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Biodiversity Assessment Report
PSP 42 North

April 2011

Natural & Cultural Heritage Consultants 38 Bertie Street (PO Box 489) Port Melbourne Victoria 3207

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Report to the Growth Areas Authority and Daleston Pty Ltd

Biodiversity Assessment Report

PSP 42 North

April 2011

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CONTENTS

BIODIVERSITY REPORT OVERVIEW

This Biodiversity Report was prepared by Biosis Research Pty. Ltd. and commissioned by the Growth Areas Authority and Daleston Pty Ltd. Information gathered and presented in this report is intended to inform the possible future preparation of Precinct Structure Plans and Native Vegetation Precinct Plans for this area.

Initial Vegetation Quality Assessments were conducted by Biosis Research in January 2009 and by AECOM between December 2008 and January 2009. Biosis Research undertook additional biodiversity assessments between November 2010 and March 2011. The survey methodologies used in preparation of this report are in accordance with guidelines and training provided by the Growth Areas Authority (GAA) and Department of Sustainability and Environment (Victoria) (DSE). Any limitations to the report or to the application of its findings are outlined in Section 2.5 of Part 2 of this report.

EXECUTIVE SUMMARY

Introduction

Biosis Research Pty. Ltd. was commissioned by the Growth Areas Authority and Daleston Pty Ltd to undertake a biodiversity assessment within what is known as PSP 42 North (the study area) (Figure i). The field assessments included general flora and fauna assessment, targeted searches for threatened flora and fauna, vegetation mapping and native vegetation quality assessments.

PSP 42 North is located within Wyndham Vale City Council and is bounded to the north by Greens Road, to the south by Black Forest Road and to the east and west by private property. It includes a minor tributary connected to Lollypop Creek.

Methods

Field assessment and mapping methods follow GAA (2009), specifically the Biodiversity Assessment Template for 2009–2011 Biodiversity Mapping Projects, and Biodiversity Assessment Project 2010/11: vegetation mapping and condition assessment procedures (DSE 2010a).

In summary:

- General flora and fauna surveys were undertaken.
- The locations of scattered trees were mapped and their size class was recorded.
- Vegetation quality assessment of the parcels not accessed in 08/09 was undertaken. A habitat hectare assessment was undertaken in accordance with DSE (2004) to determine and map native vegetation quality.
- Vegetation was categorised into remnant native vegetation, degraded treeless vegetation (DTV) and non-native vegetation and mapped at 1:5000 scale.
- Potential habitat for a number of rare or threatened species, known to or likely to occur within the contract area, were searched for those species using a range of survey of methods, as appropriate.

Results

Access

PSP 42 North covers 512.65 ha and all of this area was accessed during the current assessment (Figure ii).

Ecological Vegetation Classes

Two Ecological Vegetation Classes (EVCs) were recorded during the previous assessment in 2008/2009 and recent assessments, Plains Grassland and Aquatic Herbland (Figure iii).

Significant Species and Communities

No nationally significant flora species were recorded during the current assessment. The Victorian Biodiversity Atlas (VBA) database contains records of three species of national conservation significance from within 5 km of PSP 42 North. The DSEWPaC database predicts the occurrence of, or suitable habitat for three additional plant species listed under the EPBC Act. The review of DSE data predicts the occurrence of five additional species of national conservation significance.

One state significant flora species was recorded during the current assessment, Melbourne Yellow-gum *Eucalyptus leucoxylon* subsp. *connata*. The VBA database contains records of eight species of state conservation significance from the local area, including some of those recorded during the current assessment (within 5 km). The DSE review predicts the occurrence of nine additional species of state conservation significance from the local area.

No fauna species of national or state significance were recorded during the current assessment. However, suitable habitat for three species with national significance was identified, including Growling Grass Frog *Litoria raniformis* *Plains*-wanderer *Pedionomus torquatus* and Golden Sun Moth *Synemon plana*: The presence of suitable habitat resulted in targeted survey for Growling Grass Frog *Litoria raniformis* and Plains-wanderer *Pedionomus torquatus*. No threatened species were recorded during these targeted surveys.

In addition, there are 17 fauna species of national significance and 15 of state significance that have previously been recorded or are predicted to occur within 5 km of PSP 42 North. A further 17 fauna species listed as near threatened or data deficient under the DSE Advisory List have also been recorded within a 5 km radius of PSP 42 North.

A total of 9.77 ha of the EPBC Act listed ecological community *Natural Temperate Grassland of the Victorian Volcanic Plain* and the FFG Act listed

community Western (Basalt) Plains Grassland Community were recorded within PSP 42 North

Vegetation Quality Assessment

Of the 512.65 ha within PSP 42 North a total of 19.45 ha of indigenous vegetation (in 19 habitat zones) were mapped.

This vegetation equates to:

- 6.52 habitat hectares (hha) of *Low-rainfall* Plains Grassland
- 3.02 habitat hectares (hha) of Aquatic Herbland

No patches of indigenous vegetation were recorded by Biosis Research in 08/09 in PFI 210751891 and during the recent assessment (Biosis Research 2009). This property has been cropped and contains very few indigenous flora species and has been mapped as Degraded Treeless Vegetation. Three indigenous scattered trees were recorded within this property. Fifteen patches of indigenous vegetation were recorded by AECOM in 08/09 in PFI 52401355 (AECOM 2010). An additional four patches were recorded in this property during the most recent assessment.

Government legislation and policy

Some parts of PSP 42 North support matters of NES which would trigger the EPBC Act, in the event an action required an environmental approval under the Act. In response to this, the GAA has engaged with DSEWPaC to conduct a strategic assessment process in relation to the entire investigation area.

A planning permit to remove native vegetation would typically be required under the Wyndham Shire Planning Scheme (Clause 52.17). However, it is possible that some or all of the property will be subject to a Native Vegetation Precinct Plan (NVPP) (Clause 52.16) which would negate the need for a permit under Clause 52.17 (or other relevant clause), if removal is in line with the NVPP.

A permit will be required from DSE under the Victorian *Flora and Fauna Guarantee Act 1988* to remove protected flora from public land within PSP 42 North.

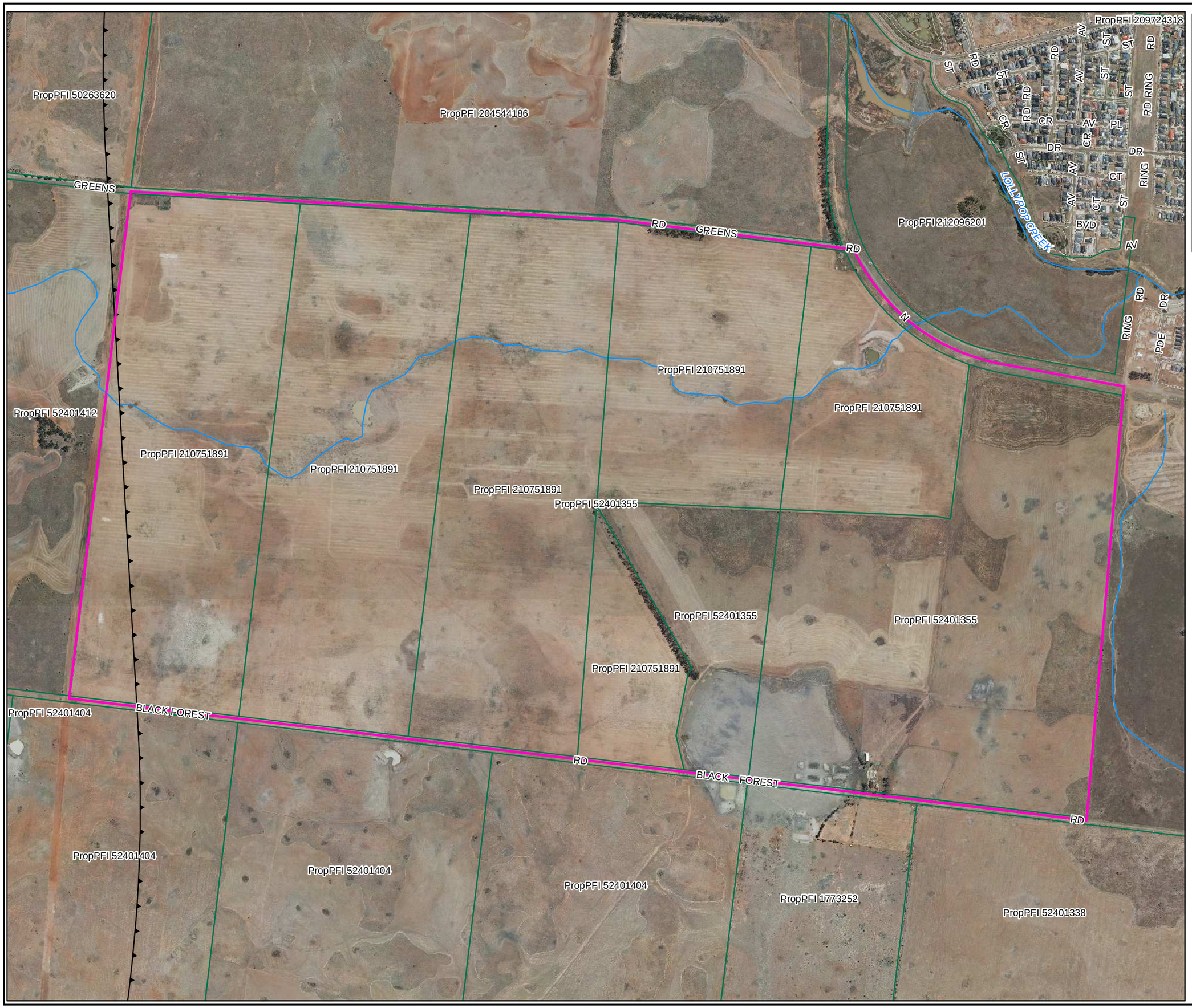
Potential losses of native vegetation associated with any development of PSP 42 North will be subject to the guidelines provided by Victoria's Native Vegetation Management Framework (the Framework).

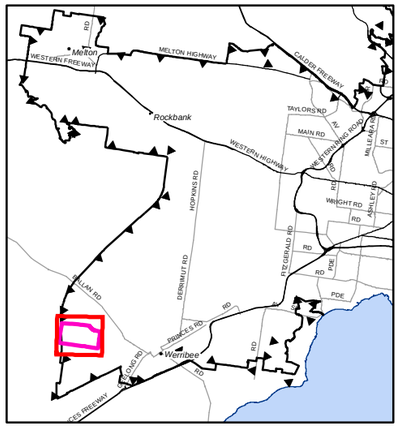
Conclusions

PSP 42 North contains areas of native vegetation comprised of two endangered EVCs and includes the EPBC Act listed ecological community Natural Temperate Grassland of the Victorian Volcanic Plain and the FFG Act listed community Western (Basalt) Plains Grassland. Areas of Very High conservation significance have been identified within PSP 42 North, based on their conservation significance, size, habitat for threatened species and habitat connectivity values. Identification of these areas provides opportunities for the precinct planning process to consider and implement the 3-step process of avoid, minimise and offset, set out in the Framework.

Three indigenous scattered trees were recorded within the cropped paddock and these are the state significant Melbourne Yellow-gum *Eucalyptus leucoxylon* subsp. *connata*.

No state or nationally significant fauna species were recorded within PSP 42 North. However, suitable habitat for three species with national significance was identified, including Growling Grass Frog , Plains-wanderer and Golden Sun Moth.





Legend

- PSP 42 North
- Parcels
- Urban Growth Boundary

Figure i: Overview of PSP 42 North

N

GDA 94 MGA Zone 55
1:11,000 at A3

0 250 500
Meters

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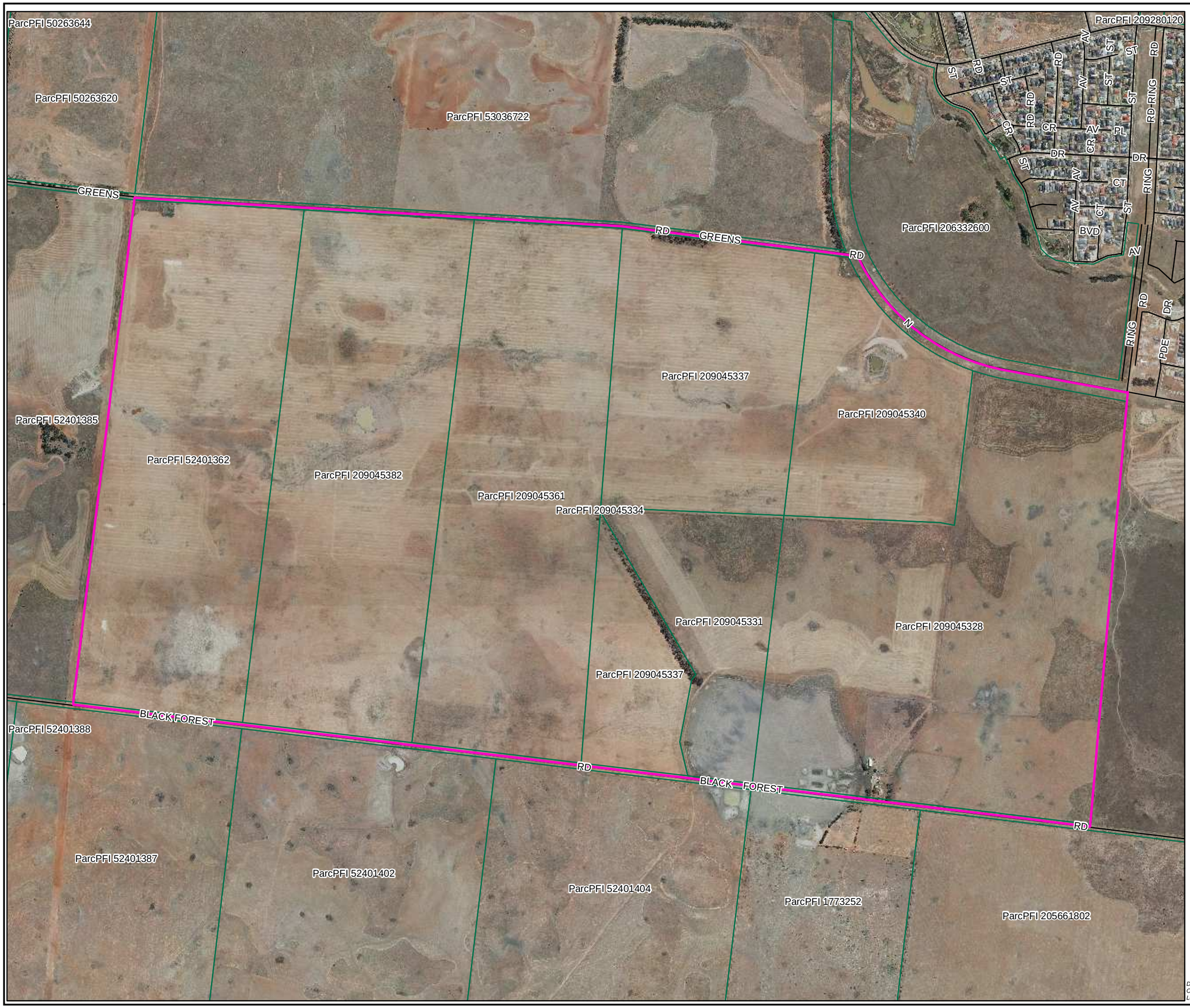

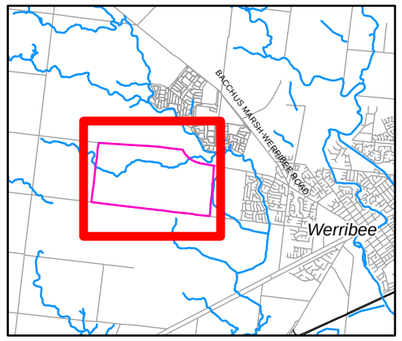

Legend

- PSP 42 North
- Parcels

Access was approved for all areas

Figure ii: Property access, PSP 42 North

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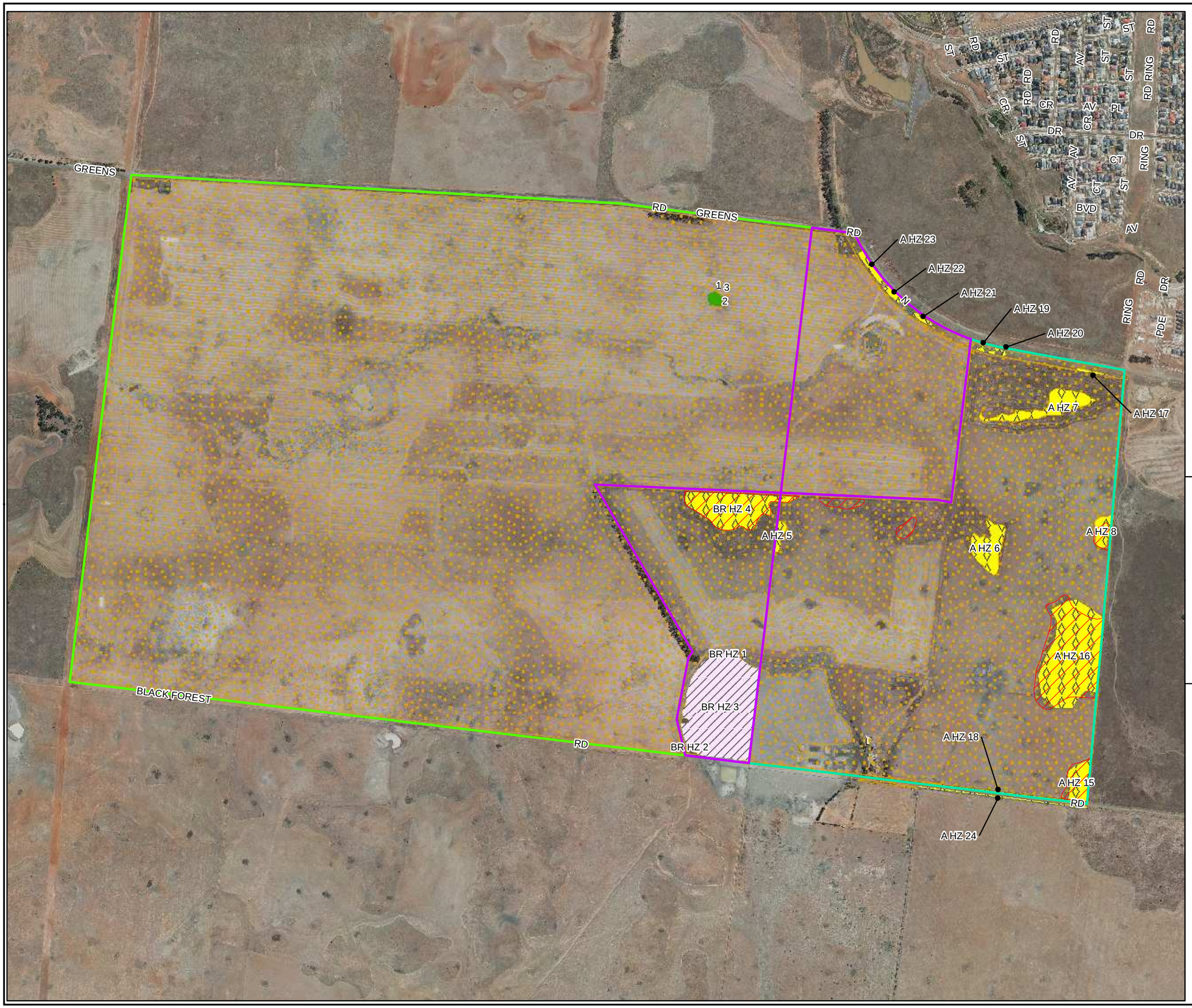

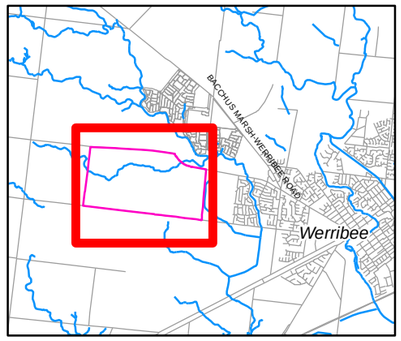

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EPBC listed Natural Temperate Grassland of the Victorian Volcanic Plain

EVC

132_63 Low-rainfall Plains Grassland

653 Aquatic Herbland

Other vegetation

Degraded Treeless Vegetation

Scattered Tree

Medium Old Tree

Vegetation Quality Assessments

AECOM 08-09/09-10

BR 08-09

BR 10-11

Figure iii: Vegetation, PSP 42 North

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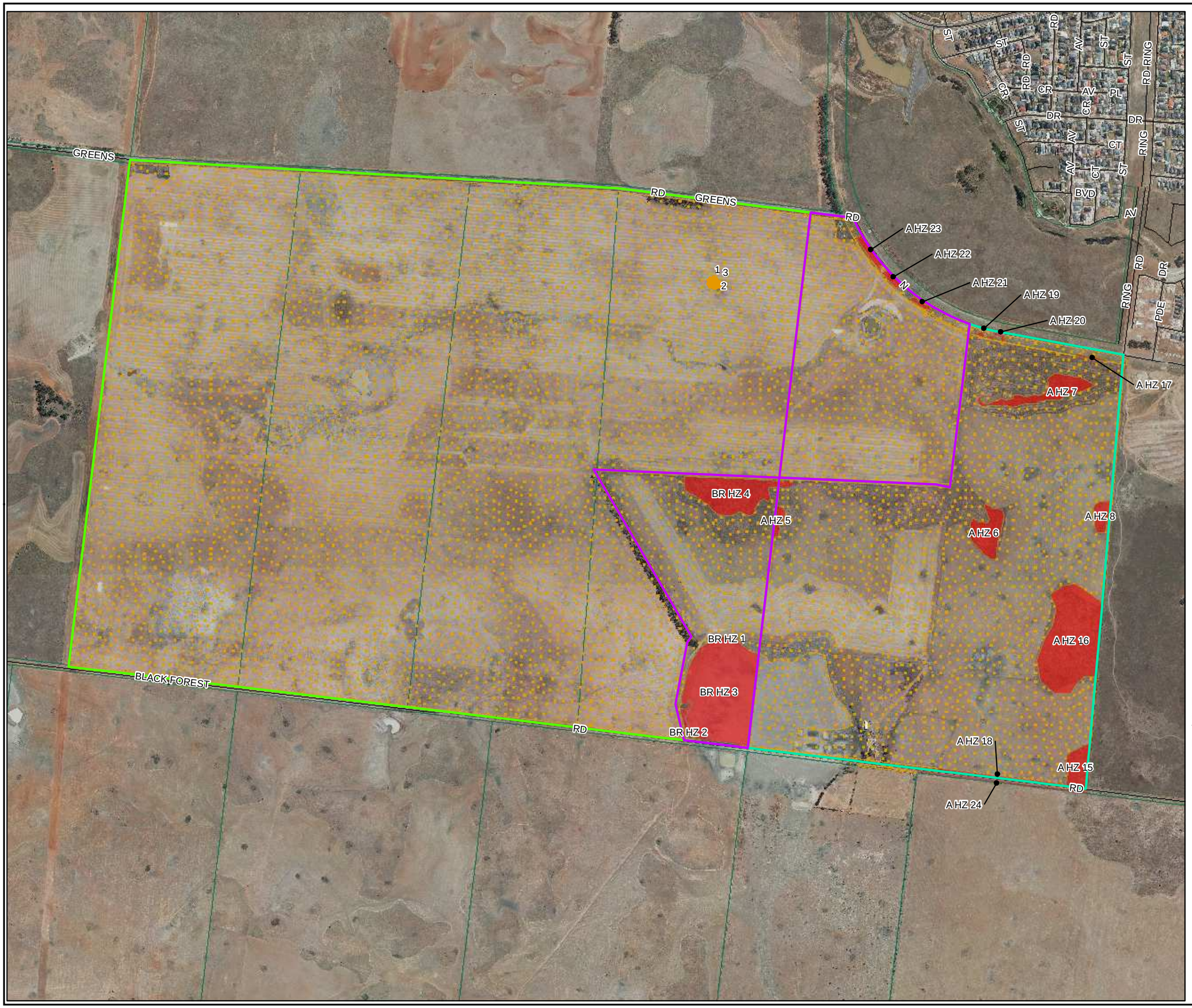

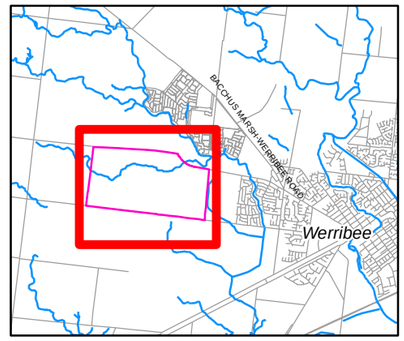

Legend

Remnant Patches

Conservation significance

Very High

Other vegetation

Degraded Treeless Vegetation

Scattered Tree

Medium Old Tree

Vegetation Quality Assessments

08-09/09-10

BR 08-09

BR 10-11

Figure iv: Conservation significance of habitat zones according to the Native Vegetation Framework (NRE 2002), PSP 42 North

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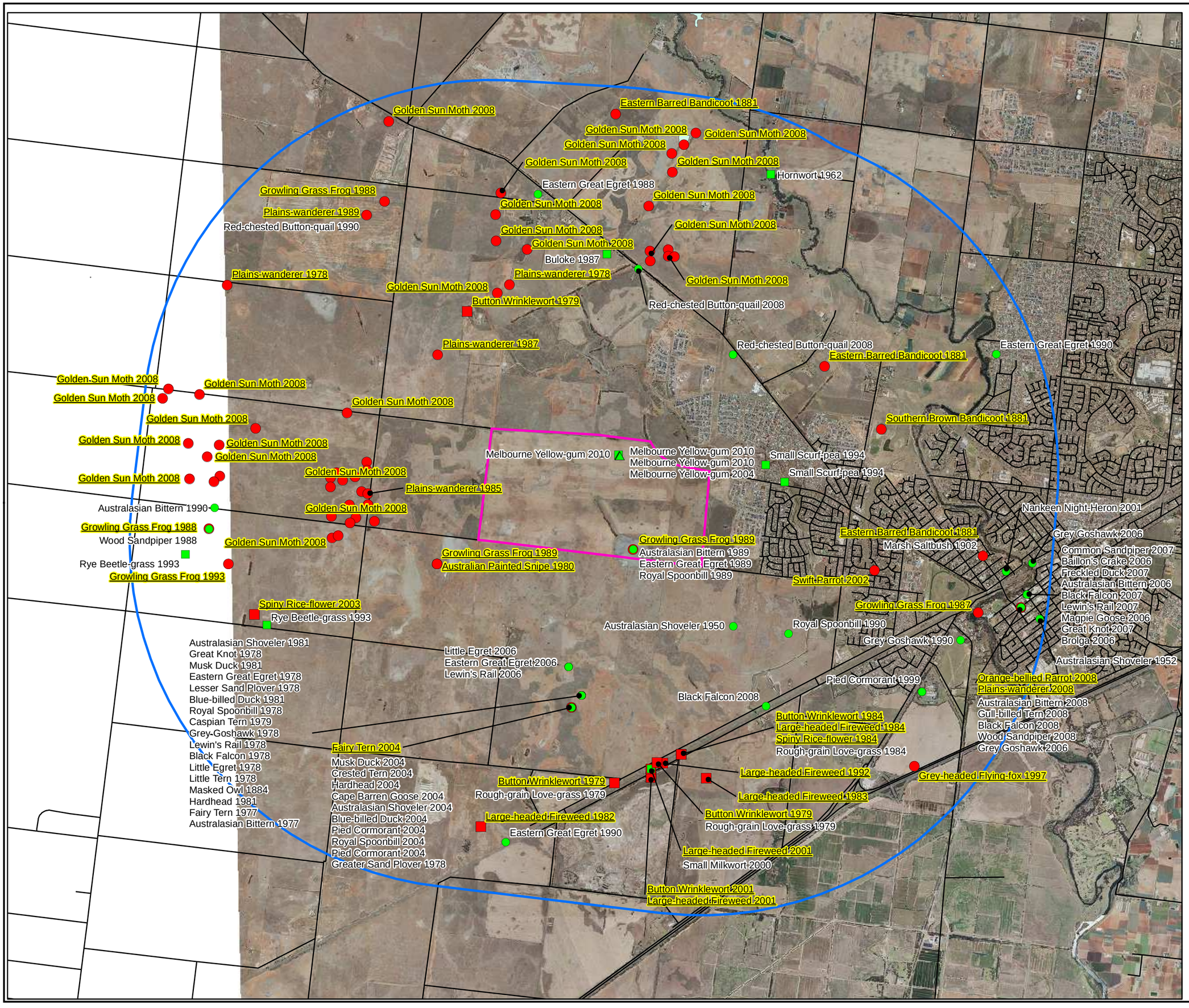

Legend

- PSP 42 North
- 5km buffer

Current and Targeted Flora results

- State

Database Fauna records

Significance

- National
- State

Database Flora records

Significance

- National
- State

Figure v: National and State Significant and DSE Advisory list (VROT) flora and fauna species

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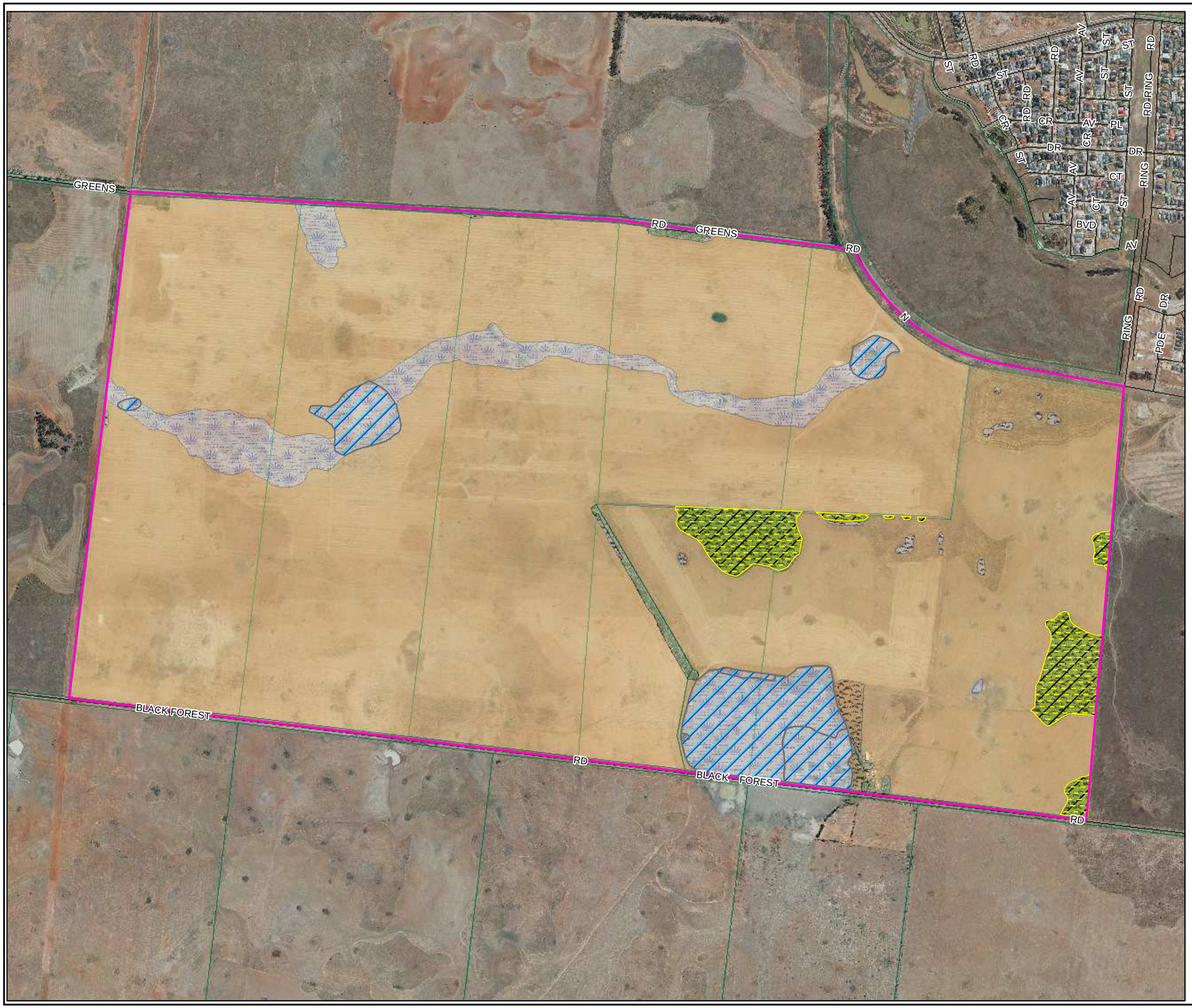

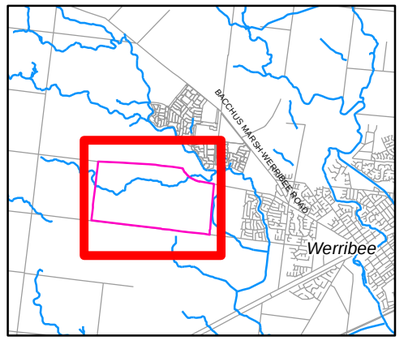

Legend

PSP 42 North

Golden Sun Moth

Potential habitat

Growling Grass Frog

Potential habitat

Striped Legless Lizard

Potential habitat

Fauna habitat

2 - Remnant tree

3 - Planted vegetation

5 - Grassland - rocky

7 - Pasture/crop - rocky

8 - Pasture/crop - not rocky

9 - Wetland/watercourse

10 - Rock walls/piles

Figure vi: Fauna Habitat, PSP 42 North

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1.0 INTRODUCTION

1.1 Project Background

Biosis Research Pty. Ltd. was commissioned by the Growth Areas Authority and Daleston Pty Ltd to undertake a biodiversity assessment within what is known as PSP 42 North, west of Melbourne (Figure 1). The purpose of this assessment was to identify biodiversity values to further inform the precinct structure planning process for this property which is designated for future urban development. The present report focuses on the land owned by the Daleston Pty Ltd (PFI 210751891) and Mr Tony Stella (PFI 52401355) (Figure 1).

