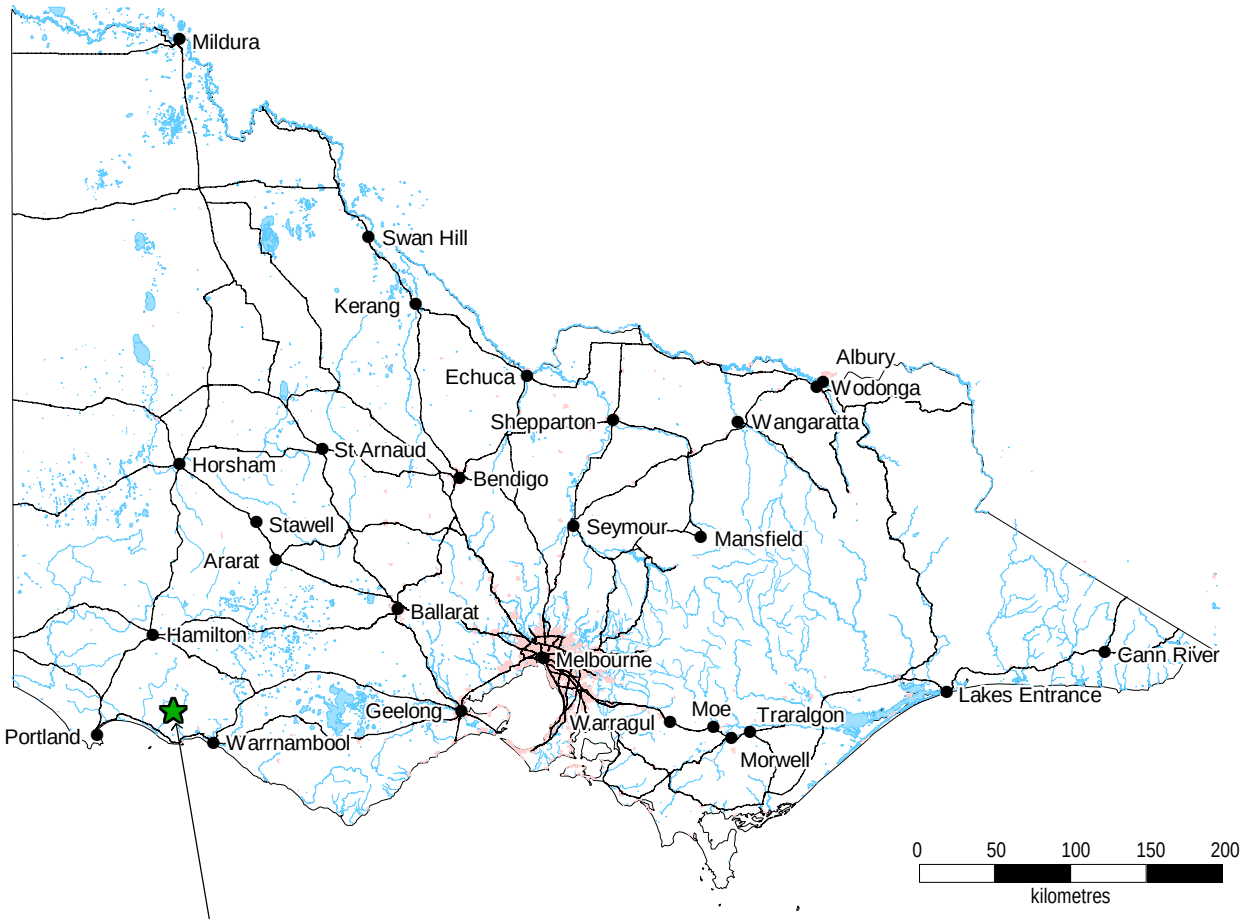
Table A6.3. Migratory and marine fauna species recorded, or predicted to occur, within 10 kilometres of the study area

