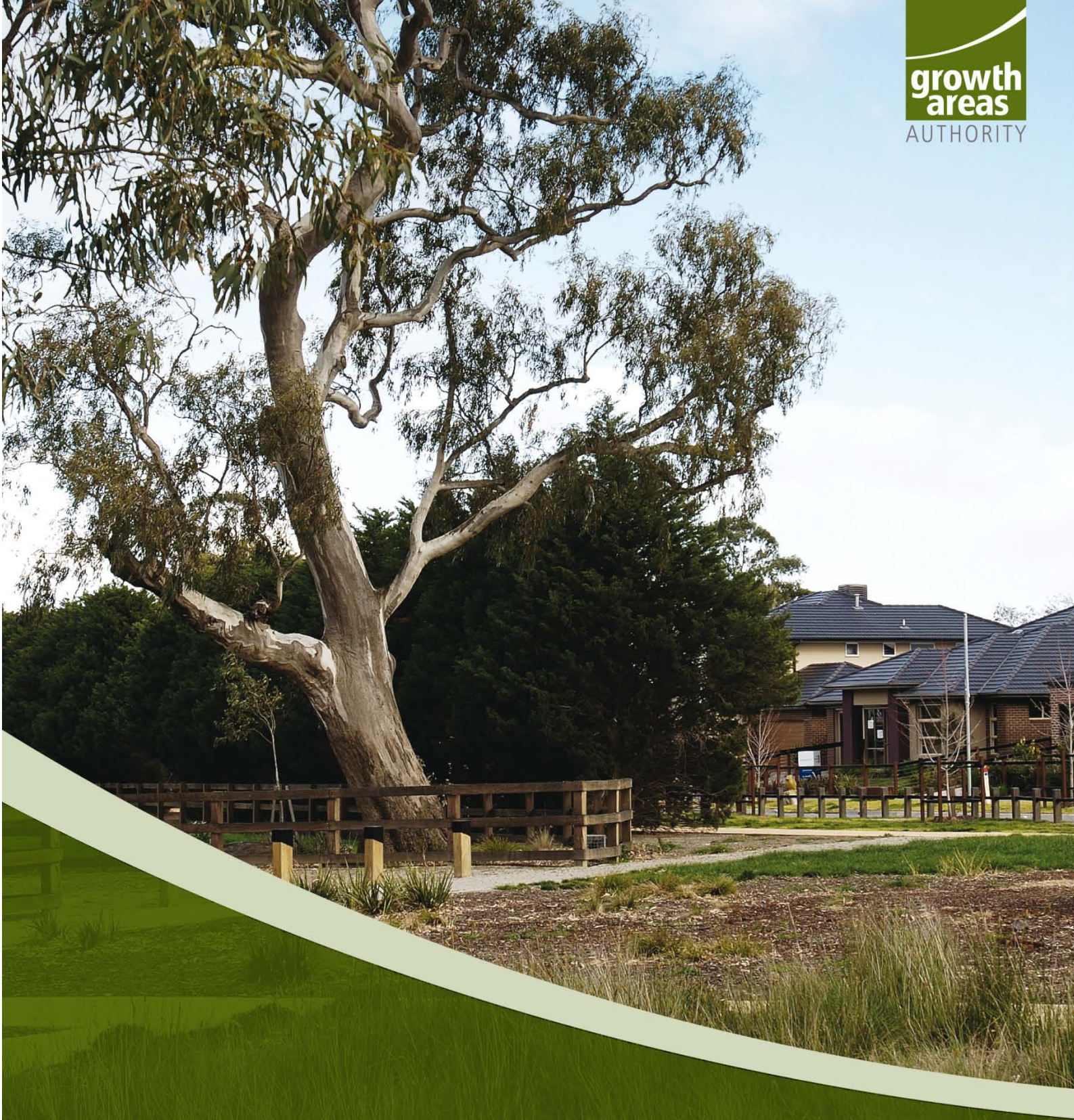

growth areas AUTHORITY

Biodiversity Assessment Report
Revised – Botanic Ridge – PSP 10

August 2012

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Biodiversity Assessment Report
Revised – Botanic Ridge – PSP 10
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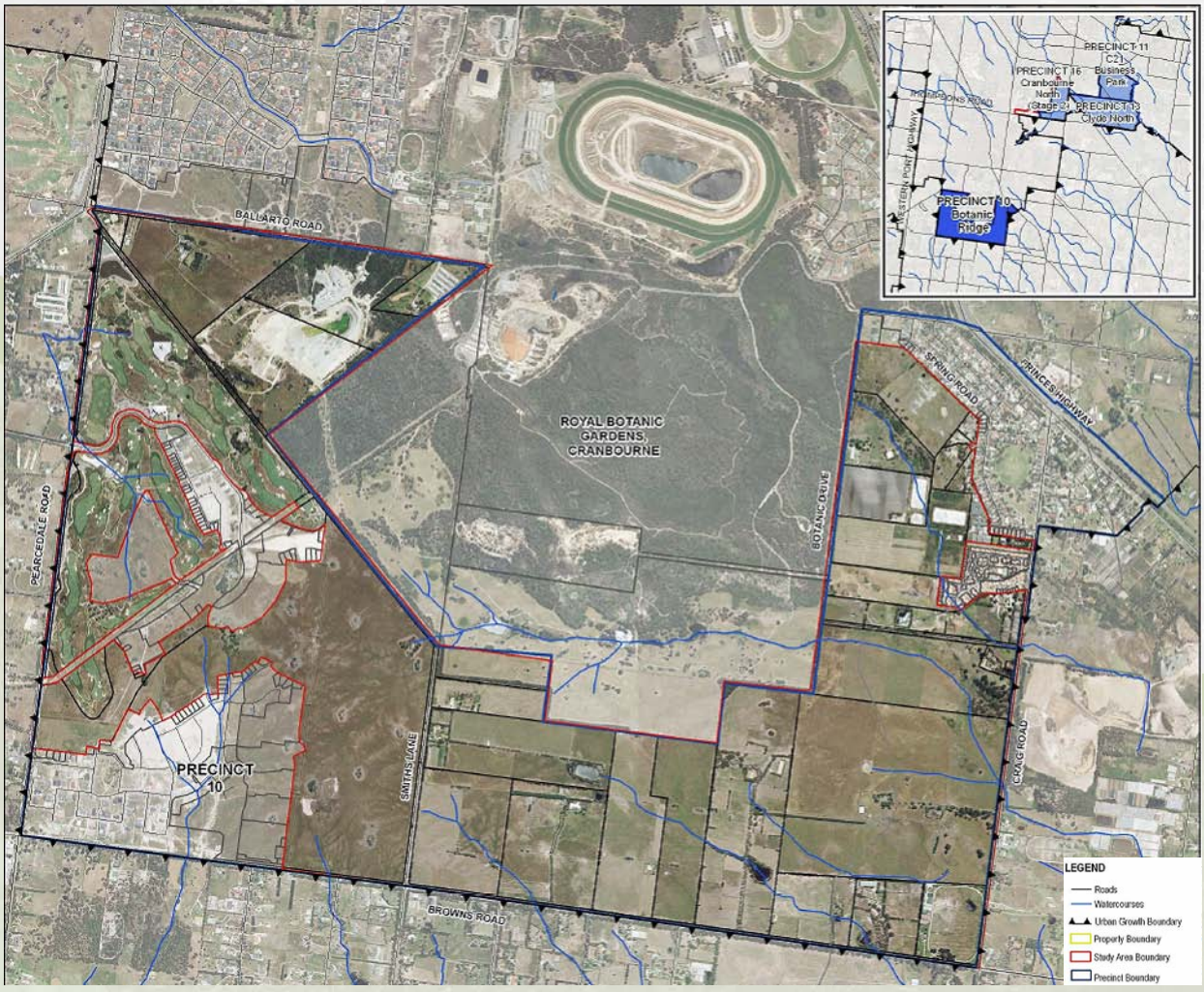

MAP: Botanic Ridge – PSP 10

Biodiversity Mapping Project
Quality Assurance – Verification Sheet
Revised – Botanic Ridge – PSP 10

Document Title	Biodiversity Assessment Report		
Precinct (Name and Number)	Botanic Ridge PSP 10		
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	Organisation
This document is approved for release	**Growth Areas Authority : Director, Technical Services:** ..... **Date:** 9/8/12
	Department of Sustainability and Environment ..... **Director, Ecosystem Services:** **Date:** 2.8.2012

Biodiversity Assessment Report: Flora and Fauna Assessment and Mapping Precinct 10, Botanic Ridge

20 July 2010

Part 1 (Background and Purpose) by Growth Areas Authority.
Part 2 (Flora) and Part 3 (Fauna) by Mark Shepherd, Joanne Henry, David Nance, Joanne North & Peter Gannon.

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2	17 December 2009	Paul Cassidy (GAA)
3	20 July 2010	

Internal review and auditing of this report for quality control was conducted by Peter Gannon.

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Practical Ecology

Staci Timms undertook GIS data processing and created maps for the report.

Joy MacDonald, Jeremy Neal, Greg James, Mark Shepherd and David Fairbridge undertook habitat hectare assessments.

Lincoln Kern provided project support and guidance.

Jane Juliff and Michael Reynolds provided technical assistance.

Nic McCaffrey assisted with 'likelihood of occurrence' ratings of significant flora.

Mal's Ecological and Environmental Services

Malcolm Legg undertook targeted survey for threatened fauna, reviewed sections of Part 3 and provided likelihood of occurrence ratings for threatened fauna

Ecocentric Environmental Consulting

Peter Gannon undertook habitat hectare assessments.

Growth Areas Authority

Yong Zhou provided *Land Subject to Inundation Overlay* and *Precinct Structure Plan* areas as GIS layers.

Department of Sustainability and Environment

Biodiversity Information Group provided access to their ecological databases; Victorian Flora Site Database (VFSD) and Atlas of Victorian Wildlife (AVW).

EXECUTIVE SUMMARY

Practical Ecology Pty Ltd was commissioned by Growth Areas Authority to undertake a targeted flora and fauna survey, and habitat hectare assessment within Precinct Structure Plan (PSP) Area 10; *Botanic Ridge,* Victoria. The purpose of this report is to provide information on the flora and fauna species, Ecological Vegetation Classes (EVCs), and fauna habitats occurring or predicted to occur within the precinct, as background information to assist the preparation of a Precinct Structure Plan for the *Botanic Ridge* PSP area 10.

Botanic Ridge is located in the suburb of Cranbourne North, within the City of Casey in Melbourne's south eastern growth corridor (Figure i). The 'U' shaped precinct is approximately 743 ha in area and is surrounded predominately by semi-rural, light urban development to the west, south and east. Parts of the study area are also covered by Biosites 4813; *Cranbourne Woodland* and 5095; *Royal Botanic Gardens - Cranbourne Annexe (old Site Ids 1562 & 3535)*, as defined by DSE (2005b). The precinct borders the Royal Botanic Gardens Cranbourne, which represents a 'core area' of significant habitat for threatened flora and fauna, including a stable population of Southern Brown Bandicoot *Isoodon obesulus obesulus*, a nationally listed threatened species.

The majority of the study area is currently being used for grazing livestock and features large open paddocks with some indigenous trees and planted vegetation. In addition there is a golf course and residential development, and an active quarry in the north-west sector. Many of the Habitat Zones recorded within the study area have been determined to be of very high conservation significance. Native vegetation is common in roadsides and adjacent to wetlands and waterways.

A LSIO occupies five hectares in the south-east of the study area. The study area is located within the Gippsland Plain bioregion (DSE 2009a).

Flora

Native vegetation within the Botanic Ridge Precinct is confined primarily to the quarry site, the golf course, drainage-lines, wetlands, scattered tree zones a habitat corridor in the north east of the site that was formally assessed due to access constraints. Of this vegetation, **24.41 hectares** of native vegetation meets DSE's native cover threshold and comprises **8.37 habitat hectares.** Seven EVCs were recorded and mapped within the study area. Most EVCs occurring within the study area have an *endangered* or *vulnerable* conservation status in the Gippsland Plains bioregion. One-hundred and thirty-two scattered trees were recorded within the study area.

Habitat Zones within the study area include:

- Heathy Woodland and Swamp Scrub remnants within the quarry in the north-west sector.
- Heathy Woodland / Swamp Scrub habitat corridor in the north east sector.
- smaller, disjunct Habitat Zones within the golf course in the north west sector.