Previous investigations

In November 2009 Biosis Research produced the *Biodiversity Assessment Report (Native Vegetation) Melton-Wyndham Investigation Area - Section A* (Biosis Research 2009). This report covered Section A which is bounded to the north by Greens Road, to the South by Narraburra Road, to the west by Edgars Road and to the east by private property and included part of PSP 42 North. This report provided the mapping of areas of remnant vegetation and degraded treeless vegetation, and included the vegetation quality assessment for part of the investigation area.

In April 2010, AECOM produced the *Vegetation Assessment Reporting Wyndham Vale Precinct Structure Area 40* (AECOM 2010). This report covered the Wyndham Vale investigation area which included part of PSP 42 North. It provided the mapping of areas of remnant vegetation and DTV, and included the vegetation quality assessment for part of this investigation area.

The current report aims to provide a more detailed analysis of the biodiversity values of PSP 42 North. It includes the results of the general flora and fauna assessment, mapping of any EPBC listed communities, targeted searches for threatened flora and fauna and provides a revision of the vegetation quality assessment undertaken by AECOM in 2008/2009 and provides the results of vegetation mapping and a native vegetation quality assessment (habitat hectares assessment) undertaken on those parcels not previously assessed.

1.2 Objectives

The objectives of the study are to:

- Identify, assess, and map all flora, fauna, and habitat and record the location and level of conservation significance of all significant flora, fauna and

vegetation communities within PSP 42 North;

- Collect data at a sufficient detail and standard that enables a Precinct structure Plan and Biodiversity Plan to be developed;
- Provide advice on any works or management measures that may reduce adverse impacts of the development on species known or likely to occur in the precinct;
- Ensure that development of the precinct is able to comply with Government legislative and policy requirements on the protection of indigenous fauna and flora species and communities.

These objectives will be achieved by:

- Determine the distribution and quality of Ecological Vegetation Classes (EVCs);
- Providing additional information regarding the biodiversity values of the site;
- Undertaking searches for significant species and mapping their likely habitat and locations of any recorded occurrences;
- Assigning a conservation significance to all patches of native vegetation and providing net gain calculations as per the Native Vegetation Framework (NRE 2002) and VQAM (DSE 2004);
- Providing a consolidated species list of flora and fauna recorded during the project and augmenting these with database records of threatened flora and fauna species provided by database searches within each area;
- Mapping any areas of *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) listed communities; and
- Identifying the limitations of the current assessment.

1.3 Study Site (Precinct)

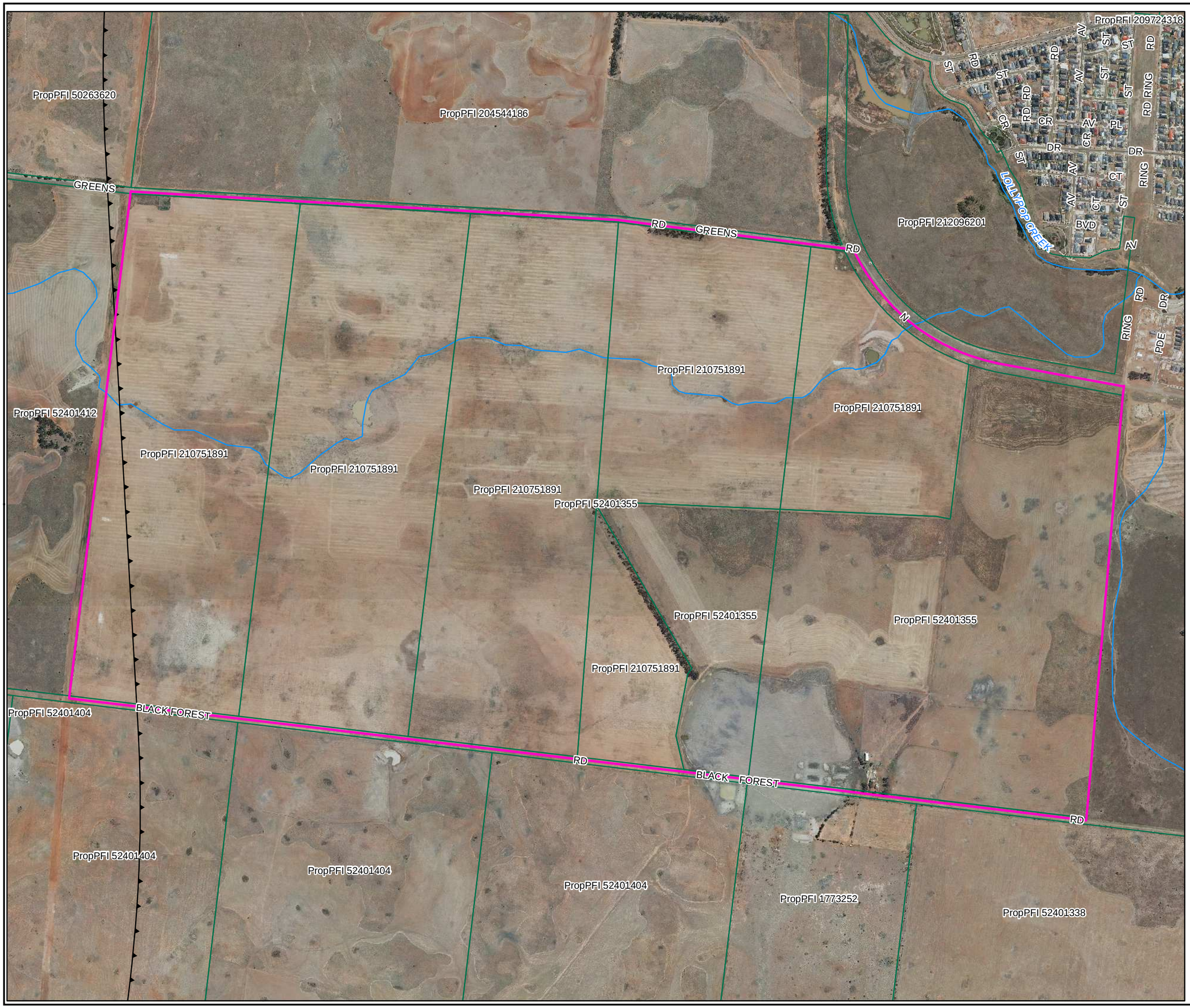
PSP 42 North is located on the western fringe of Melbourne in Wyndham Vale City Council (Figure 1). The survey site covers an area of 512.65 ha and is within the Victorian Volcanic Plain Bioregion. It is bounded to the north by Greens Road, to the south by Black Forest Road and to the west and east by private property. It includes a small tributary that is connected to Lollypop Creek.

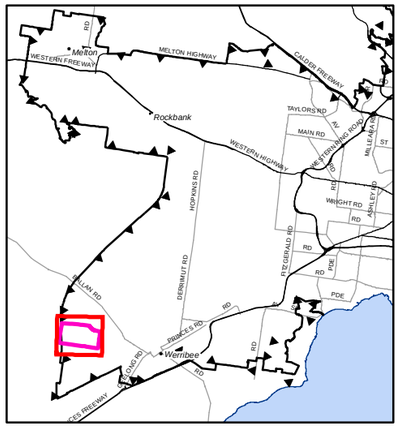
The topography is generally flat to gently undulating, resulting from lava flows

of the late Tertiary–early Quaternary periods.

The majority of land within PSP 42 North is privately owned and is subject to agricultural activities in the form of cropping and grazing livestock.

The study area lies within a landscape which is well documented for its association with a number of matters of national significance. It occurs within the range of the *Environment Protection and Biodiversity Conservation Act* (EPBC) listed ecological communities Natural Temperate Grassland of the Victorian Volcanic Plain and Grassy Eucalypt Woodland of the Victorian Volcanic Plain. In addition, there are several threatened flora and fauna species listed under the EPBC Act which have historical records from the precinct, or are otherwise predicted to occur within the precinct. These are discussed in detail under Section 3.





Legend

- PSP 42 North
- Parcels
- Urban Growth Boundary

Figure 1: Overview of PSP 42 North

N

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2.0 METHODS

Field assessment and mapping methods follow the Biodiversity Precinct Structure Planning Kit (DSE 2010b) and specifically the Biodiversity Assessment Template for 2009–2011 Biodiversity Mapping Projects (GAA 2011).

2.1 Terminology

Common and scientific names for flora and fauna follow the Victorian Biodiversity Atlas which is curated by DSE. The conservation status of species was determined from their listing in DSE advisory lists (DSE 2005, 2007, 2009) or their listing under the EPBC Act.

Classification and naming of native vegetation mapping units for planning purposes in Victoria follows a typology developed by DSE in which Ecological Vegetation Classes (EVCs) are the primary level of classification. An EVC contains one or more plant communities and represents a grouping of broadly similar environments (www.dse.vic.gov.au).

State (FFG Act 1988) and nationally (EPBC Act) listed ecological communities are classified and named by DSE and the Department of Sustainability, Environment, Water, Populations and Community (DSEWPaC) respectively (www.dse.vic.gov.au, http://www.environment.gov.au/biodiversity/threatened/index.html).

2.2 Literature and Database Review

Data from the DSE Victorian Biodiversity Atlas (VBA) (VBA_FLORA25, FLORA100 & FLORARestricted' August 2010 and VBA_FAUNA25, FAUNA100 & FAUNARestricted' August 2010) were obtained and reviewed for PSP 42 North. The contribution of the Royal Botanical Gardens Melbourne to the VBA database is acknowledged. Data was also requested and obtained from the Birds Australia database (03/12/2010). These database searches included historical records within 5 km of PSP 42 North.

The DSEWPaC online database for the EPBC Act Protected Matters Search Tool was searched to include an area within 5 km of the precinct. This search produced details of matters of national significance including threatened species known or predicted to occur within the search area and details of any relevant ecological communities present and Wetlands of International Importance (Ramsar listed wetlands).

The modelled 2005 distribution and 1750 EVCs (DSE mapping of native vegetation present at these dates) within the precinct and their bioregional conservation status was reviewed using Biodiversity Interactive Maps (www.dse.vic.gov.au). Other relevant spatial data on Biodiversity Interactive Maps was reviewed including the Wetlands Spatial Database as well as aerial photography for the precinct and topographic maps.

The report written by Biosis Research for the Growth Areas Authority in November 2009 was reviewed (Biosis Research 2009). The report written by AECOM for the Growth Areas Authority in April 2010 that is relevant to PSP 42 North was reviewed (AECOM 2010). Mapped habitat and locations of threatened flora and fauna species were reviewed and where relevant included in the current assessment. Other Biosis Research reports relevant to the precinct region were reviewed during the assessment process.

Other sources of biodiversity information reviewed, where relevant, included:

- DSE Biosites Register (DSE 2005b)
- Actions for Biodiversity Conservation (threatened species)
- Databases available through DataMart (vicmap.info@dse.vic.gov.au)
- EPBC Act Significant Impact Guidelines
- Environmental Reporting Tool (ERT)
- National Recovery Plans
- Conservation Advices
- Species Profiles and Threats Database (SPRAT)
- DSE Advisory Lists
- Conservation Status of Australian Fishes (ASFB 2004)
- Aerial photography
- Topographic maps
- Consultation with DSE/Council staff/local field naturalists

The following reports were also reviewed:

- Sub-regional surveys for the Growling Grass Frog (Ecology Australia 2010)
- Sub-regional fauna surveys: Golden Sun Moth (Biosis Research 2010)

2.3 Field Survey Techniques

The initial vegetation quality assessment and mapping of PSP 42 North was undertaken by two botanists on the 14 January 2009 by Biosis Research (Biosis Research 2009) and on the 29 December 2008 and 15 January 2009 by AECOM (AECOM 2010). An additional vegetation quality assessment of the parcels not accessed in 08/09 was conducted by one botanist on 23 November 2010 and 24 January 2011. General flora surveys were conducted by one botanist on the 23 November 2010 and 24 January 2011. Targeted flora surveys were conducted by up to two botanists on 23 November 2010 and 28 February 2011.

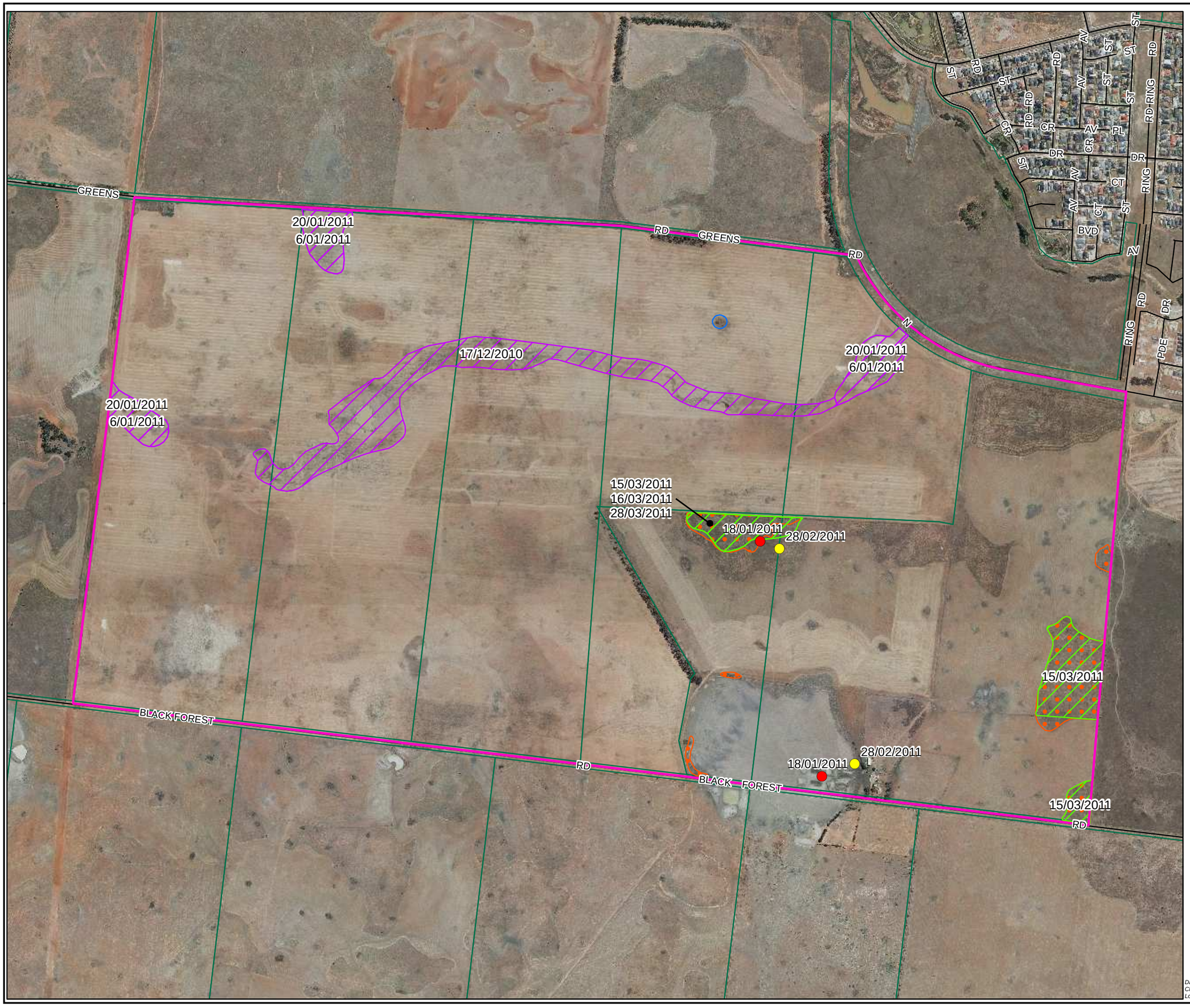
General fauna surveys and associated habitat assessments were conducted by one zoologist on 23 November 2010, 17 and 24 December 2010. Targeted surveys were conducted for Growling Grass Frog by two zoologists on 6 and 20 January 2010. Plains-wanderer targeted surveys were conducted on 15, 16, 28 March 2011. Morning and afternoon bird census surveys were conducted on the 22, 18 (AM), 24 and 28 (PM) of February 2011. Targeted fauna surveys for arboreal mammals were deemed unnecessary due to a lack of hollow bearing or habitat trees on PSP42. No aquatic surveys were conducted.

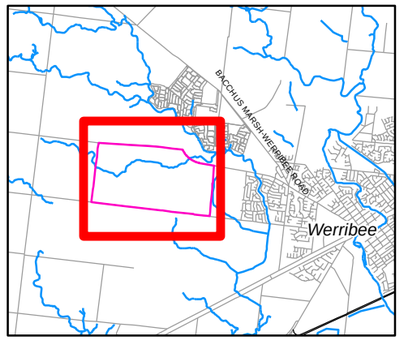
In total, approximately **512.65 ha** of private land within PSP 42 North were inspected and the following surveys were undertaken.

2.3.1 General flora survey

A general flora survey was undertaken on PSP 42 North to produce a census of vascular plants. Vascular plants include all flowering plants, conifers, ferns and fern allies. Where some material could not be fully identified in the field, specimens were collected and examined in the laboratory to verify or check determinations made in the field. Keys and descriptions in Walsh and Entwisle (1994, 1996, 1999) were used in verifying the identification of samples unless more up-to-date published taxonomy was available.

A list of vascular plants for each property was submitted to the VBA database (S14399 and S1440000).





Legend

- PSP 42 North

Fauna survey extent

- Growling Grass Frog
- Plains-wanderer
- Bats
- Birds

Flora Survey locations

- Spring Targeted Survey
- Summer Targeted Survey

Access was approved for all areas

Figure 2: Property survey and access status, PSP 42 North

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2.3.2 Native vegetation (habitat hectare assessment undertaken by Biosis Research 2009 and AECOM 2010)

The vegetation within PSP 42 North was inspected by Biosis Research on 14 January 2009 (Biosis Research 2009) and AECOM on the 29 December 2008 and 15 January 2009 (AECOM 2010). Two additional parcels which were not accessed in 08/09 were assessed on 23 November 2010 and 24 January 2011 for native vegetation. The inspection of each parcel where access was permitted focused on delineating the extent of areas definable as a patch of native vegetation. A patch is defined by DSE (2007a) as an area where at least 25% of the total understorey plant cover is native (excluding bare ground) or where canopy tree cover exceeds 20% of the site (see Appendix 1).

For each patch identified, a habitat hectare assessment was conducted and habitat score calculated (DSE 2004). A summary of this method is provided in Appendix 1. In instances where habitat hectares data collected by AECOM (AECOM 2010) were incorrect, habitat hectares scores were recalculated and updated for this report.

All areas that did not meet the definition criteria of a patch of native vegetation, but which contained at least one native flora species were mapped as Degraded Treeless Vegetation (DTV). Typically this included cropped sites, cultivated areas sown with exotic pasture species and other areas dominated by introduced species. All areas that did not meet the 25% threshold and did not contain any native understorey vegetation were mapped as Non-native Vegetation (NNV).

Indigenous canopy trees were also assessed and mapped in accordance with Victoria's Native Vegetation Management Framework (NRE 2002 – the Framework) and the relevant EVC benchmark for the definition of 'Large Old Tree'. For scattered trees, the location of individual indigenous trees was recorded within any DTV or NNV, including the species, size class and assessment to determine ecological/ habitat significance (Biosis Research 2009). The number of Very Large Old Trees (1.25 x benchmark size), Large Old Trees (1 x benchmark size), Medium Old Trees (0.75 x benchmark size) and Small Trees (<0.75 x benchmark size) was recorded within and outside patches of remnant native vegetation.

Three scattered indigenous canopy trees were identified, assessed and mapped on 23 November 2010 in accordance with Victoria's Native Vegetation Management Framework (NRE 2002 – the Framework) and the relevant EVC benchmark for the definition of 'Large Old Tree'. For scattered trees, we identified and recorded the location of individual indigenous trees encountered within any habitat zone, including the species, size class and assessment to

determine ecological/ habitat significance.

During the current assessment, we identified an additional patch of Aquatic Herbland (an extension of Habitat Zone 4) outside of those patches mapped by AECOM in 2008/2009. This additional patch has not been included in this report or allocated a habitat hectares score as the GAA and DSE have accepted and approved AECOM's 2008/2009 EVC mapping for the PSP.

DSE have stipulated that consultants should utilise the Landscape Context Modelling Data layer (NV2005_QUAL_CSDL DSE 2008) provided in the Biodiversity Interactive Map 3.1 (http://mapshare2.dse.vic.gov.au/MapShare2EXT/imf.jsp?site=bim) to assign landscape scores for each patch of native vegetation within the investigation areas. The landscape context score for each habitat zone assessed by AECOM has been updated to reflect the Landscape Context Modelling Data for patches within PSP 42 North.

2.3.3 General fauna survey

All accessible land within the precinct was investigated on foot and by vehicle to determine the types and qualities of habitat(s) present within the precinct. General fauna surveys were undertaken within these habitat types to produce a census of vertebrate fauna species for the precinct. All vertebrate species of fauna (including introduced and native birds, reptiles and frogs) observed during the assessments by means of direct observation, searching under rocks and logs, examination of tracks, scats and identifying calls were recorded. Particular attention was given to searching for significant species and their habitats. Fauna species were recorded with a view to characterising the values of the site and were not intended to provide a comprehensive survey of all fauna that has potential to utilise the site over time.

Terrestrial mammals

Surveys for terrestrial mammals were undertaken as part of the general surveys outlined above, and involved visual identification, searches for indirect evidence (e.g. scats, tracks) and to identify potential habitat. Survey time and effort depended on the size of the property and the types of habitat present.

Arboreal mammals

Surveys for arboreal mammals were not conducted on PSP 42 North due to a lack of indigenous mature hollow bearing trees. Those trees present were searched for the presence of tree hollows, distinctive scratching and scats typical of arboreal mammals.

Bats

Anabat ultrasonic detectors (Titley Scientific, Australia) were used at two locations within the study area (Figure 2) to survey for microbats, particularly to determine whether Southern Myotis *Myotis macropus* (DSE Advisory List – near threatened) occur within the study area. Anabat units remotely detect, record and store all ultrasonic bat calls onto a compact flash card from which files can be downloaded for analysis. Data were collected between dusk and dawn over three nights from 28 February 2011 to 2 March 2011. Calls were analysed by Lindy Lumsden at the Arthur Rylah Institute, DSE.

Birds

Additional bird census surveys were conducted in the early morning and late afternoon at two different habitat types (rocky grassland and a large wetland) (Figure 2). Bird Census Surveys were conducted 18, 22 (AM), 24 and 28 (PM) February 2011. This resulted in a total of eight 20 minute bird census surveys within PSP 42 North. Bird census surveys were conducted to ensure that any species active only during the early morning or late afternoon were recorded.

Reptiles

During general fauna surveys, areas of potential reptile habitat were actively searched by hand. This included random half-hour searches among each habitat type present on the survey site. These searches focused at looking beneath rocks in remnant rocky grassland, within rock walls, under leaf litter, in riparian areas and amongst artificial refuse (discarded timber, tin, etc) with the potential to provide habitat.

Amphibians

During the general fauna surveys, all aquatic habitats (e.g. creeks, rivers, dams, wetlands) were mapped and actively searched to locate any frogs that may be present. In addition, a targeted survey for Growling Grass Frog was undertaken within the study area during which all observed frogs were noted.

Invertebrates

Targeted searches for invertebrates were not undertaken as per agreement with the GAA as this was outside the scope of the investigations.

Fish

Targeted fish surveys were not commissioned by the GAA as part of the biodiversity assessment for this contract area.

2.3.4 Targeted surveys for significant flora and fauna

Information on any populations of rare or threatened species (DSE 2005, DSE 2007b, DSE 2009) observed during a property site inspection was recorded during field assessments.

Flora

Prior to our recent assessment and following discussions with DSE (Appendix 1), the following species were identified as priorities to target during the current spring and summer targeted flora survey:

- Plains Joyweed *Alternanthera* sp. 1;
- Slender Bindweed *Convolvulus angustissimus* subsp. *omnigracilis*;
- Small Scurf-pea *Cullen parvum*;
- Arching Flax-lily *Dianella* sp. aff. *longifolia* (Benambra);
- Pale Spike-sedge *Eleocharis pallens*;
- Melbourne Yellow-gum *Eucalyptus leucoxylon* subsp. *connata*;
- Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens*;
- Button Wrinklewort *Rutidosis leptorhynchoides*;
- Sunshine Diuris *Diuris fragrantissima*;
- Small Golden-moths *Diuris basaltica*;
- Tough Scurf-pea *Cullen tenax*;
- Large-fruit Fireweed *Senecio macrocarpus*;
- Basalt Sun Orchid *Thelymitra gregaria*;
- Basalt Podolepis *Podolepis* sp. 1;
- Pale Swamp Everlasting *Helichrysum* aff. *rutidolepis* (Lowland Swamp);
- Swamp Everlasting *Xerochrysum palustre*;
- Slender Tick Trefoil *Desmodium varians*;
- Clover Glycine *Glycine latrobeana*;
- Small Milkwort *Comesperma polygaloides*;
- Basalt Peppercress *Lepidium hyssopifolium*; and
- Swamp Fireweed *Senecio psilocarpus*.

The first targeted survey was conducted in spring in PFI 210751891 (23 November 2010). Targeted surveys were conducted within PFI 210751891 for one species, Melbourne Yellow-gum, in known suitable habitat. In PFI 210751891, summer targeted surveys were not completed for the other

designated threatened flora species as there was no suitable habitat within PFI 2010751891 as the property, including the creekline, wetlands and low-lying depressions had been de-rocked, cropped and sown with wheat and very little indigenous vegetation remained. Suitable habitat for most threatened flora species generally consists of higher quality areas of remnant native vegetation or Degraded Treeless Vegetation where the structure of the soil and rock cover is still intact. As such, no suitable areas of habitat occurred within PFI 2010751891.

The second targeted survey was conducted in summer in PFI 52401355 (28 February 2011) for all species listed above. Suitable habitat for most threatened flora species generally consists of higher quality areas of remnant native vegetation. As such, these areas were prioritised for searches so that areas determined as higher quality representative habitat for each target species was systematically surveyed (Figure A4). Each search area was surveyed by a minimum of two botanists walking in parallel transect lines 3 m apart. Using this method, approximately 10 ha of habitat was searched per day.

Any incidental records of additional threatened flora species identified in the general flora or targeted surveys were recorded as described above. Data collected included a GPS waypoint, estimated distribution and estimated population size.

Fauna

Fauna species identified for targeted surveys in this assessment were Growling Grass Frog on PFI 210751891 and Plains-wanderer on PFI 52401355. Other rare or threatened species were assessed as either having a low likelihood of occurrence or it is assumed that they will be present following prescriptions for areas within the Urban Growth Boundary (UGB) in DSE (2009).

Targeted survey for Growling Grass Frog was conducted at three sites along an unnamed tributary of Lollypop Creek, ephemeral wetlands and a large farm dam located near Greens Road in PFI 52401355 (Figure 2). A diurnal Growling Grass Frog habitat assessment was conducted on 17 December 2010 and targeted nocturnal survey was conducted on 6 and 20 January 2011. Nocturnal survey for Growling Grass Frogs was conducted by two experienced zoologists familiar with the identification of the species and its preferred habitat. Nocturnal targeted survey methodology followed Attachment 4 in DSE (2010) and included a combination of listening for calling males, call playback and systematic searching of water bodies and the surrounding vegetation using spotlights. Active searching of rocks, logs and other debris was undertaken to locate inactive frogs. All non-target frog species recorded during the assessment were

noted.

Targeted surveys for Plains-wanderer were conducted in PFI 210751891 on 16, 17 and 28 March 2011. Potential habitat was identified during the general fauna assessment and defined using the Plains-wanderer Habitat Management Guide (NPWS 2002). Surveys were carried out under suitable conditions (no moon, moderate minimum air temperatures and calm wind) and involved spotlighting along transects through areas of potential habitat. Transects were spaced at approximately 15 m and conducted in teams of two zoologists. Transects were conducted over rocky areas that could not be driven and therefore all present surveys were carried out on foot. To conduct the surveys hand-held spotlights were systematically swept back and forth over grassland habitat up to 15 m in front and either side of the observer. All non-target species observed during the assessment were noted.

2.3.5 Mapping

Mapping data were collected using a portable computer connected to a standard Global Positioning System (GSP) and databases for mapping with the software HabitAs developed by DSE. In addition, other GPS data were collected and field maps / aerial photographs were annotated.

Waypoints were collected for all individual rare or threatened species or defined area groups of rare or threatened species.

Mapping was refined and final maps were produced using ArcMap version 10. Recent aerial photography was used as base data to overlay HabitAs, scattered tree and threatened species data. These data were then checked for locational accuracy and completeness. Final maps were then presented using GDA94 with the VicGrid projection, according to style standards set by the Growth Areas Authority.

In conjunction with all areas of native vegetation being considered in line with the DSE requirements for this project, a minimum patch size of at least 5 m diameter was used to map all remnant vegetation, DTV and NNV. Mapping data collected are displayed at a scale of 1:10 000.

2.4 Determination of Conservation Significance

2.4.1 Remnant patch and tree significance under the Framework

The Framework (NRE 2002) defines conservation significance (Very High, High, Medium and Low) that relates to the bioregional level only. The primary measure used for determining the conservation significance of a patch of

native vegetation as defined by the Framework is the Habitat Score, coupled with the bioregional conservation status (endangered, vulnerable, rare or depleted) of the EVC.

DSE have stipulated that consultants should utilise the Landscape Context Modelling Data layer (NV2005_QUAL_CSDL DSE 2008) provided in the Biodiversity Interactive Map 3.1 (http://nremap-sc.nre.vic.gov.au/MapShare.v2/imf.jsp?site= bim external) to assign landscape scores for each patch of native vegetation within the Investigation Area. To ensure that the Habitat Score for each patch could accurately be applied to determine conservation significance landscape scores were reviewed on a patch scale and revised where appropriate based on ground-truthed knowledge.

The second measure used for determining the conservation significance of a patch of native vegetation as defined by the Framework is the presence of the best 50% of habitat for a threatened species (NRE 2002: Appendix 3). Criteria for determining the presence of such habitat are described by DSE (2007a: Table 2). Where a patch of native vegetation was not determined to be of Very High conservation significance based on its condition, all available data on the presence of threatened species were used to determine if that patch represented the best 50% of habitat for a threatened species.

The third measure used for determining the conservation significance of a patch of native vegetation as defined by the Framework is the presence of other attributes as defined by NRE (2002: Appendix 3). Where a patch of native vegetation was not already determined as Very High conservation significance because of its condition or the presence of the best 50% of threatened species habitat, the site was assessed for the presence of these other attributes.

2.4.2 Species and communities

The common language meaning of significance is ‘importance; consequence’ (Macquarie Dictionary). While the general meaning of this is clear, the term is further defined in ecological significance assessment. Significance of a species or community is determined relative to the scale at which it is considered. The sources used to categorise significance of species and communities in this report are given below:

- A taxon or community has national significance when it is listed as threatened (critically endangered, endangered, vulnerable or conservation dependent) under the Environment Protection and Biodiversity Conservation Act 1999.
- A taxon has national significance when it is listed as rare in Australia (R) in A Census of the Vascular Plants of Victoria (Walsh & Stajsic 2008).

- A taxon or community has state significance when it is listed as threatened under the Flora and Fauna Guarantee Act 1988.
- A taxon or community has state significance when it is listed as threatened (critically endangered, endangered or vulnerable) or near threatened, rare, data deficient or poorly known in Victoria on a DSE Advisory List (DSE 2005, 2007a).
- Biosis Research considers flora species to have significance at the bioregional level when they are recorded from less than 5% of sites within the Flora Information System.

2.5 Likelihood of occurrence

Database searches provide lists of species from the local area that have potential to occur on the site. Where database records of state and nationally significant species exist from the local area, but these species are not identified during field survey, it is necessary to consider the likelihood that they occur on the site. The DSEWPaC PMST may nominate EPBC Act-listed species and communities where the site lies within their broad geographic range.

Likelihood of a particular species occurring at a site is determined by assessing several factors including the quality of the habitat, history past occurrences, current or previous densities (low or high), behaviour (highly mobile or restricted) as well as the ability of a species to adapt or exploit rare or episodic resources. An understanding of these characteristics will assist in evaluating the potential for future occurrences by particular species.

The likelihood of occurrence is a broad categorisation used by Biosis Research to indicate the potential for a species to occur within a site. It is based on expert opinion, using general categories such as those provided in Table 1 below. The determination of likelihood is expressed as negligible, low, medium or high. If the species has been identified on site during our assessment or by other confirmed records then it is documented here as having been ‘recorded’. Information relating to these species is presented in the results and discussion section of the report.

Table 1: Likelihood of occurrence for significant species and examples of criteria

Likelihood of occurrence	Potential criteria
Recorded	• Species recorded on site during current or previous assessment • Aquatic species recorded from connected waterbodies in close proximity to the site during current or previous assessment.
High	• Sufficient good quality habitat is present on site • Sufficient good quality habitat is present in connected waterbodies in close proximity to the site. • Site is within species natural distributional range (if known). • Species has been recorded within 5 km or from the relevant catchment/basin since 1980.
Medium	• Records of terrestrial species within 5 km of the site or of aquatic species in the relevant basin/neighbouring basin but habitat limited in its capacity to support the species due to extent, quality, or isolation.
Low	• No records within 5 km of the site or for aquatic species, the relevant basin/neighbouring basin, since 1980. • Substantial loss of habitat since any previous record(s).
Negligible	• Habitat not present on site • Habitat for aquatic species not present in connected waterbodies in close proximity to the site. • Habitat present but sufficient targeted survey has been conducted at an optimal time of year and species wasn't recorded.