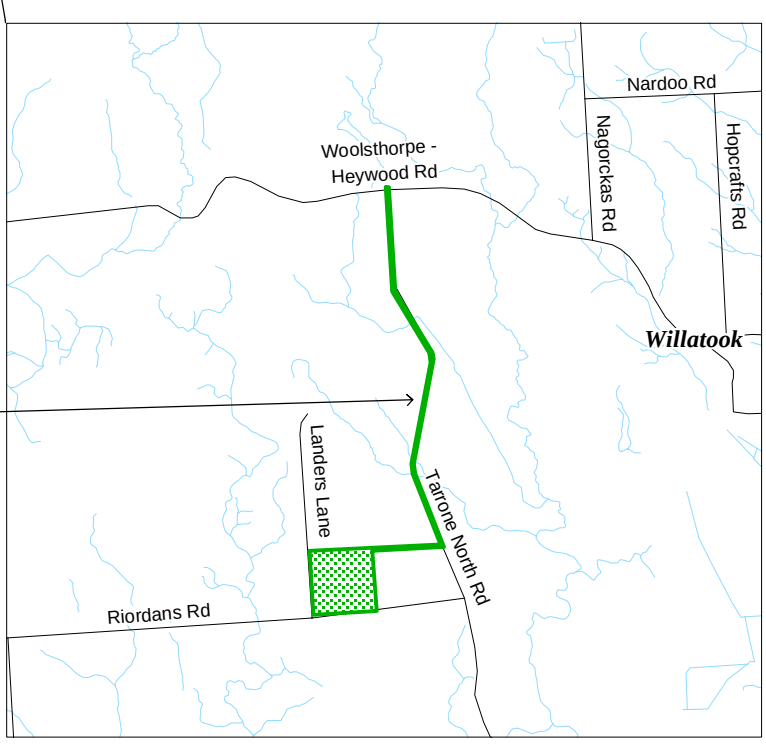
Source: DSE Atlas of Victorian Wildlife, DEWHA database, BA database (1998–2008

Note:
Species in bold were recorded in the study area during the present assessment.
# denotes species predicted to occur or with habitat predicted to occur in the local area (DEWHA database)

Scientific name	Common name	Last record
Ardenna tenuirostris	Short-tailed Shearwater	1960
Merops ornatus	Rainbow Bee-eater	#
Hirundapus caudacutus	White-throated Needletail	#
Apus pacificus	Fork-tailed Swift	#
Rhipidura rufifrons	Rufous Fantail	#
Myiagra cyanoleuca	Satin Flycatcher	#
Acrocephalus stentoreus	Clamorous Reed Warbler	1999
Ardea ibis	Cattle Egret	#
Rostratula australis	Australian Painted Snipe	#
Gallinago hardwickii	Latham's Snipe	2003/#
Ardea modesta	Eastern Great Egret	2000/#
Haliaeetus leucogaster	White-bellied Sea-Eagle	#

FIGURES





Study area

Acknowledgement: VicRoads

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Figure 1: Location of the study area, Tarrone, Victoria

DATE: 5 June 2009
Checked by: SG | Drawn by: PJY | File number:7864
Location: P:\MRG 7800s\7864\Mapping\7864 Figure 1 RoadRes.wor