- patches of aquatic vegetation within drainage lines and wetlands.
- patches of Swamp Scrub along roadsides and within drainage lines.

Non-indigenous vegetation comprises planted non-indigenous Eucalypts and other established trees along fence-lines and roadsides. Drainage lines, wetlands and roadsides include areas of modified native vegetation that comprise the floristic components of Swamp Scrub and other EVCs, but do not meet DSE's cover thresholds. Large areas of agricultural land dominate the study area and comprise little native vegetation, with the exception of scattered tress and small woodland remnants. Degraded Treeless Vegetation (DTV) assessed during the current assessment totals approximately **388 hectares** within the study area.

One flora species of state significance; Wetland Blown-grass Lachnagrostis filiformis Var 2 was recorded within two farm dams in the south of the study area. No flora species of national significance were recorded within the study area, during the current assessment. At least two nationally significant species, River Swamp Wallaby-grass *Amphibromus fluitans* and Matted Flax-lily *Dianella amoena,* are considered to have a medium likelihood of occurrence within the study area. In addition, three species, Powelltown Correa *Correa reflexa* var*. lobata*, Southern Bristle-sedge *Chorizandra australis* and Upright Panic *Entolasia stricta* are considered to have a medium likelihood of occurrence, whilst a fourth, Wetland Blown-grass *Lachnagrostis filiformis* var. 2, is considered to have a medium-high likelihood of occurrence within the study area.

Fauna

Targeted surveys were undertaken for the following state and nationally listed threatened fauna species:

- Australian Grayling *Prototroctes maraena*
- Dwarf Galaxias *Galaxiella pusilla*
- Glossy Grass Skink *Pseudemoia rawlinsoni*
- Growling Grass Frog *Litoria raniformis*
- Southern Brown Bandicoot *Isoodon obesulus obesulus*
- Southern Toadlet *Pseudophryne semimarmorata*
- Swamp Skink *Egernia coventryi*

A total of **91** fauna species were recorded within the study area during the current assessment, comprising six amphibians, ten reptiles, 62 birds, two fish and 11 mammals. Eighty species (89%) are native, while 10 species (11%) are introduced. Three state significant species; Southern Toadlet *Pseudophryne semimarmorata*, Swamp Skink *Lampropholis guichenoti* and the Pacific Gull *Larus pacificus* pacificus. One nationally significant species; Southern Brown Bandicoot *Isoodon obesulus* was recorded during the current assessment.

Surveys for other state and nationally threatened species were not commissioned by Growth Areas Authority. These include Swift Parrot *Lathamus discolor* and a suite of other threatened

woodland and wetland birds, some of which have a high likelihood of occurrence within the study area. Furthermore, general surveys for species not listed as state or nationally significant were not commissioned by Growth Areas Authority. Further survey at appropriate times is necessary to better determine the likelihood of occurrence of threatened fauna within the study area.

Fifty fauna species of national, state or regional significance have been recorded within 5km of the study area boundary (DSE 2005c) or have been predicted to occur within five kilometres by DEWHA (2009a). Thirty-one of these species are considered likely to have at least a moderate likelihood of utilising the study area or of finding critical habitat within the study area. Many of these 31 species are wetland birds that are likely to utilise the wetlands and marshy pastures within the study area.

Drainage-lines, wetlands and roadsides that do not meet the DNRE (2002) threshold for native vegetation comprise remnant or regenerating indigenous vegetation, such as Swamp Paperbark *Melaleuca ericifolia* and Common Reed *Phragmites australis* in many parts of the study area. Two threatened fauna species were recorded within modified roadsides and drainage-lines. These areas and many other areas dominated by introduced flora in drainage-lines, wetlands and roadsides are generally considered habitat for some threatened fauna species.

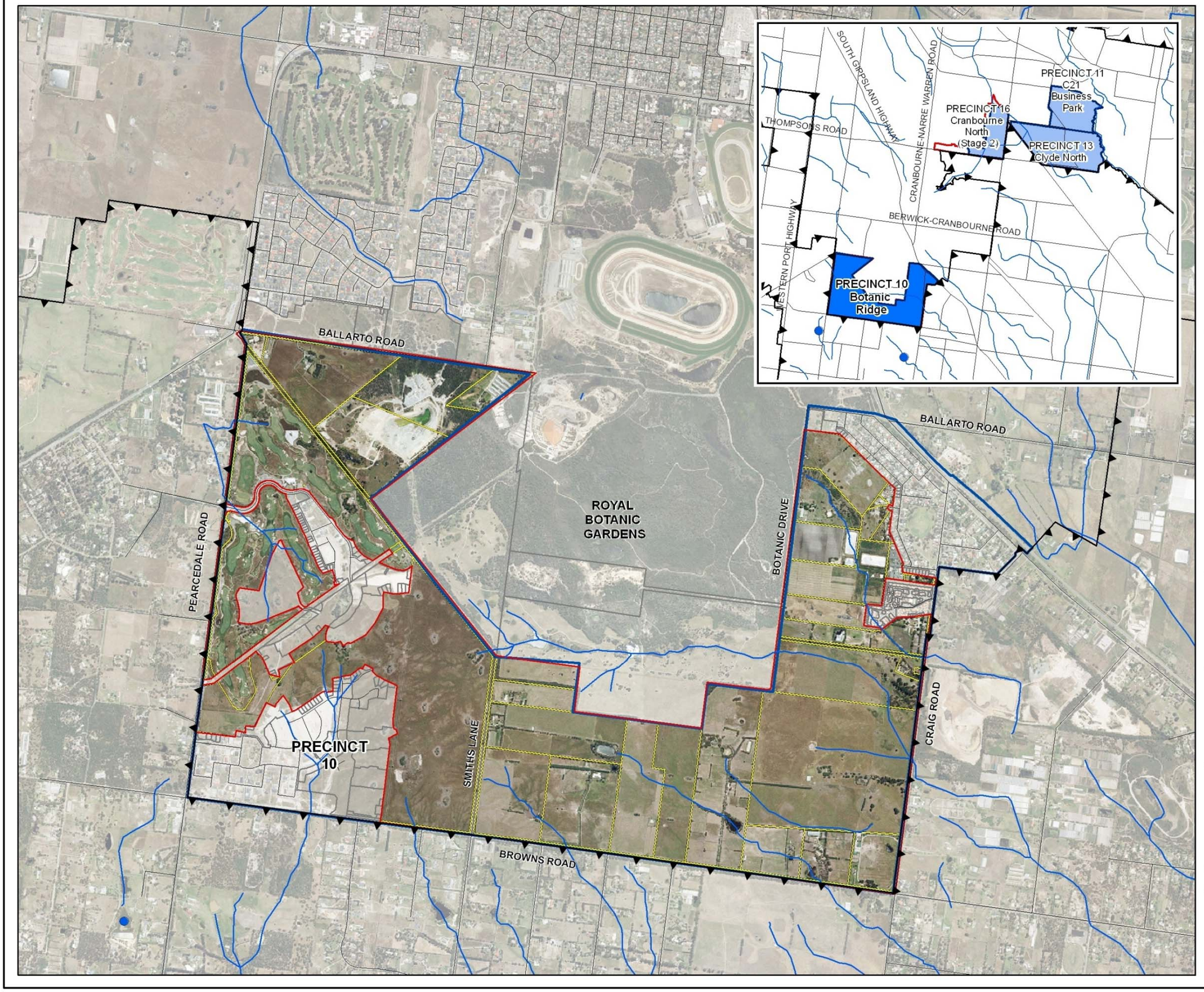
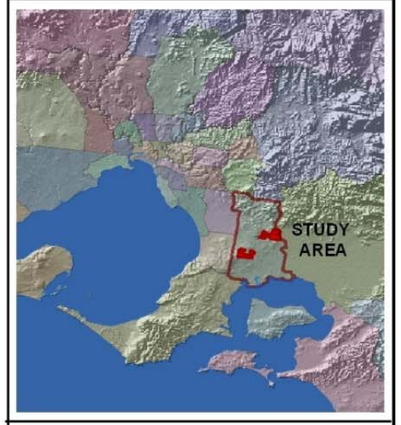


FIGURE i

Location and Overview Map
Biodiversity Assessment Report
Flora Assessment and Mapping
Botanic Ridge
Growth Areas Authority

LEGEND

- Roads
- Watercourses
- Urban Growth Boundary
- Property Boundary
- Study Area Boundary
- Precinct Boundary



MAP AND SURVEY DETAILS
Mapping by: Staci Timms, May '09
Generated from: GIS layers and Aerial Photography, supplied by DSE, GAA, ESRI and Geosciences Australia.

DATUM: GDA 94 MGA Zone 55

N

NOTES:
Practical Ecology bears no responsibility for the accuracy and completeness of this information and any decisions or actions taken on the basis of the map. While information appears accurate at publication, nature and circumstances are constantly changing.

VERSION	01	DATE	22/06/09

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Part 1

Background and Purpose

Precinct Structure Plan area 10;

Botanic Ridge

1. BACKGROUND AND PURPOSE

1.1 Study Area

Precinct Structure Plan (PSP) area 10; *Botanic Ridge*, is located within the suburbs of Cranbourne South and Junction Village, within the City of Casey in Melbourne's south eastern growth corridor (Figure 1). Botanic Ridge referred to hereafter as *Precinct 10*, is approximately 743 hectares in area and is bounded by Ballarto road to the north, Pearcedale road to the west, Craig road to the east and Browns road to the south. The study area is surrounded predominately by agricultural land to the south, east and west and by the Royal Botanic Gardens Cranbourne (RBGC) to the north (Figure 1).

The study area consists of approximately 28 privately owned properties and includes adjacent road reserves. The majority of the study area is currently being used for grazing stock and features large open paddocks with some indigenous scattered trees. Native vegetation is common in roadsides and adjacent to wetlands and waterways. Native vegetation is especially prevalent in the northeast of the study area where remnant woodlands surround an operating quarry. Parts of the study area are dominated non-indigenous and planted exotic vegetation.

Growth Areas Authority advised Practical Ecology during the course of the project that parts of Precinct 10 had already undergone rezoning and that certain parcels included within the precinct were to be no longer included within the study area (Figure 1). The parcels excluded from the study area are part of what is termed the *Botanic Ridge Estate* (Botanic Ridge Estate 2009).

The majority of Precinct 10 is zoned *Urban Growth Zone*, however several large parcels comprising the Botanic Ridge Estate in the west of the study area are zoned *Residential Zone 1*. Six parcels in the north-west of the study area are zoned *Farm Zone 1* and *Farm Zone 2*. All except one parcel within the Precinct is covered by *Environmental Significance Overlays* 2, 3 and 5. Parts of the study area are covered by a *Land Subject to Inundation Overlay* (LSIO) (DPCD 2009).

Parts of the study area are also covered by Biosites 4813; *Cranbourne Woodland* and 5095; *Royal Botanic Gardens - Cranbourne Annexe (old Site Ids 1562 & 3535)*, as defined by DSE (2005b).

The study area falls within the Gippsland Plains Bioregion (DSE 2009a).

1.2 Project Scope

The Growth Area Authority (GAA) engaged contractors during 2008 / 2009 to map and assess native vegetation and fauna habitat in designated Precinct Structure Plan areas surrounding Melbourne. The scope and design of this project was developed jointly with the Department of Sustainability and Environment (DSE). The purpose of this mapping and assessment process was to:

- Prepare biodiversity reports as essential background input into precinct structure planning at an early stage in the planning process;

- Inform the preparation of precinct structure plans in areas designated for future urban development (in most cases this will also include preparation of a Native Vegetation Precinct Plan)

- Identify priorities for protection and enhancement of biodiversity including potential reserve areas, biodiversity corridors and areas with potential to provide offsets for vegetation lost as a result of urban development;

- Assist long term planning related to infrastructure including liaison with relevant service authorities to ensure their requirements are met over the next 30-50 years;

This new approach focuses on achieving the objectives of the Victorian Native Vegetation Framework and planning development within the Urban Growth Zone at a regional level. This approach will improve the clarity and flexibility of native vegetation management, reduce the administrative burden on local government, provide greater certainty for urban development and improve biodiversity outcomes.

The mapping and assessment undertaken as part of this project has been undertaken in sufficient detail and of a sufficient standard to be used for the preparation of Native Vegetation Precinct Plans and Precinct Structure Plans.