Species listed as rare or threatened on the DSE Advisory Lists and which have at least medium likelihood of occurrence are given further consideration. These species are addressed in the assessment of conservation significance for Net Gain (DSE 2007b). The need for targeted survey for these species is also considered.

2.6 Limitations

The following limitations apply to the current assessment:

1. For property PFI 52401355, a number of differences in AECOM's 2008/2009 EVC mapping and Vegetation Quality Assessment were noted during the recent assessment (AECOM 2010). Site condition scores for Plains Grassland were not standardised in accordance with the Vegetation Quality Assessment Manual (DSE 2004) and landscape context scores did not correlate with the Landscape Context Modelling Data Layer. Some of the EVC boundaries and the vegetation quality assessment for each patch did not correspond with what was identified on site during the current assessment. AECOM also did not document a large patch of Aquatic Herbland. As the GAA and the DSE have already accepted AECOM's EVC mapping for PSP 42 North, we were not required to map that additional patch that we have identified. However, we have corrected the habitat hectares scores for

those patches mapped by AECOM and have updated the landscape context score to be in line with the Landscape Context Modelling Data layer (NV2005_QUAL_CSDL DSE 2008) provided in the Biodiversity Interactive Map 3.1.

2. Vegetation condition in PSP 42 North was assessed using current DSE standards (DSE 2004). However, the definition of remnant patches of Plains Grassland EVC using the Native Vegetation Framework (DSE 2007) does not necessarily correlate with the definition of the EPBC Act listed community *Natural Temperate Grassland of the Victorian Volcanic Plain* (NTGVVP). While the two definitions for this community generally correspond well, under the condition thresholds for NTGVVP it may be possible for a patch of Plains Grassland not to qualify as a patch of NTGVVP. Within PFI 52401355, two Habitat Zones mapped by AECOM (HZ 6 and 7) had been cleared and sown with barley prior to the recent assessment. These areas have not been mapped as the NTG VVP as they no longer meet the condition thresholds for this community.
3. Significant species, both flora and fauna, can occur in areas that do not meet the DSE definition of remnant patches of native vegetation. Examples of such species include the nationally significant Golden Sun Moth *Synemon plana*, Striped Legless Lizard *Delma impar*, Growling Grass Frog and Spiny Rice-flower. In some circumstances, areas not definable as a patch of native vegetation can support substantial populations of these species. It is therefore important to recognise that areas of degraded treeless vegetation and non-native vegetation may still contain biodiversity values.
4. Additional limitations are as follows:
    - The assessment includes only vascular flora (flowering plants, ferns, conifers) and vertebrate fauna (birds, mammals, reptiles, frogs, fish). Non-vascular flora (e.g. mosses, liverworts) were not sampled although their presence is noted as part of the cover of native species in the definition of a patch.
    - The presence of threatened flora and fauna were noted where they were encountered or were identified through targeted threatened species surveys. However, such observations are still likely to underestimate the population sizes or distribution of these species, many of which are cryptic or only seasonally visible. Aquatic species will be temporarily absent if a waterbody is dry. Sections of the tributary and the ephemeral wetland near Greens Road were surveyed during the nocturnal targeted searches.
    - The current assessment was conducted in late spring, summer and autumn which are an optimal time for survey for some species. Targeted spring flora surveys were not conducted in PFI 52401355 as

the contract for assessing this property was not awarded in time.

- The unseasonably wet and humid climatic conditions in spring and summer made detection and/or identification of certain species difficult due to the unusually dense and tall grass cover. The targeted surveys for Plains-wanderer that were undertaken in March 2011 were unlikely to record this species due to the dense and tall grass. This ground dwelling species prefers areas with low sparse native grassland vegetation. Therefore, this species may not have been present or not detected during the survey due to difficult survey conditions. For future Plains-wanderer surveys, if similar grass densities and heights are present, surveys should be undertaken with the aid of trained and muzzled dogs and handlers in late autumn and winter.
- Field 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 (manufacturer states ±15 m but generally ±2–5 m) and dependent on the limitations of aerial photo resolution, rectification and registration. As such, these points should not be relied on for survey grade design purposes.
- Data from other assessments are generally available from the species records (including threatened species) and defined area species lists submitted by Biosis Research and other consultants to the VBA on a regular basis.
- The presence or absence of significant native vegetation described in other reports is often dated and/or is otherwise superseded by the site inspections associated with this assessment. In that context a review of the more broadly available literature covering areas of land within PSP 42 North is not seen as critical to this assessment. However, a review of literature relating to the GAA investigation areas (including the study area) has been undertaken.

3.0 RESULTS

3.1 General flora survey

3.1.1 Flora species recorded

A total of 67 plant taxa (36 indigenous and 31 introduced) were recorded from PSP 42 North during the current assessment (Appendix 2, Table A2.1). The FIS contains records of 378 plant taxa (201 indigenous and 177 introduced) from the defined search of PSP 42 North comprising the study area and a 5 km buffer.

A map showing the extent of general flora surveys is shown in Figure 2.

3.1.2 Rare and threatened flora species

Of the species recorded in the VBA, three species have national significance and eight species have state significance. The DSEWPaC database also predicts the occurrence of, or suitable habitat for three additional listed flora species (Table 1).

Within the current investigation of PSP 42 North, one species of state significance (Melbourne Yellow Gum *Eucalyptus leucoxylon* subsp. *connata*) was recorded during the current assessment (Appendix 2, Table A2.1, Figure 3).

3.1.2.1 Nationally Significant Species

The VBA database contains records of three species of national conservation significance from the defined search area (Button Wrinklewort *Rutidosis leptorhynchoides*, Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens* and Large-headed Fireweed *Senecio macrocarpus*) (Table 1). These species were not recorded during the current assessment. Three of these species are considered to have at least a medium likelihood of occurrence in the study area based on the habitat present (Table 1).

The DEWHA database predicts the occurrence of three additional species listed under the EPBC Act (Curly Sedge *Carex tasmanica*, Clover Glycine *Glycine latrobeana* and Maroon Leek-orchid *Prasophyllum frenchii* within 5 km of PSP 42 North or suitable habitat for them within the defined search area. One of these species has at least a medium likelihood of occurring within the precinct (Table 1).

3.1.2.2 State Significant Species

The VBA database contains records of eight additional species of state conservation significance from the local area (within 5 km) (Table 1). Three of these species have at least a medium likelihood of occurrence within PSP 42 North and one of these species, Melbourne Yellow-gum has, been recorded within the study area (Table 1).

Six additional species not identified in the database searches have at least a medium likelihood of occurrence within PSP 42 North.

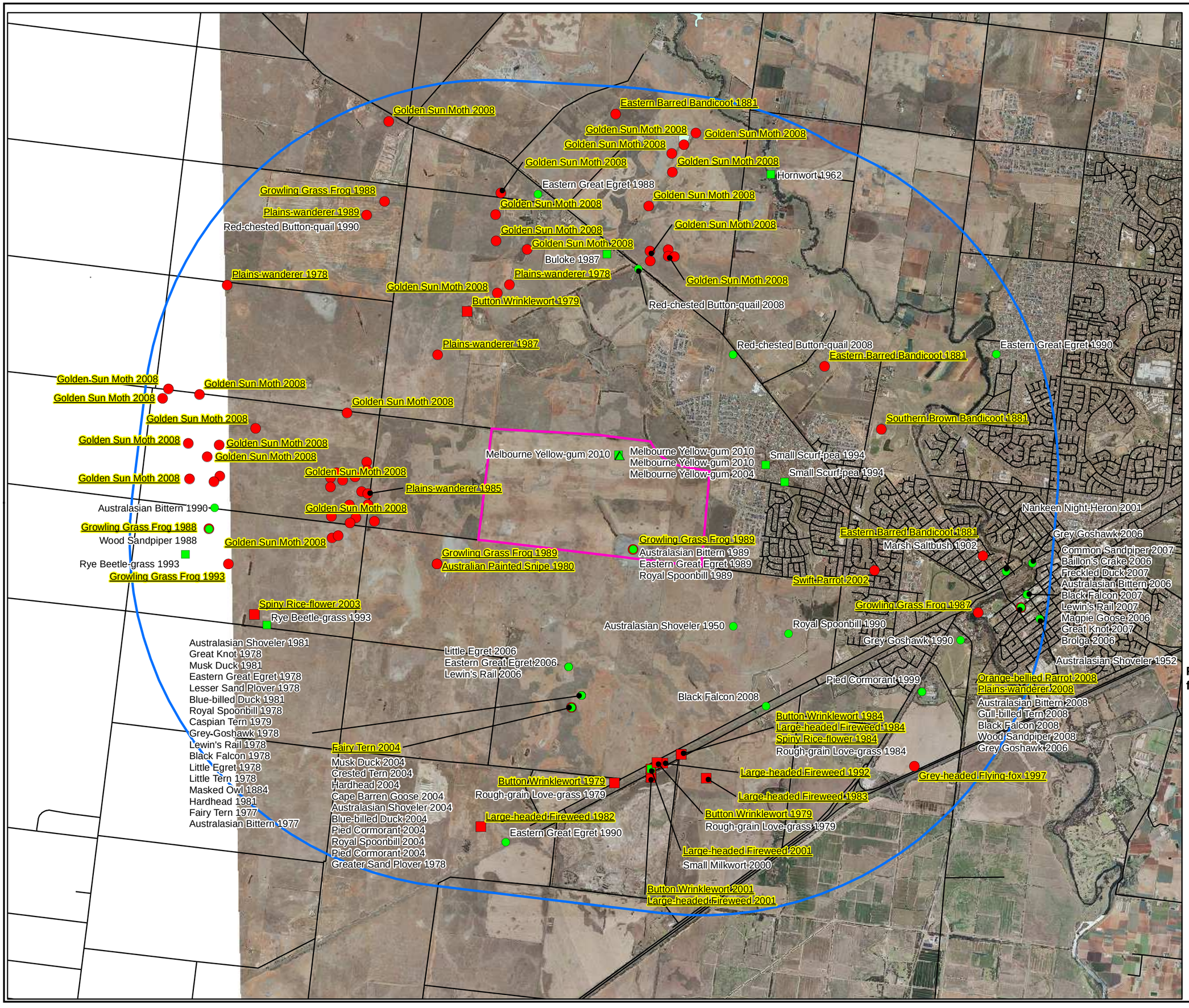

Figure 3: National and State Significant flora and fauna species locations, PSP 42 North

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Table 1. Rare or threatened flora species recorded or predicted to occur within 5 km of the precinct (likelihood of occurrence criteria in A2.2)

Lifeform	Scientific Name	Family Name	Common Name	Conservation Status			Regional Significance	Database	Other Sources	Current Survey	Total No. of Documented Records*	Likely Occurrence in Study Area**	Likelihood reasoning	Habitat Description
				EPBC	DSE	FFG								
	National Significance													
Graminoid	*Carex tasmanica*	Cyperaceae	Curly Sedge	VU	v	L	✓	DEWHA			0	Low	This species may be found in such vegetation types within PSP 42 North, including drainage lines associated with Lollypop Creek, although it was not recorded during the current assessment.	Curly Sedge is a small to medium size grass-like species which typically grows in seasonally damp grassland or grassy woodland (Carter 2010).
Graminoid	*Diuris basaltica*	Orchidaceae	Small Golden-moths	En	v	L	✓		DSE Review		0	Low	The largest known population occurs on private land at Rockbank (Backhouse and Lester 2009). Suitable habitat within PSP 42 North was searched although this species was not recorded.	This orchid is endemic to Melbourne's west where it occurs in Plains Grassland dominated by tussock-forming perennial grasses (including Kangaroo Grass); often with embedded surface basalt (Backhouse & Lester 2009). Like most other terrestrial orchid species in Victoria, this species is summer deciduous. Its underground tuberoids may persist for several seasons but not produce leaves or flowers in the absence of suitable conditions.
Graminoid	*Diuris fragrantissima*	Orchidaceae	Sunshine Diuris	En	e	L	✓		DSE Review		0	Low	There are two known populations of this species, one in Sunshine and one in Altona. It is highly unlikely that this species occurs on site due to weed invasion and changes in land use that has occurred on site. Suitable habitat within PSP 42 North was searched although this species was not recorded.	This orchid is one of the most threatened orchids in Australia. It used to be abundant on the grassy plains in Melbourne, but has suffered a significant decline in range and abundance. This species is now confined to two sites, one in Sunshine and one in Altona. This species is very close to extinction in the wild.

Lifeform	Scientific Name	Family Name	Common Name	Conservation Status			Regional Significance	Database	Other Sources	Current Survey	Total No. of Documented Records*	Likely Occurrence in Study Area**	Likelihood reasoning	Habitat Description
				EPBC	DSE	FFG								
Forb	*Glycine latrobeana*	Fabaceae	Clover Glycine	VU	v	L	✓	DSEWPaC	DSE Review		0	Medium	Higher quality grassland within PSP 42 North may be suitable habitat for this species although it was not recorded during the current assessment.	Clover Glycine is a small herb. It occupies Kangaroo Grass dominated grassland and grassy woodland throughout western Victoria as well as a number of other vegetation type elsewhere (Carter and Sutter 2010).
Forb	*Lepidium hyssopifolium*	Brassicaceae	Basalt Peppercress	EN	e	L	✓		DSE Review		0	Low	There are no historical records of this species within 5km of PSP 42 North and it was not found during the current assessment.	Basalt Peppercress is a medium size herb which persists at very few sites in Victoria (Walsh and Entwisle 1996). It occupies a range of grassland and woodland communities and is dependent on particular disturbance regimes (Cropper 1993).
Shrub	*Pimelea spinescens* subsp. *spinescens*	Thymeleaceae	Spiny Rice-flower	CR	e		✓	DEWHA / DSE	DSE Review		2	High	Higher quality grassland within PSP 42 North may be suitable habitat for this species, particularly within roadsides, although it was not recorded during the current assessment. Targeted surveys for this species are required during the appropriate time of year (April-August).	This subspecies is a small shrub which typically occupies Plains Grassland between Keilor and Dunkeld in the state's west. It is able to occupy grassland in varying condition although it does not persist with ongoing soil disturbance such as ploughing. Areas where this species are more abundant include Plains Grassland with a moderate diversity of other native species and some open spaces between grass tussocks. However, this subspecies has also been observed in grassland dominated by introduced perennial grasses provided that other conditions allow it to persist.
Forb	*Prasophyllum frenchii*	Orchidaceae	Maroon Leek-orchid	EN	e	L	✓	DEWHA			0	Negligible	It has not been recorded within 10 km of the precinct. The nearest record is near Warrambine to the west. There is a low likelihood that this species would occur within the precinct.	Maroon Leek-orchid is a small to medium size herb which, like most other terrestrial orchid species in Victoria, is summer deciduous. It occupies a range of habitats types including grassland vegetation.

Lifeform	Scientific Name	Family Name	Common Name	Conservation Status			Regional Significance	Database	Other Sources	Current Survey	Total No. of Documented Records*	Likely Occurrence in Study Area**	Likelihood reasoning	Habitat Description
				EPBC	DSE	FFG								
Forb	*Rutidosis leptorhynchoides*	Asteraceae	Button Wrinklewort	EN	e	L	✓	DEWHA / DSE	DSE Review		8	Medium	The most recent record of this species in the local area is from 1979. However, it is possible that this species may occupy high quality grassland within PSP 42 North although it was not found during the current assessment.	Button Wrinklewort occupies some higher quality Plains Grassland and Grassy Woodland in Western Victoria and is quite scarce in the Melbourne region. Some Plains Grassland within the precinct appear to be structurally suitable for this species but lacks the appropriate fire regime (DSE 2003) which is likely to be required for broader scale maintenance of this species' habitat requirements.
Forb	*Senecio macrocarpus*	Asteraceae	Large-headed Fireweed	VU	e	L	✓	DEWHA/DSE	DSE Review		9	Medium	There is one area of grassland within PSP 42 North that may be suitable habitat for this species, Habitat Zone 16, although it was not recorded during the current assessment.	This species grows on heavy soil in vegetation including grassland, shrubland and woodland but is typically associated with grassland in western Melbourne (DSE 2009). It is sensitive to inappropriate fire regimes and may persist in relatively long unburnt grassland.
Forb	*Senecio psilocarpus*	Asteraceae	Swamp Fireweed	VU	v		✓		DSE Review		0	Negligible	No potential habitat occurs on site, the creekline and wetlands have been significantly modified. There are no historical records of this species from within 10 km of PSP 42 North and it was not recorded during the current assessment.	This species is a medium size herb with a cylindrical cluster of small yellow flowers. It grows in seasonally inundated grassy vegetation. Areas of Plains Grassy Wetland or related EVC are potential habitat for this species.
Forb	*Xerochrysum palustre*	Asteraceae	Swamp Everlasting	VU	v	L	✓		DSE Review		0	Negligible	There may be potential habitat within the wetlands, but these have been significantly modified. There are no historical records of this species from within 10 km of PSP 42 North and it was not recorded during the current assessment.	This species is a relatively large yellow flowered daisy which grows in seasonally inundated sites or permanent wetland habitats. This species is endemic to south-east Australia.

Lifeform	Scientific Name	Family Name	Common Name	Conservation Status			Regional Significance	Database	Other Sources	Current Survey	Total No. of Documented Records*	Likely Occurrence in Study Area**	Likelihood reasoning	Habitat Description
				EPBC	DSE	FFG								
	State Significance													
Tree	*Allocasuarina luehmannii*	Casuarinaceae	Buloke			L	✓	DSE			1	Negligible	This species has been recorded within PSP 41, but has not been recorded during the current or past assessments in PSP 42 North.	Buloke is a medium size tree which occurs predominantly in the state's northwest. It occurs in scattered location on the volcanic plain west of Melbourne and has recorded from the precinct, but not within PSP 42 North.
Forb	*Alternanthera* sp. 1 (Plains)	Amaranthaceae	Plains Joyweed		k		✓		DSE Review		0	Medium	There is suitable habitat for this species to occur roadsides and within grassland patches near moister soils. However, this species was not recorded during the present assessment.	This species is scattered throughout grassland in Melbourne's west where it is often associated with moist soils; although it has been observed (e.g. around Melton) in drier rocky situations.
Shrub	*Atriplex paludosa* subsp. *paludosa*	Chenopodiaceae	Marsh Saltbush		r		✓	DSE			1	Negligible	There is no potential or suitable habitat for this species within PSP 42 North. Coastal or near coastal Saltmarsh has not been recorded within the study area.	This is a sprawling shrub to 1.6m tall. This species is commonly found on the fringes of coastal and near-coastal Saltmarsh (Walsh and Entwisle 1994).
Forb	*Ceratophyllum demersum*	Ceratophyllaceae	Hornwort		k			DSE			1	Low	There is no suitable habitat for this species. Wetlands within the study area were all ephemeral and were not permanent, still or deep waterbodies.	A submerged, semi-aquatic herb which is scattered throughout Victoria. This species forms dense growth in fresh still, deep to slow flowing waters.
Forb	*Comesperma polygaloides*	Polygalaceae	Small Milkwort		v	L	✓	DSE	DSE Review		1	Medium	Plains Grassland provides suitable habitat for this species although it has not been recorded within 5 km of PSP 42 North and was not recorded during the current assessment.	In western Melbourne, Small Milkwort grows in Kangaroo Grass dominated grassland where is occurs in localised patches (McIntyre et al. 2004).

Lifeform	Scientific Name	Family Name	Common Name	Conservation Status			Regional Significance	Database	Other Sources	Current Survey	Total No. of Documented Records*	Likely Occurrence in Study Area**	Likelihood reasoning	Habitat Description
				EPBC	DSE	FFG								
Scrambler	*Convolvulus angustissimus* subsp. *omnigracilis*	Convolvulaceae	Slender Bindweed		k		✓		DSE Review		0	High	The species was not recorded during the current assessment. There is some likelihood that it occurs within patches of Plains Grassland within the precinct although its presence was not recorded during targeted searches.	This small, trailing herb with pink flowers is endemic to Victoria. This taxon has been recorded throughout the western plains of Melbourne and is typically associated with Plains Grassland.
Forb	*Cullen parvum*	Fabaceae	Small Scurf-pea		e	L	✓	DSE	DSE Review		2	Low	This species may be found in such vegetation types within PSP 42 North, including drainage lines associated with Lollypop Creek and extensive populations have been found in PSP 41 to the north of the study area. However, the suitable habitat for this species in PSP 42 North is substantially modified due to cropping and it was not recorded during the current assessment.	Small Scurf-pea is a small trailing herb with three to five narrow leaves and pale purple or white flowers. This species typically occupies Plains Grassland and sites which are subject to irregular flooding.
Forb	*Cullen tenax*	Fabaceae	Tough Scurf-pea		e	L	✓		DSE Review		0	Medium	This species was not recorded within PSP 42 North during the current assessment and has not been recorded within 5km of PSP 42 North. However, there is potential for it to be found in Plains Grassland patches following a change in conditions e.g. fire	Tough Scurf-pea is a medium size herb which typically occupies Plains Grassland, but may also be found in a number of other EVCs locally.
Forb	*Desmodium varians*	Fabaceae	Slender Tick-trefoil		k		✓		DSE Review		0	Low	This species may be found in such vegetation types within PSP 42 North, including drainage lines associated with Lollypop Creek. However, the suitable habitat for this species in PSP 42 North is substantially modified due to cropping and it was not recorded during the current assessment.	Slender Tick-trefoil grows in a broad range of vegetation types within well drained soils. There are several records of this species scattered in Melbourne's western plains.

Lifeform	Scientific Name	Family Name	Common Name	Conservation Status			Regional Significance	Database	Other Sources	Current Survey	Total No. of Documented Records*	Likely Occurrence in Study Area**	Likelihood reasoning	Habitat Description
				EPBC	DSE	FFG								
Graminoid	*Dianella* sp. aff. *longifolia* (Benambra)	Hemerocallidaceae	Arching Flax-lily		v		✓		DSE Review		0	Medium	Although most patches within the PSP are modified, any remnant grassland within the precinct is habitat for this species.	This species is scattered in grassland and woodland of varying condition within broader western Melbourne area and within the precinct. It is conspicuous and readily visible most times of the year.
Graminoid	*Eleocharis pallens*	Cyperaceae	Pale Spike-sedge		k		✓		DSE Review		0	High	This species has the potential to occur within the large Aquatic Herbland within this PSP, although it had not been recorded during the present assessment.	This medium herb grows in seasonally inundated areas such as Plains Grassy Wetland patches and dies back during drier periods.
Graminoid	*Eragrostis trachycarpa*	Poaceae	Rough-grain Love-grass		r		✓	DSE			3	Medium	The validity of the records associated with western Melbourne is uncertain as it is mainly restricted to the Gippsland region. The nearest record is within 5 km to the south of PSP 42 North. It was not recorded during the current assessment.	This is a rare grass which was first recorded at Providence Ponds. It is mainly confined to moist sites in the lower catchments of the Gippsland Lakes. However, a few outlier records greater than 20 years old also occur near Bulban Road, Werribee.
Tree	*Eucalyptus leucoxylon* subsp. *connata*	Myrtaceae	Melbourne Yellow-gum		v		✓	DSE	DSE Review	Recorded	1	Recorded	This species has been recorded within PSP 42 North in a small, significantly disturbed uncropped area.	This is a subspecies which occurs on well drained slopes in a restricted area around Melbourne and Geelong.
Forb	*Helichrysum* aff. *Rutidolepis* (Lowland Swamp)	Asteraceae	Pale Swamp Everlasting		v		✓		DSE Review		0	Low	There may be potential habitat within the wetlands, but these have been significantly modified. There are no historical records of this species from within 10 km of PSP 42 North and it was not recorded during the current assessment.	This medium herb typically occupies seasonally inundated areas including wet depressions in Plains Grassland or Plains Grassy Wetland patches.

Lifeform	Scientific Name	Family Name	Common Name	Conservation Status			Regional Significance	Database	Other Sources	Current Survey	Total No. of Documented Records*	Likely Occurrence in Study Area**	Likelihood reasoning	Habitat Description
				EPBC	DSE	FFG								
Forb	*Podolepis* sp. 1	Asteraceae	Basalt Podolepis		e		✓		DSE Review		0	Medium	There are several areas of suitable grassland habitat within the precinct for this species although it was not recorded during the present assessment.	Basalt Podolepis is a medium to large herb which grows in a range of grasslands and grassy woodlands. The majority of records for western Melbourne are located near Laverton, about 12 km to the west of the precinct.
Graminoid	*Thelymitra gregaria*	Orchidaceae	Basalt Sun-orchid		e	L	✓		DSE Review		0	Low	Habitat exists within PSP 42 North, but it has been modified and it was not recorded during the present assessment. All records in western Melbourne are more than 50 years old and not within 5 km of PSP 42 North.	Basalt Sun orchid is a medium size herb which grows in Kangaroo Grass dominated grassland with poorly draining soils (Coates 2003).
Graminoid	*Tripogon loliiformis*	Poaceae	Rye Beetle-grass		r		✓	DSE			2	High	This species may be found in Plains Grassland patches within the precinct and have been given high likelihood of occurrence as it has been recorded within 5 km of PSP 42 North.	Rye Beetle-grass occurs predominantly in drier Plains Grassland and grassy woodlands (Walsh and Entwisle 1994) and is a short lived annual grass.

National significance – CE (critically endangered), EN (endangered), VU (vulnerable), R (rare), K (poorly known). State significance – e (endangered), v (vulnerable), r (rare), k (poorly known), L (*Flora and Fauna Guarantee Act* listed). * from review data only, refer to Figure 3 for records from the current assessment. ** Rationale for likelihood of occurrence is largely based on the amount and quality of habitat present within the precinct (A2.2).

3.1.3 Best or remaining 50% of habitat for rare or threatened flora species

The habitats within PSP 42 North generally comprise exotic pasture or crop with undulating grassland, a creekline and wetlands. The native grassland varies in condition and contains a mix of native and introduced herbs. Native grassland vegetation commonly contains sub-surface rocks where soil disturbance and grazing has been reduced. Wetlands are modified, but after sufficient rain have been observed to return to a natural state. Some dry creek bed areas occur, but these have been cropped and sown with Wheat.

Table 1 describes the general habitat requirements of rare or threatened species recorded during this investigation (Table 1). The presence of best or remaining 50% of habitat for these species within the bioregion was determined for PSP 42 North for species which are considered to have at least a medium likelihood of occurrence within the precinct (Table 2).

Table 2 provides detail of whether native vegetation zones delineated for assessing vegetation condition constitute the best 50% or remaining 50% of habitat for relevant rare or threatened species (in Table 1) within the Victorian Volcanic Plain bioregion; in sense of the Native Vegetation Framework. Species listed as poorly known (k) in Victoria warrant further study to determine their status, but as they are not currently deemed threatened or rare, therefore they are not considered in determining if the habitat zone is the best or remaining 50% habitat for those species under Table 5 of *Victoria's Native Vegetation Management - A Framework for Action* (DNRE 2002).

Table 2. Determination of best or remaining 50% of habitat for a rare or threatened plant species

Species	**Conservation Status**	**Habitat zone** (Figure 4)	**Steps***	**Outcome**	**Conservation Significance** (threatened species rating)	**Notes**
Clover Glycine	Threatened	1, 16, 18, 20, 21, 22, 23, 24	A, D – F	Best 50% habitat	Very High	Habitat zones have habitat that clearly meets the requirements of the species and the sites represent above-average condition and landscape context for the EVC.
		5, 6, 7, 8, 15, 17, 19, 25	A, D – F	Remaining 50% habitat	High	Habitat zones have habitat that clearly meets the requirements of the species, but the sites represent below-average condition and landscape context for the EVC.
		2, 3, 4	A, D	No further consideration	N/A	Habitat on these sites does not meet the requirements for this species.
Spiny Rice-flower	Threatened	1, 16, 18, 20, 21, 22, 23, 24	A, D – F	Best 50% habitat	Very High	Habitat zones have habitat that clearly meets the requirements of the species and the sites represent above-average condition and landscape context for the EVC.
		5, 6, 7, 8, 15, 17, 19, 25	A, D – F	Remaining 50% habitat	High	Habitat zones have habitat that clearly meets the requirements of the species, but the sites represent below-average condition and landscape context for the EVC.
		2, 3, 4	A, D	No further consideration	N/A	Habitat on these sites does not meet the requirements for this species.
Button Wrinklewort	Threatened	1, 16, 18, 20, 21, 22, 23, 24	A, D – F	Best 50% habitat	Very High	Habitat zones have habitat that clearly meets the requirements of the species and the sites represent above-average condition and landscape context for the EVC.
		5, 6, 7, 8, 15, 17, 19, 25	A, D – F	Remaining 50% habitat	High	Habitat zones have habitat that clearly meets the requirements of the species, but the sites represent below-average condition and landscape context for the EVC.
		2, 3, 4	A, D	No further consideration	N/A	Habitat on these sites does not meet the requirements for this species.
Large-headed Fireweed	Threatened	1, 16, 18, 20, 21, 22, 23, 24	A, D – F	Best 50% habitat	Very High	Habitat zones have habitat that clearly meets the requirements of the species and the sites represent above-average condition and landscape context for the EVC.

Species	**Conservation Status**	**Habitat zone** (Figure 4)	**Steps***	**Outcome**	**Conservation Significance** (threatened species rating)	**Notes**
		5, 6, 7, 8, 15, 17, 19, 25	A, D – F	Remaining 50% habitat	High	Habitat zones have habitat that clearly meets the requirements of the species, but the sites represent below-average condition and landscape context for the EVC.
		2, 3, 4	A, D	No further consideration	N/A	Habitat on these sites does not meet the requirements for this species.
Small Milkwort	Threatened	1, 16, 18, 20, 21, 22, 23, 24	A, D – F	Best 50% habitat	Very High	Habitat zones have habitat that clearly meets the requirements of the species and the sites represent above-average condition and landscape context for the EVC.
		5, 6, 7, 8, 15, 17, 19, 25	A, D – F	Remaining 50% habitat	High	Habitat zones have habitat that clearly meets the requirements of the species, but the sites represent below-average condition and landscape context for the EVC.
		2, 3, 4	A, D	No further consideration	N/A	Habitat on these sites does not meet the requirements for this species.
Tough Scurf-pea	Threatened	1, 16, 18, 20, 21, 22, 23, 24	A, D – F	Best 50% habitat	Very High	Habitat zones have habitat that clearly meets the requirements of the species and the sites represent above-average condition and landscape context for the EVC.
		5, 6, 7, 8, 15, 17, 19, 25	A, D – F	Remaining 50% habitat	High	Habitat zones have habitat that clearly meets the requirements of the species, but the sites represent below-average condition and landscape context for the EVC.
		2, 3, 4	A, D	No further consideration	N/A	Habitat on these sites does not meet the requirements for this species.
Arching Flax-lily	Threatened	1, 16, 18, 20, 21, 22, 23, 24	A, D – F	Best 50% habitat	Very High	Habitat zones have habitat that clearly meets the requirements of the species and the sites represent above-average condition and landscape context for the EVC.
		5, 6, 7, 8, 15, 17, 19, 25	A, D – F	Remaining 50% habitat	High	Habitat zones have habitat that clearly meets the requirements of the species, but the sites represent below-average condition and landscape context for the EVC.
		2, 3, 4	A, D	No further consideration	N/A	Habitat on these sites does not meet the requirements for this species.

Species	**Conservation Status**	**Habitat zone** (Figure 4)	**Steps***	**Outcome**	**Conservation Significance** (threatened species rating)	**Notes**
Melbourne Yellow-gum	Threatened	All habitat zones	A, D	No further consideration	N/A	Habitat on these sites does not meet the requirements for this species.
Rough-grain Love-grass	Rare	2, 3, 4	A, D – F	Best 50% habitat	High	Habitat zones have habitat that clearly meets the requirements of the species and the sites represent above-average condition and landscape context for the EVC.
		All habitat zones	A, D	No further consideration	N/A	Habitat on these sites does not meet the requirements for this species.
Basalt Podolepis	Threatened	1, 16, 18, 20, 21, 22, 23, 24	A, D – F	Best 50% habitat	Very High	Habitat zones have habitat that clearly meets the requirements of the species and the sites represent above-average condition and landscape context for the EVC.
		5, 6, 7, 8, 15, 17, 19, 25	A, D – F	Remaining 50% habitat	High	Habitat zones have habitat that clearly meets the requirements of the species, but the sites represent below-average condition and landscape context for the EVC.
		2, 3, 4	A, D	No further consideration	N/A	Habitat on these sites does not meet the requirements for this species.
Rye Beetle-grass	Rare	1, 16, 18, 20, 21, 22, 23, 24	A, D – F	Best 50% habitat	High	Habitat zones have habitat that clearly meets the requirements of the species and the sites represent above-average condition and landscape context for the EVC.
		5, 6, 7, 8, 15, 17, 19, 25	A, D – F	Remaining 50% habitat	Medium	Habitat zones have habitat that clearly meets the requirements of the species, but the sites represent below-average condition and landscape context for the EVC.
		2, 3, 4	A, D	No further consideration	N/A	Habitat on these sites does not meet the requirements for this species.

***** Habitat assessment for threatened species taken from Table 2 of the Native Vegetation Guide for assessment of referred planning permit applications (DSE 2007).

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 Best50% 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

3.1.4 Vegetation

3.1.4.1 Ecological Vegetation Classes

One EVC was recorded within PSP 42 North by AECOM (AECOM 2010). Plains Grassland was represented by the floristic communities *Heavier-soils* Plains Grassland (EVC 132_61). Upon review, we have updated the habitat hectares information to reflect what was recorded on site during the recent assessment. Plains Grassland patches were therefore changed to the floristic community *Low-rainfall* Plains Grassland. One additional EVC was located on site during the current assessment, Aquatic Herbland (EVC 653).

Plains Grassland and Aquatic Herbland are both endangered within the Victorian Volcanic Plain bioregion, due to their reduction in area of occupancy since 1750 (www.dse.vic.gov.au).