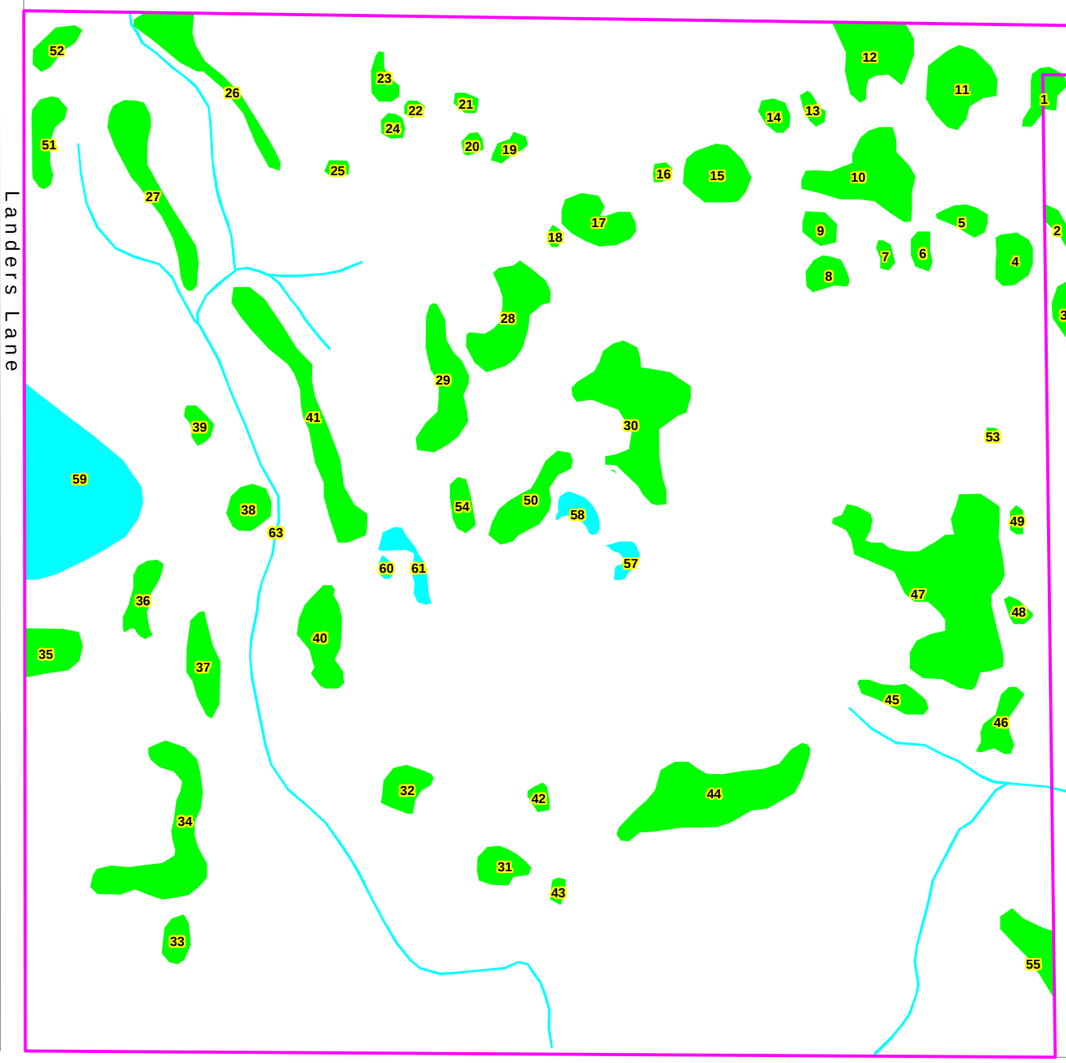
Scale: 0 1 2 3 4 kilometres

MGA Zone 54

Landers Lane

Tarrone North Road

Riordans Road



Legend

Ecological Vegetation Classes

- Plains Grassy Wetland EVC
- Stony Knoll Shrubland EVC
- Study area

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Figure 2: Patches of native vegetation within the study area, Tarrone

DATE: 5 June 2009

Checked by: SG | Drawn by: PJY | File number: 7864

Location: P:\MRG 7800s\7864\Mapping\7864 Figure 2 PlantSite.wor

Scale: 0 50 100 150 200 250 metres

N W E S

Figure 2: Patches of native vegetation within the study area, Tarrone

Landers Lane

Tarrone North Road

Riordans Road

Legend

Stony Knoll Shrubland

- Quality Zone A
- Quality Zone B
- Quality Zone C
- Quality Zone D

Plains Grassy Wetland

- Quality Zone E
- Quality Zone G
- Quality Zone H

Study area

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Figure 3: Quality zones of native vegetation within the study area, Tarrone

DATE: 5 June 2009

Checked by: SG | Drawn by: PJY | File number: 7864

Location: P:\MRG 7800s\7864\Mapping\7864 Figure 3 PlantSite.wor

Scale: 0 50 100 150 200 250 metres

Figure 3: Quality zones of native vegetation within the study area, Tarrone

Landers Lane

Tarrone North Road

Riordans Road

Legend

Study area

Isolated record of Wavy Swamp Wallaby-grass

Wetlands supporting Wavy Swamp Wallaby-grass

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Figure 4: Locations of significant flora within the study area, Tarrone