The contractors assessed and mapped vegetation within existing precinct planning areas inside the Urban Growth Boundary (UGB). Contractors were required to submit a GIS data layer of all site assessments, together with other site information and observations on a monthly basis.
The site assessments included:The extent of native and non-native vegetation
Mapped polygons of sites / zones
Confirmation of the native vegetation type (EVC)
Native vegetation condition assessment (Habitat Hectares site and landscape context score) and other site attributes including land use, dominant weeds etc.
The genera, size (small, medium, large and very large) and location of all remnant indigenous scattered trees

The number and size (small, medium, large and very large) of trees within vegetation patches that meet DSE's benchmark definition of a canopy species
The location of all observed rare or threatened plants or observed native flora
The location of all observed rare or threatened native fauna or habitat and land use features for fauna

The outputs of the Vegetation and Fauna Assessment and Mapping project will include two parts:

PART A: Vegetation condition, Rare or Threatened Flora species, Habitat and Land Use Features.

PART B: Fauna Surveys.

After consideration of the maps, information and records collected in Part A above and - existing data and fauna and mapping provided by DSE - GAA in consultation with DSE proposed to identify Study Sites for a general assessment of fauna and habitats.

This original approach to Fauna surveys was amended through negotiation with, and agreement of, the DSE to a targeted approach to survey for significant species. The specifications for these surveys are outlined in Appendix 1 of this report.

The priority for 2008 / 2009 was to assess areas for the next group of precinct structure plans, including PSP numbers 10, 13, 16, 23, 25, 26, 37, & 40 (total area 6796 hectares).

1.3 Amended Project Scope

The GAA became aware that the State Government was preparing to commission other major transport infrastructure projects and to plan for the future growth of Melbourne. These proposed projects, all of which were within, or in close proximity to, the GAA study areas, required assessment and mapping of vegetation and fauna. GAA staff negotiated with the Department's responsible for these projects for them to use the established GAA contract and project arrangements to obtain the vegetation and fauna information for their projects.

Additional PSP areas (PSP areas 11 and 4) were contracted to Practical Ecology to be assessed in 2008 for the extent and quality of native vegetation. PSP 4 was later withdrawn (late Nov 2008) as the surveys had been commissioned by City of Cardinia.

The outputs of the Vegetation and Fauna Assessment and Mapping project will also provide some of the vegetation and fauna data for four key Government projects:

1. Investigation to plan for the future growth of Melbourne
2. Regional Rail Link between West Werribee and Southern Cross via Tarneit and Sunshine
3. Outer Metropolitan Ring Transport Corridor Reservation Project
4. Ensuring critical grasslands are protected. The State Government is committed to the creation of two large areas as grassland protected areas.

Only Project No. 2 (above) directly involved existing PSP areas. The results for these projects will be reported in separate reports being prepared for each Project.

2. PROJECT SPECIFICATIONS AND MANAGEMENT ARRANGEMENTS

2.1 Tenders and Selection of Contractors

The Request for Tender was prepared by Growth Areas Authority jointly with the Department of Sustainability and Environment to ensure that the survey methodologies and all data collected and recorded as part of the project complied with Departmental standards. The Request for Tender was advertised in the Herald Sun and on the VicTender web site on the 23rd July 2008.

The Tenders were assessed against the Evaluation Criteria and 4 Contracts were awarded on the 26th August 2008 for Part A (Vegetation condition/Rare or Threatened Flora species/Habitat attributes and Land Use Features). Two Contracts were also awarded for Part B (Fauna Surveys).

Vegetation Condition Assessment and Mapping

Each contractor identified Habitat Zones (as per the method described in Vegetation Quality Assessment Manual Version 1.3, DSE 2004) within the assigned study sites. Habitat Zonesand conducted a habitat hectare assessment using 'Habitat Hectares for Arc Pad'. Each contractor recorded land use, other habitat features, and dominant weed species at each zone. DSE supplied each contractor with 'Habitat Hectares for Arc Pad' which was used when mapping and undertaking habitat hectare assessments.

Contractors undertook a 30 minute assessment to identify and (using a GPS) record (i) all Victorian rare or threatened species (VROTS) and; (ii) any habitat features for native fauna. A count or estimate of the number of individual VROTS was provided at each recorded point location. DSE provided an assessment sheet for recording habitat and land use features for fauna likely to be present in the study area including hollow logs, tree 6hollows, litter, rocks and rock walls. This assessment sheet was also made available to load onto PDAs and these land use and habitat attributes were recorded for all properties that have been assessed and mapped.

For scattered trees, contractors identified and recorded the location of all individual indigenous trees encountered within any Habitat Zone, including the genera, diameter at breast height and assessment to determine ecological/ habitat significance.

Targeted Fauna Surveys

Appendix 1 outlines the agreed approach to surveys for significant fauna species throughout these investigation areas.

2.2 Training of Contractors

The GAA and DSE provided a mandatory (3 day) training course in the assessment methods and tools. The dates for this training course were 27, 28 &, 29 August 2008. This training included habitat hectare assessments and mapping (to ensure the method is being applied in a consistent manner), use of the Habitat Hectares for Arc Pad software, other data collection requirements, OH&S and landholder engagement.

Staffs of contractors were trained in field situations in Native Vegetation assessment by DSE using the habitat hectare assessment methodology and the use of hand held GPS devices loaded with Arc View software provided by DSE.

2.3 Access to Properties and Communication with Landholders

GAA, in consultation with contractors, developed procedures for access to properties and protocols for contact with landholders. Contractors were provided with GAA authorised identification documentation to be carried by all staff whilst undertaking field surveys. The GAA assisted in the engagement of landholders in the process and facilitated access to properties to undertake site assessments.

A letter explaining the mapping project and requesting access to properties was sent to each landholder and occupier. Fact Sheets explaining precinct structure planning and the vegetation mapping project were also forwarded with the letter to landholders. Land owners were given the choice to make contact with the respective contractor to arrange access to their property. Contractors also spent considerable resources making contact with land owners and arranging site visits. A small number of landholders refused to provide access to their properties and in some cases the land owner data base did not lead to any contact being made with the land owner or occupier. Contractors provided regular updates as to which landowners had denied the contractor access to their property to conduct a survey.

In cases where access to a property has not been possible, mapping in this report will show the DSE modelled data layer of information and the contractors confirmation of this by a 'drive by' assessment. While this is not ground survey results it provides an indication of likely vegetation and habitat. In some cases, finalisation of the precinct structure plan and /or native vegetation precinct plan will require additional on ground assessment surveys to be undertaken at these properties.

2.4 Access to Existing Reports and Databases

In some parts of the precinct planning areas flora and/or fauna surveys had been previously arranged by landholders, councils or property developers. GAA, where possible, sought access to these reports and provided a copy to the relevant contractor. DSE staff also provided copies of reports that they knew existed for some of these areas.

Contractors were provided with a copy of, or access to, the DSE corporate flora and fauna databases, including the Atlas of Victorian Wildlife, Flora Information System and Aerial

photography. Access to landholder and property information was arranged through DSE and in some cases a contractor was engage to compile a telephone contact database to enable contractors to contact property owners.

2.5 DSE Quality Assurance Arrangements

Field surveys were undertaken by qualified and experienced botanists and ecologists who had participated in the training provided by the DSE as part of this project.

DSE also undertook quality assurance site visits with the contractors to ensure that the assessment methodology was being applied in a consistent manner.

Contractors provided monthly reports to the GAA contract manager including an account of hectares assessed and the data collected. GAA undertook a check of GIS integrity and then arranged for DSE to check the data for its consistency with the *Vegetation Quality Assessment Manual* Version 1.3 (DSE 2004).

Audits of the data files were conducted by DSE to ensure that the records conformed to DSE standards and that all attributes had been recorded accurately.

Any deficiencies were reported to each contractor for correction and improvement prior to acceptance of the results and finalisation of payments.

2.6 Project Governance

A Native Vegetation Project Control Group was established by GAA, which initially included GAA and DSE representatives only. Representatives of VicRoads and Department of Transport were later invited to join the Project Control Group when it was decided that GAA's contractors would be used to undertake the assessment and data gathering for VicRoads and Department of Transport's road and rail project. The Department of Transport also arranged for their project manager (Maunsell) to attend the meetings. The Project Control Group has met regularly since the project commenced.

2.7 Monthly Reporting

Monthly updates and data files were provided on the progress of the assessments along with the contractor's updated project plan to ensure completion of the planned extent of assessment/mapping within the time period provided for the assessment. Initially the assessments were to be completed by the end of December 2008 but the GAA negotiated with contractors to extend the survey deadline into early 2009 to maximise the areas assessed and mapped.

BACKGROUND & PURPOSE APPENDIX 1. TARGETED FAUNA SURVEYS – Specifications for Casey- Cardinia Area

Includes Precincts: Botanic Ridge PSP area 10, Botanic Ridge PSP area 13, Botanic Ridge PSP area 10.

In addition to the targeted survey guidance as outlined in Appendix 2 of DSE's *Draft Flora, Fauna, and Habitat Hectare Assessment Model* please see comments below.

Fauna Species discussed at site visit:

- **Growling Grass Frogs** – ideal time for nocturnal surveying is October to December for calling males – particularly after rain. Survey can be extended until February for nocturnal spotlighting and diurnal surveys. Survey all drainage lines, dams, water bodies, streams, rivers, areas where there is water in all three precincts etc.

- **Dwarf Galaxias, Australasian Grayling** – ideal time is spring when there is permanent water. Survey all areas where there is water.

- **Southern Brown Bandicoots** – survey should occur in winter when the species are active and digging. Survey in areas of potential habitat (where vegetation or habitat structure is appropriate – including patches of weeds) in Botanic Ridge and other precincts with suitable habitat.

  Survey to include:

  - Daytime searches of at least two hours for each site of suitable habitat resources, such as areas with a dense understorey and thick ground cover, perhaps focussing on areas where fire has produced a mosaic of habitat that vary according to time since burning.

  - Daytime searches for signs of activity, including tracks, scats, nests and conical foraging holes. Usually undertaken concurrently with habitat resource searches and recommended survey effort is therefore the same.

  - Collection and analysis of predator scats, owl casts or remains, targeting predatory bird/mammal nests/dens.

  - Multiple spotlight surveys of transects at least 100 m apart in all areas of likely habitat to maximise area surveyed with total transect length of at least 1000m; repeat over two nights and across all seasons if possible to reduce influence of climatic conditions on survey outcome

  - Additional cage (3 nights in a row) and camera surveys in areas of likely habitat.

DSE has provided information of landholders with records and updated AVW records.

- **Swamp Skink, Glossy Grass Skink** –

- Likely to be present in Botanic Ridge precinct and other precincts if suitable habitat.
- Pit fall traps/ tiles /metal sheets over summer period in selected areas of potential habitat
- If Elliot traps used they should be triggered for the lightest weight possible
- They are cryptic species and often missed in targeted survey so very important for ecological assessment of site and potential and likely habitat to be mapped. Often in disturbed areas.

- **Southern Toadlet**
  - Survey in autumn
- **White Footed Dunnart**
  - If there are records around Botanic Ridge then targeted survey in likely habitat.

Part 2

Habitat Hectare Assessment and Targeted Flora Survey

Precinct Structure Plan area 10;

Botanic Ridge

3. FLORA INTRODUCTION

Practical Ecology Pty Ltd was commissioned by Growth Areas Authority (GAA) to undertake a habitat hectare, threatened flora survey and site condition assessment of Precinct Structure Plan area 10 in Cranbourne South, Victoria. The primary objectives of this study are to establish the distribution, abundance and significance of remnant EVC Habitat Zones, threatened flora and significant habitat within the study area and to present the information within the context of relevant legislation and policy.

This report provides information on significant flora and habitat hectare values within Precinct 10 by:

- identifying the study area's known habitat hectare values and the conservation status therein
- documenting significant flora species that occur or have potential to occur within the study area
- assessing all fieldwork data and information from relevant literature and databases against relevant policy and legislation

This information will be utilised by GAA to inform:

- the preparation of precinct structure plans the identification of priorities for protection and enhancement of biodiversity including potential reserve areas, biodiversity corridors and areas with potential to provide offsets for vegetation lost as a result of urban development
- long term planning related to infrastructure including liaison with relevant service authorities to ensure their requirements are met over the next 30-50 years.