DSE mapping of 1750 vegetation (a 1:25,000 scale map of vegetation as at this date) models the majority of PSP 42 North as previously supporting Plains Grassland (EVC 132) with two Plains Grassy Wetlands (EVC 125). The DSE 2005 EVC vegetation mapping indicates that approximately 40% of the native vegetation has been cleared since 1750 and Plains Grassland and Plains Grassy Wetland remain.

AECOM mapped 15 habitat zones containing Plains Grassland within PSP 42 North. An additional four habitat zones were recorded in PFI 52401355 during the recent assessment. The following general description for Plains Grassland and Aquatic Herbland recorded in PSP 42 North is based on data collected during the current assessment.

***Low-rainfall* Plains Grassland**

A total of **12.83 ha** of Plains Grassland were mapped in PSP 42 North in the recent assessment and by AECOM (AECOM 2010; Figure 4; Plate 1). Of the native species present, this EVC was dominated by grasses such as Kneed Spear-grass *Austrostipa bigeniculata*, Brown-back Wallaby-grass *Austrodanthonia duttoniana*, Kangaroo-grass *Themeda triandra* and Windmill Grass *Chloris truncata*. Shrubs were typically very sparse in this EVC and the floristic composition is determined largely by annual rainfall and localised hydrology. Common forb or shrub species present include Clammy Goosefoot *Chenopodium pumilio*, Wingless Bluebush *Maireana enchylaenoides*, Blue Heron's-bill *Erodium crinitum*, Kidney Weed *Dichondra repens* and Blushing Bindweed *Convolvulus angustissimus*.

Typical weeds include Red-flower Mallow *Modiola caroliniana*, Artichoke Thistle *Cynara cardunculus*, Toowoomba Canary-grass *Phalaris aquatica*,

Serrated Tussock *Nassella trichotoma*, Onion Grass *Romulea rosea*, Galenia *Galenia pubescens* var. *pubescens* and Big Heron's-bill *Erodium botrys.*

Plate 1: Plains Grassland recorded in PFI 52401355

Aquatic Herbland

A total of **6.63 ha** of Aquatic Herbland were mapped in PSP 42 North during the recent assessment (Figure 4; Plate 2). Of the native species present, this EVC was dominated by Common Nardoo *Marsilea drummondii*, *Ottelia ovalifolia*, Common Spike-sedge *Eleocharis acuta*, Common Duckweed *Lemna disperma* and Southern Cane-grass *Eragrostis infecunda*.

Typical weeds include Hogweed *Polygonum aviculare*, Spear Thistle *Cirsium vulgare*, Toowoomba Canary-grass and Bathurst Burr *Xanthium spinosum*.

One patch (HZ 4) of Aquatic Herbland had been given the default score for wetland systems as this area had been previously cropped. Following the heavy rainfall over summer the wetland filled up, but did not have time to recover to it's natural state prior to our assessment.

Plate 2: Aquatic Herbland recorded in PFI 52401355

Other vegetation mapping units

Degraded Treeless Vegetation is composed of highly disturbed agricultural and land consisting of predominantly introduced vegetation. By definition, it does not include vegetation where indigenous trees are present. It mainly consists of areas used for cereal crop production or sown pastures for grazing and as such is dominated by typical crop weed species, disturbance species and pasture grasses.

A total of 489.66 ha of Degraded Treeless Vegetation were mapped in PSP 42 North in the recent assessment and by Biosis Research (Biosis Research 2009b) and AECOM (AECOM 2010). These areas generally contain vegetation dominated by cereal crops and a mix of introduced herbs including annual grasses (Plate 3). Common species present include Barley *Hordeum vulgare*, Wheat *Triticum aestivum*, Serrated Tussock, Artichoke Thistle, Wimmera Rye-grass *Lolium rigidum*, Bathurst Burr and Ribwort *Plantago lanceolata*.

A very low cover of indigenous herbs including Kidney Weed, Clammy Goosefoot, Slender Dock *Rumex brownii* and Berry Saltbush *Atriplex semibaccata* are often present within this vegetation. However, the cover of

these does not meet the definition threshold as a patch of native vegetation under the Native Vegetation Framework (NRE 2002).

Three habitat zones, HZ 5, 6 and 7, no longer qualify as a patch of vegetation as these areas have been cleared, de-rocked and sown with Barley. We could not confirm if these areas qualified as the EPBC listed community *Natural Temperate Grassland of the Victorian Volcanic Plain.*

No areas of Non-native Vegetation were mapped.

Plate 3: Degraded Treeless Vegetation

3.1.4.2 Protected plant communities

The Australian Government Policy Statement 3.8 states that the listed ecological community *Natural Temperate Grassland of the Victorian Volcanic Plain* (NTG VVP; critically endangered) is present within the western suburbs of Melbourne and extends to Hamilton in western rural Victoria, and follows most closely the floristics of Plains Grassland (EVC 132) and Creekline Tussock Grassland (EVC 654). Creekline Tussock Grassland has not been mapped during the current

assessment within PSP 42 North. However, Plains Grassland (and the EPBC-listed ecological community) is present within PSP 42 North (Figure 4).

A total of 9.77 ha of NTG VVP was recorded within PSP 42 North (Figure 4). Three habitat zones (HZ 5, 6 and 7) mapped by AECOM in 2008/2009 do not meet the criteria listing as these patches no longer exist and have been cropped. HZ 19 does not meet the size criteria of the listed community (<0.05 ha). Due to differences in weed cover, some of the boundaries of Plains Grassland and NTG VVP are different and have been mapped accordingly (Figure 4).

All areas identified as meeting the EPBC listed grassland community, including Plains Grassland patches, also meet the definition criteria for the FFG Act listed community Western (Basalt) Plains Grassland. The description contained within the relevant FFG Action Statement equates the community to Plains Grassland (EVC 132) present within the area bounded by the Plenty River (Melbourne) to the east, Hamilton to the west, Beaufort to the north and Colac to the south. Therefore, all Plains Grassland mapped within PSP 42 North and some areas of native vegetation outside of these patches are also considered to be the FFG Act-listed Western (Basalt) Plains Grassland Community (Figure 4).

All EVCs recorded in PSP 42 North are considered by DSE to be endangered within the Victorian Volcanic Plain bioregion.

3.1.4.3 Geographic context of native vegetation

The native vegetation within the precinct has an influence on the vegetation outside of the precinct. In a landscape context, the extant native vegetation provides a source and sink for species reproductive propagules and genetic material which, with availability of suitable habitat, is the basis for the ongoing persistence of populations.

Many species populations within the precinct will be connected in some way with those outside of the precinct (e.g. breeding between colonies, adjoining territories and complex population structures). Furthermore, some native vegetation and fauna habitats are contiguous with the same types on adjoining land.

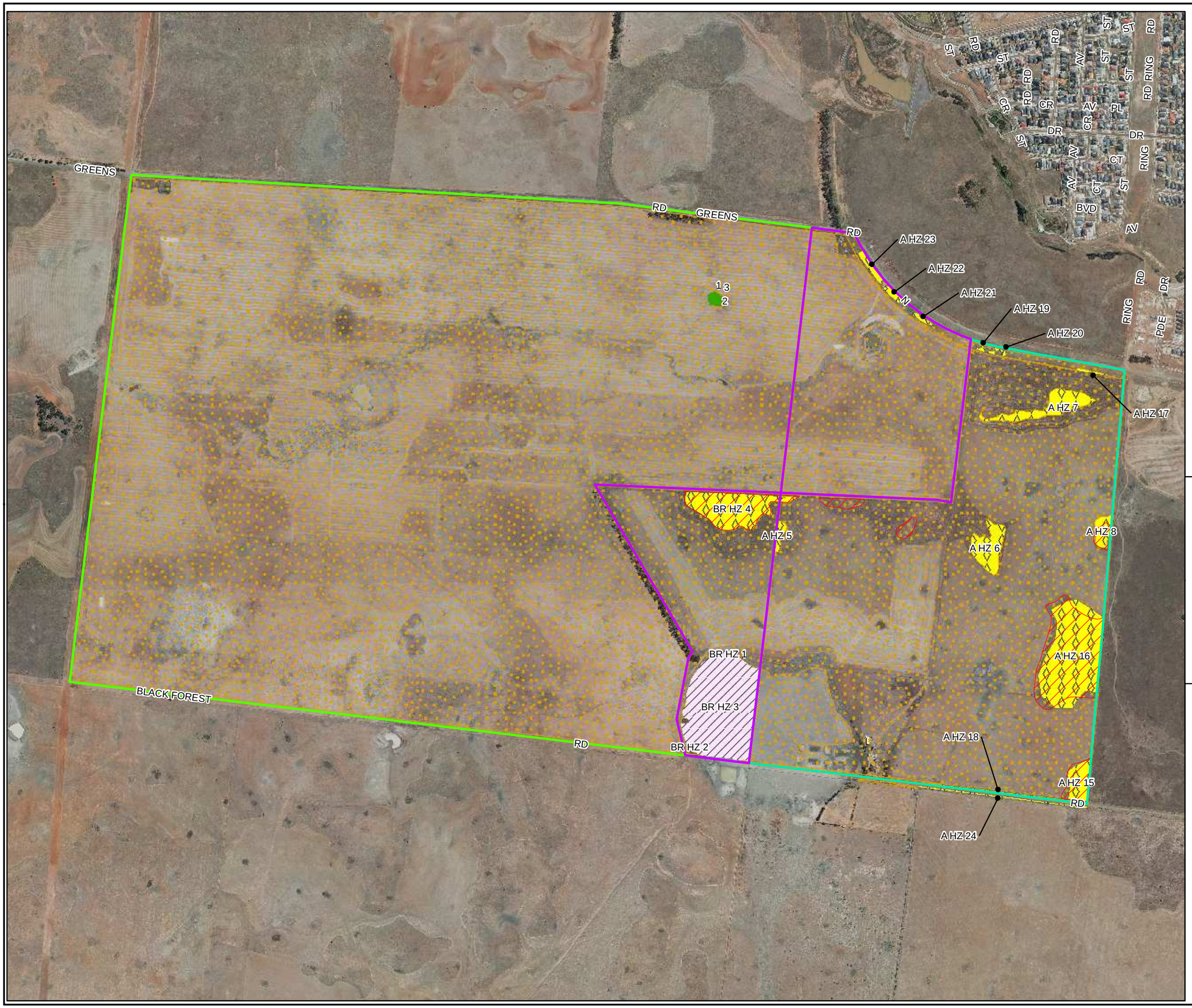
Remnant native vegetation within the precinct provides habitat for a suite of native species. The majority of these species were not the subject of surveys undertaken for the current assessment but are vital for maintaining ecological processes which exist. They include fungi, lichens, non-vascular plants (mosses, liverworts and hornworts) and invertebrate animals. These species in addition to those recorded during the current assessment have evolved in conditions typically provided by intact native vegetation with a natural soil structure.

PSP 42 North contains one regionally significant BioSite (Wyndham Vale Swamp – 4561).

DSEs Interactive Maps show approximately 40% of the within 10 km surrounding the precinct as occupied by remnant native vegetation, the majority of which is Plains Grassland. This area includes significant Plains Grassland patches including the proposed Western Grassland Reserves, as well as numerous swamps and wetlands, the Werribee River, Lollypop Creek and a number of National, State and Regionally significant BioSites.

In a regional, state and national context, the native vegetation present is significant as it:

- Provides potential habitat for state or nationally rare or threatened species;
- Includes one plant taxon of state significance – Melbourne Yellow-gum;
- Provides habitat for plant communities which are nationally threatened; and
- Includes one regionally significant Biosite (Wyndham Vale Swamp).



Legend

- EPBC listed Natural Temperate Grassland of the Victorian Volcanic Plain

EVC

- 132_63 Low-rainfall Plains Grassland
- 653 Aquatic Herbland

Other vegetation

- Degraded Treeless Vegetation

Scattered Tree

- Medium Old Tree

Vegetation Quality Assessments

- AECOM 08-09/09-10
- BR 08-09
- BR 10-11

Figure 4: Vegetation, PSP 42 North

N

GDA 94 MGA Zone 55
1:11,000 at A3

0 250 500
Meters

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BIOSIS RESEARCH

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Date: 08 April 2011, File number: 12536
Checked by: JAF, Drawn by: SKM/STF
Location: P:\12500s\12536\Mapping\12536 Fig 4 Vegetation.mxd

3.2 Habitat Hectare assessment

The benchmark for *Low-rainfall* Plains Grassland EVC and Aquatic Herbland EVC recorded within PSP 42 North is provided in Appendix 3.

3.2.1 Scattered Trees

The areas assessed within PSP 42 North by AECOM contained three scattered indigenous trees (Table 3).

Table 3: Scattered indigenous trees within PSP 42 North recorded by Biosis Research 2009

Tree number	Scientific Name	Common Name	Size class	Conservation Status	EVC	Bioregion	Other Attributes	Conservation Significance	Datum: GDA 94	
									Lat	Long
1	*Eucalyptus leucoxylon* subsp. *connata*	Melbourne Yellow-gum	MOT	Endangered	Plains Woodland	VVP	N/A	High	-37° 53' 3.49"	144° 35' 31.81"
2	*Eucalyptus leucoxylon* subsp. *connata*	Melbourne Yellow-gum	MOT	Endangered	Plains Woodland	VVP	N/A	High	-37° 53' 3.70"	144° 35' 31.98"
3	*Eucalyptus leucoxylon* subsp. *connata*	Melbourne Yellow-gum	MOT	Endangered	Plains Woodland	VVP	N/A	High	-37° 53' 3.73"	144° 35' 32.18"

3.2.2 Vegetation in Patches

AECOM identified a total of 15 habitat zones (or native vegetation polygons) within PSP 42 North in 2008/2009 (AECOM 2010, Table 4). An additional four habitat zones were identified in the recent assessment. No habitat zones were identified in PFI 210751891. The current extent, quality and conservation significance of these habitat zones is provided in Table 4 and 5.

For EVCs that are naturally treeless, the site condition scores were standardised (as appropriate) to maintain the relative weighting of site condition and landscape scores (DSE 2004).

A total of **19.45 hectares** (all Very High conservation significance) of native vegetation in habitat zones were mapped within PSP 42 North. The habitat hectares scores presented in AECOM 2010 were updated in the present assessment to reflect the correct floristic community, site condition and landscape context of the habitat zones. These habitat zones now comprise **6.52 habitat hectares (hha)** of *Low-rainfall* Plains Grassland and **3.02 hha** of Aquatic Herbland within PSP 42 North (Table 5).

Conservation significance

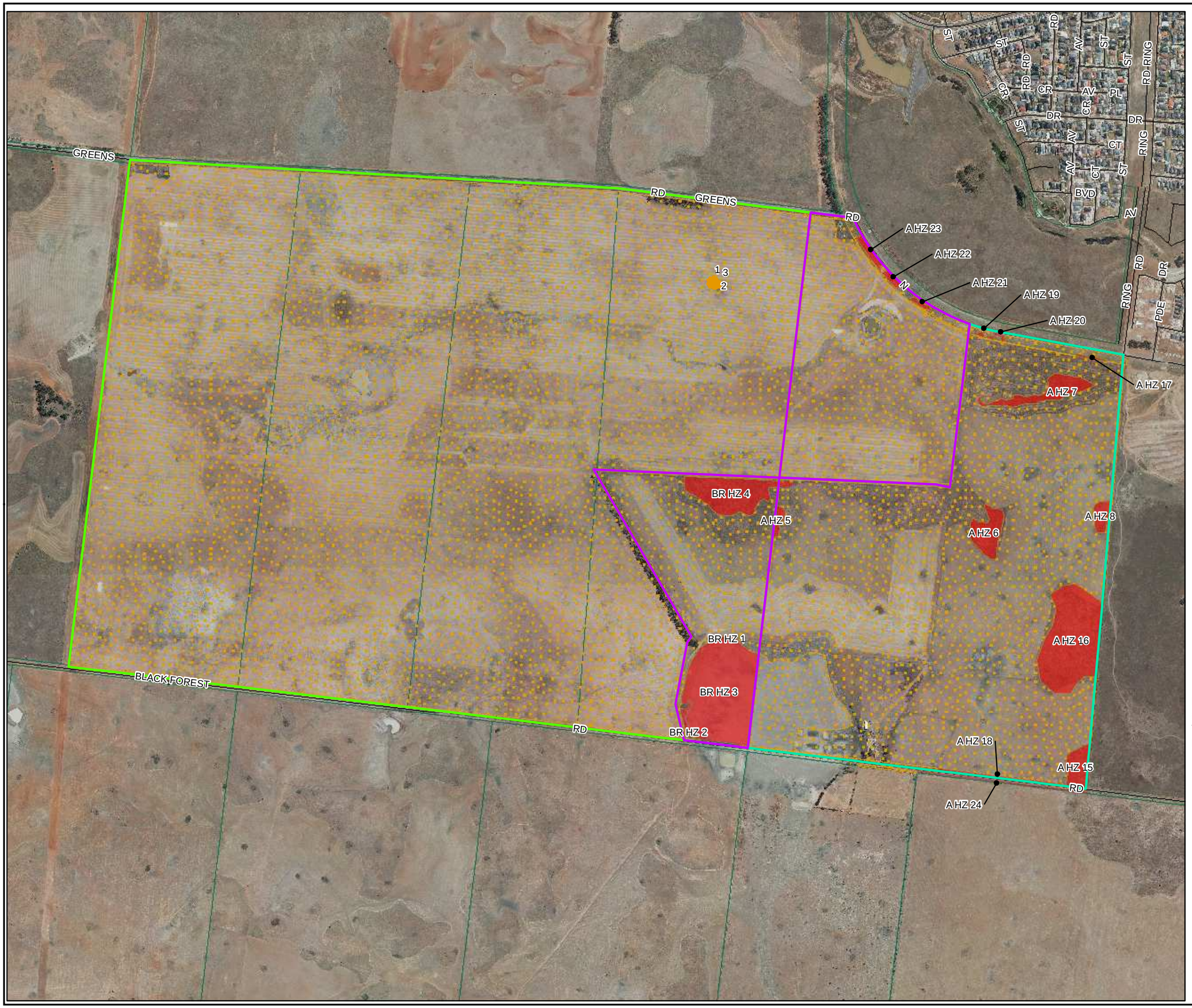
The conservation significance of each polygon of native vegetation within PSP 42 North is shown in Table 5. PSP 42 North supports **9.54 hha** of Very High conservation significance (Figure 5).

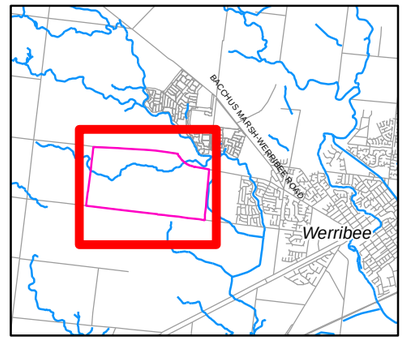
Table 4. Summary of habitat hectares for each patch of Plains Grassland mapped during the recent assessment and by AECOM within PSP 42 North. Habitat scores in zones 5–25 have been updated during the current assessment to update results recorded by AECOM.

Habitat zone	Area of zone	EVC	Habitat Score	Habitat Hectares	Conservation Status	Conservation Significance
1*	2.59	*Low-rainfall Plains Grassland*	0.57	1.47	Endangered	Very High
2*	0.07	*Aquatic Herbland*	0.40	0.03	Endangered	Very High
3*	0.24	*Aquatic Herbland*	0.52	0.13	Endangered	Very High
4*	6.32	*Aquatic Herbland*	0.45	2.87	Endangered	Very High
5	0.19	*Low-rainfall Plains Grassland*	0.40	0.08	Endangered	Very High
6	1.09	*Low-rainfall Plains Grassland*	0.41	0.45	Endangered	Very High
7	1.24	*Low-rainfall Plains Grassland*	0.43	0.53	Endangered	Very High
8	0.42	*Low-rainfall Plains Grassland*	0.30	0.13	Endangered	Very High
15	0.80	*Low-rainfall Plains Grassland*	0.41	0.33	Endangered	Very High
16	5.08	*Low-rainfall Plains Grassland*	0.55	2.79	Endangered	Very High
17	0.07	*Low-rainfall Plains Grassland*	0.32	0.02	Endangered	Very High
18	0.35	*Low-rainfall Plains Grassland*	0.51	0.18	Endangered	Very High
19	0.03	*Low-rainfall Plains Grassland*	0.39	0.01	Endangered	Very High
20	0.08	*Low-rainfall Plains Grassland*	0.46	0.04	Endangered	Very High
21	0.09	*Low-rainfall Plains Grassland*	0.50	0.05	Endangered	Very High
22	0.14	*Low-rainfall Plains Grassland*	0.61	0.09	Endangered	Very High
23	0.25	*Low-rainfall Plains Grassland*	0.61	0.15	Endangered	Very High

Habitat zone	Area of zone	EVC	Habitat Score	Habitat Hectares	Conservation Status	Conservation Significance
24	0.36	*Low-rainfall Plains Grassland*	0.54	0.19	Endangered	Very High
25	0.05	*Low-rainfall Plains Grassland*	0.44	0.02	Endangered	Very High

*Habitat Zones recorded during the recent assessment





Legend

Remnant Patches

Conservation significance

Very High

Other vegetation

Degraded Treeless Vegetation

Scattered Tree

Medium Old Tree

Vegetation Quality Assessments

08-09/09-10

BR 08-09

BR 10-11

Figure 5: Conservation significance of habitat zones according to the Native Vegetation Framework (NRE 2002), PSP 42 North

N

GDA 94 MGA Zone 55
1:11,000 at A3

0 250 500

Meters

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Date: 13 April 2011, File number: 12536
Checked by: JAF, Drawn by: SKM/STF
Location: P:\12500s\12536\Mapping\12536 Fig 5 Cons Sig.mxd

Table 5: Quantification and significance of habitat zones of native vegetation mapped in PSP 42 North

Biosis 2011 Habitat Zone, AECOM Habitat Zone			**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**TOTAL**
Bioregion			VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	
EVC #: Name			LRPG	AH	AH	AH	LRPG	LRPG	LRPG	LRPG	LRPG	LRPG	LRPG	LRPG	LRPG	LRPG	LRPG	LRPG	LRPG	LRPG	LRPG	
EVC Bioregional Conservation Status			E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	
		Max Score	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	
Site Condition	Large Old Trees	10	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	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	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
	Lack of Weeds	15	7	7	7	7	7	7	7	7	7	7	2	6	2	2	6	9	9	6	6	
	Understorey	25	15	10	15	10	5	5	10	5	5	15	10	10	10	10	10	15	15	15	15	
	Recruitment	10	3	6	6	6	3	3	0	3	3	3	3	6	3	6	6	6	6	3	3	
	Organic Matter	5	5	2	0	3	4	5	4	4	5	5	4	5	2	4	3	3	3	5	5	
	Logs	5	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
	Total Site Score		30	25	28	26	19	20	21	19	20	30	19	27	17	22	25	33	33	29	29	
	EVC standardiser (x 75/55)		1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	
	Adjusted Site Score		40.91	34.09	38.18	35.45	25.91	27.27	28.64	25.91	27.27	40.91	25.91	36.82	23.18	30.00	34.09	45.00	45.00	39.55	39.55	
Total Landscape Score			16	6	14	10	14	14	14	4	14	14	6	14	16	16	16	16	16	14	4	
HABITAT SCORE		**100**	56.91	40.09	52.18	45.45	39.91	41.27	42.64	29.91	41.27	54.91	31.91	50.82	39.18	46.00	50.09	61.00	61.00	53.55	43.55	
Habitat points = #/100		**1**	**0.57**	**0.40**	**0.52**	**0.45**	**0.40**	**0.41**	**0.43**	**0.30**	**0.41**	**0.55**	**0.32**	**0.51**	**0.39**	**0.46**	**0.50**	**0.61**	**0.61**	**0.54**	**0.44**	
Habitat Zone area (ha)			2.59	0.07	0.24	6.32	0.19	1.09	1.24	0.42	0.8	5.08	0.07	0.35	0.03	0.08	0.09	0.14	0.25	0.36	0.05	19.45
Habitat Hectares (Hha)			**1.47**	**0.03**	**0.13**	**2.87**	**0.08**	**0.45**	**0.53**	**0.13**	**0.33**	**2.79**	**0.02**	**0.18**	**0.01**	**0.04**	**0.05**	**0.09**	**0.15**	**0.19**	**0.02**	9.54
Conservation Significance	Conservation Status x Hab Score		VH	VH	VH	VH	VH	VH	VH	H	VH	VH	H	VH	H	VH	VH	VH	VH	VH	VH	
	Threatened Species Rating		VH	VH	VH	VH	n/a	n/a	n/a	H	VH	VH	H	VH	H	VH	VH	VH	VH	VH	VH	
	Other Site Attribute Rating		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
	Overall Conservation Significance (highest rating)		**VH**	**VH**	**VH**	**VH**	**VH**	**VH**	**VH**	**H**	**VH**	**VH**	**H**	**VH**	**H**	**VH**	**VH**	**VH**	**VH**	**VH**	**VH**	
Number of Large Old Trees present			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	

3.3 Targeted Flora Survey

The locations of all significant flora species records (including database records) within PSP 42 North are shown on Figure A3a–i (Appendix 5).

A total of 9.66 ha of land within PSP 42 North was searched for targeted flora species. Eighteen flora species were selected as priority species (by DSE) to be surveyed using targeted search methods described in Section 2.3.4 (Appendix 1). These were:

- Plains Joyweed *Alternanthera* sp. 1;
- Slender Bindweed *Convolvulus angustissimus* subsp. *omnigracilis*;
- Small Scurf-pea *Cullen parvum*;
- Arching Flax-lily *Dianella* sp. aff. *longifolia* (Benambra);
- Pale Spike-sedge *Eleocharis pallens*;
- Melbourne Yellow-gum *Eucalyptus leucoxylon* subsp. *connata*;
- Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens*;
- Button Wrinklewort *Rutidosis leptorhynchoides*;
- Sunshine Diuris *Diuris fragrantissima*;
- Small Golden-moths *Diuris basaltica*;
- Tough Scurf-pea *Cullen tenax*;
- Large-fruit Fireweed *Senecio macrocarpus*;
- Basalt Sun Orchid *Thelymitra gregaria*;
- Basalt Podolepis *Podolepis* sp. 1;
- Pale Swamp Everlasting *Helichrysum* aff. *rutidolepis* (Lowland Swamp);
- Swamp Everlasting *Xerochrysum palustre*;
- Slender Tick Trefoil *Desmodium varians*;
- Clover Glycine *Glycine latrobeana*;
- Small Milkwort *Comesperma polygaloides*;
- Basalt Peppercress *Lepidium hyssopifolium*; and
- Swamp Fireweed *Senecio psilocarpus.*

One of the target species, Melbourne Yellow-gum was recorded during the spring targeted searches and three plants were identified. While none of the other species were recorded, there is the potential for 13 additional species to occur within the study area. Further targeted searches will be conducted in late autumn/winter for Spiny Rice-flower.

Table 7. Targeted flora survey results

Assessor	Date	Property PFI	Time	Local climate conditions	Species recorded	Type of survey	Duration of survey
Julia Franco	23/11/2010	210751891	9am–4pm	Sunny, hot	*Eucalyptus leucoxylon* subsp. *connata*	Spring Targeted	7hrs
Julia Franco, Kylie Payze	28/02/2011	52401355	9am–5pm	Sunny, warm	None recorded	Summer Targeted	8hrs

3.4 Fauna

3.4.1 Fauna habitats

Fauna habitats that occur within PSP 42 North can be characterised according to vegetation communities and other natural and artificial features such as wetlands and rock walls. Fauna habitats vary in size and quality throughout the study area. Fauna habitats identified within PSP 42 North are shown in Figure 6 and described in detail below.

Plains grassland

Plains grassland is present in scattered and isolated patches that are separated by planted cereal crop. Plains grassland habitat is characterised by native perennial tussock grasses and other herbs growing within inter-tussock spaces. Trees and woody shrubs are typically absent. Much of the plains grassland habitat present on site contained loose surface rock and embedded rock (Plate 4).

The plains grassland habitat present on site was generally very dense in structure and tall (Plate 5). The increased densities and height of grassland within each patch was possibly in response to the unseasonably high rainfall recorded during recent months.

Plains grassland provides habitat for a diverse range of terrestrial fauna, many of which have national and state significance such as the Striped Legless Lizard *Delma impar* and Golden Sun Moth. However, no species of national and state significance were recorded. Several common bird species were observed foraging within plains grassland habitat, including Stubble Quail *Coturnix pectoralis* and Willie-wagtail *Rhipidura leucophrys*. Raptors that forage over open plains grassland areas including Swamp Harrier *Circus approximans* and Brown Falcon *Falco berigora* were also observed during the present survey. The dense tussocks and rocky areas provides suitable habitat for a number of ground dwelling species that were not recorded during the present survey, including Fat-tailed Dunnart *Sminthopsis crassicaudata*, Common Blue-tongue Lizard *Tiliqua scincoides* and Little Whip Snake *Suta flagellum.*

Plate 4: Exposed and surface rock located within plains grassland habitat.

Plate 5: Dense tall grassland patch where Plains-wanderer surveys were undertaken.

Remnant native trees

Three remnant native trees were present within a single isolate patch (Figure A3). Each tree contained several small hollows that were occupied by the introduced Common Blackbird *Turdus merula* and House Sparrow *Passer domesticus*.

Planted Vegetation

This habitat type is characterised by planted exotic and non-indigenous trees and shrubs typically found in wind-breaks or as scattered paddock trees. The non-indigenous Sugar Gum *Eucalyptus cladocalyx* was the most common species in the wind-break plantings present in the study area (Plate 6, Figure 6).

During the present study the Sugar Gums present on the survey site were flowering. This may have attracted some bird species onto the survey site that otherwise would not have been present or recorded. Common introduced and native woodland birds recorded among the planted trees included Common Blackbird, Magpie-lark *Grallina cyanoleuca* and Black-faced Cuckoo Shrike *Coracina novaehollandiae*. Raptors including the Brown Falcon were observed roosting on the dead branches of the Sugar Gum near Greens Road.

Plate 6: Planted Sugar Gums.

Exotic pasture or cultivated crop

This habitat type is characterised by exotic pasture grasses, weeds and agricultural crops. Extensive areas of PSP 42 North are presently being used for barley production (Plate 7). These areas are highly disturbed and as a consequence lack the food resources and protective cover required to support most native reptiles, frogs, birds and mammals. This is reflected in the poor species diversity and absence of native reptile and mammal observations recorded during the present survey.

Several open-country foraging bird species including the Australian Pipit *Anthus novaeseelandiae,* Horsfield's Bushlark *Mirafra javanica,* Australian Magpie *Gymnorhina tibicen,* Little Raven *Corvus mellori* and the introduced European Skylark *Alauda arvensis* were recorded among the cropped areas. Brown Falcons and Swamp Harriers were observed flying over these cultivated areas.

Plate 7: Extensive cultivated barley crop present on site.

Rock Walls and Rock Piles

Man made rock walls and piles are common features in the basalt plains west of Melbourne. There is one small loosely constructed rock wall and several rock piles scattered throughout the survey site (Figure 6). All of the rock piles appear

to have been constructed by rock removed from areas presently being used for barley crop production.

No fauna species were recorded from within the rock piles. However, similar rock piles and naturally occurring surface rock are known to offer potential habitat for the nationally significant Grassland Earless Dragon *Tympanocryptis pinguicolla* and Striped Legless Lizard.

Wetlands (drainage line and farm dams)

Wetlands and waterway habitats were present within the study areas as farm dams, ephemeral drainage lines and low-lying areas prone to seasonal inundation (seasonally ephemeral and large permanent) (Figure 6). These wetland habitats have the potential for attracting common, state or nationally significant fauna species, and varied in quality throughout the survey site. Those wetlands and farm dams near Greens Road were of poorer quality due to absence of native aquatic and riparian vegetation (Plate 8). In contrast, the large wetland near Black Forest Road contained high water levels and dense emergent and fringing vegetation. (Plate 9).

These wetland areas could potentially offer habitat and dispersal corridors for the national significant Growling Grass Frog *Litoria raniformis*. The species has previously been recorded within the study area at the Black Forest Road wetland in 1989. Wetland habitat within the study area also provides suitable foraging sites for the state significant Nankeen Night Heron *Nycticorax caledonicus*, Baillon's Crake *Porzana pusilla*, Musk Duck *Biziura lobata*, Blue-billed Duck *Oxyura australis* and Royal Spoonbill *Platalea regia.*

Plate 8: A small farm dam on the eastern margin of the study area. Note absence of native vegetation and presence of planted crop surrounding dam

Plate 9: Large wetland, Aquatic Herbland and farm dams located at the end of Black Forest Road.

3.4.5 Fauna species recorded

A total of 34 indigenous fauna species (23 birds, seven mammal species and four frog species) and eight introduced fauna species (six birds and two mammals) were recorded within the PSP 42 North study area during the present assessment (Appendix 4, Table A4.1).

Threatened fauna species

No species of national or state significance were recorded during the present assessment. There are 9 fauna species of national significance and 15 species of state significance that appear on database records within 5 km of the site (Table 7). The EPBC protected matters search tool also predicts the occurrence of, or suitable habitat for a further eight nationally significant species and one state significant species. An additional 17 species listed as 'near threatened' in Victoria have also been previously recorded or are predicted to occur within the vicinity of the study area (Table 7).

Of the state and nationally significant species that have been recorded or are predicted to occur within 5 km of the study area, ten species have a medium or higher likelihood of occurring within the study area. These include:

- Growling Grass Frog *Litoria raniformis* (EPBC listed – nationally Significant) - potential habitat identified within low-lying ephemeral wet lands and farm dams present at the end of Black Forest Road.

- Striped Legless Lizard *Delma impar* (EPBC listed - Nationally significant) - potential habitat identified in rocky Plains Grassland patches that occur throughout the study area.

- Golden Sun Moth *Synemon plana* (EPBC listed – Nationally significant) – potential habitat identified in plains grassland throughout the study area. Population confirmed from neighbouring property (Biosis Research 2011).

The areas of potential habitat for these species are shown in Figure 6. The general habitat requirements and reasoning for likelihood of occurrence of all fauna species recorded or predicted to occur within 5 km of the study area are provided in Table 7.