DATE: 5 June 2009

Checked by: SG | Drawn by: PJY | File number: 7864

Location: P:\MRG 7800s\7864\Mapping\7864 Figure 4 PlantSite.wor

Scale: 0 50 100 150 200 250 metres

Figure 4: Locations of significant flora within the study area, Tarrone

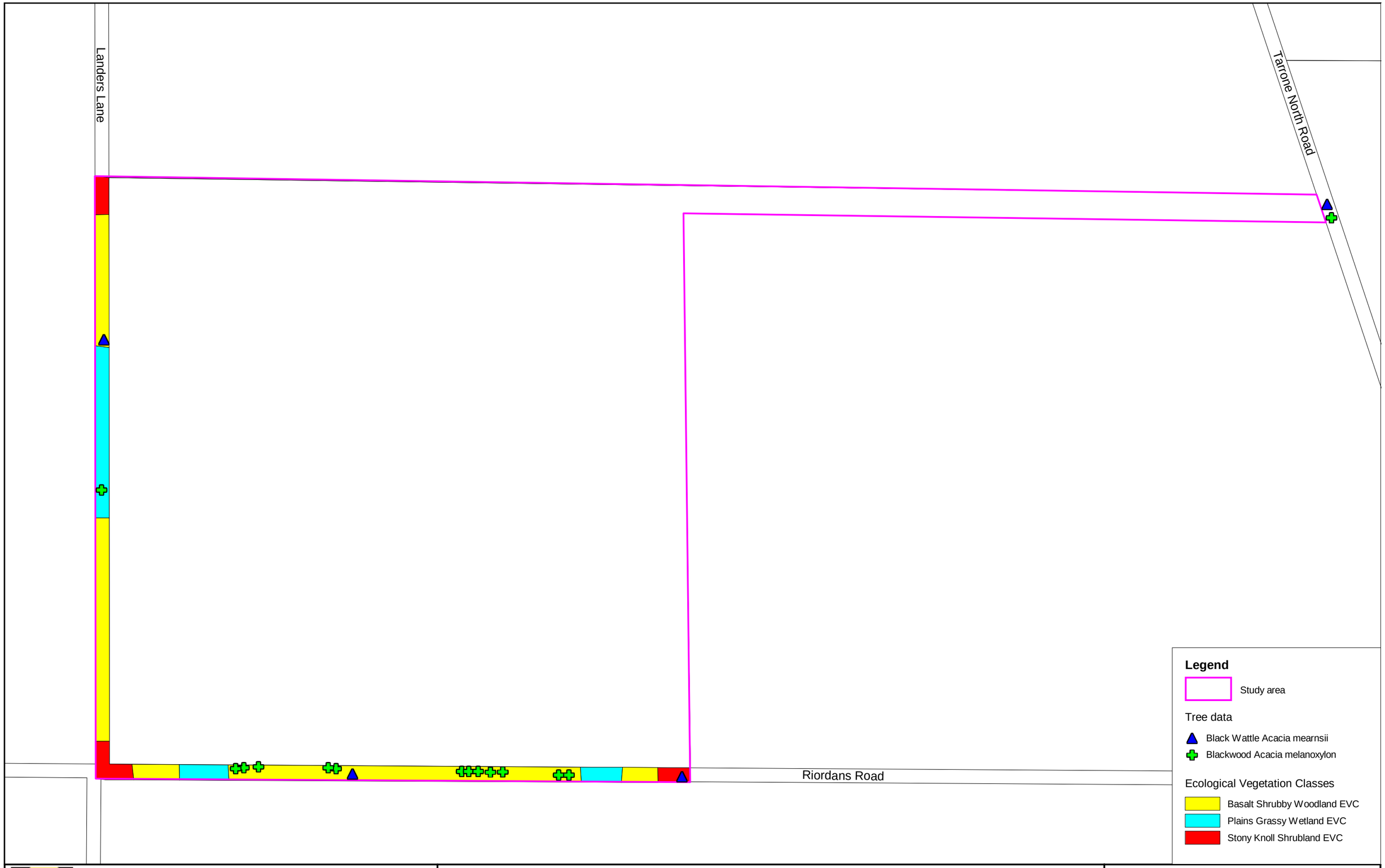

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Figure 5: Ecological features of the study area, Tarrone