4. FLORA METHODS

Flora taxonomy is consistent with the Flora Information System (FIS) database when accessed through Viridans software (DSE 2007a). Taxonomic nomenclature for scientific names is derived from Walsh and Stajsic (2008).

4.1 Literature review and desktop assessment

Background information on the study area's bioregion and EVC distribution (pre-1750, and current) was gathered by literature review prior to site surveys. Planning reports and land management documents were also reviewed. Several GIS mapping layers were provided to Practical Ecology by GAA and DSE and these were incorporated into a GIS. Mapping layers and data sources are detailed below.

Cadastre data and parcel identifiers: the cadastre data, identifying individual land parcels, along with individual parcel identifiers were supplied by GAA/DSE for this project and incorporated into Practical Ecology's GIS.

Bioregion: determined by referring to DSE's *Biodiversity Interactive Map* (DSE 2009a).

Pre 1750 EVCs: determined by referring to DSE's pre-1750 EVC distribution maps (DSE 2009a).

Extant EVCs: the extant EVC GIS mapping layer was supplied by DSE for this project and geo-rectified with the aerials for this study.

Modeled Native Vegetation Extent and Quality: determined by referring to DSE on-line maps and confirmed on site (DSE 2009a).

Biosites: the Biosite25_region mapping layer was not supplied by DSE for this project but was inspected using DSE's Biosite cd (DSE 2005b).

Significant attribute waypoints: the Fauna100_point, Flora100_point and lfw100_point waypoint attribute layers were supplied by DSE for this project and integrated into our GIS of the study area.

Flora Information System (FIS) and Atlas of Victoria Wildlife (AVW): The Flora Information System (DSE 2007a) and Atlas of Victoria Wildlife (DSE 2005c) databases were queried for the study area. The record locations of significant flora and fauna taxa were referred to in the field during the habitat hectare surveys.

Management reports: A review was conducted of management reports available to us from the region to assist in the pre-survey identification of significant sites and habitat corridors. These reports included McMillan et al (2003), Fairbridge & Appleby (2009), Lane & Associates (2008) and Costello et al (2003).

Site aerials: the study area was previewed prior to site assessment using both Google Earth and aerials supplied by DSE to identify patches of vegetation. Google Earth aerials were also

streamed live to a laptop during the site surveys for site identification, and for comparison with more up-to-date DSE aerials for the study area.

Fieldwork: Field survey was undertaken on foot. The majority of survey was undertaken between October and November 2008. However, access to individual properties was dependent on correct landholder contact details and the contactability of landholders, the lack of which prevented contact via telephone in some cases. Certain landholders were therefore contacted in person through 'door knocking'. Furthermore, in some instances, permission was granted on the condition that the landholder to be present during the survey, which required arrangements to be made for meeting the landholder at a mutually agreeable time. Circumstances such as these contributed to delays in property access in some cases and resulted in some surveys being undertaken in January. Survey was therefore disjointed and extended over a period of several months. Weather conditions during the survey were therefore varied due to the extended period over which survey was undertaken.

4.2 Flora

Habitat hectare assessments were conducted, on a land parcel by parcel basis, across the study area. The assessments were conducted in accordance with DSE's *Vegetation Quality Assessment Manual* (DSE 2004), *User Guide Habitat Hectares Assessment Sheet for ArcPad 7.1.1 – Version 6* (DSE 2008a) and *GAA Native Vegetation Mapping Project Field Assessment Methodology – Quick Reference Guide* (DSE 2008b). Training was provided by DSE in a three day session at the project's inception. Auditing was undertaken by DSE throughout the fieldwork stage.

Flora data was collected in the field using a hand held Person Digital Assistant (PDA). The Department of Sustainability and Environment (DSE) developed a software application for ArcPad 7.1.1 for the *Growth Areas Authority Native Vegetation and Mapping project* (DSE 2008a) in order to enable the collection of data in the field. DSE's software application enabled the collection of data as outlined in the sections below. The resulting ESRI shapefiles were processed using ArcView V.9 software to re-edit and refine of polygon boundaries, based on hardcopy mapping.

GIS data was submitted to GAA and DSE for monthly review throughout the project. Requested edits were completed and data was resubmitted. At the conclusion of the fieldwork, the monthly data was merged to form a single GIS file, which was exported to into excel spreadsheets for presentation in this report.

The site assessments included:

- mapping the extent of remnant and non-remnant vegetation
- mapping polygons of Habitat Zones, as defined below and in accordance with Victoria's *Native Vegetation Management Framework* (DNRE 2002)
- determination of Ecological Vegetation Classes (EVC)

- native vegetation condition assessment (Habitat Hectares site and landscape context score) and assessment of other site attributes including land-use, habitat attributes and high threat environmental weeds
- the size (small, medium, large and very large) and genera of trees (either as patches or individual trees when scattered in the landscape)
- the location of observed rare or threatened plant species
- the location of incidentally recorded threatened fauna species.

Vegetation in the study area was categorised into different types. These categories and their definitions are consistent with policy and legislation, particularly *Victoria's Native Vegetation Management Framework* (DNRE 2002), and assists in identifying where such policies come into effect.

The following categories were applied.

4.2.1 Remnant Vegetation Patch

- EVCs and Habitat Zones were identified within each patch in accordance with Section 5 of DSE's *Vegetation Quality Assessment Manual Version 1.3* (DSE 2004).
- For each Habitat Zone the Zone Overview data was recorded using DSE's Site Assessment Checklist. Details on the type of information collected is provided in the GAA Vegetation Mapping User Guide, Section 2 – *Collecting Zone Overview data.*
- Each Habitat Zone was mapped and a Habitat Hectares Assessment using DSE's PDA based 'Habitat Hectares for ArcPad' software was conducted in accordance with the GAA Vegetation Mapping User Guide, Section 5 – *Completing a Habitat Hectares Assessment.*
- The number of Very Large Old Trees (VLOTS), Large Old Trees (LOTS), Medium Old Trees (MOTS) and Small Trees (STs) were recorded in the Tree Count Tab of DSE's PDA based 'Habitat Hectares for ArcPad' software (refer to Section 5.6.5 of the GAA Vegetation Mapping User Guide for more information).
- The number of STs cannot be recorded via the Scattered Tree software and was therefore recorded manually and transferred to the Habitas.dbf file (refer to Section 5.6.5 of the GAA Vegetation Mapping User Guide for more information).
- The location of any observed VROT flora was recorded using DSE's PDA based 'tflora_template' shapefile (refer to Section 10 of the GAA Vegetation Mapping User Guide – *Mapping the Location & Number of all Observed Rare or Threatened Flora* for more information).
- The location of any observed VROT fauna was recorded using DSE's PDA based 'tfauna_template' shapefile (refer to Section 11 of the GAA Vegetation Mapping User

Guide, Section 11 – *Mapping the Location & Number of all Observed Rare or Threatened Fauna* for more information).

4.2.2 Scattered Trees

- Scattered tree polygons were assigned in the field and an scattered tree EVC was assigned in accordance with Section 5 of DSE's *Vegetation Quality Assessment Manual Version 1.3* (DSE 2004).

- Scattered tree Zone Overview data was recorded for each scattered tree 'zone' using DSE's Site Assessment Checklist. Details on the type of information collected is provided in the GAA Vegetation Mapping User Guide, Section 2 – *Collecting Zone Overview data.*

- For each Zone map the complete boundary of each Habitat Zone was mapped and a Scattered Trees Assessment was conducted using DSE's PDA based 'Scattered Tree Assessment for ArcPad software in accordance with the GAA Vegetation Mapping User Guide, Section 6 – *Completing a Scattered Tree Assessment.*

- The number of VLOT, LOT, MOT and ST was recorded for each scattered tree zone using DSE's PDA based STLocn_template shapefile in accordance with the GAA Vegetation Mapping User Guide, Section 6 – *Completing a Scattered Tree Assessment*.

- The location of any observed VROT flora was recorded using DSE's PDA based 'tflora_template' shapefile (refer to Section 10 of the GAA Vegetation Mapping User Guide – *Mapping the Location & Number of all Observed Rare or Threatened Flora* for more information).

- The location of any observed VROT fauna was recorded using DSE's PDA based 'tfauna_template' shapefile (refer to Section 11 of the GAA Vegetation Mapping User Guide, Section 11 – *Mapping the Location & Number of all Observed Rare or Threatened Fauna* for more information).

4.2.3 Degraded Treeless Vegetation

- Degraded Treeless Vegetation Overview data was recorded for each site using DSE's Site Assessment Checklist. Details on the type of information collected is provided in the GAA Vegetation Mapping User Guide, Section 2 – *Collecting Zone Overview data.*

- The complete boundaries of each site was mapped the relevant data was recorded using DSE's PDA based 'Habitat Hectares for ArcPad' software in accordance with the GAA Vegetation Mapping User Guide, Section 9 – *Completing a Degraded Treeless Vegetation Assessment*.

- The location of any observed VROT flora was recorded using DSE's PDA based 'tflora_template' shapefile (refer to Section 10 of the GAA Vegetation Mapping User

Guide – *Mapping the Location & Number of all Observed Rare or Threatened Flora* for more information).

- The location of any observed VROT fauna was recorded using DSE's PDA based 'tfauna_template' shapefile (refer to Section 11 of the GAA Vegetation Mapping User Guide, Section 11 – *Mapping the Location & Number of all Observed Rare or Threatened Fauna* for more information).

4.3 Additional flora and fauna survey 2009-2010

Growth Areas Authority engaged Practical Ecology to undertake additional flora and fauna survey within Botanic Ridge in October 2009. This additional work is hereafter referred to as *Variation # 1.* Variation # 1 had two primary objectives:

- To undertake an assessment in properties previously unable to be accessed due to lack of landowner permission during the 2008/2009 survey period,
- To undertake targeted flora surveys throughout the PSP, and
- To record scattered tree species.

4.3.1 Methods

The Variation #1 flora survey period commenced in early November 2009 and concluded 15 December 2009. Variation #1 comprised three discrete tasks, as described below.

Task 1: Flora & Fauna assessment at 20 and 60 Botanic Drive.

Practical Ecology was engaged to undertake a flora and fauna assessment of properties at 20 & 60 Botanic Drive, Cranbourne East (properties previously unable to be accessed) using the *Biodiversity Mapping Project* (BMP) 2009-2011 assessment specifications. The BMP flora specifications differ from the previous *Native Vegetation Assessment and Mapping* specifications described in this report. Differences include a requirement for general flora species lists and the identification of Scattered Tree species in the BMP specifications. Other differences between the specifications include a requirement to categorise vegetation in one of three categories under the BMP 2009-2011 contract:

- Remnant patch
- Degraded tree-less vegetation, and
- Non-native vegetation.

BMP 2009-2011 Specifications can be obtained from Growth Areas Authority upon request.

Targeted flora surveys for the following species within properties at 20 & 60 Botanic Drive using the BMP specifications were commissioned by GAA:

a. Matted Flax Lily
b. River Swamp Wallaby Grass
c. Pale Swamp Everlasting
d. Swamp Everlasting
e. Maroon Leek Orchid
f. Grey Billy Buttons
g. Veined Spear Grass
h. Purple Diuris
i. Naked Sun Orchid
j. Wine Lipped Spider Orchid
k. Frankston Spider Orchid
l. Cream Spider Orchid
m. Green Striped Greenhood
n. Metallic Sun Orchid

Task 2: Targeted Flora Surveys for the Balance of stage 2 and 3 area

Targeted flora surveys were commissioned in the balance of Stage 2 and 3 within the PSP area. Contact details for many of the properties within the balance of the Stage 1 and 2 areas were provided by GAA to Practical Ecology. Contact with landholders, or their representatives was attempted by Practical Ecology up to three times if initial contact was not made. Once contact was made, permission was sought to undertake the targeted survey.

The following flora species were targeted during the survey:

a. Matted Flax Lily
b. River Swamp Wallaby Grass
c. Maroon Leek Orchid
d. Swamp Everlasting
e. Veined Spear Grass
f. Purple Diuris

The area subject to targeted surveys included existing areas of native vegetation mapped by Practical Ecology (Figure 2) and key drainage lines in properties that granted access. Growth Areas Authority specified that approximately 6,550 lineal metres of drainage lines, (some more prominent than others) were located within the study area.

Task 3: Species identification of Scattered Trees

To the extent that it is possible and when scattered trees are within the properties being accessed for task 2, scattered tree species were identified and recorded.