Table 7. Rare or threatened fauna species occurring or predicted to occur within 5 km of the study site.

Scientific Name	Common Name	Conservation status			Most Recent Record	Database	Other source	Current survey	No. of database records	Likely occurrence in study area	Likelihood reasoning	Habitat description
		EPBC	DSE	FFG								
National Significance												
Birds												
Anthochaera phrygia	Regent Honeyeater	EN	cr	L	#	DSEWPaC	-	-	2	Negligible	No habitat present	This species inhabits dry woodlands and forests dominated by box and ironbark eucalypts. Breeding is mostly confined to a small number of sites in north-eastern Victoria and along the inland slopes of the Great Dividing Range of New South Wales.
Botaurus poiciloptilus	Australasian Bittern	EN	en	L	2008	VBA	-	-	3	Medium	Wetlands in study area offer suitable habitat	This species occupies hallow brackish or freshwater swamps that are densely vegetated with tall sedges, rushes and reeds.
Lathamus discolor	Swift Parrot	EN	en	L	2002/#	VBA / DSEWPaC	-	-	2	Low	No habitat present	This species breeds in Tasmania during the summer and migrates to south-east mainland Australia for the winter months. They prefer to inhabit box-ironbark forests but have been recorded in urban parks, gardens, street trees and golf courses with flowering trees and shrubs.
Pedionomus torquatus	Plains-wanderer	VU	cr	L	2008	VBA	-	-	6	Low	Grassland habitats too	This species inhabits open grazed and ungrazed

Scientific Name	Common Name	Conservation status			Most Recent Record	Database	Other source	Current survey	No. of database records	Likely occurrence in study area	Likelihood reasoning	Habitat description
		EPBC	DSE	FFG								
											dense	grasslands with patches of bare ground and an absence of tall shrubs and trees. Due to a range of threatening processes, the species has declined markedly from most of its range.
Rostratula australis	Australian Painted Snipe	VU	cr	L	#/1980	VBA / DSEWPaC	-	-	2	Low	Wetlands within study area offer marginal habitat	This species inhabits shallow freshwater lakes, swamps, waterlogged grasslands or saltmarshes. They have been recorded in modified pasture, sewage farms, dams and irrigations schemes. They roost on the ground beneath clumps of lignum or dense ground cover.
Sternula nereis	Fairy Tern	VU	en	L	2004	VBA / BA	-	-	1	Negligible	No habitat present	This species occurs in a variety of coastal bays, inlets, lakes, salt fields and sewerage ponds.
Mammals												
Dasyurus maculatus	Spot-tailed Quoll	EN	en	L	#	DSEWPaC	-	-	1	Negligible	No habitat present	This species occupies a range of natural habitats, however its range has significantly declined due to habitat loss and modification. The species is considered to be locally extinct throughout agricultural Victoria.
Isoodon obesulus	Southern Brown	EN	nt		1881	VBA	-	-	1	Negligible	No habitat present	This species inhabits dry heath, shrubland, heathy forest and woodland, usually

Scientific Name	Common Name	Conservation status			Most Recent Record	Database	Other source	Current survey	No. of database records	Likely occurrence in study area	Likelihood reasoning	Habitat description
		EPBC	DSE	FFG								
obesulus	Bandicoot											associated with well drained soils. This species prefers habitats with dense understorey vegetation for protection from predators and for nesting sites.
Perameles gunnii	Eastern Barred Bandicoot	EN	cr	L	1982	VBA	-	-	6	Negligible	No habitat present	Historically, this species is known to inhabited native grassland and grassy woodland habitats. The mainland species is extinct over much of its previous range and is now restricted to a few isolated populations in western Victoria.
Pseudomys novaehollandiae	New Holland Mouse	VU	vu	L	#	DSEWPaC	-	-	1	Negligible	No habitat present	This species occurs along the coast of south-eastern Australia in habitats ranging from coastal heath, heathy woodland and coastal scrub.
Pteropus poliocephalus	Grey-headed Flying-fox	VU	vu	L	#	DSEWPaC	-	-	1	Low	Marginal habitat present	This species feeds on nectar, pollen and fruit from a variety of native trees (e.g. eucalypts melaleucas and banksias), the fruit from introduced plants. Colonies are currently located in Melbourne, Geelong and Mallacoota.
Reptiles												
Delma impar	Striped Legless Lizard	VU	en	L	#	DSEWPaC	-	-	1	Medium	Grassland habitat with surface rock present	This species inhabits native and modified grasslands with sufficient protective cover. Generally associated with

Scientific Name	Common Name	Conservation status			Most Recent Record	Database	Other source	Current survey	No. of database records	Likely occurrence in study area	Likelihood reasoning	Habitat description
		EPBC	DSE	FFG								
												soils of cracking clays or with embedded, surface and exposed rocks.
Tympanocryptis pinguicolla	Grassland Earless Dragon	EN	cr	L	#	DSEWPaC	-	-	1	Low	Grassland habitats too dense	This species prefers native temperate grasslands with little or no grazing pressure. The last confirmed sighting of the Grasslands Earless Dragon in Victoria was at Little River in 1967 (AVW).
Amphibians												
Litoria raniformis	Growling Grass Frog	VU	en	L	2007/#	VBA / DSEWPaC	Ecology Australia (2010)	-	7	Medium	Wetlands offer suitable habitat	This species occurs in a variety of permanent and semi-permanent waterbodies that contain abundant submerged and emergent vegetation. The species will also occupy slow-moving sections of creeks and rivers.
Fish												
Prototroctes maraena	Australian Grayling	VU	vu	L	#	DSEWPaC	-	-	1	Negligible	No habitat present	Australian Grayling is a diadromous species and spends most of its life in freshwater within rivers and large creeks. Juveniles inhabit estuaries and coastal seas, whilst adults occur in freshwater habitats, typically rivers and streams with cool, clear waters and gravel substrates, but occasionally also in turbid waters.
Galaxiella	Dwarf	VU	vu	L	#	DSEWPaC	-	-	1	Negligible	No habitat present	This species occurs in still or slow flowing, relatively

Scientific Name	Common Name	Conservation status			Most Recent Record	Database	Other source	Current survey	No. of database records	Likely occurrence in study area	Likelihood reasoning	Habitat description
		EPBC	DSE	FFG								
pusilla	Galaxias											shallow ephemeral waterbodies (streams, wetlands, drains) that often dry up over summer. Abundant marginal and aquatic vegetation is an important habitat feature.
Endangered invertebrates												
Synemon plana	Golden Sun Moth	CR	cr	L	2008/#	VBA / DSEWPaC	Biosis Research (2010a)	-	44	Medium	Grassland habitats highly fragmented	This small diurnal moth inhabits grassy woodlands and grasslands. Once thought to be a specialised species inhabiting grasslands dominated by Wallaby-grasses, it is now recognised that this species can occur in exotic grasslands dominated by Chilean Needle Grass.
State Significance							-	-				
Birds												
Anas rhynchotis	Australasian Shoveler		vu		2004	VBA / BA	-	-	16	Medium	Wetlands offer suitable habitat	Prefers large, deep permanent lakes and swamps with abundant aquatic vegetation.. Open water is needed for foraging but birds nest in densely vegetated freshwater wetlands.
Accipiter novaehollandiae	Grey Goshawk		vu	L	2006	VBA	-	-	1	Negligible	No habitat present	This species typically inhabits woodland and wetter forests in near-coastal

Scientific Name	Common Name	Conservation status			Most Recent Record	Database	Other source	Current survey	No. of database records	Likely occurrence in study area	Likelihood reasoning	Habitat description
		EPBC	DSE	FFG								
												Victoria. Birds are most common in the Otway area of Victoria with occasional visits to central and Gippsland areas.
Ardea modesta	Eastern Great Egret		vu	L	2004/#	VBA / BA	-	-	12	Medium	Wetlands offer suitable habitat	This species prefers wetlands, estuarine and wet grassland habitats. They will forage among permanent well-vegetated waterbodies freshwater meadows, channels and larger dams. The species roosts and breeds in fringing trees, mostly in the Murray-Darling basin.
Aythya australis	Hardhead		vu		2004	VBA / BA		-	12	Medium	Wetlands offer suitable habitat.	This species prefers to inhabit large, deep brackish wetlands, freshwater lakes, dams and water storage ponds, with abundant aquatic vegetation.
Biziura lobata	Musk Duck		vu		2004	VBA / BA		-	13	Medium	Wetlands offer marginal habitat	This species prefers deep water on large, permanent swamps, lakes and estuaries with abundant aquatic vegetation. Will use dams and other small shallow waters.
Calidris tenuirostris	Great Knot		en	L	2007	VBA	-	-	2	Negligible	No habitat present	Great Knots inhabit sheltered coastal environments including intertidal mudflats,

Scientific Name	Common Name	Conservation status			Most Recent Record	Database	Other source	Current survey	No. of database records	Likely occurrence in study area	Likelihood reasoning	Habitat description
		EPBC	DSE	FFG								
												sandflats and beaches. This species has been recorded inland lakes and swamps. A summer migrant to Australia from the Arctic.
Charadrius leschenaultii	Greater Sand Plover		vu		1978	VBA	-	-	2	Negligible	No habitat present.	Greater Sand Plovers occur in littoral and estuarine environments along the coast of Australia. A summer migrant to Australia from the Northern Hemisphere.
Charadrius mongolus	Lesser Sand Plover		vu		1978	VBA	-	-	2	Negligible	No habitat present	Lesser Sand Plovers occur in littoral and estuarine environments along the coast of Australia. A summer migrant to Australia from the Northern Hemisphere.
Falco subniger	Black Falcon		vu		2008	VBA	AECOM (2010)	-	5	Low	Marginal habitat present	This species inhabits woodlands, open country and wetlands. It prefers arid and semi-arid zones of Australia, including the north-west of Victoria.
Haliaeetus leucogaster	White-bellied Sea-Eagle		vu	L	#	VBA	-	-	1	Negligible	No habitat present.	This species is mostly recorded along or near coastal areas in the east of the state, and around large inland rivers such as the Murray River.
Hydroprogne caspia	Caspian Tern		nt	L	1979	VBA	-	-	1	Negligible	No habitat present	This species occurs in sheltered coastal harbours, lagoons, and estuary and river deltas. Also occurs at sea.

Scientific Name	Common Name	Conservation status			Most Recent Record	Database	Other source	Current survey	No. of database records	Likely occurrence in study area	Likelihood reasoning	Habitat description
		EPBC	DSE	FFG								
Oxyura australis	Blue-billed Duck		en	L	2004	VBA / BA		-	7	Medium	Wetlands suitable habitat	This species prefers deep, large permanent wetlands with abundant aquatic vegetation, including melaleuca swamps.
Platalea regia	Royal Spoonbill		vu		2004	VBA / BA	-	-	8	Medium	Wetlands suitable habitat.	This species prefers wetlands, wet grassland areas, lakes, swamps and lagoons. They forage along rivers and coastal estuaries, inlets and intertidal mudflats.
Tringa glareola	Wood Sandpiper		vu		2008	VBA	-	-	1	Medium	Wetlands suitable habitat	This species inhabits shallow freshwater wetlands which have abundant emergent and fringing vegetation. Also known to occur in inundated grasslands and irrigated crops.
Turnix pyrrhothorax	Red-chested Button-quail		vu	L	2008	VBA	AECOM (2010)	-	3	Low	Grasslands provide potential habitat	This species occurs in grasslands and grassy woodlands of temperate and tropical Australia. In south-eastern Australia they prefer perennial, damp grasslands and also occur in irrigated pastures and crops.
Other conservation categories												
Birds												
Calidris canutus	Red Knot		nt		2006	VBA	-	-	3	Negligible	No habitat present	Red Knots inhabit coastal environments such as intertidal mudflats, sandflats and beaches. Rarely recorded on inland lakes and

Scientific Name	Common Name	Conservation status			Most Recent Record	Database	Other source	Current survey	No. of database records	Likely occurrence in study area	Likelihood reasoning	Habitat description
		EPBC	DSE	FFG								
												swamps. A migrant to Australia from August to April, with some over-wintering birds
Calidris melanotos	Pectoral Sandpiper		nt		2007	VBA	-	-	1	Low	Wetlands offer marginal habitat	This species inhabits a variety of wetland habitats including coastal bays and lagoons, lakes, swamps, creeks, inundated grasslands, saltmarshes and artificial wetlands.
Calidris subminuta	Long-toed Stint		nt		2006	VBA	-	-	2	Negligible	No habitat present	This species inhabits a variety of wetland habitats including coastal bays and lagoons, lakes, swamps, creeks, inundated grasslands, saltmarshes, muddy shorelines, and artificial wetlands.
Cereopsis novaehollandiae	Cape Barren Goose		nt		2004	VBA	-	-	12	Negligible	No habitat present	Cape Barren Goose can be found grazing on short grass, pasture, and crops on the edges of low lying wetlands.
Circus assimilis	Spotted Harrier		nt		2006	VBA	-	-	3	Low	Marginal habitat present	This species inhabits open and wooded country of inland and sub-inland Australia, where they hunt over undulating country with low vegetation cover. In Victoria they are mostly common over the Murray Valley with occasional visits to coastal Victoria.
Coturnix	Brown		nt		2011	VBA	Biosis	-	6	Medium	Grasslands	Brown Quail are found in a

Scientific Name	Common Name	Conservation status			Most Recent Record	Database	Other source	Current survey	No. of database records	Likely occurrence in study area	Likelihood reasoning	Habitat description
		EPBC	DSE	FFG								
ypsilophora	Quail						Research (2011)				provide habitat	variety of habitats including grasslands, croplands, heaths, rainforest edges, and woodlands. Habitat is generally wet with rank ground vegetation. This species can also occur on road verges provided paddocks are nearby.
Gallinago hardwickii	Latham's Snipe		nt		2006/#	VBA / DSEWPaC	AECOM (2010)	-	12	Medium	Wetlands offer marginal habitat	Latham's Snipe inhabit a wide variety of wetlands and roost dense riparian tussock grasslands, reeds and rushes, tea-tree scrub, woodlands and forests. A migrant to Australia from Japan during July to April.
Larus pacificus pacificus	Pacific Gull		nt		1979	VBA	-	-	6	Negligible	No habitat present	This species inhabits sandy and rocky coasts where they forage between the high water mark and shallow water.
Numenius madagascariensis	Eastern Curlew		nt		1978	VBA	-	-	5	Negligible	No habitat present	A migrant to Australia from July to May. Eastern Curlews inhabit estuaries, mudflats, sandflats, lagoons, mangroves and saltmarshes.
Nycticorax caledonicus	Nankeen Night Heron		nt		2007	VBA / BA		-	2	Low	Wetlands offer marginal habitat	This species inhabits the shallow margins, banks and mudflats of swamps, rivers, lakes, wetlands and grasslands. They will also use wet meadows and

Scientific Name	Common Name	Conservation status			Most Recent Record	Database	Other source	Current survey	No. of database records	Likely occurrence in study area	Likelihood reasoning	Habitat description
		EPBC	DSE	FFG								
												pastures, urban wetlands and ponds. This species roosts and nests in dense trees and shrubs.
Phalacrocorax varius	Pied Cormorant		nt		2004	VBA / BA	-	-	10	Low	Wetlands offer marginal habitat	This species occurs in mainly marine environments, coastal waters, estuaries, inland lakes, rivers and billabong where they breed and roost in trees or bushes on the banks of variety of water bodies and artificial pylons.
Plegadis falcinellus	Glossy Ibis		nt		2008	VBA / DSEWPaC		-	1	Low	Wetlands offer suitable habitat	This species inhabits wetlands, wet pasture environments and low lying wetland environments. Occasionally uses dry grassland and emergent aquatic vegetation.
Pluvialis fulva	Pacific Golden Plover		nt		2007	VBA	-	-	5	Negligible	No habitat present	Pacific Golden Plovers occur in sandy, muddy or rocky coastal environments, including lagoons and estuaries and have been recorded in paddocks and crops. A migrant to Australia from the Northern Hemisphere in September to May.
Pluvialis squatarola	Grey Plover		nt		1978	VBA	-	-	2	Negligible	No habitat present	Grey Plovers occur in most coastal environments, including inlets, estuaries, and lagoons with intertidal

Scientific Name	Common Name	Conservation status			Most Recent Record	Database	Other source	Current survey	No. of database records	Likely occurrence in study area	Likelihood reasoning	Habitat description
		EPBC	DSE	FFG								
												flats or outcrops. A migrant to Australia from the Northern Hemisphere in August to April.
Stiltia isabella	Australian Pratincole		nt		1992	VBA	-	-	1	Low	Grasslands provide marginal habitat	This species inhabits open plains, sparsely wooded plains and tussock grasslands in arid and semi-arid environments. In Victoria, mostly found in the north-west regions of the state.
Thalaseus bergii	Crested Tern		nt		2004	VBA / BA	-	-	5	Negligible	No habitat present	This species is mostly confined to coastal habitats such as ocean beaches, estuaries, lagoons, bays and harbours.
Mammals												
Sminthopsis crassicaudata	Fat-tailed Dunnart		nt		1990	VBA	-	-	1	Medium	Grasslands provide potential habitat	This species inhabits sparse grasslands with areas of bare ground and suitable surface rocks or logs for refuge and for constructing nests of grass or other dried plant material.

National significance – CE (critically endangered), EN (endangered), VU (vulnerable). State significance – ce (critically endangered), en (endangered), vu (vulnerable), nt (near threatened), L (*Flora and Fauna Guarantee Act* listed). ** Rationale for likelihood of occurrence is largely based on the amount and quality of habitat present within the precinct.

3.4.6 Best or remaining 50% habitat for rare and threatened fauna species

Table 7 describes the general habitat requirements of threatened fauna species that have been recorded or are predicted to occur with 5 km of the study area. The presence of best or remaining 50% of habitat for these species within the bioregion was determined for PSP 42 North for species which are considered to have at least a medium likelihood of occurrence within the precinct.

Table 8 provides detail of whether native vegetation zones delineated for assessing vegetation condition constitute the best 50% or remaining 50% of habitat for relevant threatened fauna species (in Table 7) within the Victorian Volcanic Plain bioregion; in sense of the Native Vegetation Framework. The pathway for each decision made (in accordance with DSE's Table 2) is outlined in Table 8 below.

Fauna species listed as 'near threatened' or 'data deficient' under the DSE Advisory List are not considered for best or remaining 50% assessment under the framework.

Table 8. Determination of best or remaining 50% of habitat for threatened fauna

Species	**Conservation Status**	**Habitat zone** (Figure 4)	**Steps***	**Outcome**	**Conservation Significance** (threatened species rating)	**Notes**
Australasian Bittern	Nationally Significant	2, 3 and 4	A, D – F	Remaining 50% habitat	High	Habitat on these sites does not meet the requirements for this species. Habitat on site does not represent above average condition and landscape context for the Australasian Bittern
		1, 5 - 25	A - D	No further consideration	N/A	Habitat on these sites does not meet the requirements for this species.
Striped Legless Lizard	Nationally Significant	1, 5 - 25	A, D – F	Best 50% habitat	Very High	Habitat zones have habitat that clearly meets the requirements of the species and the sites represent above-average condition and landscape context as habitat for Striped Legless Lizard.
		2, 3 and 4	A - D	No further consideration	N/A	Habitat on these sites does not meet the requirements for this species.
Growling Grass Frog	Nationally Significant	2, 3 and 4	A, D – F	Best 50% habitat	Very High	Habitat zones have habitat that clearly meets the requirements of the species and the sites represent above-average condition and landscape context as habitat for the Growling Grass Frog. This species was recorded within the survey site in 1989.
		1, 5-25	A - D	No further consideration	N/A	Habitat on these sites does not meet the requirements for this species.
Golden Sun Moth	Nationally Significant	1, 5 - 25	A, D – F	Best 50% habitat	Very High	Habitat zones have habitat that clearly meets the requirements of the species and the sites represent above-average condition and landscape context as habitat for the species.
		2, 3 and 4	A - D	No further consideration	N/A	Habitat on these sites does not meet the requirements for this species.
Australasian Shoveler, Hardhead, Musk Duck, and Royal Spoonbill	State Significant	2, 3 and 4	A, D – F	No-remaining 50% habitat	High	Habitat on these sites does not meet the requirements for this species. Habitat on site does not represent above average condition and landscape context for the Australasian Shoveler, Hardhead, Musk Duck and Royal Spoonbill.

Species	**Conservation Status**	**Habitat zone** (Figure 4)	**Steps***	**Outcome**	**Conservation Significance** (threatened species rating)	**Notes**
		1, 5-25	A - D	No further consideration	N/A	Habitat on these sites does not meet the requirements for this species.
Little Egret and Blue-billed Duck	State Significant	2, 3 and 4	A, D – F	No-remaining 50% habitat	High	Habitat on these sites does not meet the requirements for this species. Habitat on site does not represent above average condition and landscape context for the Little Egret and Blue-billed Duck.
		1, 5-25	A - D	No further consideration	N/A	Habitat on these sites does not meet the requirements for this species.
Wood Sandpiper	State Significant	2, 3 and 4	A, D – F	No-remaining 50% habitat	High	Habitat on these sites does not meet the requirements for this species. Habitat on site does not represent above average condition and landscape context for the Wood Sandpiper.
		1, 5-25	A - D	No further consideration	N/A	Habitat on these sites does not meet the requirements for this species.

Table 9.* Habitat assessment for threatened species taken from Table 2 of the Native Vegetation Guide for assessment of referred planning permit applications (DSE 2007).

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 (e.g. 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

3.4.7 Targeted fauna survey

Growling Grass Frog targeted survey results

A diurnal habitat assessment of each waterbody on parcel PFI 210751891 was conducted on 17 December 2010. This incorporated an assessment of the aquatic vegetation, terrestrial refuge and water levels at each waterbody. The diurnal habitat assessment was used to determine the likelihood of occurrence for the species within the study area and to identify areas for nocturnal targeted survey. Habitat assessments were carried out at an ephemeral wetland (near Greens Road), five isolated pools associated with an unnamed tributary of Lollypop Creek and a large farm dam. Targeted nocturnal survey was conducted on 6 and 20 January 2011 (Table 10). All search areas lacked dense emergent and submerged aquatic and riparian vegetation. The only vegetation present within and surrounding each waterbody on PFI 210751891 was planted agricultural crop species (Plate 8).

Growling Grass Frog was not recorded during the current targeted survey. The absence of Growling Grass Frogs is most likely due to an absence of suitable habitat within and surrounding each water body. The targeted survey was conducted at a suitable time of year and under optimal weather conditions when the species are known to be active and readily detectable. The overnight temperatures ranged between a low of 15.9°C and 25.8°C (Table 10).

A single Growling Grass Frog was recently recorded along Lollypop Creek in close proximity to the survey area (Ecology Australia 2010; Figure 6). There are also a small number of VBA records for Growling Grass Frog from the Black Forest Road wetland within the study area and surrounding areas from 1988 – 1989.

Even though the species was not recorded during the current assessment and there is a distinct lack of potential habitat for the species on PFI 210751891, the small tributary and Black Forest Road wetland (PFI 210751891), if rehabilitated using appropriate methods, may become an important corridor and breeding site for the species. With permanent pools of water and sufficient aquatic vegetation this tributary could provide opportunities for frogs to disperse from Lollypop Creek and colonise areas along the tributary in PFI 210751891.

Table 10: Growling Grass Frog targeted survey results on PFI 210751891

Assessor	Date	Time	Location	Site conditions	Species recorded	Type of survey	Duration of survey
Rodney Armistead and Katrina Sofo	6/01/2011	8.00pm – 8.30pm	Series of small farm dams on western boundary	Warm, no wind, no precipitation	Spotted Marsh Frog	Targeted	30mins
Rodney Armistead and Katrina Sofo	6/01/2011	8.40pm – 8.50pm	Ephemeral wetland near Greens Road	Warm, no wind, no precipitation	Spotted Marsh Frog, Southern Bullfrog	Targeted	20mins
Rodney Armistead and Katrina Sofo	6/01/2011	9.00pm – 9.30pm	Large farm dam on eastern boundary	Warm, no wind, no precipitation	Common Froglet, Spotted Marsh Frog, Southern Bullfrog	Targeted	30mins
Rodney Armistead and Katrina Sofo	20/01/2011	8.30pm – 9.00pm	Series of small farm dams on western boundary	Warm, no wind, no precipitation	Spotted Marsh Frog, Southern Bullfrog	Targeted	30mins
Rodney Armistead and Katrina Sofo	20/01/2011	9.10pm – 9.20pm	Ephemeral wetland near Greens Road	Warm, no wind, no precipitation	Common Froglet, Spotted Marsh Frog, Southern Bullfrog	Targeted	10min
Rodney Armistead and Katrina Sofo	20/01/2011	9.30pm – 10.00pm	Large farm dam on eastern boundary	Warm, no wind, no precipitation	Common Froglet, Spotted Marsh Frog, Southern Bullfrog	Targeted	30mins

Plains-wanderer targeted survey

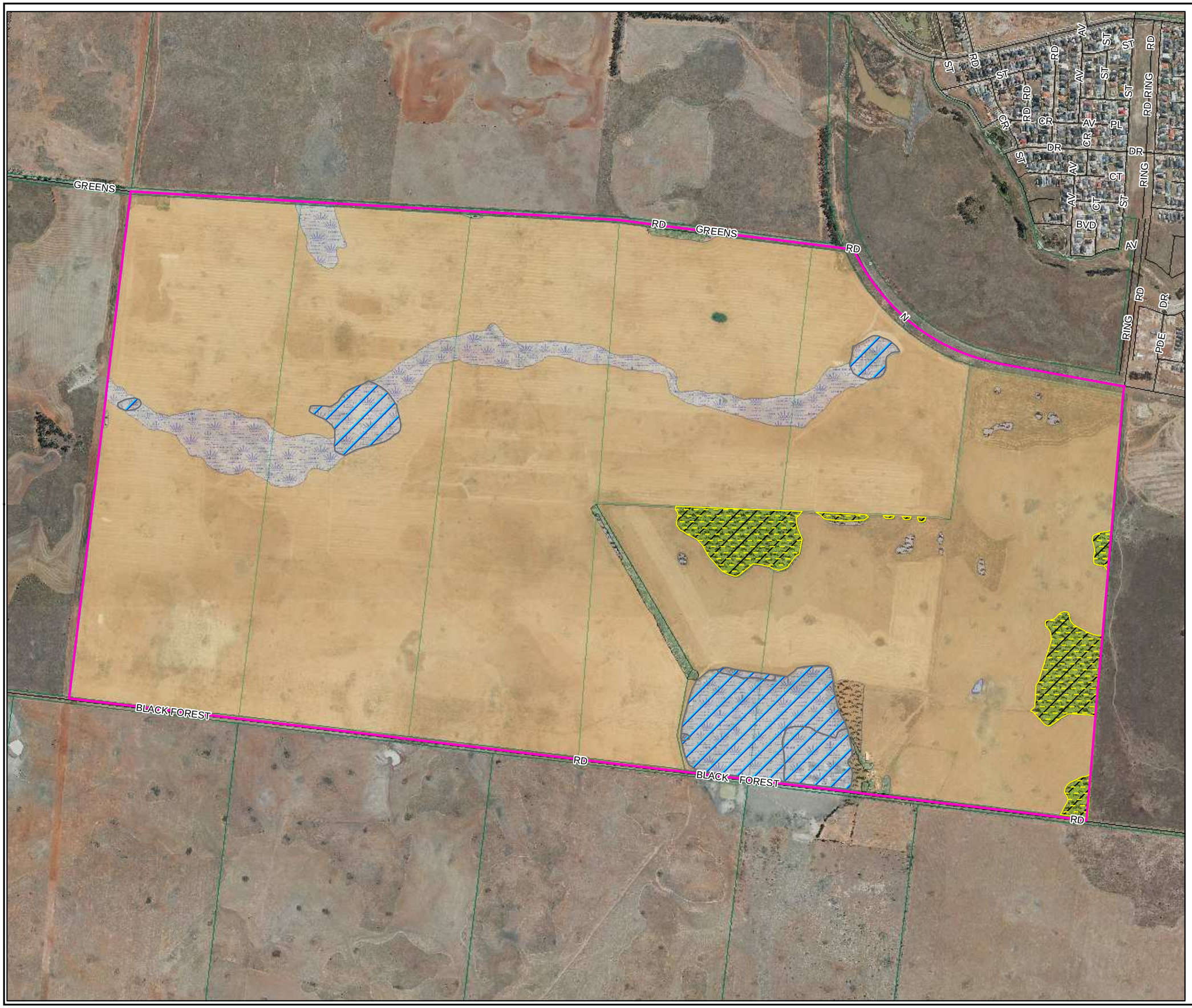
No Plains-wanderers were recorded during the current targeted survey. The weather conditions were considered optimal for the survey with minimum air temperatures of 12º Celsius and very little to no wind (Table 11). However, the present status of the grassland habitat was considered to be unsuitable for Plains-wanderer. An unusually wet and mild 2010/2011 summer has encouraged excessive plant growth which has resulted in tall and very dense patches of native grass.

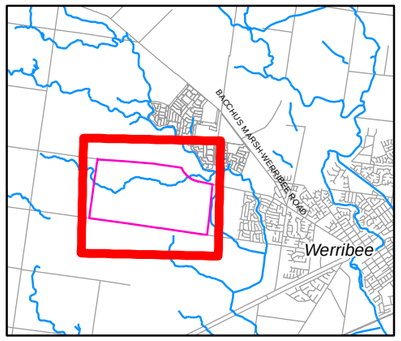
Table 11: Plains-wanderer targeted survey results from surveys conducted on PFI 5201355

Assessor	Date	Time	Site conditions	Species recorded	Type of survey	Duration of survey
Rodney Armistead and Thea Shell	16/03/2011	9:30pm–11:00pm	Calm/little wind (<15km/hr), no moon, mild temperatures (>14º C)	8 x Stubble Quail	Targeted	1.5 hrs
Rodney Armistead and Thea Shell	17/03/2011	7:00pm–9.30pm	Calm/little wind (<15km/hr), no moon, mild temperatures (>14º C)	6 x Stubble Quail	Targeted	1.5 hrs
Rodney Armistead and Daniel Gilmore	28/03/2011	7:00pm–9.30pm	Calm, no wind. Mild temperatures (>12 º C). New moon.	6 x Stubble Quail	Targeted	1.5 hrs

Bird census surveys

A total of 27 bird species were recorded during the bird census surveys (22 native and five introduced). Four species were recorded during the bird census surveys that were not recorded during the general fauna survey (Dusky Moorhen *Gallinula tenebrosa*, Black-faced Cormorant, Brown Falcon *Falco berigora*, *albifrons,* Crested Pigeon *Ocyphaps lophotes*). Results from the bird census surveys are incorporated into Appendix 4, Table 4.1.





Legend

PSP 42 North

Golden Sun Moth

Potential habitat

Growling Grass Frog

Potential habitat

Striped Legless Lizard

Potential habitat

Fauna habitat

2 - Remnant tree

3 - Planted vegetation

5 - Grassland - rocky

7 - Pasture/crop - rocky

8 - Pasture/crop - not rocky

9 - Wetland/watercourse

10 - Rock walls/piles

Figure 6: Fauna Habitat, PSP 42 North

N

GDA 94 MGA Zone 55
1:11,000 at A3

0 250 500

Meters

Biosis Research Pty. Ltd.
38 Bertie Street
(PO Box 489)
Port Melbourne
VICTORIA 3207

Offices also in: Ballarat, Sydney, Wollongong, Canberra, Wangaratta

Date: 07 April 2011, File number: 12536
Checked by: JAF, Drawn by: SKM/STF
Location: P:\12500s\12536\Mapping\Report figures\12536 Fig 6 Habitat.mxd

4.0 BIODIVERSITY LEGISLATION AND GOVERNMENT POLICY

Biodiversity legislation and government policy that is relevant to PSP 42 North are discussed below.

4.1 Commonwealth

4.1.1 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 PSP 42 North

There are three matters of national significance that are of relevance to the proposed development:

- listed threatened species and ecological communities;
- listed migratory species; and
- wetlands of international importance (Ramsar sites).

These are summarised below.

Listed threatened species and/or ecological communities

Ecological communities: One listed ecological communities, *Natural Temperate Grassland of the Victorian Volcanic Plain* occurs within PSP 42 North.

Listed flora species: Flora species listed under the Act are discussed in Section 3.1.2 and listed in Table 1. No listed species were recorded within PSP 42 North (Figure A3). There is suitable habitat within PSP 42 North for four species of national significance (Table 1).

Listed fauna species: Fauna species listed under the Act are discussed in Section 3.4.4 and listed in Table 6. In summary one listed species, Grey-headed Flying Fox was recorded within Area 81 (Figure A3). Four other species have at least medium likelihood of occurring within the precinct.

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 4, Table A4.3 and summarised below:

- The VBA contains records for 35 migratory bird species from within a 5km radius of PSP 42 North.

While some of these species would be expected to use PSP 42 North on occasions, and some of them may do so regularly or may be resident, it does not provide important habitat for an ecologically significant proportion of any of these species.

Wetlands of International Importance (Ramsar sites)

PSP 42 North is identified by the DEWHA database as being within the

catchment of a Wetland of International Significance (Ramsar site): The Lower reaches of Lollypop Creek are within the Port Phillip Bay (western shoreline) Ramsar site. However this is approximately 9km downstream of PSP 42 North. Significant impacts on the Ramsar site are not expected if sediment control and stormwater guidelines are followed.

4.1.1.1 Delivering Melbourne's Newest Sustainable Communities - Strategic Impact Assessment Report

The land within PSP 42 North contains matters of NES which would trigger the EPBC Act in the event an action required an environmental approval under the Act. In response to this, the GAA has engaged with DSEWPaC to conduct a strategic assessment process to address changes to the Melbourne Urban Growth Boundary.