DATE: 5 June 2009

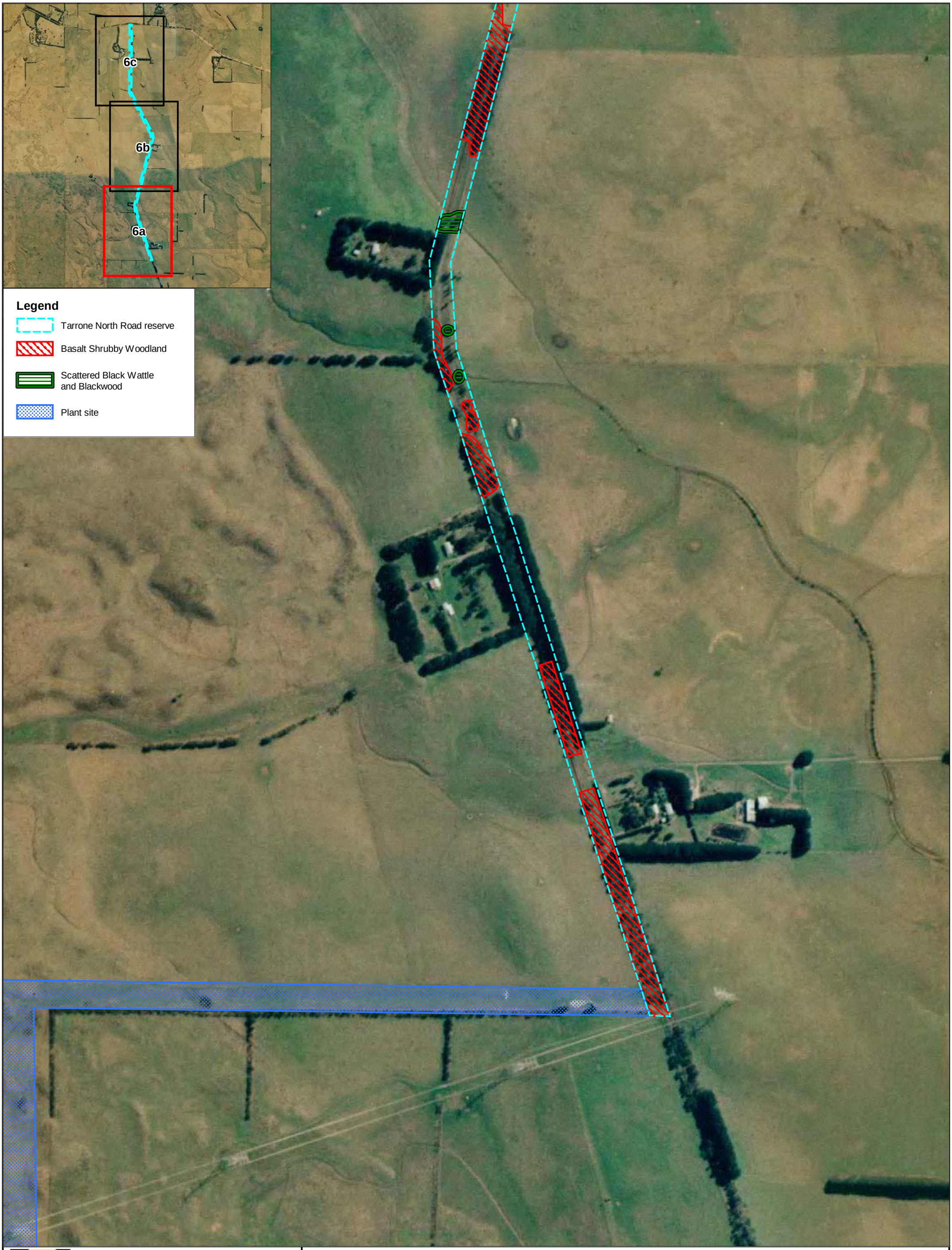
Checked by: SG | Drawn by: PJY | File number: 7864

Location: P:\MRG 7800s\7864\Mapping\7864 Figure 5 PlantSite.wor

Scale: 0 50 100 150 200 250 metres

N W E S

Figure 5: Ecological features of the study area, Tarrone



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Offices also in:
Sydney, Ballarat,
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Figure 6a: Patches of Native Vegetation within Tarrone North Road reserve, Tarrone