5. FLORA LIMITATIONS

5.1 Flora survey and ecological assessment

Flora species lists for each property and for the entire precinct were not commissioned by GAA and were not compiled by Practical Ecology for the study area. No incidental records, flora quadrat or transect analyses were undertaken. Lists of weed species were recorded during habitat hectare assessments and are included as part of the GIS files created during the project. However, these lists were complied for the purposes of habitat hectare assessments and were selected from a 'drop-down' list of common weed species. The lists are therefore not exhaustive or necessarily complete records of weed species recorded within the study area, and are therefore not included in this report.

No data other than habitat hectare assessments and site condition checklists was collected during site visits, as per the project brief. Practical Ecology was not commissioned to undertake biodiversity reporting for the study area at the time of the field assessment. Information relating to the general site condition contained within this report is therefore a product of assessor recollection of the study area. Photographs and hard copy mapping of the ecological attributes of the site was not undertaken.

5.2 Site Access

Many properties within the study area did not respond to the GAA's initial contact queries. These properties were later canvassed on foot and permission was sought for access and the conduct of site surveys at some of these properties. This time consuming process contributed to delays in the survey process, and subsequently, resulted a 'temporally and geographically disjointed' assessment across the study area.

The owner of six properties refused Practical Ecology permission to access:

- 60 Botanic Drive, Junction Village (PFI: 608725).
- 4 Shaw Road, Junction Village (PFI: 2089032).
- 2 Shaw Road, Junction Village (PFI: 53056302).
- 79-81 Browns road, Cranbourne South (PFI: 152670586).
- 105-107 Browns Road, Cranbourne South (PFI: 604542).
- 860 Ballarto Road, Cranbourne South (PFI: 96245) (partial access granted)

The property at 60 Botanic Drive (PFI 608725) comprises a Heathy Woodland / Swamp Scrub habitat corridor along a drainage-line. Please note that a habitat hectare assessment was not undertaken within this property due to access constraints and that the vegetation therefore is not mapped as a Habitat Zone in the Figures contained within this report (Figures 2, 3, & 5).

5.3 Flora survey for threatened species

The timing and temporal extent of threatened flora surveys for a project of this scale was considered a significant constraint. Targeted surveys for threatened flora species are ideally extend over a twelve month period, with extensive survey being conducted during the spring flowering-seed set period. Unseasonably dry and hot conditions during the survey phase of this project also presents as a limitation, and may have influence over the results of this study. One property in particular, was considered potential habitat for threatened flora. This property consisted of a quarry at 860 Ballarto Road, Cranbourne South. The property owners permitted access for habitat hectare survey, however, targeted survey for threatened species was not permitted.

The majority of the remainder of the study area was not considered highly likely habitat for threatened flora species, due to the highly modified nature of the agricultural landscape within which it is situated.

5.4 Scattered Trees

The number of Very Large Old Trees (VLOTs), Large Old Trees (LOTs), Medium Old Trees (MOTs) and Small Trees (STs) were recorded for each scattered tree zone using DSE's PDA based STLocn_template shapefile in accordance with the GAA *Vegetation Mapping User Guide*, Section 6 - *Completing a Scattered Tree Assessment*. Size classifications were based on the trunk diameter at breast height (DBH), as measured at 1.3 metres from ground level. Records of actual DBH measurements of individual trees were not kept, in accordance with the project brief and the *User Guide*. The DBH of small trees is however, required to calculate tree recruitment offset requirements for small trees using the *Port Phillip and Westernport Native Vegetation Plan* (PPWPCMA 2008).

Scattered Tree EVCs were not recorded for 16 of the 132 scattered trees that occur within the study area due to an unknown data entry or data processing error. However, the conservation status of scattered tree EVCs did not influence the overall conservation significance of any scattered trees within the study area. Therefore, the absence of an assigned EVC for 16 scattered trees will have no implications for a Net Gain analysis and subsequent offsets of the PSP area.

5.5 Limitations of additional flora and fauna survey 2009-2010

60 Botanic Drive denied access to Practical Ecology despite earlier indicating that access would be granted. Therefore this property was not assessed during the 2009-2010 survey.

Many property owners within the study area refused permission to access or could not be contacted. Several property owners who granted access in the initial *Native Vegetation Assessment and Mapping* survey period did not grant access for a second round of survey. Property access is depicted in Flora Figure 2.

6. FLORA RESULTS

6.1 Remnant Patches

A total of**24.41 hectares** of native vegetation comprising **8.37 habitat hectares** was defined as meeting DSE's (2004) native vegetation cover thresholds within the study area.

Vegetation patches within the study area that constitute Habitat Zones, in accordance with Victoria's *Native Vegetation Management Framework* policy (DSE 2004), vary between 0.01 and 2.05 hectares and are generally less than 0.5 hectares per patch. Furthermore, many patches of native vegetation are modified and not contiguous with other native vegetation. This was reflected in the relatively low-moderate habitat hectare assessment scores, which were generally less than 0.50. The scores are a reflection of the modified agricultural landscape within which the study area occurs and operation of a large quarry in the north-west of the study area. Low habitat hectare scores can be attributed to, but not necessarily limited to:

- pugging (due to hard hooves) by livestock, particularly within damper soils in the gullies and around marshy areas
- soil disturbance, such as gully erosion, tracks through remnants and areas of exposed soil with little to no vegetative cover
- introduction of grassy weeds, pasture grasses and high nutrient levels
- cropping of tussock grasses and the ground storey vegetation in general
- general absence of regeneration of woody species (due to grazing and rabbits) and subsequently a declining canopy coverage
- loss of middle and ground-storey vegetation resulting in a depauperate native vegetative understorey cover.
- Vegetation disturbance as a result of the operation of an extractive industry, including surface scraping and elevated dust levels.

Several patches of native vegetation were significantly sized and scored relatively highly, compared to the majority of patches throughout the study area. These patches are predominately found in the north-west of the study area, as Heathy Woodland near and within the quarry at 860 Ballarto Road, and as wetland vegetation in the wetlands and drainage lines in the north of the study area.

6.1.1 Ecological Vegetation Classes

Seven EVCs were identified and mapped within the study area. Table 1 summarises EVCs recorded within the study area.

Table 1. Summary of EVCs recorded within the study area.

EVC Name	EVC Number	EVC cons status	Area (ha)	Habit Hectares
Damp Heathy Woodland	GipP0793	Vulnerable	0.72	0.32
Grassy Woodland	GipP0175	Endangered	2.53	0.468
Heathy Woodland	GipP0048	Least Concern	16.24	6.227
Plains Grassy Woodland	GipP0055	Endangered	0.05	0.008
Swamp Scrub	GipP0053	Endangered	3.57	0.922
Sedge Wetland	GipP0136	Vulnerable	1.08	0.362
Wetland Formation	GipP0074	Endangered	0.22	0.059
		Totals	**24.41**	**8.37**

The following EVC descriptions are based on the condition of Habitat Zones found on site, and include more general descriptions referenced from EVC benchmarks available on-line (DSE 2009b) and from Oates and Taranto (2001).

Damp Heathy Woodland (EVC 793)

Damp Heathy Woodland is a low (≤10m tall) woodland with tall dense heathy understorey which can become tall scrub if left un-burnt in high rainfall areas. The ground layer consists of grasses, herbs, small shrubs and tough-leaved monocots. This EVC is most commonly found on sandy soils of moderate to low fertility, that are typically wet in winter (due to impeding sub-surface soil layers) and dry in summer (DSE 2009b).

Damp Heathy Woodland within the study area is represented by five small patches, three of which are within roadsides (Flora Figure 2). All patches achieved a habitat hectare score of 0.45 and scored 9 out of a possible 10 for large old trees, which reflects a near benchmark density of trees greater than 60cm DBH.

This EVC has a 'Vulnerable' Conservation Status within the Gippsland Plains bioregion (DSE 2007b).

Grassy Woodland (EVC 175)

In remnant unmodified condition, Grassy Woodland EVC is a variable, open eucalypt woodland (to 15m tall) with a diverse ground layer of grasses and herbs and a sparse shrub component. It occurs on sites with moderate fertility on gentle slopes or undulating hills on a range of geologies (DSE 2009b). The Grassy Woodland canopy can comprise various Eucalypt species, such as Narrow-leaf Peppermint *Eucalyptus radiata,* Coast Manna Gum *Eucalyptus viminalis* subsp. *pryoriana,* Snow Gum *Eucalyptus pauciflora* or Sheoaks; Drooping Sheoak *Allocasuarina verticillata* and Black Sheoak *Allocasuarina littoralis* (Oates & Taranto 2001).

Grassy Woodland would once have occupied all but the north-east corner of the study area, cloaking the fertile lower slopes of the site. It is likely that it would have been ecotonal with Heathy Woodland EVC on the sandier, drier soils of neighbouring upper slopes. This EVC has all but been cleared from the region for agricultural land use, and in more recent times, urban development.

This EVC is represented on site as seventeen individual patches of varying quality and size within the study area (Figure 2). Most patches scored poorly for 'understorey' and 'lack of weeds', which is a reflection of the highly modified understorey, including significant weed invasion in many of the patches. None of the Habitat Zones recorded Large Old Trees (benchmark DBH 70cm) and the average habitat hectare score within the study area is 0.23. Patches were generally scattered and discontiguous with other habitat Zones.

Heathy Woodland (EVC 48)

Heathy Woodland is usually associated with nutrient poor, sandy soils in areas of low to moderate rainfall. The EVC is a low (to 10m tall), Eucalypt-dominated woodland and generally supports a diverse array of narrow-leaved shrubs (except where frequent fire has reduced these to a dense cover of bracken) (Oates & Taranto 2001). Geophytes and annuals can be quite common but the ground cover is normally fairly sparse (DSE 2009b).

The overstorey typically consists of Messmate *Eucalyptus obliqua,* Narrow-leaf Peppermint *Eucalyptus radiata*, Shining Peppermint *Eucalyptus willisii* and Coast Manna Gum *Eucalyptus viminalis* subsp. *pryoriana*. The shrub layer may typically include species such as *Leptospermum myrsinoides*, Prickly Tea-tree *Leptospermum continentale* and Common Heath *Epacris impressa*. Understorey species may include Wattle Mat-rush *Lomandra filiformis*, Common Raspwort *Gonocarpus tetragynus*, and Tall Sundew *Drosera peltata* subsp. *auriculata* (Oates & Taranto 2001).

This EVC would once have occupied the northern sector of the study area, extending through the Cranbourne Botanic Gardens and the Botanic Ridge towards the south east. Little remains of this EVC within the Cranbourne region with much of its former extent cleared for agricultural use (particularly market gardening) and quarrying. Fifty patches of Heathy Woodland comprising over 16 hectares and 6.23 habitat hectares occurs within the study area, with particularly large patches occurring within the quarry (860 Ballarto Road) (Figure 2). The quarry site (PFIs 602010 and 50232515) retains nine of the top 10 scoring Habitat Zones, with an average habitat hectare score between all Heathy Woodland remnants in the quarry of 0.44 (almost double the average 0.28 score of Habitat Zones across the site).

Most patches of Heathy Woodland within the study area recorded moderate habitat hectare scores due to the lack of edge effects in the larger patches, the relatively unmodified nature of the remnants and the absence of stock. However, clearing, the long term absence of fire, and other disturbance related to the extractive industry within 860 Ballarto Road has significantly modified habitat zones closest to this activity. Many understorey patches scored 15 out of a possible twenty-five, and large old trees were present at benchmark density in many patches.

This EVC has a 'Least Concern' Conservation Status within the Gippsland Plains bioregion (DSE 2007b).

Plains Grassy Woodland (EVC 55)

Plains Grassy Woodland typically occupies poorly drained, fertile soils on flat or gently undulating plains at low elevations. Scattered River Red Gums *Eucalyptus camaldulensis* would have dominated the upper canopy, with an understorey consisting of a few sparse shrubs over a species-rich grassy and herbaceous ground layer. It is likely that this EVC would have been ecotonal with the Grassy Woodland and Heathy Woodland EVCs within the region, however, based on the geology, soil types and topography, it is not expected that this EVC would have been extensive within the study area.

Plains Grassy Woodland within the study area is represented by a single Habitat Zone of 0.05 hectares and is highly modified. The patch is suffering from the impacts of weed invasion and other disturbance as a result of agricultural land use.

This EVC has an 'Endangered' Conservation Status within the Gippsland Plains bioregion (DSE 2009b).