An agreement under the Strategic Assessment provision of the EPBC Act (Section 146(1) Agreement, Part 10 Strategic Assessment (EPBC Act)) was made between the Commonwealth of Australia and the State of Victoria on 16th June 2009. The Strategic Assessment provides an opportunity to align State and Commonwealth requirements and approval standards for issues of common interest. The prescriptions for listed species and communities identified in the Strategic Impact Assessment report will be used to determine if clearing is permitted under the SIAR.

Where prescriptions are specified, these must be followed. Where treatments are not yet defined they will be developed in accordance with the process outlined in the Strategic Assessment.

4.1.2 Recovery Plans

DESWPAC may make or adopt and implement recovery plans for threatened species or communities under the EPBC Act. Precinct planning for PSP 42 North should have regard to the Recovery Plans for the following species:

- Clover Glycine;
- Spiny Rice-flower; and
- Large-headed Fireweed.

4.1.3 Conservation Advices

When a native species or ecological community is listed as threatened under the EPBC Act, Conservation Advice is developed to assist in the species or

communities recovery. Conservation Advice provides information on key threats, priority conservation actions and threat abatement actions for listed threatened species and communities. Precinct planning for PSP 42 North should have regard to the Conservation Advice for the listed threatened community Natural Temperate Grassland of the Victorian Volcanic Plains.

4.1.4 Threat Abatement Plans

Threat abatement plans provide for the research, management and other actions necessary to reduce the impact of a listed key threatening process on native species and ecological communities. Implementing the plan should assist the long term survival in the wild of affected native species or ecological communities. Precinct planning for PSP 42 North should have regard to the Threat Abatement Plans for:

- Competition and Land Degradation by rabbits;
- Infection of amphibians with chytrid fungus resulting in chytridiomycosis;
- Predation by European red fox; and
- Predation by feral cats.

4.1.5 Policy Statements

Policy statements provide the public with practical guidance on the EPBC Act. Policy statement guidelines have been written to provide guidance on specific threatened species and ecological communities and should be read in conjunction with the significant impact guidelines. Precinct planning for PSP 42 North should have regard to Policy Statements for:

- Natural Temperate Grassland of the Victorian Volcanic Plain;
- Spiny Rice Flower;
- Golden Sun Moth; and
- Growling Grass Frog.

4.2 State

4.2.1 Planning and Environment Act 1987 - Victorian Planning Provisions

A planning permit may be required to remove, destroy or lop native vegetation under the relevant local government planning scheme (e.g. Clause 52.17) unless exemptions in a clause apply or if the removal, destruction or lopping of vegetation is in accordance with a Native Vegetation Precinct Plan (Clause 52.16) that has been incorporated into the planning scheme. A Native Vegetation Precinct Plan may form part of a Precinct Structure Plan and may also determine whether exemptions to the requirement of a permit under Clause 52.16–4 apply. It is possible that some or all of PSP 42 North will be the subject of a Native Vegetation Precinct Plan, drawing on information collected by this and other ecological surveys. Such a plan would identify which areas of native vegetation are to be retained and which are permitted to be cleared and offset.

4.2.2 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;
- plant taxa belonging to communities listed as threatened; and
- 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).

Much of land in PSP 42 North is privately owned and is not declared 'critical habitat'. Therefore a permit to 'take' listed flora and fauna species is not required under the FFG Act on these lands.

One threatened community, Western (Basalt) Plains Grassland Community, is present within PSP 42 North. This community is mapped as Natural Temperate Grassland of the Victorian Volcanic Plain and *Low-rainfall* Plains Grassland on Figure A4.

Parts of PSP 42 North that are public land (road reserves) require a permit from DSE under the FFG Act to remove listed and protected flora species. Listed threatened and protected species recorded in PSP 42 North during the current assessment are identified in Appendix 2, Table A2.1. All species that are component of the Western (Basalt) Plains Grassland Community are also protected under the Act.

Precinct planning for PSP 42 North should have regard to the Action Statements prepared under the FFG Act for:

- Plains-wanderer
- Striped Legless Lizard
- Golden Sun Moth
- Little Egret
- Eastern Great Egret
- Blue-billed Duck
- Large-headed Fireweed
- Clover Glycine
- Button Wrinklewort
- Small Milkwort
- Spiny Rice-flower
- Tough Scurf-pea
- Western (Basalt) Plains Grassland

4.2.3 Environmental Effects Act 1978

The Environmental Effects Act 1978 is the legislation in Victoria which is used by the Minister for Planning to make a decision on the need for an Environmental Effects Statement (EES) for projects with potentially significant environmental effects. The Act enables Ministers, local government and statutory authorities to make an informed decision about whether a project with potentially significant environmental impact should proceed. If required by the Minister for Planning, an EES will need to be prepared by the proponent for the development site.

4.2.4 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 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.

Construction managers need to monitor affected surface waters to assess if beneficial uses are being protected. The GAA may need to consult with the EPA and Melbourne Water with regard to establishing appropriate water quality objectives and monitoring requirements.

4.2.5 Catchment and Land Protection Act 1994

The *Catchment and Land Protection Act* 1994 (CaLP) is legislation in Victoria that establishes a framework for the management of catchments in order to maintain and enhance the long term productivity of the land while conserving the environment and to ensure that the quality of the State's land and water resources, including plant and animal life, are maintained and enhanced.

Amongst other things, the Act addresses the management of the environment within catchments by establishing a system of controls on noxious weeds and pest animals. The CaLP Act is the principal legislation relating to weed management in Victoria. It contains provisions relating to land management and noxious weeds, stating that land managers must take all reasonable steps to meet their obligations under the Act. It provides for the declaration of plants as noxious weeds if they have the potential to become a threat to primary production, the environment or community health.

Under the CaLP Act, certain plants are declared as noxious weeds in Victoria. These plants cause environmental or economic harm or have the potential to cause such harm. They can also present risks to human health. The CaLP Act defines four categories of noxious weeds:

- State Prohibited Weeds;
- Regionally Prohibited Weeds;
- Regionally Controlled Weeds; and
- Restricted Weeds.

Declared noxious weeds identified on PSP 42 North are listed in Appendix 2.

4.2.6 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.

A permit will be required for removal of habitat at the site. It may be that removal of habitat will be covered by a permit to remove native vegetation and 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.

4.2.7 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.

Offsets are typically generated by managing an area of remnant vegetation on private land. Active ecological management of such areas will generally yield a gain in habitat score of 20 % (approximately) over the nominated 10 years.

The net gain implications for native vegetation within PSP 42 North are not discussed within this report.

4.2.8 Port Phillip and Westernport Native Vegetation Plan

This document (PPWCMA 2006) 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 (PPWCMA 2006: pg 52).

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.

Offsets for unavoidable tree losses that are not covered by the Framework replacement ratios are calculated using the Port Phillip and Westernport Native Vegetation Plan.

4.2.9 Victoria's Biodiversity Strategy

Actions to ensure biodiversity is managed in a manner that is both ecologically sound and sustainable is identified in *Victoria's Biodiversity – Directions in Management* (NRE 1997). The key goal of that Strategy is the principle of 'no net loss' of native vegetation. The native vegetation goals of the strategy are implemented through Victoria's Native Vegetation Management Framework (NRE 2002).

4.3 Local

4.3.1 Local planning scheme matters

Some local government planning zones and overlay relate directly to biodiversity matters. Most land within the precinct falls under Wyndham City Council's Urban Growth Zone, Rural Conservation Zone and Urban Floodway Zone. There is also Environmental Significance Overlay Schedule 2 and 4, and Public Acquisition Overlay Schedule 5 and 6.

The objectives of Wyndham City Council's zoning and overlays can be found at http://www.dse.vic.gov.au/planningschemes/.

Planning applications within areas covered by these overlays will need to consider the objectives of these overlays.

Clause 52.16 applies to land where a native vegetation precinct plan, corresponding to that land, is incorporated into this scheme. Where an NVPP applies, a permit is required to remove, destroy or lop native vegetation, except

where it is in accordance with that NVPP. Though an NVPP can stand alone, it may form part of a more general strategic or precinct structure plan. The purpose of an NVPP is to protect and conserve native vegetation, to reduce the impact of land and water degradation and provide habitat for plants and animals, and to enable other areas of native vegetation to be removed in accordance with the NVPP. The NVPP may require specified works to be provided or specified payments to be made to offset the removal, destruction or lopping of native vegetation. Where an NVPP is incorporated and listed in the schedule to clause 52.17 Native Vegetation, no permit is required under c52.17.

4.3.2 Local Planning Policies/Strategies

No additional local planning policies with regards to native flora and fauna occur within the Wyndham City Council's planning schemes. Precinct planning for PSP 42 North should have regard to the Wyndham City Council's Environment and Sustainability Strategy 2011-2015.

5.0 KEY BIODIVERSITY ISSUES AND IMPLICATIONS IDENTIFIED FROM THE ASSESSMENT

The future proposed land use within PSP 42 North may result in significant impacts to existing biodiversity values by (amongst other factors):

- the permanent removal of some native species and their habitats;
- the fragmentation of native species populations into genetically and geographically isolated smaller populations;
- changes to wildlife behaviour;
- increased invasion by exotic species and garden escapes;
- disturbance to soil;
- alterations to the hydrological regime of creeklines and wetlands within PSP 42 North; and
- alterations to water quality of creeklines and wetlands within and downstream of PSP 42 North.

It is important that biodiversity values within PSP 42 North be maintained in the long term and that more mobile species (particularly rare or threatened species) should have access to a network of suitable environments connected through a series of habitat corridors.

The Victorian Volcanic Plain Bioregion supports nationally significant ecosystems and species values including Natural Temperate Grasslands (listed as critically endangered), Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens,* Golden Sun Moth *Synemon plana* (listed as critically endangered), Grassland Earless Dragon *Tympanocryptis pinguicolla*, Swift Parrot *Lathamus discolor* (listed as endangered), Striped Legless Lizard *Delma impar*, Plains-wanderer *Pedionomus torquatus*, Australian Painted Snipe *Rostratula australis*, Large-fruit Fireweed *Senecio macrocarpus*, River Swamp Wallaby-grass *Amphibromus fluitans* and Growling Grass Frog *Litoria raniformis*. Many of these values remain due to the persistence of native vegetation and habitats within a predominantly agricultural landscape.

At a regional level, there are significant landscape components within PSP 42 North such as the Wyndham Vale Swamp.

5.1 Opportunities to reduce potential impacts

The following general recommendations have been made regarding opportunities to reduce potential impacts to biodiversity values within PSP 42 North:

- Retain corridors of vegetation for the movement of fauna species, providing connectivity for flora species populations and for the fauna

species on which some plant species rely for pollination and dispersal. Priority connections include the creekline corridor and wetlands. Plains Grassland in the east of PSP 42 North is also likely to provide important habitat connectivity with the same EVC on private land further south and the large wetland is likely to provide habitat connectivity to the proposed Western Grassland Reserve (outside of the precinct).

- Maintain and protect the creekline and wetlands within the precinct. Incorporate the creekline and wetland areas into development designs ensuring that natural hydrology is maintained. That is, ephemeral and seasonal waterbodies should be maintained so that they are inundated following sufficient rainfall, and allowed to dry out over summer. Therefore, they would not be suitable for stormwater runoff collection or treatment.
- Retain all high scoring Very High conservation significance native vegetation, particularly Habitat Zone 1, 2, 3, 4, 15 and 16.
- Retain and protect all sites containing populations of rare or threatened plant taxa, in particular the area that contains the three Melbourne Yellow-gums.
- Maintain and fence a minimum 50 m buffer between all retained native vegetation and wetlands (minimum 200 m either side of a creek or tributary which provides habitat for Growling Grass Frog) and land developed for residential use or other purpose.
- Retain the creekline and wetlands within open space and minimise alterations to hydrological regime and runoff water quality via use of water sensitive urban design.
- Minimise disturbance to creekline and wetlands. Stormwater treatment wetlands should be located adjacent to (offline), rather than located within (online) these waterways.

5.2 Opportunities to protect and enhance local and regional biodiversity values

The following general recommendations have been made regarding opportunities to protect and enhance biodiversity values within PSP 42 North:

- Prepare conservation management plans for the ongoing management of native vegetation, wetlands and creekline corridor. This should include the provision for ecological burning in Plains Grassland and allowances should be made for this when planning residential areas.

- Prepare conservation management plans for Melbourne Yellow-gum, Golden Sun Moth and Growling Grass Frog for PSP 42 North. Undertake monitoring of populations during and following development.

- Prepare a roadside vegetation management plan for road reserves containing remnant native vegetation. Identify no-go zones during the design phase to limit construction access. Investigate alternative alignments for road upgrades.

6.0 CONCLUSION

The areas assessed within PSP 42 North as part of the Growth Areas Authority biodiversity assessment contain a significant area of native vegetation. A total of **19.45 hectares** of native vegetation in habitat zones were mapped within PSP 42 North which comprises **9.54 habitat hectares** (hha) comprising the endangered EVCs *Low-rainfall* Plains Grassland and Aquatic Herbland. Additional areas of Aquatic Herbland were identified in the current assessment. However, as DSE have already accepted AECOM's EVC mapping for part of PSP 42 North, we were not required to map those additional areas that we have identified.

A total of 9.77 ha of *Low-rainfall* Plains Grassland meets the definition criteria for the EPBC Act listed ecological community *Natural Temperate Grassland of the Victorian Volcanic Plain* (critically endangered). All Plains Grassland patches are Western (Basalt) Plains Grassland Community listed under the FFG Act.

In addition, the area provides valuable habitat for the nationally significant species Australasian Bittern, Striped Legless Lizard and Growling Grass Frog. State significant species have been recorded within PSP 42 North include Melbourne Yellow-gum. The following national and state significant flora species have the potential to occur; Clover Glycine, Spiny Rice-flower, Button Wrinklewort, Large-headed Fireweed, Plains Joyweed, Small Milkwort, Slender Bindweed, Tough Scurf-pea, Arching Flax-lily, Pale Spike-sedge, Rough-grain Love-grass, Basalt Podolepis and Rye Beetle-grass. There is potential for the state significant Australian Shoveler, Eastern Great Egret, Hardhead, Musk Duck, Blue-billed Duck, Royal Spoonbill and Wood Sandpiper to occur within the survey area.

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GLOSSARY & ABBREVIATIONS

Items marked with an asterisk (*) are cited from DSE (2007b).

BA (Birds Australia)

Birds Australia is a non-government organisation that maintains an independent database of bird records throughout Australia.

Benchmark*

A standard vegetation –quality reference point, dependent on vegetation type, which is applied in habitat hectare assessments. Represents the average characteristics of a mature and apparently long undisturbed state of the same vegetation type.

Biodiversity*

The variety of all life-forms, the different plants, animals and micro-organisms, the genes they contain, and the ecosystems of which they form a part. The Framework applies this definition to those native species indigenous to or expected to visit the site.

Biodiversity Interactive Map (BIM)

Web based interactive map available on the DSE website that provides information on the biodiversity of Victoria and displays flora and fauna data from the Victorian Biodiversity Atlas.

Bioregion*

Biogeographic areas that capture the patterns of ecological characteristics in the landscape or seascape, providing a natural framework for recognising and responding to biodiversity values. A landscape based approach to classifying the land surface using a range of environmental attributes such as climate, geomorphology, lithology and vegetation.

Bioregional conservation status (of an EVC)*

A state-wide classification of the degree of depletion in the extent and/or quality of an Ecological Conservation Class (EVC) within a bioregion in comparison to the State's estimation of its pre-1750 extent and condition. The assessment takes account of how commonly it originally occurred, the current level of depletion due to clearing, and the level of degradation of condition typical of remaining stands. There are 6 classes: Presumed Extinct, Endangered, Vulnerable, Depleted, Rare and Least Concern as described on page 51 of the Framework (NRE 2002).

CAMBA (China – Australia Migratory Bird Agreement)

An international agreement relating to protection of migratory birds that range between China and Australia.

Conservation status (see Bioregional conservation status)

Degraded treeless vegetation*

Vegetation that is neither a wetland, a remnant patch nor scattered tree(s).

DEWHA (Department of the Environment, Water, Heritage and the Arts). Now DSEWPAC.

DBH (Diameter at Breast Height)*

The diameter of the main trunk of a tree measured 1.3 m above ground level.

DSE (Department of Sustainability & Environment)

DSEWPAC (Department of Sustainability, Environment, Water, Population and Communities). Formerly DEWHA.

Ecological Vegetation Class (EVC)*

A type of native vegetation classification that is described through a combination of its floristic, life form and ecological characteristics, and though an inferred fidelity to particular environmental attributes. Each EVC includes a collection of floristic communities (i.e. lower level in the classification that is based solely on groups of the same species) that occur across a biogeographic range, and although differing in species, have similar habitat and ecological processes operating.

EPBC (Environment Protection and Biodiversity Conservation Act 1999)

EVC (see Ecological vegetation class)*

FIS (Flora Information System)

Database produced by Viridans Biological Databases (2009), containing flora data and information from throughout Victoria. Used until December 2010 then superseded by the Victorian Biodiversity Atlas.

Forb

A herbaceous flowering plant that is not a graminoid (grass, sedge or rush).

FFG (Flora and Fauna Guarantee Act 1988 (Vic.))

Gain*

An increase in the extent and/or quality of a site either by management or maintenance commitments and actions.

Gain Target*

The amount of gain that needs to be achieved to offset a loss measured in habitat hectares.

Habitat hectare*

A site based measure of quality and quantity of native vegetation that is assessed in the context of the relevant native vegetation.

Habitat score*

The score assigned to a habitat zone that indicates the quality of the vegetation relative to the ecological vegetation class benchmark – sum of the site condition score and landscape context score, usually expressed as a percentage or on a scale of 0 to 1.

Habitat zone*

A discrete area of native vegetation consisting of a single vegetation type (EVC) within an assumed similar quality. This is the base spatial unit for conducting a habitat hectare assessment. Separate *Vegetation Quality Assessments* (or habitat hectare assessments) are conducted for each habitat zone within the designated assessment area.

Improvement gain*

This is gain resulting from management commitments beyond existing obligations under legislation to improve the current vegetation quality. Achieving improvement gain is predicated on maintenance commitments being already in place. For example, control of any threats such as grazing that could otherwise damage the native vegetation must already be agreed. Typical actions leading to an improvement gain include reducing or eliminating environmental weeds, enhancement planting or revegetation over a 10-year management period. If the vegetation is to be used as an offset, a commitment to maintain the improvement gain (i.e. no subsequent decline in quality) will be required in perpetuity.

Indigenous vegetation*

The type of native vegetation that would have normally been expected to occur on the site prior to European settlement.

IUCN (International Union for Conservation of Nature)

JAMBA (Japan – Australia Migratory Bird Agreement)

An international agreement relating to protection of migratory birds that range between Japan and Australia.

Large Old Tree (LOT)*

A tree with a DBH equal to or greater than the large tree diameter as specified in the relevant EVC benchmark.

Like-for-like*

These are part of the criteria for determination of an offset and provide a direct link between the loss and the offset gain, in terms of vegetation type or landscape function. There are more specific requirements for higher conservation significance vegetation and more flexible requirements for lower significance.

Maintenance Gain*

This is gain from commitments that contribute to the maintenance of the current vegetation quality over time (i.e. avoiding any decline). Includes foregoing certain entitled activities that could otherwise damage or remove native vegetation, such as grazing or firewood collection. Also typically requires a commitment to ensure no further spread of environmental weeds that may otherwise result in the loss of vegetation quality over time. If the vegetation is to be used as an offset, a commitment to maintain

the vegetation quality will be required in perpetuity.

Medium Old Tree (MOT)*

A tree with a DBH equal to or greater than 0.75 of the large tree diameter in the relevant EVC benchmark but less than the DBH for a large old tree.

MWF (Melbourne Water Fish database)

Database provided by Melbourne Water containing fish data within Melbourne Water's management area to 2009.

Native (indigenous) vegetation*

Native vegetation is plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses (as defined in Clause 72 of the planning scheme).

Net Gain*

Where, over a specified area and period of time, losses of native vegetation and habitat, as measured by a combined quality-quantity measure (habitat-hectare), are reduced, minimised and more than balanced by commensurate gains.

Net outcome*

The result of applying conservation significance criteria to protection, investment and offset decisions. This results in a range of outcomes from short term losses for Low conservation significance to substantial net gain for Very High conservation significance. For offsets, the Framework (Table 6) specifies a multiplier on the calculated loss (in habitat hectares) to achieve the net outcome. This is graded according to conservation significance.

Offset Management Plan (OMP)

A document which sets out the requirements for establishment, protection and management of a Net Gain offset site.

Old tree*

A tree with a DBH equal to or greater than 0.75 of the large tree diameter as specified in the relevant EVC benchmark. Includes medium old trees and large old trees (see separate definitions). Some Regional Native Vegetation Plans additionally define very large old trees (1.5 times large tree diameter).

Offset*

A native vegetation offset is any works, or other actions to make reparation for the loss of native vegetation arising from the removal or destruction of native vegetation. The gains achieved must be permanent and ongoing, and linked to a specific clearing site. See also on-site offset and third-party offset.

On-site offset*

An offset located on the same property as the clearing.

Third-party offset*

An offset located on a property owned by a person other than the landowner who incurs the native vegetation loss being offset.

Patch (see Remnant Patch)

Prior management gain

This gain acknowledges actions to manage vegetation since State-wide planning permit controls for native vegetation removal were introduced in 1989.

Property Vegetation Plan*

A plan which relates to the management of native vegetation within a property, and which is contained within an agreement made pursuant to section 69 of the Conservation, Forests and Lands Act 1987.

Protection (of a tree) *

An area with twice the canopy diameter of the tree(s) fenced and protected from adverse impacts: grazing, burning and soil disturbance not permitted, fallen timber retained, weeds controlled, and other intervention and/or management if necessary to ensure adequate natural regeneration or planting can occur.

Recruitment*

The production of new generations of plants, either by allowing natural ecological processes to occur (regeneration etc), by facilitating such processes such as regeneration to occur, or by actively revegetating (replanting, reseeding). See Revegetation.

Remnant patch or patch*

An area of vegetation, with or without trees, where native plants constitute more than 25% of the total understorey plant cover (bare ground is not included); or an area of treed vegetation where the density of the trees is such that canopy tree cover is at least at benchmark canopy cover.

Remnant vegetation*

Native vegetation that is established or has regenerated on a largely natural landform. The species present are those normally expected in that vegetation community. Largely natural landforms may have been subject to some past surface disturbance such as some clearing or cultivation (or even the activities of the nineteenth century gold rushes) but do not include man-made structures such as dam walls and quarry floors.

Revegetation*

Establishment of native vegetation to a minimum standard in formerly cleared areas, outside of a remnant patch.

ROKAMBA (Republic of Korea – Australia Migratory Bird Agreement)

An international agreement relating to protection of migratory birds that range between the Republic of Korea and Australia.

Scattered trees*

Canopy trees within an area where total understorey plant cover comprises at least 75% of weeds or non-native plants and the overall canopy cover for a group (i.e. Three or more trees) is less than 20%.

Section 173 agreements*

A management agreement primarily between a landowner and the responsible authority according to section 173 of the Planning and Environment Act 1987.

Security Gain

This is gain from actions to enhance security of the on-going management and protection of native vegetation at the offset site, either by entering into an on-title agreement (for example under Section 173 of the *Planning and Environment Act 1987*), or by locating the offset on land that has greater security than the clearing site, or by transferring private land to a secure public conservation reserve.

Small tree*

A tree with a DBH equal to or greater than 0.25 of the large tree diameter in the relevant EVC benchmark but less than the DBH for a medium old tree.

sp.

Species (one species).

spp.

Species (more than one species).

Supplementary planting

Establishment of overstorey and/or understorey plants within a remnant patch. Typically includes the planting or direct-seeding of understorey life forms.

Taxon (plural taxa)

A term used to describe any taxonomic unit. This term is typically used when referring broadly to any scientifically recognised species, subspecies or variety.

Understorey*

Understorey is all vegetation other than mature trees – includes immature trees, shrubs, grasses, herbs, mosses, lichens and soil crust. It does not include dead plant material that is not attached to a living plant. More information on understorey life forms is set out in the Vegetation Quality Assessment Manual (DSE 2004).

VAF (Victorian Aquatic Fauna database)

Database provided by DSE containing aquatic fauna data throughout Victoria to 2003. Used until December 2010 then superseded by the Victorian Biodiversity Atlas.

VBA (Victorian Biodiversity Atlas)

Government database for species distribution and abundance information. Accessed on line via DSE's Biodiversity Interactive Map. Refer to Section 2.1 for list of databases used in this report.

Vegetation Quality Assessment

The standard DSE method for assessing remnant patches of vegetation. Details of the method are outlined in the Vegetation Quality Assessment Method (DSE 2004). The results of the assessment are expressed in habitat hectares. Also referred to as a 'habitat hectare assessment'.

Very Large Old Tree (VLOT)

A tree with a DBH of at least 1.5 times that of the large tree DBH as specified in the relevant EVC benchmark.

VFD (Victorian Fauna Database)

Database produced by Viridans Biological Databases (2009), containing fauna data and information from throughout Victoria. Used until December 2010 then superseded by the Victorian Biodiversity Atlas.

APPENDICES

APPENDIX 1

DSE Vegetation Assessment Methodology

A1.1 Habitat hectares

Habitat hectares are calculated where at least 25 % of the understorey cover is native or a group (i.e. at least 3) of trees where the tree canopy cover is at least 20% (DSE 2007). Such sites are termed 'patches' of native vegetation.

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). Trees smaller than 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 native 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

PSP 42 North flora data

A.2.1. Flora Results

Flora species (36 indigenous species, 32 introduced species) recorded within PSP 42 North during the current assessment.

Significance of species (Source: DSE Flora Information System which follows DSE advisory lists)

Australian status:

CE	Listed under EPBC Act as critically endangered
E	Listed under EPBC Act as endangered
V	Listed under EPBC Act as vulnerable
R	Rare (Briggs & Leigh 1996)
K	Listed as poorly known in Australia (Walsh & Stajsic 2007)

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

e	Endangered
v	Vulnerable
r	Rare
k	Poorly known in Victoria
L	Listed as threatened under the Flora and Fauna Guarantee Act 1988
p	Protected species on public land listed under the FFG Act (Note: all species part of the Western (Basalt) Plains Grassland Community are also protected in addition to those shown here)

Species of regional significance recorded in PSP 42 North during the current investigation are identified below**.** These species are those recorded in less than 5% of sites (quadrats/defined area lists) from the Victorian Volcanic Plain Bioregion in the Flora Information System unless there is reason to believe they are undersampled in the available data.

All indigenous species have at least local significance.

Table A2.1 Indigenous flora recorded as part of the general flora and targeted flora surveys within PSP 42 North during the current assessment

Indigenous Flora Species			Conservation Status			
Lifeform	**Scientific Name**	**Common Name**	**EPBC**	**DSE**	**FFG**	**Regional**
Tree	**Myrtaceae**					
	Eucalyptus leucoxylon subsp. *connata*	Melbourne Yellow-gum		v		
Shrub	**Chenopodiaceae**					
	Enchylaena tomentosa var. *tomentosa*	Ruby Saltbush				✓
	Violaceae					
	Melicytus dentatus s.s.	Tree Violet				✓
Forb	**Asteraceae**					
	Pseudognaphalium luteoalbum	Jersey Cudweed			p	✓
	Chenopodiaceae					
	Atriplex semibaccata	Berry Saltbush				
	Chenopodium pumilio	Clammy Goosefoot				✓
	Einadia nutans subsp. *nutans*	Nodding Saltbush				
	Maireana enchylaenoides	Wingless Bluebush				✓
	Convolvulaceae					
	Dichondra repens	Kidney-weed				
	Crassulaceae					
	Crassula sieberiana s.s.	Sieber Crassula				✓
	Euphorbiaceae					
	Chamaesyce drummondii	Flat Spurge				
	Fabaceae					
	Glycine tabacina s.s.	Variable Glycine				✓
	Geraniaceae					
	Erodium crinitum	Blue Heron's-bill				✓
	Haloragaceae					
	Haloragis heterophylla	Varied Raspwort				
	Hydrocharitaceae					
	Ottelia ovalifolia subsp. *ovalifolia*	Swamp Lily				
	Lemnaceae					
	Lemna disperma	Common Duckweed				✓
	Lythraceae					
	Lythrum hyssopifolia	Small Loosestrife				
	Oxalidaceae					
	Oxalis perennans	Grassland Wood-sorrel				
	Polygonaceae					
	Rumex brownii	Slender Dock				
	Rumex dumosus	Wiry Dock				
Graminoid	**Cyperaceae**					
	Eleocharis acuta	Common Spike-sedge				
	Juncaceae					
	Juncus sarophorus	Broom Rush				
	Juncus spp.	Rush				
	Poaceae					
	Austrodanthonia auriculata	Lobed Wallaby-grass				
	Austrodanthonia duttoniana	Brown-back Wallaby-grass				
	Austrodanthonia racemosa var. *racemosa*	Slender Wallaby-grass				
	Austrodanthonia setacea	Bristly Wallaby-grass				

Indigenous Flora Species			Conservation Status			
Lifeform	**Scientific Name**	**Common Name**	**EPBC**	**DSE**	**FFG**	**Regional**
	Austrostipa bigeniculata	Kneed Spear-grass				
	Austrostipa gibbosa	Spurred Spear-grass				✓
	Austrostipa nodosa	Knotty Spear-grass				✓
	Austrostipa scabra	Rough Spear-grass				✓
	Chloris truncata	Windmill Grass				
	Eragrostis infecunda	Southern Cane-grass				✓
	Themeda triandra	Kangaroo Grass				
Scrambler /climber	**Convolvulaceae**					
	Convolvulus angustissimus	Blushing Bindweed				
Fern	**Marsileaceae**					
	Marsilea drummondii	Common Nardoo				✓

Table A2.2 Non-indigenous native and exotic flora recorded as part of the general flora and targeted flora surveys within PSP 42 North during the current assessment

Life form	Scientific Name	Common Name	Listed Status
Exotic species			**CaLP Act Listed Weeds**
Tree	**Myrtaceae**		
	Eucalyptus cladocalyx	Sugar Gum	
Shrub	**Aizoaceae**		
	Galenia pubescens var. *pubescens*	Galenia	
	Solanaceae		
	Lycium ferocissimum	African Box-thorn	✓
Forb	**Asteraceae**		
	Arctotheca calendula	Cape Weed	
	Cirsium vulgare	Spear Thistle	
	Cynara cardunculus	Artichoke Thistle	✓
	Helminthotheca echioides	Ox-tongue	
	Hypochaeris radicata	Flatweed	
	Leontodon taraxacoides subsp. *taraxacoides*	Hairy Hawkbit	
	Picnomon acarna	Soldier Thistle	
	Sonchus asper s.s.	Rough Sow-thistle	
	Sonchus oleraceus	Common Sow-thistle	
	Xanthium spinosum	Bathurst Burr	✓
	Brassicaceae		
	Lepidium africanum	Common Peppercress	
	Chenopodiaceae		
	Chenopodium murale	Sowbane	
	Fabaceae		
	Trifolium spp.	Clover	
	Geraniaceae		
	Erodium botrys	Big Heron's-bill	
	Malvaceae		
	Malva nicaeensis	Mallow of Nice	
	Modiola caroliniana	Red-flower Mallow	
	Polygonaceae		
	Polygonum aviculare s.s.	Hogweed	
	Rumex crispus	Curled Dock	
	Veronicaceae		
	Plantago coronopus	Buck's-horn Plantain	
	Plantago lanceolata	Ribwort	
Graminoid	**Iridaceae**		
	Romulea rosea	Onion Grass	
	Poaceae		
	Aira cupaniana	Quicksilver Grass	
	Avena spp.	Oat	
	Hordeum vulgare	Barley	
	Lolium rigidum	Wimmera Rye-grass	
	Nassella trichotoma	Serrated Tussock	✓
	Phalaris aquatica	Toowoomba Canary-grass	
	Triticum aestivum	Wheat	
	Vulpia bromoides	Squirrel-tail Fescue	

APPENDIX 3

EVC Benchmarks

Low-rainfall Plains Grassland (EVC 132_63)

Department of Sustainability and Environment

EVC/Bioregion Benchmark for Vegetation Quality Assessment

Victorian Volcanic Plain bioregion

EVC 132_63: *Low-rainfall* Plains Grassland

Description:
Treeless vegetation mostly < 1 m tall dominated by largely graminoid and herb life forms. Occupies cracking basalt soils prone to seasonal waterlogging in areas receiving < 500 mm annual rainfall.

Life forms:

Life form	#Spp	%Cover	LF code
Small Shrub*	1	5%	SS
Prostrate Shrub	1	5%	PS
Large Herb*	2	5%	LH
Medium Herb	8	20%	MH
Small or Prostrate Herb*	3	10%	SH
Large Tufted Graminoid	1	5%	LTG
Medium to Small Tufted Graminoid	10	30%	MTG
Medium to Tiny Non-tufted Graminoid*	2	5%	MNG
Bryophytes/Lichens and Soil Crust**	na	20%	BL

* Largely seasonal life form
** Note: treat as one life form in this EVC

LF Code	Species typical of at least part of EVC range	Common Name
SS	*Pimelea curviflora* s.s.	Curved Rice-flower
PS	*Atriplex semibaccata*	Berry Saltbush
LH	*Ptilotus macrocephalus*	Feather-heads
MH	*Acaena echinata*	Sheep's Burr
MH	*Plantago gaudichaudii*	Narrow Plantain
MH	*Maireana enchylaenoides*	Wingless Bluebush
MH	*Calocephalus citreus*	Lemon Beauty-heads
SH	*Solenogyne dominii*	Smooth Solenogyne
SH	*Oxalis perennans*	Grassland Wood-sorrel
SH	*Chamaesyce drummondii*	Flat Spurge
SH	*Goodenia pinnatifida*	Cut-leaf Goodenia
LTG	*Austrostipa bigeniculata*	Kneed Spear-grass
MTG	*Austrostipa scabra*	Rough Spear-grass
MTG	*Austrostipa nodosa*	Knotty Spear-grass
MTG	*Whalleya proluta*	Rigid Panic
MTG	*Austrodanthonia duttoniana*	Brown-back Wallaby-grass
TTG	*Centrolepis strigosa* ssp. *strigosa*	Hairy Centrolepis
TTG	*Centrolepis aristata*	Pointed Centrolepis
SC	*Convolvulus erubescens* spp. agg.	Pink Bindweed

Recruitment:
Episodic/Fire or Grazing. Desirable period between disturbances is 5 years.