DATE: 5 June 2009

Checked by: SG | Drawn by: PJY | File number: 7864

Location: P:\MRG 7800s\7864\Mapping\7864 Figure 6 RoadRes.wor

Scale: 0 50 100 150 200 250 metres

N W E S

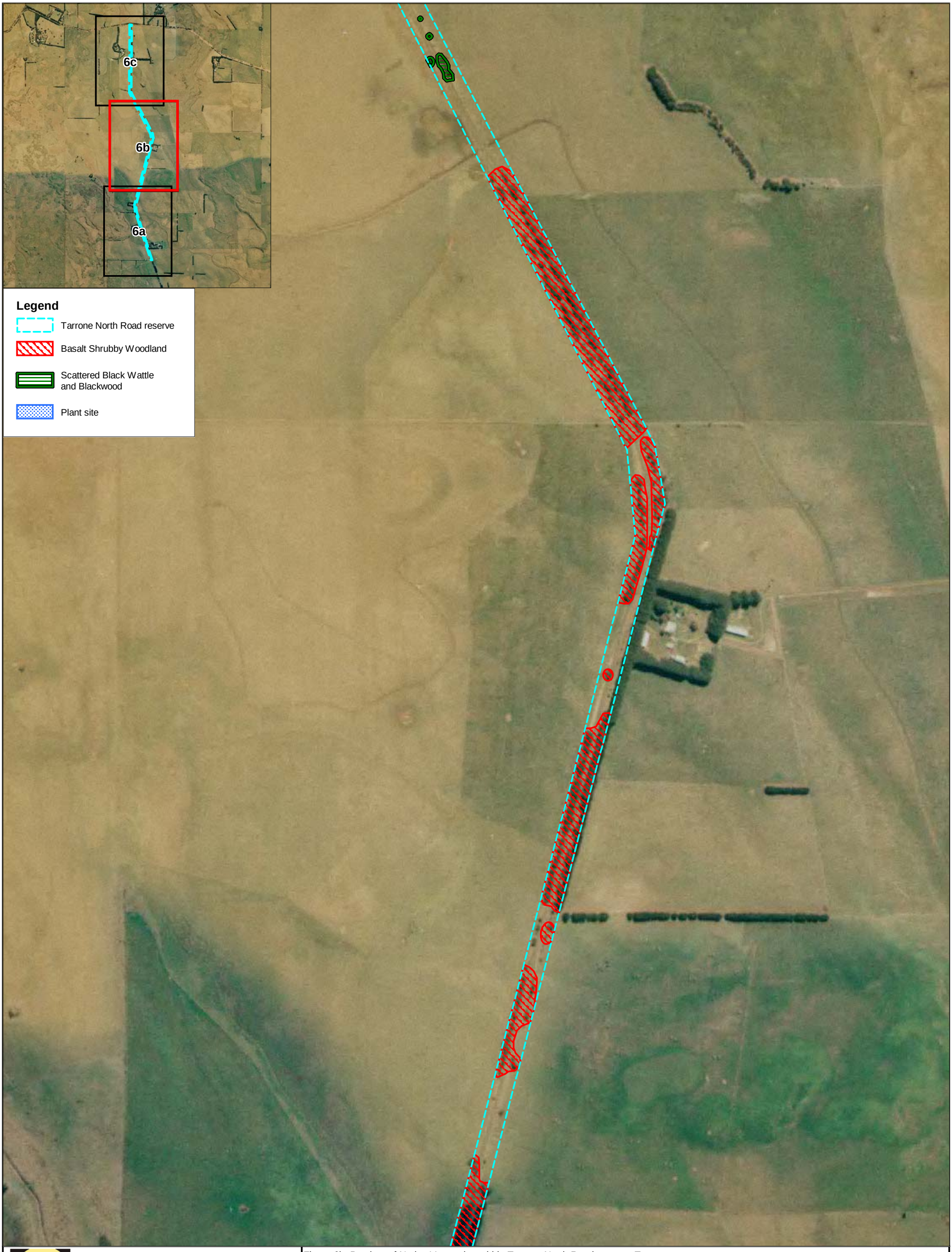

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Figure 6b: Patches of Native Vegetation within Tarrone North Road reserve, Tarrone