Swamp Scrub (EVC 53)

Swamp Scrub is dominated by Swamp Paperbark *Melaleuca ericifolia* or sometimes Woolly Tea-tree *Leptospermum lanigerum* which forms a dense closed canopy. The EVC forms on poorly drained sites or on alluvial deposits along streams. Swamp Paperbark typically out-competes Eucalypt species, although emergent Swamp Gum *Eucalyptus ovata* may occur. Shrubs are usually absent; while a herbaceous and grassy understorey may be present depending on light availability (Oates & Taranto 2001).

Twenty-three mostly small patches of Swamp Scrub were recorded within the study area on low-lying, damp reaches of roadside verge and drainage-line. These patches are generally the result of natural regeneration of this EVC within damp, marshy sites that have been left relatively undisturbed. Several larger patches of Swamp Scrub of low-moderate quality were recorded within the quarry at 860 Ballarto Road. These significant sites offer wetland habitat diversity and were ecotonal with the Heathy Woodland EVC surrounding them.

In this region the canopy is dominated by a closed cover of Swamp Paperbark over an understorey of low-moderate diversity. Very large to medium emergent eucalypts however were a not uncommon mix in the canopy and several smaller roadside patches were recorded as scattered tree zones.

Swamp Scrub patches generally show good signs of regeneration and colonisation suggesting that this EVC would naturally colonise damp sites and flood zones if left un-grazed and un-slashed. Small patches with an immature canopy cover were common within the study area.

This EVC has an 'Endangered' Conservation Status within the Gippsland Plains bioregion (DSE 2009b).

Sedge Wetland (EVC 136)

Sedge Wetland more typically occupies in low-lying areas where landforms such as billabongs, lakes, swamps or depressions occur. Vegetation is generally treeless, however shrubs may be

present at the fringes and occasionally scattered throughout the EVC. Vegetation is dominated by sedges, rushes and reeds and tends to be low in diversity in central areas with more variety towards the fringes (DSE 2009b).

Within the study area, this EVC was found fringing dams and was generally the result of natural colonisation and was probably not remnant vegetation. Dams that were subject to frequent access by stock or with a fluctuating water level were less likely to have a colonising aquatic margin. On the whole, floristic diversity within this EVC was low, as can be expected of colonising aquatic vegetation in farm dams.

The *Settlers Run Golf Course* includes an extensive wetland complex in the north-east, which has been revegetated using locally indigenous species. Vegetation within this wetland includes Sedge Wetland and possibly other wetland EVCs, however, the vegetation is planted and is less than 10 years old. It was therefore not assessed as a patch of native vegetation. Theses wetlands do however provide excellent habitat for fauna including threatened birds and amphibians (see Part 3).

This EVC has a 'Vulnerable' Conservation Status within the Gippsland Plains bioregion (DSE 2009b).

Wetland Formation (EVC 74)

Wetland formation is a broad EVC that is similar in structure and species composition to Sedge Wetland. The EVC is considered an EVC aggregate that incorporates a range of freshwater wetland EVCs. Wetland Formation occurs in depressions associated with standing water and ephemeral water bodies. The EVC can have herbland, sedgeland and rushland elements and is characterised by the lack of woody plants (shrubs and trees). It can also be ecotonal with Swamp Scrub (DSE 2009b).

Wetland Formation within the study area was found fringing a number of dams and was generally the result of natural colonisation. Within the study area, this EVC preferred dams with a shallow aquatic margin and a relatively non-fluctuating water level.

This EVC has an 'Endangered' Conservation Status within the Gippsland Plains bioregion (DSE 2009b).

6.1.2 Conservation Significance

Of the 103 patches of native vegetation recorded within the study area, 55 patches have been assigned **very high** conservation significance, as per Appendix 3 of Victoria's *Native Vegetation Framework* DNRE (2002) (Appendix 2). The remaining 48 patches have been assigned **high** conservation significance (Appendix 2).

The high and very high conservation significance determinations within the study area are due primarily to the endangered conservation status of the majority of EVCs and the recorded presence of threatened fauna within actual Habitat Zones or similar habitats within the study area. While 'other site attributes' have not influenced the overall conservation significance of any patches, certain patches fall within areas identified as Biosites by DSE (2005b) of state and

regional significance and by McMillan et al (2003) as significant remnant vegetation in the City of Casey (Appendix 4).

6.1.3 Vegetation Quality (habitat hectares)

Vegetation quality in terms of habitat hectare scores varies between 0.12 and 0.55 (Appendix 2). The average habitat hectare score is 0.28 within the study area.

The relatively low habitat hectare scores are a reflection of the highly modified nature of the agricultural landscape within which the study area is situated. Landscape scores are ≤10, which is a reflection of a lack of surrounding native vegetation and large conservation reserves within 5km of the study area boundary. The Heathy Woodland and Swamp Scrub remnants within the quarry are distinguished from most other parts of the study area the other in that they score 0.45 or higher.

Table 1 presents a summary of habitat hectares assigned to each EVC, while Appendix 2 presents all habitat hectare scores recorded within the study area during the current assessment.

6.1.4 Key Biodiversity Issues and Implications

Approximately 23 hectares of the 743 hectare study area (3%) comprises native vegetation classified as Habitat Zones (Figure 2). Areas of highest conservation value within the precinct include the Heathy Woodland and Swamp Scrub remnants within the quarry at 860 Ballarto Road, regenerating Swampy Riparian Woodland at 60 Botanic Drive and all other native vegetation contiguous with the RBGC.

Furthermore, many roadsides, fence-lines and drainage lines dominated by exotic vegetation displayed in Part 3 Figure 3 are considered habitat for threatened fauna species within the study area.

There are several small, disjunct Habitat Zones within the golf course in the north west of the study area. These Heathy Woodland, Swamp Scrub and Grassy Woodland remnants, together with several roadside remnants, offer good habitat values for a range of indigenous fauna including regionally significant taxa. There is potential to link these sites through the incorporation of indigenous flora within fairways and ornamental wetlands and water storage sites.

Several large farm dams in the south of the study area, such as within 91-93 Browns Road have been colonised by a relatively diverse assemblage of native wetland flora species and are considered habitat for a range of significant wetland birds. Wetland Blown Grass *Lachnagrostis filiformis* Var 2 was recorded within such dams at 91-93 Browns Road (Flora Figure 4B). There is the potential for these dams to be incorporated into stormwater treatment systems and associated habitat links.

A Large intact vegetation remnant in the north-west of the study area surrounding a quarry at 860 Ballarto Road (Figure 2A), holds particular value due to its connectivity with Cranbourne

Botanic Gardens. This vegetation comprises Heathy Woodland and Swamp Scrub of relative high quality, which is reflected in the habitat hectare scores.

Additional areas of high conservation value include Habitat Zones found along roadsides, drainage lines and wetlands within the study area. In addition, there are areas of fauna habitat that do not meet DSE (2004) cover thresholds including patches of exotic vegetation along roadsides (particularly woody weed thickets), drainage lines and treed fence-lines. A *Land Subject to Inundation Overlay* (LSIO) occupies five hectares of the study area in the south-east (DPCD 2009). This area represents potential habitat for wetland birds during times of flood.Areas of exotic vegetation surrounding wetland complexes are especially important due to the movement of fauna between water-bodies and the utilisation of inundated pasture near water-bodies by certain wetland birds (Pizzey & Knight 2007) (Part 3 Appendix 2).

Opportunities for connecting habitat through the facilitation of habitat links have been identified for Precinct 10 by a number of authors including McCaffrey & Henry (2010), McCaffrey et al. (2010), Marshall (2008), Lane (2008) and City of Casey (2005). The creation of habitat links within Precinct 10 would facilitate the linking of the state significant RBGC habitat to other core areas within the bioregion such as the Langwarrin Flora and Fauna Reserve and Western Port Bay (Coates et al. 2008). Habitat links proposed by the authors listed above would include all or most existing remnants in a reserve system including revegetation corridors and buffer zones. Several properties within the study area coincide with proposed habitat links. Some of these properties do not necessarily comprise native vegetation, but coincide with drainage-lines within the study area.

One habitat corridor of particular significance in the north east of the study area identified by McCaffrey & Henry (2010) and McCaffrey et al. (2010) links the Gardens to semi-urbanised Heathy Woodland habitats and areas of high quality wetland and woodland habitat in the neighbouring precincts to the east of the study area. A key property within this corridor; 60 Botanic Drive, is contiguous with RBGC and comprised modified stands of Swampy Riparian Woodland during the 08/09 assessment (Photo 1).

Photo 1. 60 Botanic Drive (photograph taken from the Botanic Drive roadside).

Photo 2. 60 Botanic Drive (photograph taken from 20 Botanic Drive boundary fence).

Vegetation on this property was not assessed as part of this study due to denial of access, however, the property was inspected from the boundary of 20 Botanic Drive during additional survey undertaken between November and December 2009 (Photos 2 & 3). The vegetation was later destroyed by the landowner using heavy machinery, however, the soil at the vegetation clearance site appears to remain relatively undisturbed which would therefore most likely allow for the regeneratation of indigenous flora species. An opportunity to control regenerating Gorse and other woody weeds, which were abundant on the property prior to clearance, is also apparent, and would further facilitate the regeneration of indigenous species.

Photo 3. 60 Botanic Drive (photograph taken from 20 Botanic Drive boundary fence).

A boundary inspection of 20 Botanic Drive, combined with an inspection of aerial images suggests that this remnant was likely to score in the range of 0.20- 0.30 in a habitat hectare assessment and includes a range of relatively intact and modified Swampy Riparian Woodland.

Southern Brown Bandicoot has been recorded within the roadsides of Botanic Drive, which form the western boundary of 60 Botanic Drive. It is therefore likely that Southern Brown Bandicoot would have utilised this property, due to the thick vegetative cover and the proximity to Bandicoot records and the Royal Botanic Gardens Cranbourne.

6.2 Scattered Trees

One-hundred and thirty-two 'scattered trees', as defined by DSE (2007b) occur within the study area (Appendix 3). Scattered trees constitute important habitat for the region's indigenous fauna and in many cases are the only source of tree hollows and canopy nectar in an otherwise highly modified environments (Part 3 Figure 3).

In general, scattered trees displayed poorer than expected canopy health, most likely due to:

- below average rainfall in recent years
- higher than expected mistletoe infestations
- cattle pugging and soil compaction at the base of the trees
- tree trunk damage due to stock rubbing against trees
- general impacts associated with agricultural use of the land such as
    - removal of supporting ground and middle-storey vegetation,
    - soil cultivation,
    - introduction of fertilizers and nutrients and
    - changes to the surface and sub-surface hydrology.

6.2.1 All scattered trees found within the study area belong to the genus *Eucalyptus*. Ecological Vegetation Classes

Six EVCs have been assigned to scattered treeswithin the study area (Table 2; Appendix 3; Figure 2). The majority of scattered trees are within Heathy Woodland EVC at the study area. All scattered trees belong to the genus *Eucalyptus*. Species records for individual scattered trees are not included within this report (refer to Section 3.4, *Limitations* for more detail).

6.2.2 Conservation Significance of Scattered Trees

The Conservation Significance of Scattered Trees is determined by a combination of:

- EVC conservation status
- the presence of threatened species and
- 'other site attributes'.

All EVCs, except Heathy Woodland assigned to scattered tree zones within the study area are classified as 'Endangered' EVC within the Gippsland Bioregion (DSE 2009b). The remaining

Heathy Woodland EVC scattered tree zones are classified as 'Least Concern' within the Gippsland Bioregion (DSE 2009b).

All scattered trees were considered 'remaining 50%' habitat for several threatened species that occur within 5km on the AVW database (DSE 2005c) or are predicted to occur by DEWHA (2009a) (Appendix 3). All scattered trees have therefore been assigned **high** conservation significance. While 'other site attributes' have not influenced the overall conservation significance of any scattered trees, the location of certain scattered trees within the study area coincide with Biosite #6888 (Appendix 3).

6.3 Degraded Treeless Vegetation

6.3.1 Description

Degraded Treeless Vegetation (DTV) dominates the study area in the form of grazing land (Figure 2). DTV within the study area typically comprises exotic pasture grasses, such as Rye grasses *Hordeum* spp with occasional introduced crop weeds such as Thistles and other broadleaf weeds. Residential areas (including gardens), windbreaks and other areas vegetated with non-indigenous flora have been included within DTV at the study area.