Organic Litter:
10% cover

Victoria The Place To Be

Ecological Vegetation Class bioregion benchmark

EVC 132_63: *Low-rainfall* Plains Grassland - Victorian Volcanic Plain bioregion

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
LH	*Plantago lanceolata*	Ribwort	high	low
LH	*Cirsium vulgare*	Spear Thistle	high	high
LH	*Sonchus oleraceus*	Common Sow-thistle	high	low
MH	*Hypochoeris radicata*	Cat's Ear	high	low
MH	*Leontodon taraxacoides* ssp. *taraxacoides*	Hairy Hawkbit	high	low
MH	*Trifolium subterraneum*	Subterranean Clover	high	low
MH	*Plantago coronopus*	Buck's-horn Plantain	high	low
MH	*Trifolium striatum*	Knotted Clover	high	low
MH	*Trifolium dubium*	Suckling Clover	high	low
MTG	*Romulea rosea*	Onion Grass	high	low
MTG	*Vulpia bromoides*	Squirrel-tail Fescue	high	low
MTG	*Briza minor*	Lesser Quaking-grass	high	low
MTG	*Bromus hordeaceus* ssp. *hordeaceus*	Soft Brome	high	low
MTG	*Briza maxima*	Large Quaking-grass	high	low
MTG	*Lolium rigidum*	Wimmera Rye-grass	high	low
MTG	*Lolium perenne*	Perennial Rye-grass	high	low
MTG	*Nassella neesiana*	Chilean Needle-grass	high	high
MNG	*Cynosurus echinatus*	Rough Dog's-tail	high	low
MNG	*Juncus capitatus*	Capitate Rush	high	low

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Aquatic Herbland (EVC 653)

Department of Sustainability and Environment

EVC/Bioregion Benchmark for Vegetation Quality Assessment

Victorian Volcanic Plain bioregion

EVC 653: Aquatic Herbland

Description:
Herbland of permanent to semi-permanent wetlands, dominated by sedges (especially on shallower verges) and/or aquatic herbs. Occurs on fertile paludal soils, typically heavy clays beneath organic accumulations.

Life Forms:

Life form	#Spp	%Cover	LF code
Large Herb	2	10%	LH
Medium Herb	5	40%	MH
Small or Prostrate Herb	2	10%	SH
Large Non-tufted Graminoid	1	5%	LNG
Medium to Small Tufted Graminoid	4	10%	MTG
Medium to Tiny Non-tufted Graminoid	2	10%	MNG
Total understorey projective foliage cover		**85%**	

LF Code	Species typical of at least part of EVC range	Common Name
LH	*Villarsia reniformis*	Running Marsh-flower
MH	*Myriophyllum simulans*	Amphibious Water-milfoil
MH	*Potamogeton tricarinatus s.l.*	Floating Pondweed
MH	*Potamogeton pectinatus*	Fennel Pondweed
MH	*Marsilea drummondii*	Common Nardoo
SH	*Azolla filiculoides*	Pacific Azolla
SH	*Lobelia pratioides*	Poison Lobelia
SH	*Lemna disperma*	Duckweed
LNG	*Eleocharis sphacelata*	Tall Spike-sedge
MTG	*Triglochin procerum s.l.*	Water Ribbons
MTG	*Lachnagrostis filiformis*	Common Blown-grass
MTG	*Glyceria australis*	Australian Sweet-grass
MTG	*Austrodanthonia duttoniana*	Brown-back Wallaby-grass
MNG	*Eleocharis pusilla*	Small Spike-sedge
MNG	*Eleocharis acuta*	Common Spike-sedge

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

Organic Litter:
10% cover

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
LH	*Aster subulatus*	Aster-weed	high	low
LH	*Rumex crispus*	Curled Dock	high	low
MH	*Plantago coronopus*	Buck's-horn Plantain	high	high
MH	*Cotula coronopifolia*	Water Buttons	high	high
MTG	*Lolium rigidum*	Wimmera Rye-grass	high	low
MTG	*Romulea rosea*	Onion Grass	high	low

Victoria The Place To Be

Ecological Vegetation Class bioregion benchmark

EVC 653: Aquatic Herbland - Victorian Volcanic Plain bioregion

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APPENDIX 4

PSP 42 North fauna data

A.4.1. Indigenous Fauna Results

National status (EPBC Act):

CR	critically endangered
EN	endangered
VU	vulnerable
CD	conservation dependent
Mi	listed migratory species

Victorian status (FFG Act, DSE Advisory list):

cr	critically endangered (DSE 2007b)
e	endangered (DSE 2007b)
v	vulnerable (DSE 2007b)
L	listed under Flora and Fauna Guarantee Act

Regional status (DSE Advisory list):

cd	conservation dependent (DSE 2007b)
nt	near threatened (DSE 2007b)
dd	data deficient (DSE 2007b)

Type of record:

Direct observation	seen and/or heard
Indirect observation	scat/digging/scratch marks
Active	hand searching

All indigenous species have at least local significance

Table A4.1. Indigenous fauna species recorded as part of the general surveys in the study area.

Scientific Name	Common Name	Conservation status				Type of record	Survey Method	Comments
		EPBC	DSE	FFG	Regional			
Birds								
Anas superciliosa	Pacific Black Duck					Direct observation	General Fauna, Bird Census	
Anthus novaeseelandiae	Australasian Pipit					Direct observation	General Fauna, Bird Census	
Circus approximans	Swamp Harrier					Direct observation	General Fauna	
Coracina novaehollandiae	Black-faced Cuckoo-shrike					Direct observation	General Fauna	
Corvus mellori	Little Raven					Direct observation	General Fauna, Bird Census	
Coturnix pectoralis	Stubble Quail					Direct observation	General Fauna, Bird Census	
Cygnus atratus	Black Swan					Direct observation	General Fauna, Bird Census	
Egretta novaehollandiae	White-faced Heron					Direct observation	General Fauna, Bird Census	
Grallina cyanoleuca	Magpie-lark					Direct observation	General Fauna, Bird Census	
Hirundo neoxena	Welcome Swallow					Direct observation	General Fauna	
Microcarbo melanoleucos	Little Pied Cormorant					Direct observation	General Fauna, Bird Census	
Phalacrocorax fuscescens	Black-Faced Cormorant					Direct observation	Bird Census	
Pelecanus conspicillatus	Australian Pelican					Direct observation	General Fauna, Bird Census	
Rhipidura leucophrys	Willie Wagtail					Direct observation	General Fauna, Bird Census	
Tadorna tadornoides	Australian Shelduck					Direct observation	General Fauna, Bird Census	
Taeniopygia guttata	Zebra Finch					Direct observation	General Fauna, Bird Census	
Threskiornis molucca	Australian White Ibis					Direct observation	General Fauna, Bird Census	
Threskiornis spinicollis	Straw-necked Ibis					Direct observation	General Fauna, Bird Census	
Pcyphaps lophotes	Crested Pigeon					Direct observation	Bird Census	
Mirafra javanica	Bush Lark					Direct observation	General Fauna, Bird Census	
Gallinula tenebrosa	Dusky Moorhen					Direct observation	Bird Census	
Vanellus miles	Masked Lapwing					Direct observation	General Fauna, Bird Census	
Falco berigora	Brown Falcon					Direct observation	Bird Census	

Scientific Name	Common Name	Conservation status				Type of record	Survey Method	Comments
		EPBC	DSE	FFG	Regional			
Mammals								
Macropus giganteus	Eastern Grey Kangaroo					Scat	General Fauna	
Chalinolobus gouldii	Gould's Wattled Bat					Call recording	Anabat Survey	
Chalinolobus morio	Chocolate Wattled Bat					Call recording	Anabat Survey	
Nyctophilus geoffroyi	Lesser Long-ears Bat					Call recording	Anabat Survey	
Tadarida australis	White-striped Freetail Bat					Call recording	Anabat Survey	
Vespadelus darlingtoni	Large Forest Bat					Call recording	Anabat Survey	
Vespadelus vulturnus	Little Forest Bat					Call recording	Anabat Survey	
Amphibians								
Limnodynastes dumerilii insularis	Southern Bullfrog (south-eastern form)					Heard	General Fauna, Growling Grass Frog survey	
Limnodynastes peronii	Striped Marsh Frog					Heard	General Fauna	
Limnodynastes tasmaniensis SCR	Spotted Marsh Frog SCR					Direct observation	General Fauna	
Crinia signifera	Common Froglet					Heard	General Fauna	

A.4.2. Exotic Fauna Results

Table A4.2. Exotic fauna species recorded as part of the general surveys in the study area.

Scientific Name	Common Name	CaLP Act Status	Type of record	Survey Method	Comments
Birds					
Alauda arvensis	European Skylark		Direct observation	General Fauna, Bird Census	
Anas platyrhynchos	Northern Mallard		Direct observation	General Fauna	
Passer domesticus	House Sparrow		Direct observation	General Fauna	
Sturnus vulgaris	Common Starling		Direct observation	General Fauna	
Turdus merula	Common Blackbird		Direct observation	General Fauna	
Streptopelia chinensis	Spotted Turtle-dove		Direct observation	Bird Census	
Mammals					
Oryctolagus cuniculus	European Rabbit	Established	Scats	General Fauna	
Vulpes vulpes	Red Fox	Established	Direct observation	General Fauna	Foxes possibly using rock piles for breeding

A.4.3. Migratory Species

Includes records from the following sources:

- DSE Victorian Biodiversity Atlas (VBA)
- DSEWPAC database (accessed on 03.12.10)
- Current survey

Search area is 5 km radius.

Most recent record:

#	species predicted to occur by the DSEWPaC database (not recorded on other databases unless dated)
Year	recorded on databases listed above
This study	recorded during current survey

Table A4.3. Migratory fauna species recorded, or predicted to occur, within 5 km of the study area.

Scientific Name	Common Name	Family Name	Conservation Status			Most recent record	Database	No. of database records
			EPBC	DSE	FFG			
Acrocephalus stentoreus	Clamorous Reed Warbler	Sylviidae	Mi			1986	VBA	7
Anthochaera phrygia	Regent Honeyeater	Meliphagidae	EN, Mi	c	L	#	EPBC	2
Apus pacificus	Fork-tailed Swift	Apodidae	Mi			#	EPBC	1
Ardea ibis	Cattle Egret	Ardeidae	Mi			1990/#	VBA/EPBC	14
Ardea modesta	Eastern Great Egret	Ardeidae	Mi	vu	L	2006/#	VBA/BA/EPBC	12
Arenaria interpres	Ruddy Turnstone	Scolopacidae	Mi			1979	VBA	3
Arenaria interpres	Ruddy Turnstone	Scolopacidae	Mi			1977	VBA	
Calidris acuminata	Sharp-tailed Sandpiper	Scolopacidae	Mi			#/1989	VBA	15
Calidris canutus	Red Knot	Scolopacidae	Mi	nt		1978	VBA	3
Calidris ferruginea	Curlew Sandpiper	Scolopacidae	Mi			#/1981	VBA/EPBC	11
Calidris melanotos	Pectoral Sandpiper	Scolopacidae	Mi	nt		1978	VBA	1

Scientific Name	Common Name	Family Name	Conservation Status			Most recent record	Database	No. of database records
			EPBC	DSE	FFG			
Calidris ruficollis	Red-necked Stint	Scolopacidae	Mi			#/1981	VBA/BA/EPBC	8
Calidris subminuta	Long-toed Stint	Scolopacidae	Mi	nt		1978	VBA	2
Calidris tenuirostris	Great Knot	Scolopacidae	Mi	e	L	1978	VBA	2
Charadrius mongolus	Lesser Sand Plover	Charadriidae	Mi	vu		1978	VBA	2
Charadrius bicinctus	Double-banded Plover	Charadriidae	Mi			1990/#	VBA/DSEWPaC	5
Charadrius leschenaultii	Greater Sand Plover	Charadriidae	Mi	vu		1978	VBA	2
Gallinago hardwickii	Latham's Snipe	Scolopacidae	Mi	nt		2006/#	VBA/EPBC	12
Haliaeetus leucogaster	White-bellied Sea-Eagle	Accipitridae	Mi	vu	L	#	EPBC	1
Hirundapus caudacutus	White-throated Needletail	Apodidae	Mi			1990/#	VBA/EPBC	3
Hydroprogne caspia	Caspian Tern	Laridae	Mi	nt	L	1979	VBA	1
Limosa lapponica	Bar-tailed Godwit	Scolopacidae	Mi			1978	VBA	5
Merops ornatus	Rainbow Bee-eater	Meropidae	Mi			#/1988	VBA/EPBC	2
Myiagra cyanoleuca	Satin Flycatcher	Dicruridae	Mi			#	EPBC	1
Numenius madagascariensis	Eastern Curlew	Scolopacidae	Mi	nt		1978	VBA	5
Numenius minutus	Little Curlew	Scolopacidae	Mi			2008	VBA	10
Plegadis falcinellus	Glossy Ibis	Threskiornithidae	Mi	nt		1980	VBA	1
Pluvialis fulva	Pacific Golden Plover	Charadriidae	Mi	nt		2007	VBA	5
Pluvialis squatarola	Grey Plover	Charadriidae	Mi	nt		1978	VBA	2
Rhipidura rufifrons	Rufous Fantail	Dicruridae	Mi			#/1989	VBA/EPBC	2
Rostratula australis	Australian Painted Snipe	Rostratulidae	VU, Mi	cr	L	#/1980	VBA/EPBC	2
Sternula albifrons	Little Tern	Laridae	Mi	vu	L	1978	VBA	1
Tringa glareola	Wood Sandpiper	Scolopacidae	Mi	vu		1988	VBA	1
Tringa nebularia	Common Greenshank	Scolopacidae	Mi			1988	VBA/BA	8
Tringa stagnatilis	Marsh Sandpiper	Scolopacidae	Mi			1978	VBA	2

APPENDIX 5
FIGURES

Figure A1: Overview of PSP 42 North

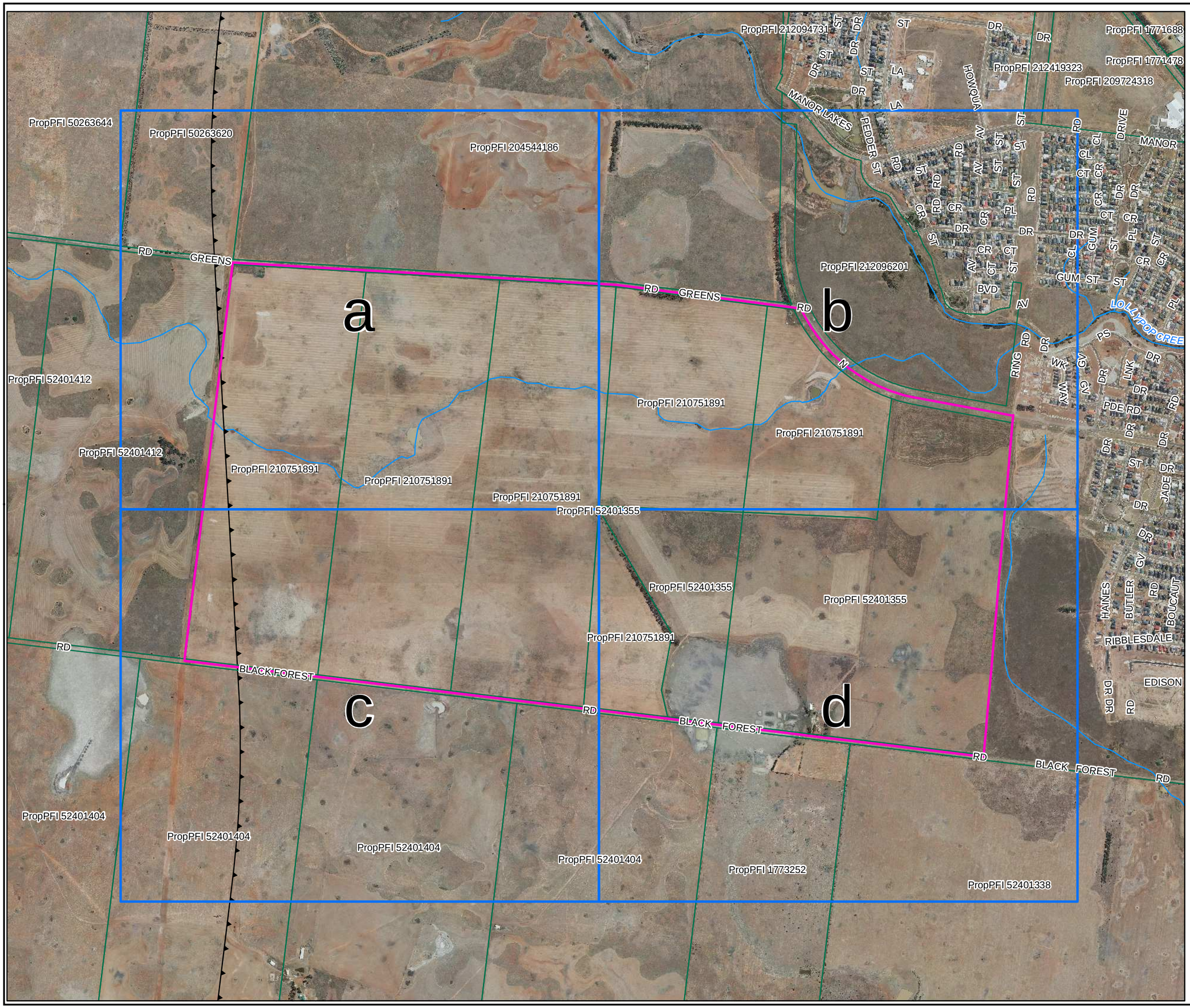
Figure A2: Property Survey and Access Status, PSP 42 North

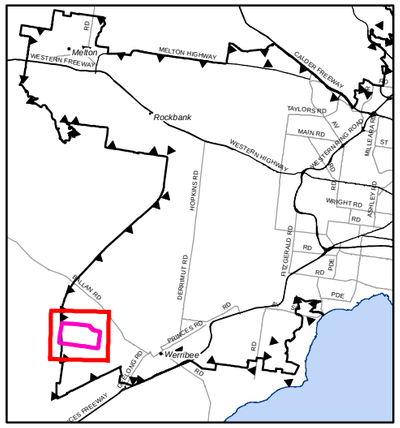
Figure A3: National and State Significant flora and fauna species locations, PSP 42 North

Figure A4: Vegetation, PSP 42 North

Figure A5: Conservation significance of habitat zones according to the Native Vegetation Framework (NRE 2002), PSP 42 North

Figure A6: Fauna Habitat, PSP 42 North





Legend

- Map sheets
- PSP 42 North
- Parcels
- Urban Growth Boundary

Figure 1: Overview of PSP 42 North

N

GDA 94 MGA Zone 55
1:14000 at A3

0 250 500
Meters

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Date: 11 April 2011, File number: 12536
Checked by: JAF, Drawn by: SKM/STF
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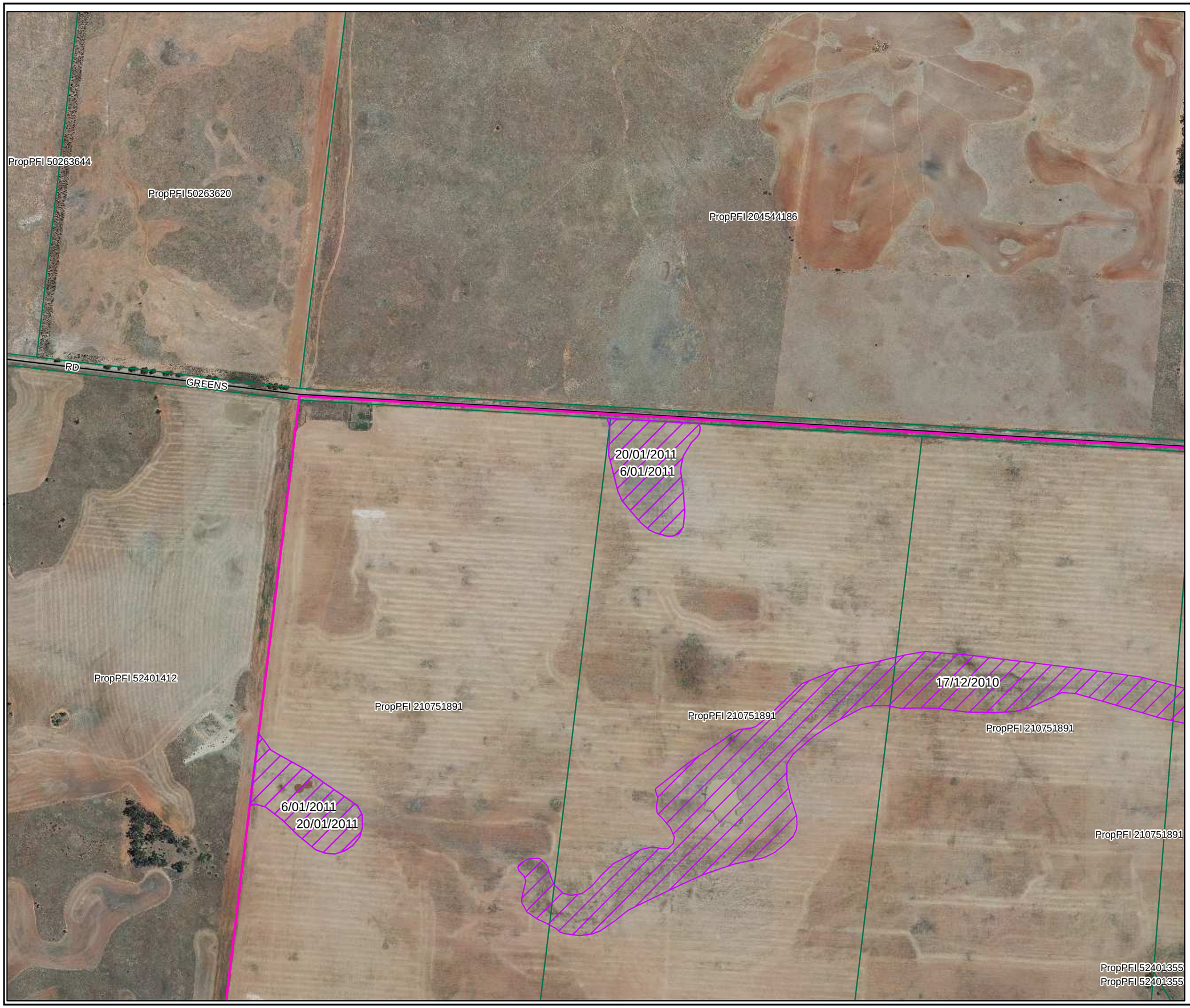

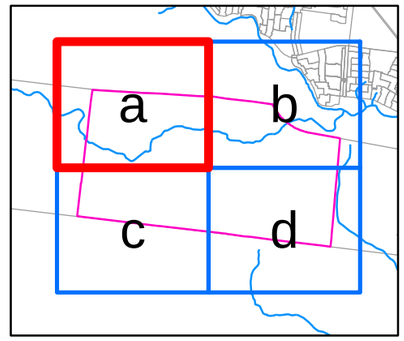

Legend

PSP 42 North

Fauna survey extent

Growling Grass Frog

Plains-wanderer

Bats

Birds

Flora Survey locations

Spring Targeted Survey

Summer Targeted Survey

Access was approved for all areas

Figure A2a: Property access, PSP 42 North

N

GDA 94 MGA Zone 55
1:6,000 at A3

0 150 300

Meters

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Date: 13 April 2011, File number: 12536
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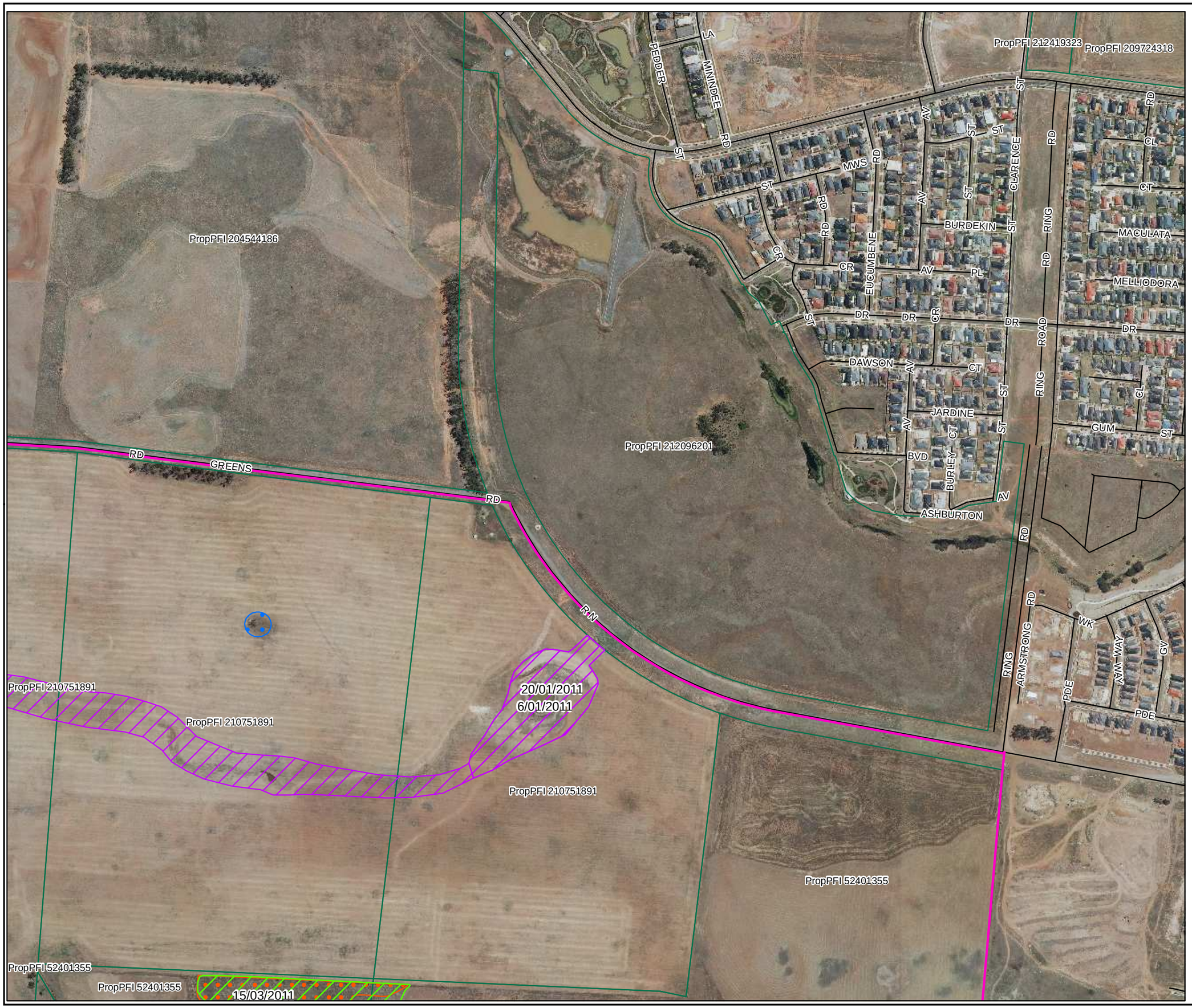

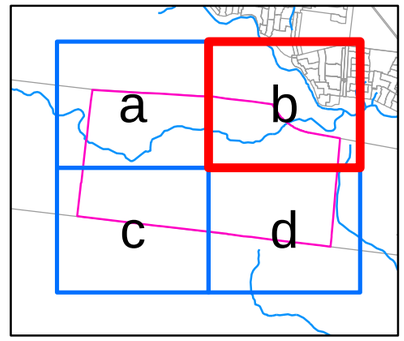

Legend

- PSP 42 North

Fauna survey extent

- Growling Grass Frog
- Plains-wanderer
- Bats
- Birds

Flora Survey locations

- Spring Targeted Survey
- Summer Targeted Survey

Access was approved for all areas

Figure A2b: Property access, PSP 42 North

N

GDA 94 MGA Zone 55
1:6,000 at A3

0 150 300

Meters

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Date: 13 April 2011, File number: 12536
Checked by: JAF, Drawn by: SKM/STF
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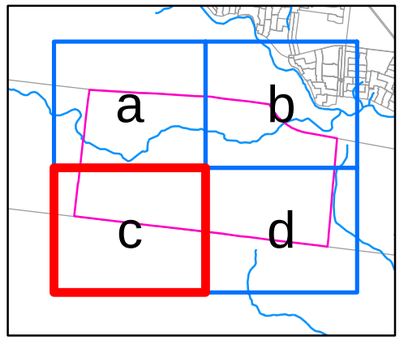

Legend

- PSP 42 North

Fauna survey extent

- Growling Grass Frog
- Plains-wanderer
- Bats
- Birds

Flora Survey locations

- Spring Targeted Survey
- Summer Targeted Survey

Access was approved for all areas

Figure A2c: Property access, PSP 42 North

N

GDA 94 MGA Zone 55
1:6,000 at A3

0 150 300

Meters

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Date: 13 April 2011, File number: 12536
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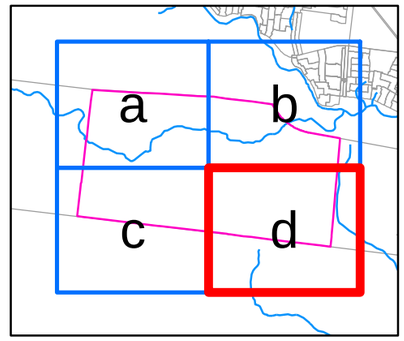

Legend

PSP 42 North

Fauna survey extent

Growling Grass Frog

Plains-wanderer

Bats

Birds

Flora Survey locations

Spring Targeted Survey

Summer Targeted Survey

Access was approved for all areas

Figure A2d: Property access, PSP 42 North

N

GDA 94 MGA Zone 55
1:6,000 at A3

0 150 300

Meters

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Checked by: JAF, Drawn by: SKM/STF
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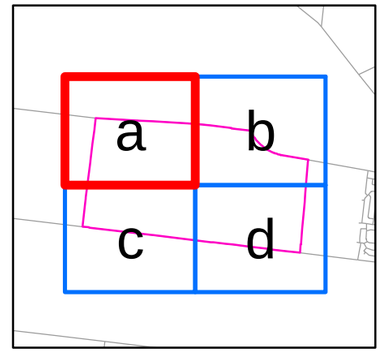

Legend

PSP 42 North

Current and Targeted Flora results

State

Database Fauna records

Significance

National

State

Database Flora records

Significance

National

State

Figure A3: National and State Significant and DSE Advisory list (VROT) flora and fauna species

N

GDA 94 MGA Zone 55
1:6000 at A3

0 125 250

Meters

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Date: 08 April 2011, File number: 12536
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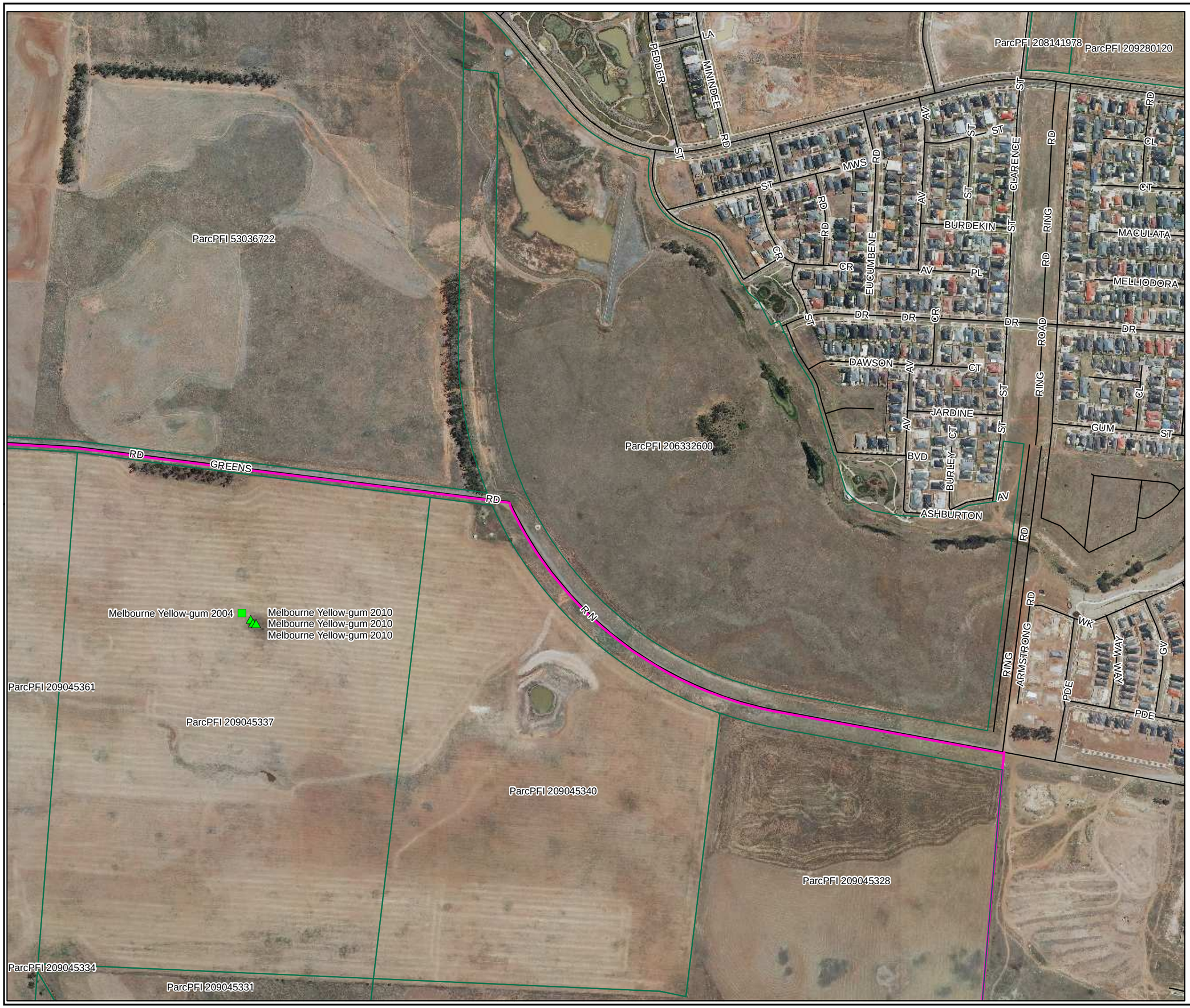