DATE: 5 June 2009

Checked by: SG | Drawn by: PJY | File number: 7864

Location: P:\MRG 7800s\7864\Mapping\7864 Figure 6 RoadRes.wor

Scale: 0 50 100 150 200 250 metres

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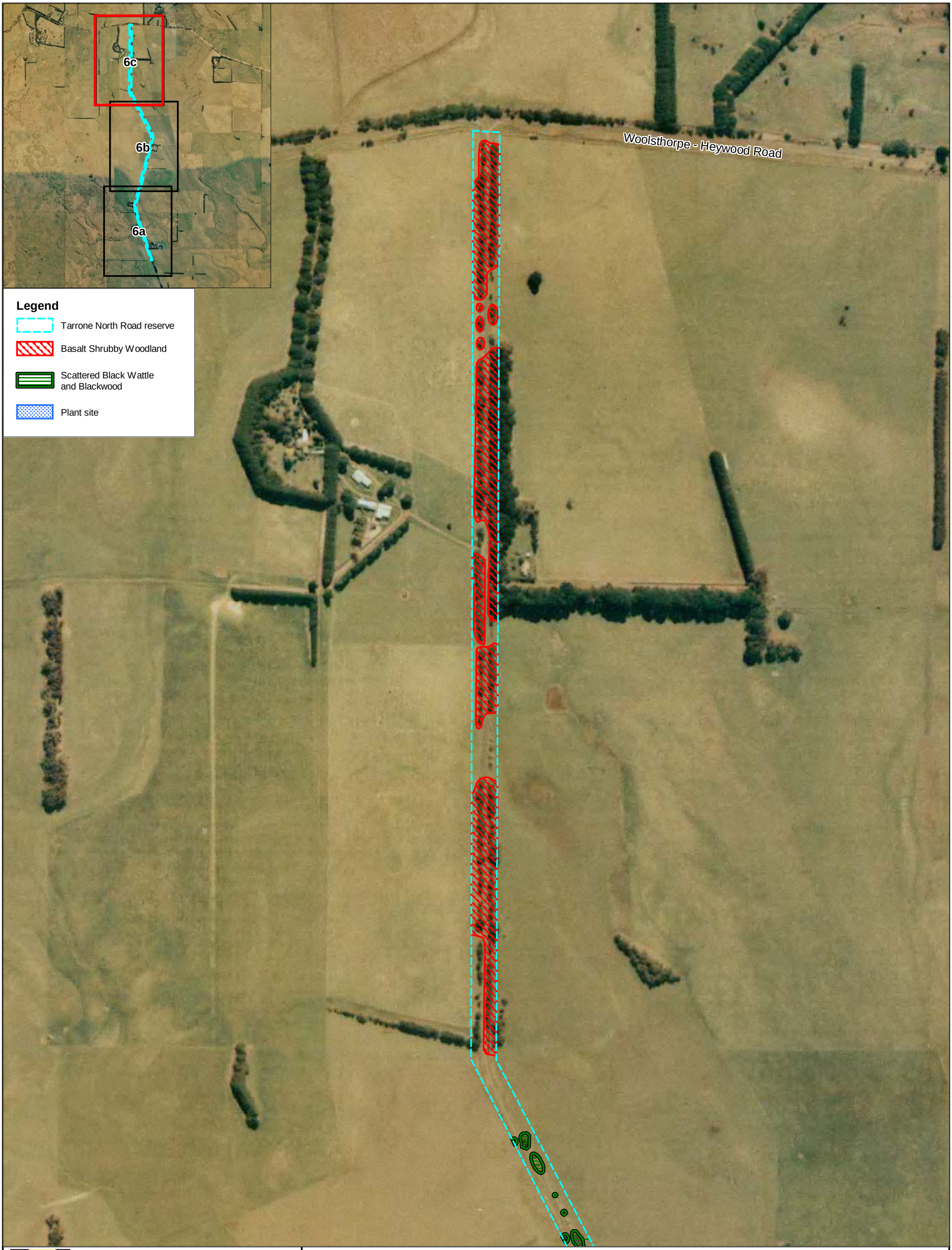

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Figure 6c: Patches of Native Vegetation within Tarrone North Road reserve, Tarrone

DATE: 5 June 2009

Checked by: SG | Drawn by: PJY | File number: 7864

Location: P:\MRG 7800s\7864\Mapping\7864 Figure 6 RoadRes.wor

Scale: 0 50 100 150 200 250 metres

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