Many drainage lines and roadsides dominated by exotic vegetation and woody weed thickets offer habitat for ground dwelling fauna. Furthermore, many sections of roadside and drainage-line that are dominated by exotic vegetation contain indigenous flora that does not meet DSE native vegetation cover thresholds in order to be determined to be a 'patch' of native vegetation (DSE 2004). Many of these roadsides and drainage-lines are contain greater floristic diversity compared to the surrounding agricultural land and are habitat for birds, reptiles and amphibians.

6.3.2 Hectares present

Degraded Treeless Vegetation occupies approximately **388 hectares** within the study area (Figure 2).

6.4 Significant Flora Species and Ecological Communities

6.4.1 Listed Ecological Communities

No Listed Ecological Communities listed under the EPBC Act 1999 and the FFG Act 1988 were recorded within the study area.

6.4.2 Nationally Significant Flora Species

Recorded during the current assessment

No nationally significant flora species listed under the EPBC Act 1999 were recorded during the current assessment.

Recorded in 5 km database searches

Six nationally significant flora species listed under the EPBC Act 1999 were predicted to occur by the DEWHA Protected Matters Search Tool within 5km of the study area boundary (DEWHA 2009a) (Appendix 1). Two nationally significant species, River Swamp Wallaby-grass *Amphibromus fluitans* and Matted Flax-lily *Dianella amoena,* were assigned a medium likelihood of occurrence rating based on the identification of potentially suitable habitat within the study area, and numerous other records within the region.

River Swamp Wallaby-grass *Amphibromus fluitans*

River Swamp Wallaby-grass is listed as *Vulnerable* under the EPBC Act 1999 and is mostly confined to the north-central Victorian reach of the Murray River and is uncommon in southern Victoria. The species is known to occur in a variety of natural and constructed wetlands such as farm dams, lagoons and swamp margins (DEWHA 2009b; Walsh & Entwistle 1994). River Swamp Wallaby-grass has been recorded in wetlands in Lyndbrook and near the RBGC (DSE 2007a). Potential habitat exists at wetland sites, including farm dams within the study area.

Matted Flax-lily Dianella amoena

Matted Flax-lily is confined to southern Victoria and is now considered extinct in Tasmania. This plant has been recorded in a variety of vegetation types characterised by fertile soils and dominated by grasses in the understorey, such as lowland grasslands, grassy woodlands and grassy wetlands. The species can tolerate well drained to seasonally wet soils (DEWHA 2009c).

All records within the vicinity of the study area are west of the Cardinia Creek (DSE 2007a). Suitable habitat may exist in the study area, particularly within small patches of Plains Grassy Woodland and Grassy Woodland along roadsides.

6.4.3 State Significant Flora Species

One species listed as 'poorly known in Victoria' by DSE (2005a); *Lachnagrostis filiformis* Var 2, was recorded within farm dams at 91-93 Browns Road, Cranbourne South, within the study area (Figure 4B). No State significant flora species listed under the FFG Act 1988 were recorded during the current assessment.

Wetland Blown Grass was recorded in during additional targeted flora survey (as described in section 4.3). The farm dams within which it was recorded have been colonised by other indigenous wetland flora species, including rushes, sedges and herbs.

Wetland Blown-grass *Lachnagrostis filiformis* Var 2 is considered 'poorly known' (k) by DSE (2005a). The conservation status of species is more accurately classified as 'Vulnerable', as opposed to 'Rare', since its population decline in the region is attributable to wetland habitat loss rather than it being a naturally restricted species. Wetland Blown-grass is therefore considered 'threatened' rather than 'rare'.

Recorded in 5 km database searches

Twenty state significance species listed under the FFG Act 1988 or listed under DSE's Advisory list of rare or threatened plants in Victoria (DSE 2005a) have been recorded within 5km of the study area according to DSE's Flora Information System (DSE 2007a) (Appendix 1). Three of these species, Powelltown Correa *Correa reflexa* var*. lobata*, Southern Bristle-sedge *Chorizandra australis* and Upright Panic *Entolasia stricta* have been assigned a medium likelihood of occurrence, whilst the fourth, Wetland Blown-grass *Lachnagrostis filiformis* var. 2, has been assigned a medium-high likelihood of occurrence within the study area, based on the identification of potential suitable habitat and numerous other records within the region. These species are discussed in more detail below.

Powelltown Correa *Correa reflexa* var*. lobata*

Powelltown Correa is locally common in areas south-east of Melbourne. It prefers moist sites in open forests or within heathlands and heathy woodlands (Walsh & Entwistle 1999).

Southern Bristle-sedge *Chorizandra australis*

There are widespread, infrequent populations of this species across southern Victoria. This sedge prefers lowland swamps and waterholes of low-nutrient soils (Walsh & Entwistle 1994).

Upright Panic *Entolasia stricta*

Prefers sandy soils in grassy low open forests. The distribution of this species is uncertain, however, it has been recorded east of Bairnsdale and near Frankston and Stradbroke (Walsh & Entwistle 1994).

Wetland Blown-grass *Lachnagrostis filiformis* var. 2

Grows on the edges of wetlands and within swampy sites and wet soil disturbed areas.

7. FLORA LEGISLATIVE REQUIREMENTS

The following section outlines the implications of legislation, treaties, plans, or policies, for habitat hectare, flora and fauna values found on site.

7.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Act 1999* (EPBC Act 1999) applies to sites where proposed developments or projects may have a *significant impact* on *matters of National environmental significance*.

Under the EPBC Act 1999, the proponent must refer proposed actions that may require approval, to the Commonwealth Environment Minister. The Minister then decides which assessment and reporting option is applied. The Minister may approve a 'controlled action' allowing the development to proceed provided conditions are applied to mitigate significant impacts protected by this act.

Using the Department of Environment, Water, Heritage and the Arts (DEWHA's) Protected Matters Search Tool (DEWHA 2009a) six threatened flora species of national significance were predicted to occur within 5km of the study area boundary. Three EPBC listed flora species, River Swamp Wallaby-grass *Amphibromus fluitans*, Maroon Leek-orchid *Prasophyllum frenchii* and Swamp Everlasting *Xerochrysum palustre,* have been recorded within 5km of the study area (DSE 2007a). No listed threatened species or communities were recorded during this survey. Two EPBC-listed flora species Matted Flax-lily and River Swamp Wallaby-grass are assessed as having a *medium* likelihood of occurrence in the study area (Section 4.4). Appendix 1 lists all relevant flora species detected using the EPBC Protected Matters Search Tool (DEWHA 2009a). Further surveys during optimal survey conditions may better refine the likelihood of occurrence, however the type and extent of proposed development will determine if further surveys are required.

7.2 Flora and Fauna Guarantee Act 1988

The *Flora and Fauna Guarantee Act 1988* (FFG Act 1988) was legislated to ensure the continued survival of all Victorian species of flora and fauna and all Victorian communities of plants and animals. A key component of the FFG Act 1988 is to ensure the sustainable use of flora and fauna resources whether they are threatened or not.

The FFG Act 1988 lists:

- threatened species of flora and fauna
- threatened communities of flora and fauna
- protected flora
- potentially threatening processes

There were no threatened flora species listed under the FFG Act 1988 recorded during this survey within the study area. There are also no listed threatened communities known to occur within the study area. No FFG-listed species were assessed as having a moderate likelihood of occurrence in the study area (Section 4.4).

Protected Flora are species are listed as protected to regulate exploitation including removal from the wild for cultivation and the cut-flower industry. Among others the list includes all members of the Asteraceae (daisies) family, all members of Epacridaceae (heaths), all members of Orchidaceae (orchids) and all Acacias (excluding Silver Wattle, Early Black Wattle, Lightwood, Blackwood and Hedge Wattles). While flora species lists were not compiled for the study area, it is highly likely that a number of species found throughout the study area are listed under the FFG Act 1988 as Protected Flora.

A permit is required if proposed works may kill, injure or disturb listed flora species.

7.3 Planning and Environment Act 1987

The purpose of the *Planning and Environment Act 1987* is to establish a framework for planning the use, development and protection of land in Victoria in the present and long-term interests of all Victorians.

Under the Act a Planning Permit is required for development within Victoria which may have significant effects on the environment, or which the responsible authority considers the environment may have on the use or development. The objectives of planning and the planning framework include (among others):

- To provide for the protection of natural and man-made resources and the maintenance of ecological processes and genetic diversity.
- To establish a system of planning schemes based on municipal districts to be the principal way of setting out objectives, policies and controls for the use, development and protection of land.
- To ensure that the effects on the environment are considered and provide for explicit consideration of social and economic effects when decisions are made about the use and development of land.
- To facilitate development which achieves the objectives of planning in Victoria and planning objectives set up in planning schemes.

Clause 52.17 of the Planning Scheme is the principle action of the Planning and Environment Act within the Scheme relating to native vegetation impacts, unless:

- The application is exempt under the Table of Exemptions 52.17-6 within the Clause.
- A Native Vegetation Precinct Plan applies.

Victoria's *Native Vegetation Management framework* can be triggered by Clause 52.17 and is discussed below. Properties within Precinct 10 that were not subject to a field assessment during the current assessment will be defined in the *Native Vegetation Precinct Plan* as "Areas requiring a permit under Clause 52.17". These properties will be subject to a separate field assessment at permit stage to address Victoria's *Native Vegetation Management framework*.

7.4 Native Vegetation Management Framework

A principle tenet of Victoria's *Native Vegetation Management Framework* is the objective of retention and management of native vegetation (DNRE 2002). According to the DSE (2002:14) the goal of native vegetation management in Victoria is to achieve:

> *A reversal, across the entire landscape, of the long-term decline in the extent and quality of native vegetation, leading to a Net Gain.*

Four individual actions to achieve the above goal are outlined in the DNRE's (2002) Framework. These are:

- active improvement of the quality of existing vegetation
- avoidance or minimisation of further permanent losses through clearing
- strategic increase in the cover of native vegetation through biodiverse revegetation
- the flexibility that is required to support landholders as they move towards more sustainable land use

To achieve the most strategic outcome for native vegetation across Victoria the *Native Vegetation Management Framework* embraces a system of classification determining both the land protection and conservation significance of any given site. The Net Gain methodology is intended to provide a systematic approach that ensures the conservation of the majority of remnant vegetation across Victoria. DNRE (2002) has established a three step approach to use when applying the Net Gain process. These steps are:

- To avoid adverse impacts, particularly through vegetation clearance.
- If impacts cannot be avoided, to minimise impacts through appropriate consideration in planning processes and expert input to project design or management.
- Identify appropriate offset options.

The outcome of the Net Gain process is intended to ensure that the most significant vegetation incurs no losses (exceptions may apply) and less significant vegetation is adequately managed through commensurate offsets based on the level of significance. During the planning process, it must be ensured that every effort has been made to avoid clearing remnant vegetation at the outset and, if clearance is unavoidable, impacts have been minimised. Preference must also be given to the avoidance of damage or loss of the most significant vegetation and reduce the amount of overall vegetation cleared.

The Precinct development is in the early phases of structure planning that will determine future land useThe Native Vegetation Framework requires that the avoidance of native vegetation is a priority . When vegetation cannot be avoided, vegetation loss and other detrimental impacts must be minimised.

Relatively little of this site's remnant vegetation remains within the study area. This presents an opportunity, through appropriate (re)zoning, to protect what little remains and avoid future impacts to native vegetation through the integration of a precinct reserve system within the Planning Scheme.

Figures 2 displays the location of native vegetation, including scattered trees within the study area. Section 6.1.5 discusses the Net Gain three step process and potential offset requirements

7.5 Port Phillip and Westernport CMA Native Vegetation Plan

Victoria's *Native Vegetation Management Framework* states that regional vegetation plans will provide regional guidelines for responsible authorities in determining permit applications to remove, destroy or lop native vegetation. The *Port Phillip and Westernport Native Vegetation Plan* (PPWCMA 2006) is to be used as a reference document for the conservation status of native vegetation communities in the region. The *Native Vegetation Plan* represents the minimum requirement for offsets and:

- Describes the overall policy response to clearing applications.
- Describes the requirements for offsetting the loss of remnant but relatively intact areas of native vegetation.
- Describes the requirements for offsetting the loss of scattered, individual trees of various ages, sizes and growth rates.
- Describes the requirements for offsetting the loss of scattered trees smaller than medium old trees and slow-growing tree species.
- Describes the requirements for offsetting grass trees and tree ferns.
- Describes the requirements for offsetting harvesting of timber from naturally established native forest on private land.