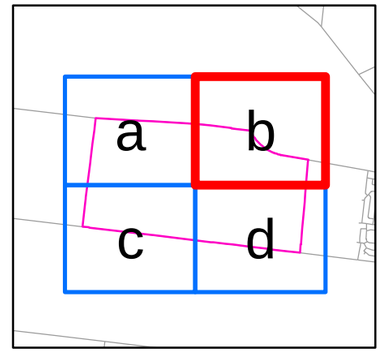

Legend

PSP 42 North

Current and Targeted Flora results

State

Database Fauna records

Significance

National

State

Database Flora records

Significance

National

State

Figure A3: National and State Significant and DSE Advisory list (VROT) flora and fauna species

N

GDA 94 MGA Zone 55
1:6000 at A3

0 125 250

Meters

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Date: 08 April 2011, File number: 12536
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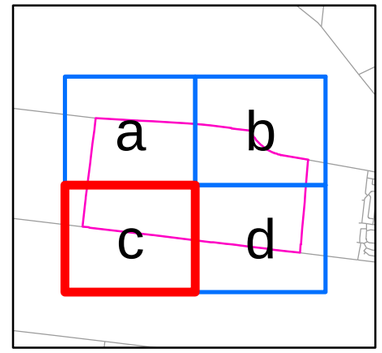

Legend

PSP 42 North

Current and Targeted Flora results

State

Database Fauna records

Significance

National

State

Database Flora records

Significance

National

State

Figure A3: National and State Significant and DSE Advisory list (VROT) flora and fauna species

N

GDA 94 MGA Zone 55
1:6000 at A3

0 125 250

Meters

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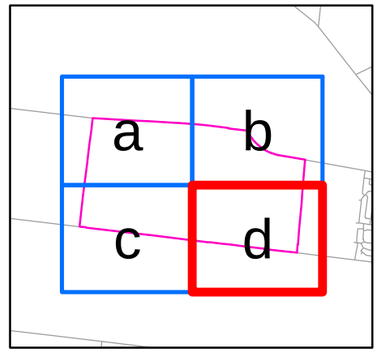

Legend

PSP 42 North

Current and Targeted Flora results

State

Database Fauna records

Significance

National

State

Database Flora records

Significance

National

State

Figure A3: National and State Significant and DSE Advisory list (VROT) flora and fauna species

N

GDA 94 MGA Zone 55
1:6000 at A3

0 125 250

Meters

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Date: 08 April 2011, File number: 12536
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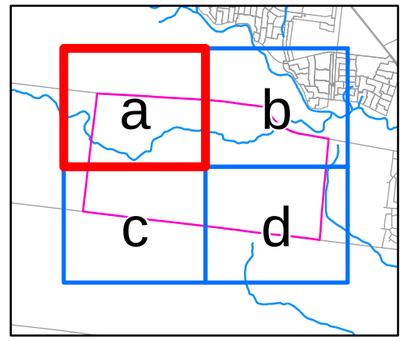

Legend

EPBC listed Natural Temperate Grassland of the Victorian Volcanic Plain

EVC

132_63 Low-rainfall Plains Grassland

653 Aquatic Herbland

Other vegetation

Degraded Treeless Vegetation

Scattered Tree

Medium Old Tree

Vegetation Quality Assessments

AECOM 08-09/09-10

BR 08-09

BR 10-11

Figure A4a: Vegetation, PSP 42 North

N

GDA 94 MGA Zone 55
1:6000 at A3

0 150 300

Meters

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Date: 08 April 2011, File number: 12536
Checked by: JAF, Drawn by: SKM/STF
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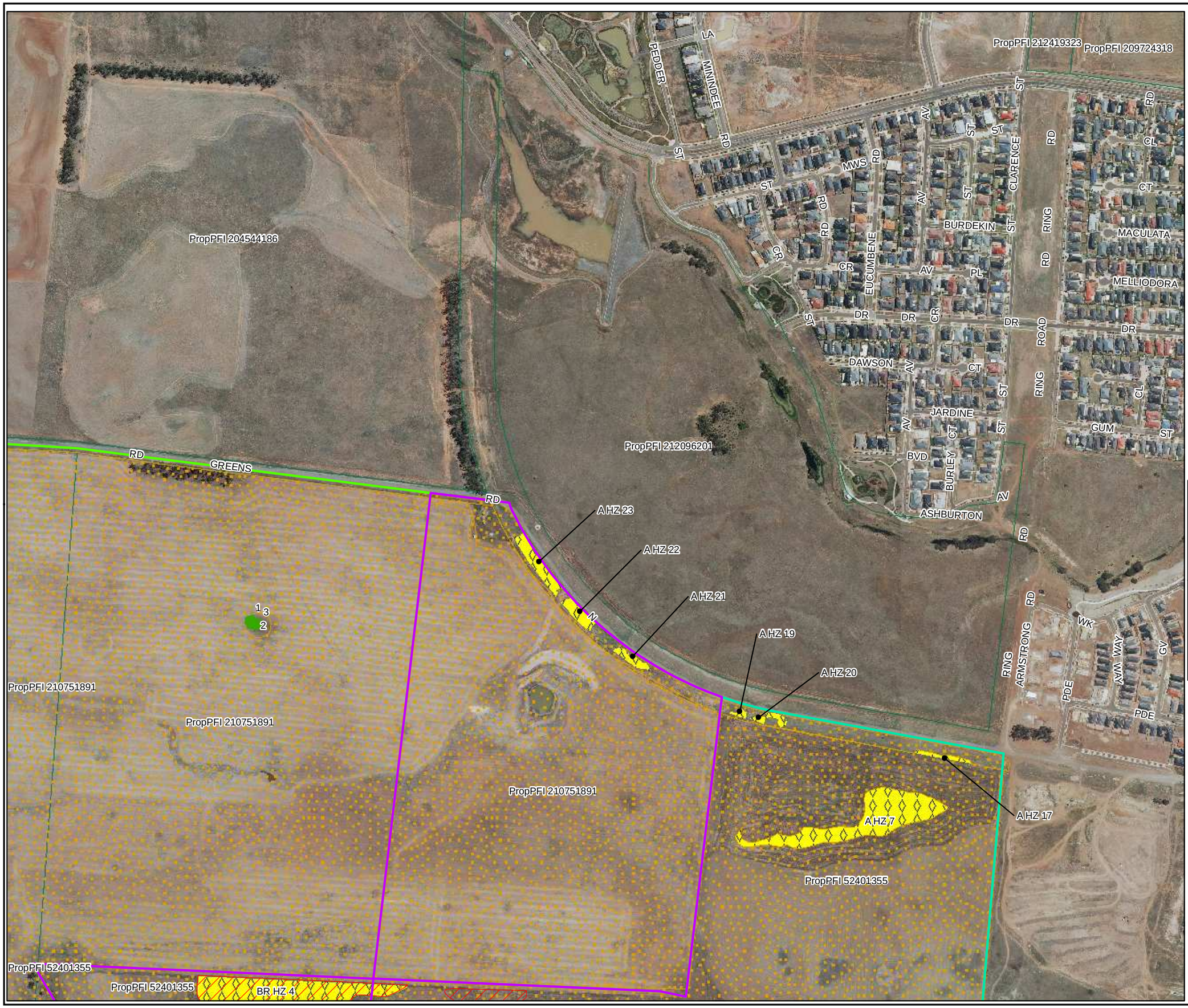

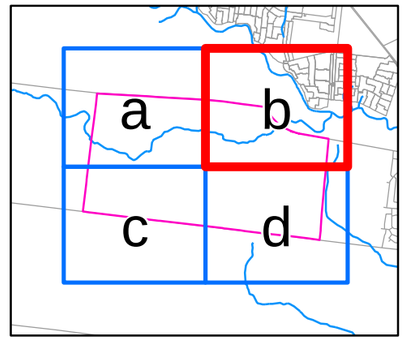

Legend

EPBC listed Natural Temperate Grassland of the Victorian Volcanic Plain

EVC

132_63 Low-rainfall Plains Grassland

653 Aquatic Herbland

Other vegetation

Degraded Treeless Vegetation

Scattered Tree

Medium Old Tree

Vegetation Quality Assessments

AECOM 08-09/09-10

BR 08-09

BR 10-11

Figure A4b: Vegetation, PSP 42 North

N

GDA 94 MGA Zone 55
1:6000 at A3

0 150 300

Meters

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Date: 08 April 2011, File number: 12536
Checked by: JAF, Drawn by: SKM/STF
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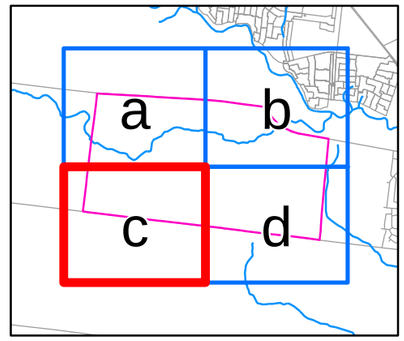

Legend

EPBC listed Natural Temperate Grassland of the Victorian Volcanic Plain

EVC

132_63 Low-rainfall Plains Grassland

653 Aquatic Herbland

Other vegetation

Degraded Treeless Vegetation

Scattered Tree

Medium Old Tree

Vegetation Quality Assessments

AECOM 08-09/09-10

BR 08-09

BR 10-11

Figure A4c: Vegetation, PSP 42 North

N

GDA 94 MGA Zone 55
1:6000 at A3

0 150 300

Meters

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Date: 08 April 2011, File number: 12536
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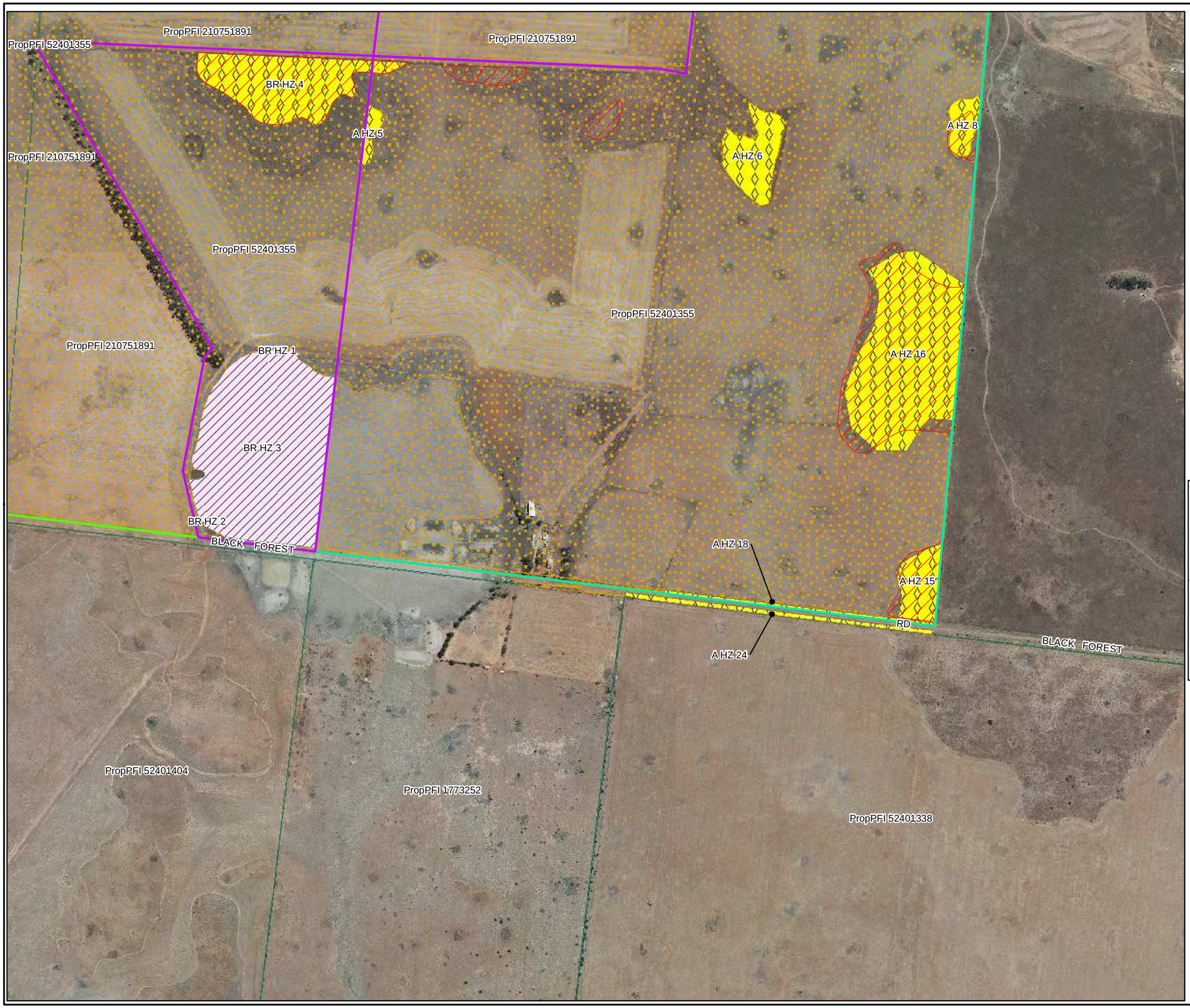

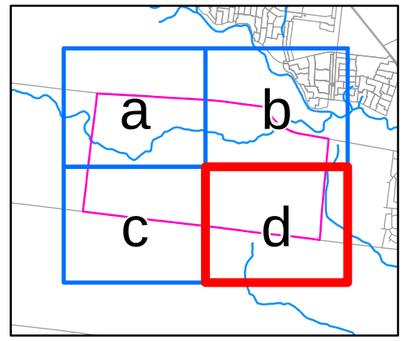

Legend

EPBC listed Natural Temperate Grassland of the Victorian Volcanic Plain

EVC

132_63 Low-rainfall Plains Grassland

653 Aquatic Herbland

Other vegetation

Degraded Treeless Vegetation

Scattered Tree

Medium Old Tree

Vegetation Quality Assessments

AECOM 08-09/09-10

BR 08-09

BR 10-11

Figure A4d: Vegetation, PSP 42 North

N

GDA 94 MGA Zone 55
1:6000 at A3

0 150 300

Meters

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Date: 08 April 2011, File number: 12536
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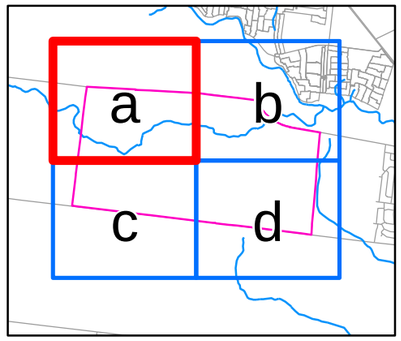

Legend

Remnant Patches

Conservation significance

Very High

Other vegetation

Degraded Treeless Vegetation

Scattered Tree

Medium Old Tree

Vegetation Quality Assessments

08-09/09-10

BR 08-09

BR 10-11

Figure A5 a Conservation significance of habitat zones according to the Native Vegetation Framework (NRE 2002), PSP 42 North

N

GDA 94 MGA Zone 55
1:6000 at A3

0 150 300

Meters

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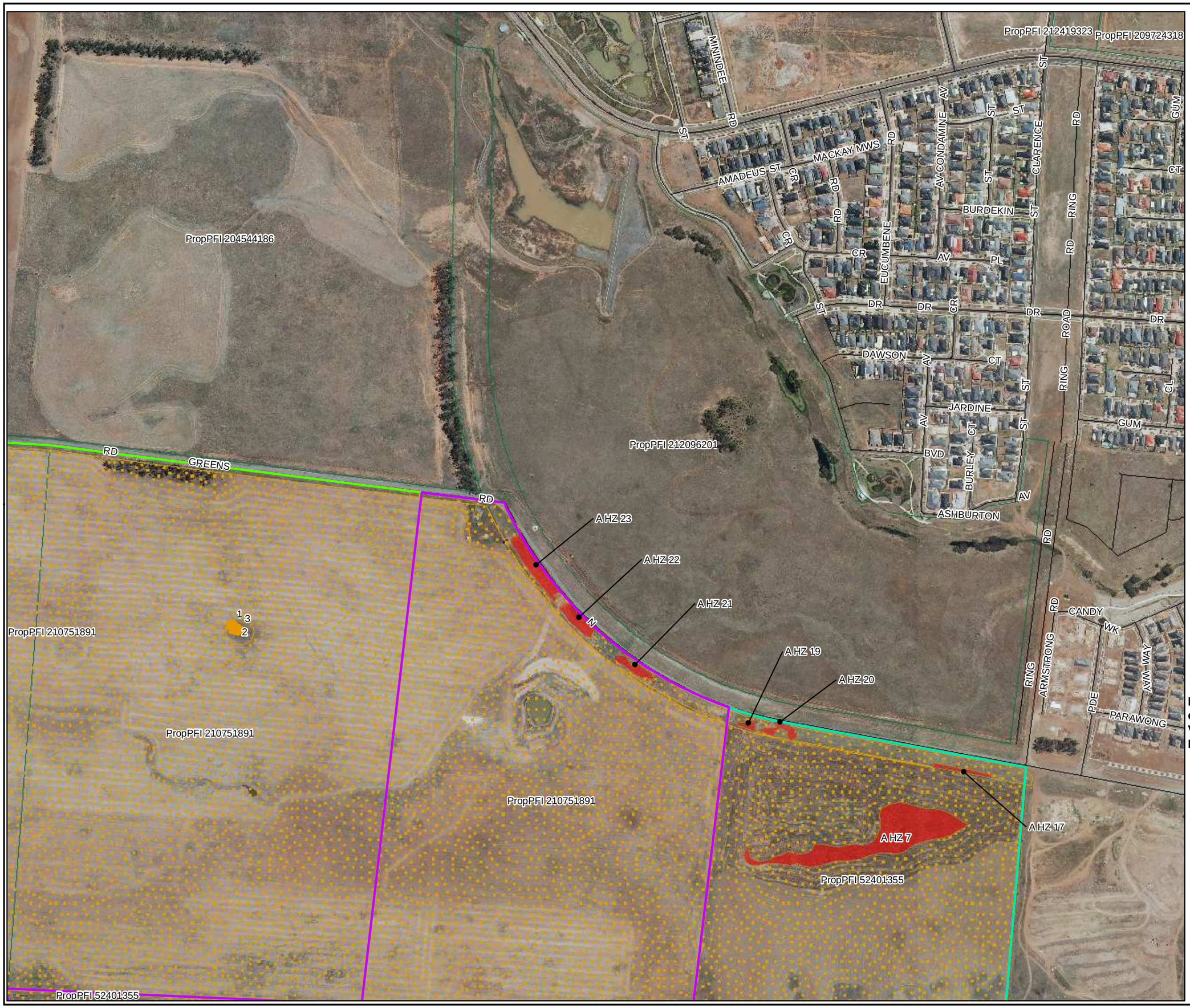
Date: 13 April 2011, File number: 12536
Checked by: JAF, Drawn by: SKM/STF
Location: P:\12500s\12536\Mapping\12536 Fig iv Cons Sig.mxd



Legend

Remnant Patches

Conservation significance

Very High

Other vegetation

Degraded Treeless Vegetation

Scattered Tree

Medium Old Tree

Vegetation Quality Assessments

08-09/09-10

BR 08-09

BR 10-11

Figure A5 b Conservation significance of habitat zones according to the Native Vegetation Framework (NRE 2002), PSP 42 North

N

GDA 94 MGA Zone 55
1:6000 at A3

0 150 300

Meters

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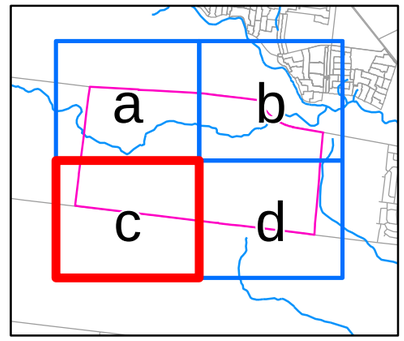
Date: 13 April 2011, File number: 12536
Checked by: JAF, Drawn by: SKM/STF
Location: P:\12500s\12536\Mapping\12536 Fig iv Cons Sig.mxd



Legend

Remnant Patches

Conservation significance

Very High

Other vegetation

Degraded Treeless Vegetation

Scattered Tree

Medium Old Tree

Vegetation Quality Assessments

08-09/09-10

BR 08-09

BR 10-11

Figure A5 c Conservation significance of habitat zones according to the Native Vegetation Framework (NRE 2002), PSP 42 North

N

GDA 94 MGA Zone 55
1:6000 at A3

0 150 300

Meters

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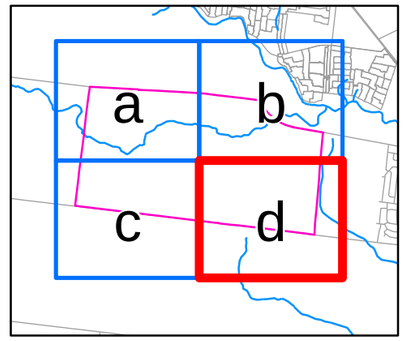

Legend

Remnant Patches

Conservation significance

Very High

Other vegetation

Degraded Treeless Vegetation

Scattered Tree

Medium Old Tree

Vegetation Quality Assessments

08-09/09-10

BR 08-09

BR 10-11

Figure A5 d Conservation significance of habitat zones according to the Native Vegetation Framework (NRE 2002), PSP 42 North

N

GDA 94 MGA Zone 55
1:6000 at A3

0 150 300

Meters

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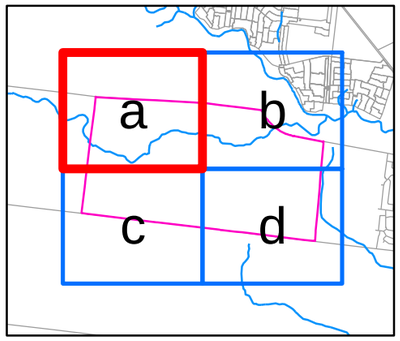

Legend

PSP 42 North

Golden Sun Moth

Potential habitat

Growling Grass Frog

Potential habitat

Striped Legless Lizard

Potential habitat

Fauna habitat

- 2 - Remnant tree
- 3 - Planted vegetation
- 5 - Grassland - rocky
- 7 - Pasture/crop - rocky
- 8 - Pasture/crop - not rocky
- 9 - Wetland/watercourse
- 10 - Rock walls/piles

Figure A6a: Fauna Habitat, PSP 42 North

N

GDA 94 MGA Zone 55
1:6000 at A3

0 145 290

Meters

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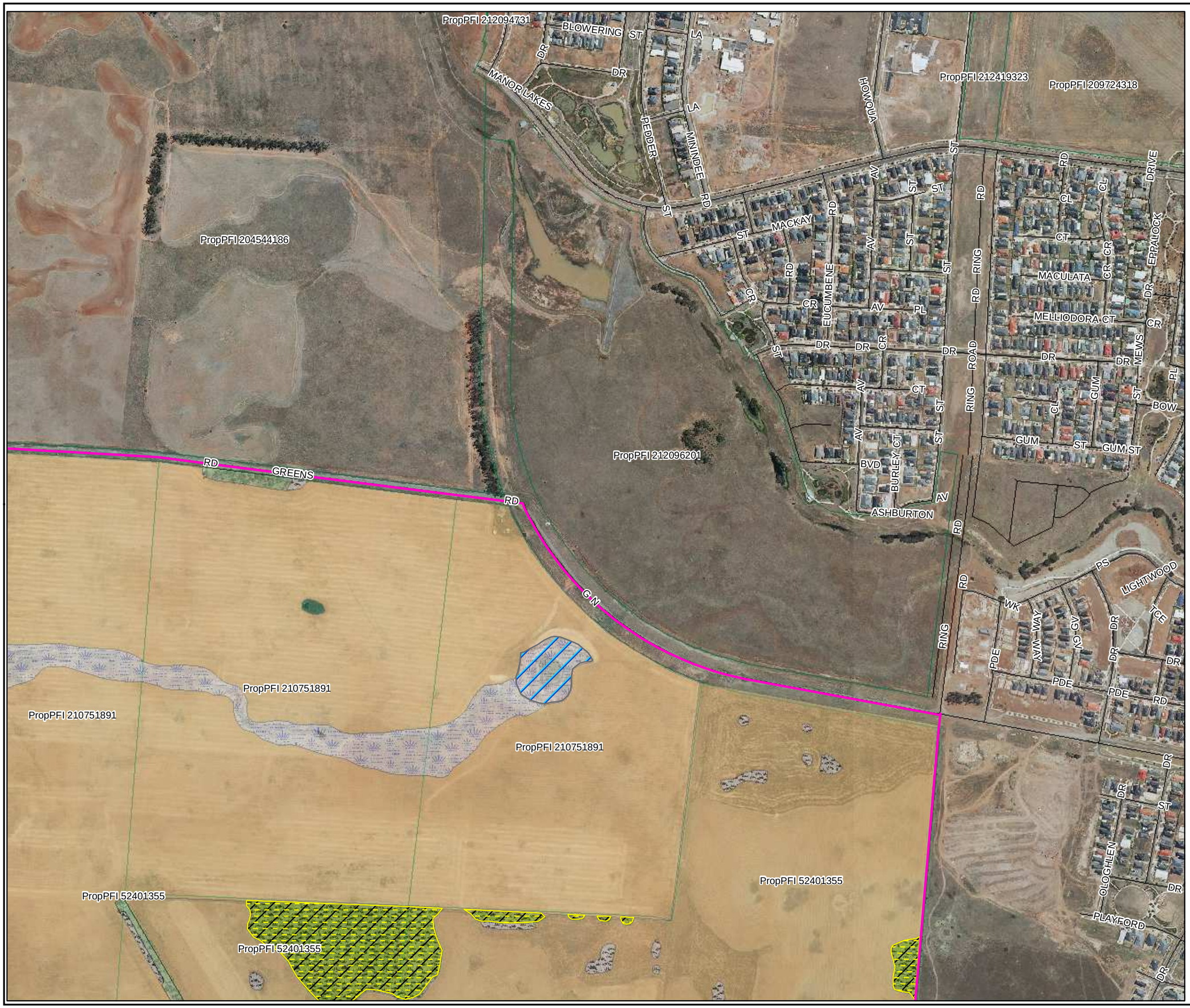

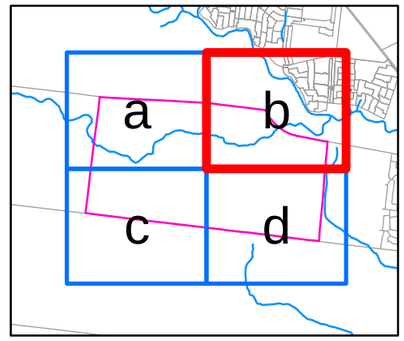

Legend

PSP 42 North

Golden Sun Moth

Potential habitat

Growling Grass Frog

Potential habitat

Striped Legless Lizard

Potential habitat

Fauna habitat

- 2 - Remnant tree
- 3 - Planted vegetation
- 5 - Grassland - rocky
- 7 - Pasture/crop - rocky
- 8 - Pasture/crop - not rocky
- 9 - Wetland/watercourse
- 10 - Rock walls/piles

Figure A6b: Fauna Habitat, PSP 42 North

N

GDA 94 MGA Zone 55
1:6000 at A3

0 145 290

Meters

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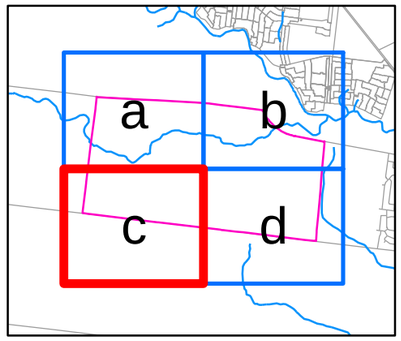

Legend

- PSP 42 North

Golden Sun Moth

- Potential habitat

Growling Grass Frog

- Potential habitat

Striped Legless Lizard

- Potential habitat

Fauna habitat

- 2 - Remnant tree
- 3 - Planted vegetation
- 5 - Grassland - rocky
- 7 - Pasture/crop - rocky
- 8 - Pasture/crop - not rocky
- 9 - Wetland/watercourse
- 10 - Rock walls/piles

Figure A6c: Fauna Habitat, PSP 42 North

N

GDA 94 MGA Zone 55
1:6000 at A3

0 145 290

Meters

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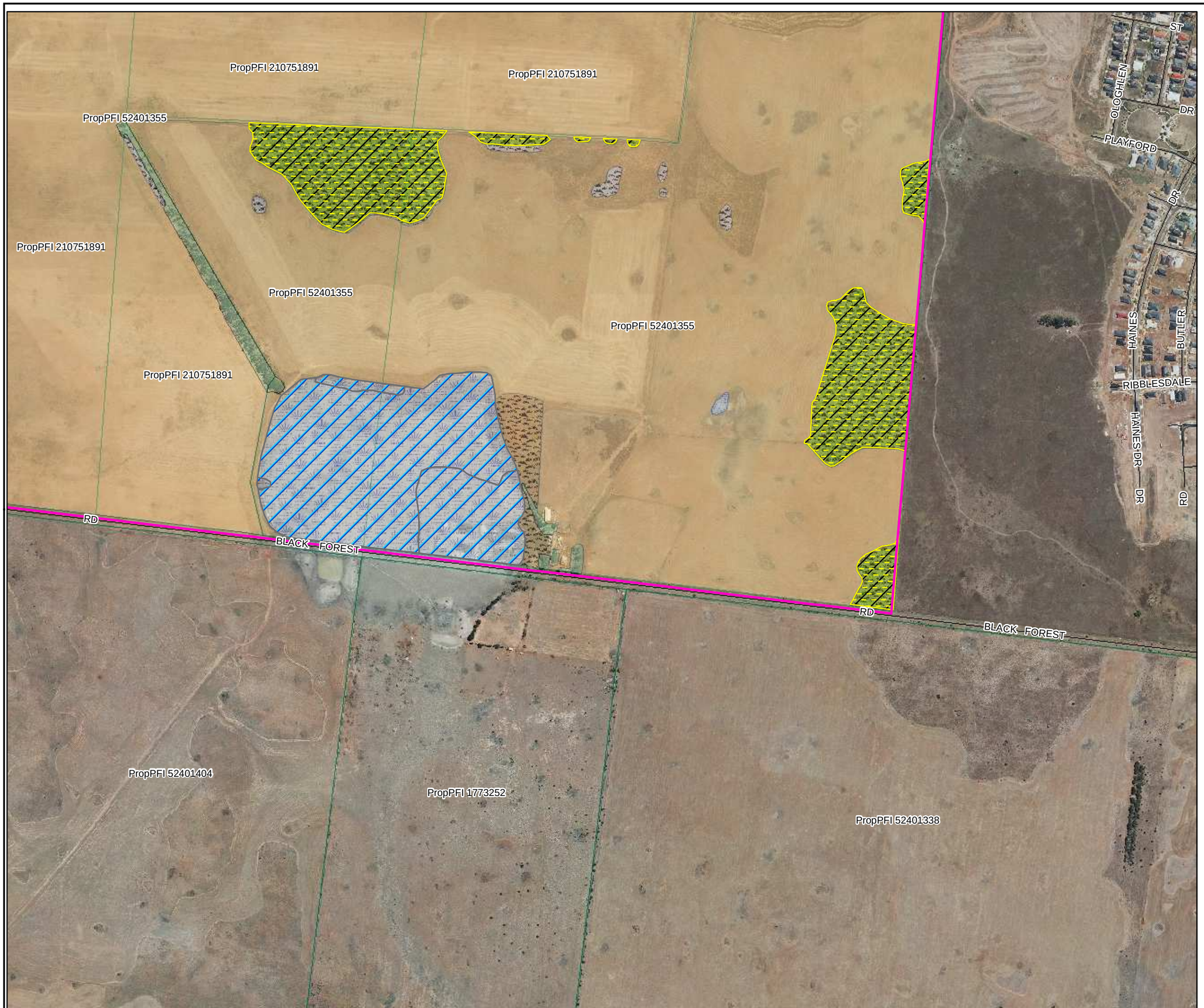

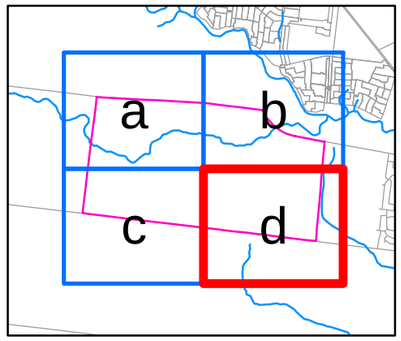

Legend

PSP 42 North

Golden Sun Moth

Potential habitat

Growling Grass Frog

Potential habitat

Striped Legless Lizard

Potential habitat

Fauna habitat

2 - Remnant tree

3 - Planted vegetation

5 - Grassland - rocky

7 - Pasture/crop - rocky

8 - Pasture/crop - not rocky

9 - Wetland/watercourse

10 - Rock walls/piles

Figure A6d: Fauna Habitat, PSP 42 North

N

GDA 94 MGA Zone 55
1:6000 at A3

0 145 290

Meters

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