The *Native Vegetation Plan* applies where *parcels of land greater than 4ha with less than 8 scattered trees per hectare* or where *parcels of land less then 4ha with any number of scattered old trees per hectare* (DNRE 2002). This applies to very large, large and medium old trees and any trees less than medium trees.

Appendix 3.4 of the *Native Vegetation Plan* states that "where protection and recruitment is not required by Victoria's *Native Vegetation Management Framework* and there is no practical way to achieve protection, a *recruitment only offset* may be applied" (PPWCMA 2006). However, it is part of DSE Port Phillip Region's focus to require the *protection and recruitment* prescription in

most planning applications (DSE 2007a). Table 3.4C of the *Native Vegetation Plan* sets out the offset requirements for the loss of trees of various ages and sizes.

7.6 Wildlife Act 1975 and associated regulations

The purpose of the *Wildlife Act 1975* is to establish procedures in order to promote the protection and conservation of wildlife, prevent wildlife from becoming extinct, and to prohibit and regulate the conduct of persons engaged in activities concerning or related to wildlife. The Act requires people engaged in wildlife research (such as fauna surveys, salvage or translocation activities) to obtain a permit in order to ensure that these activities are undertaken with appropriate conservation and protection measures.

Furthermore, the Act requires that a permit is obtained for the management of wildlife where:

- Wildlife is damaging any building, vineyard, orchard, crop, tree, pasture, habitat or other property.
- For the purposes of the management, conservation, protection or control of wildlife or for the purposes of education about wildlife, research into wildlife or scientific or other study of wildlife.
- For aboriginal cultural purposes.
- For the purposes of enabling the care, treatment or rehabilitation of sick, injured or orphaned wildlife.
- For the purposes of ensuring the health or safety of any person or class of persons.
- To support a recognised wildlife management plan.
- To make provision for the custody, care and management of wildlife, held under another authorisation or a licence which has been suspended, during the period of that suspension.

Under the *Wildlife Act 1975* land can also be designated as State Game Reserves, State Game Refuges, State Faunal Reserves, Game Management Stations, or other classifications as specified, for the preservation and conservation of wildlife. A plan of management is to be developed as soon as practicable for each reserve once gazetted.

7.6.1 Wildlife Regulations 2002

The objectives of the *Wildlife Regulations 2002* are:

- To make further provision in relation to the licensing system established by section 22 of the Wildlife Act 1975.
- To prescribe fees, offences, royalties and various other matters for the purposes of the Wildlife Act 1975.

- To provide for exemptions from certain provisions of the Wildlife Act 1975.

Under *Wildlife Regulations 2002* a person, unless licensed, permitted or authorised to do so under the Act:

- Must not willfully damage, disturb or destroy any wildlife habitat.
- Must not use a bait, lure, poison, decoy, or live animal to attract wildlife for the purpose of taking that wildlife.
- Must not use a firearm from an aircraft, motor vehicle, boat, or any other vehicle to take wildlife.
- Must not use an artificial light, electronic device, or recorded sound to hunt or take wildlife.
- Must not use a gun, bow or other weapon, trap, or any other equipment or substance for the purpose of taking wildlife.

Authorisation to conduct wildlife research or wildlife management can be obtained under the Act, and is subject to any conditions, limitations or restrictions placed on that authorisation. Proponents must allow inspection by an authorised officer, at any reasonable time, for the purpose of monitoring compliance with this Act.

7.7 Water Act 1989

The *Water Act 1989* provides the framework for allocating surfacewater and groundwater throughout Victoria. The Act allows authorities and individuals, via various entitlement mechanisms, to use water for commercial or irrigation purposes. Some licences enable withdrawals of water directly from streams, others from groundwater. The *Water Act 1989* also defines water that is set aside for the environment under the Environmental Water Reserve.

The purpose of the Act is to integrated management of all elements of the terrestrial phase of the water cycle. This includes promotion of orderly, equitable and efficient water use, greater community involvement, integration of surface and subsurface flow management, to promote conservation and environmental enhancement and provide for the protection of catchment conditions.

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

State Environment Protection Policies (SEPPs) express, in law, the Victorian community's expectations, needs and priorities for protecting and sustainably using the environment, and the social and economic values that depend on it. Made under the *Environment Protection Act 1970*, SEPPs are a means of setting agreed outcomes against which we can measure progress and coordinate environment protection throughout Victoria.

The SEPP Waters of Victoria then sets the framework for government agencies, businesses and the community to work together, to protect and rehabilitate Victoria's surface water environments. The Waters of Victoria SEPP details the uses and values of our water environments (beneficial uses), sets measurements and indicators so we know how well they are being protected (environmental quality objectives) and outlines what needs to be done to protect them (attainment program).

The result is a 'blueprint' for achieving agreed environmental outcomes and strategic directions for protecting Victoria's water. More detailed management frameworks and tools are provided through statewide strategies (e.g. the Victorian River Health Strategy) and more detailed actions are provided in regional plans developed by catchment, coastal and water management bodies.

The *Environment Protection Act 1970* also adopts as a principle tenet the Precautionary Principle where, in the threat of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

7.9 Port Phillip and Western Port Regional Catchment Strategy

A primary function of the Port Phillip and Westernport Catchment Management Authority is to prepare a catchment management strategy for its region and coordinate and monitor its implementation. The *Port Phillip and Western Port Regional Catchment Strategy* describes the natural assets of the region, how these are interrelated, and provides a management framework for their conservation and sustainable use. The *Regional Catchment Strategy* focuses on four main groups of catchment assets - water resources (sustainable water use and healthy waterways), land (appropriate land management and sustainable productivity), biodiversity (healthy, diverse and enduring ecosystems) and the people of the region (community participation working to achieve sustainability).

The *Regional Catchment Strategy* is an important planning and working document for all organisations and people involved in natural resource management in the region, including government agencies and councils, water authorities and Landcare and community groups. It provides a framework for effort, an investment guide, a means of integrating policy, and an action plan for catchment works. It allocates tasks and defines roles for many stakeholders in the delivery of environmental programs across the region. It is also a regional investment guide, informing the allocation of Victorian and Australian Government investment in natural resource management in the region.

7.10 Port Phillip and Western Port Regional River Health Strategy

The *Port Phillip and Westernport Regional River Health Strategy* was developed by Melbourne Water in consultation with the Port Phillip and Westernport Catchment Management Authority, their local community and key stakeholders. The *River Health Strategy* provides a five year blueprint for the stakeholders to work together to improve our rivers and creeks. It identifies waterway values (catchment based), threats to waterway values, and actions to address these

threats. The Strategy identifies river health related objectives, activities and targets for rivers located within the Maribyrnong, Werribee, Bunyip and Yarra river basins.

The *Port Phillip and Westernport Regional River Health Strategy* also covers drainages within the Westernport, Werribee and Maribyrnong catchments which, until now, had no designated regional management authority. Under the new arrangements, Melbourne Water is now the regional drainage, waterways and floodplain manager for the entire region, and is responsible for river health, management and maintenance of regional drains as well as identifying and maintaining areas subject to flooding. This arrangement will also provide more consistent and coordinated delivery of waterway health and improvement programs.

7.11 Local Government Planning Schemes

Local Government Planning Schemes set out policies and provisions for the use, development and protection of land for municipalities in Victoria. These are legal documents prepared by the local council or the Minister for Planning, and approved by the Minister.

The development of the Planning Schemes is based on a comprehensive set of planning provisions for Victoria outlined in the Victorian Planning Provisions (VPPs). VPPs were introduced as part of a planning reform process in 1996 to simplify and standardise the planning process.

Provision 52.17 of the VPP outlines objectives for the protection and conservation of native vegetation. The purpose of 52.17 is to protect and conserve native vegetation, to reduce the impact of land and water degradation and provide habitat for plants and animals, to avoid, minimise or Offset vegetation loss, and to manage vegetation near buildings to reduce the threat to life and property from wildfire.

Before deciding on an application, in addition to the decision guidelines in Clause 65, the responsible authority must consider, as appropriate:

- Victoria's Native Vegetation Management – A Framework for Action (DNRE 2002).
- Whether the proposed development can be located and designed to avoid the removal of native vegetation.
- Whether the proposed development is located and designed to minimise the removal of native vegetation.
- The need to offset the loss of native vegetation having regard to the conservation significance of the vegetation.
- The conservation and enhancement of the area.
- The preservation of and impact on the natural environment or landscape values.
- Any relevant approved Regional Vegetation Plan.

- Whether the proposed development is in accordance with any property vegetation plan that applies to the site.

- The cumulative impact of native vegetation removal on biodiversity conservation and management.

Exemptions apply in certain circumstances, as outlined in Clause 52.17-6, Table of exemptions.

The majority of Precinct 10 is zoned *Urban Growth Zone*, however several large parcels comprising the Botanic Ridge Estate in the west of the study area are zoned *Residential Zone 1*. Six parcels in the north-west of the study area are zoned *Farm Zone 1* and *Farm Zone 2*. All except one parcel within the Precinct is covered by *Environmental Significance Overlays* 2, 3 and 5. Parts of the study area are covered by a *Land Subject to Inundation Overlay* (LSIO) (DPCD 2009).

The Environmental Significance Overlay ESO3 applies to a large area of the Precinct. The overlay states that the environmental objectives to be achieved are to:

- To protect the biological values, landscape quality and amenity of the nearby Royal Botanic Gardens Cranbourne for the purpose of scientific investigation and for the benefit and enjoyment of the public.

- To ensure that development in the vicinity of the Royal Botanic Gardens Cranbourne is compatible with the maintenance of the values referred to above.

The Urban Growth Zoning appears to contradict the ESO within the precinct. An extensive system of biolinks including buffer zones, revegetation and remnant vegetation protection and enhancement need to be zoned for during the rezoning process in order to address some of the requirements outlined in the ESO.

7.12 Catchment and Land Protection Act 1994

The *Catchment and Land Protection Act 1994* (CaLP Act 1994) contains provisions relating to the integrated management and protection of catchments, encourages community participation in the management of land and water resources, and sets up a system of controls for the management of noxious weeds and pest animals. This Act also provides a legislative framework for the integrated and coordinated management of private and public land at a catchment level which:

- Focuses on long-term land productivity while also conserving the environment.

- Ensures that the quality of the State's land and water resources and their associated plant and animal life are maintained and enhanced.

- Establishes processes that can be used to assess the condition of the State's land and water resources and the effectiveness of land protection measures.

- Establish processes to encourage and support participation of land holders, resource managers and other members of the community in catchment management and land protection.

- Establishes and supports the operation of the Victorian Catchment Management Council and the Catchment Management Authorities.

- To provide for the control of noxious weeds and pest animals.

The study site supports a number of weeds that are declared noxious under the CaLP Act 1994. Plants occurring on this list are known, or have the potential to, result in detrimental environmental or economic impact.

Under the CaLP Act 1994 declared noxious weeds are categorised into four groups depending on their known and potential impact and specific circumstances for each region. These categories include:

- State Prohibited Weeds (S) are either currently absent in Victoria or are restricted enough to be eradicated. The Victorian Government is responsible for their control.

- Regionally Prohibited Weeds (P) in the Port Phillip Catchment Management Authority area are not necessarily widespread but have the potential to become widespread. It is expected that weeds that meet this criteria can be eradicated from the region. For weeds considered to be Regionally Prohibited it is the responsibility of the land owner to control these weeds on their land but not on adjacent roadside reserves.

- Regionally Controlled Weeds (C) are usually widespread but it is important to prevent further spread. It is the responsibility of the landowner to control these weeds on their property and on adjacent roadside reserves.

- Restricted occur in other states and are considered to be a serious threat to primary production, Crown land, the environment and/or community health if they were traded in Victoria. No weeds are currently listed as Restricted Weeds.

The study area may support regionally controlled noxious weeds listed by DPI (2006). The control of these weeds on private land and adjacent roadsides is the responsibility of the landholder. The landholder must take all reasonable measures to prevent their spread and control these weed species.

8. FLORA CONCLUSION

There are several sites of significant habitat and indigenous Habitat Zones within the study area. These include but are not limited to:

- Heathy Woodland and Swamp Scrub remnants within the quarry in the north-west sector. These patches are contiguous with the RBGC and act as a buffer for significant flora and fauna values therein. The Gardens are also a recognised biosite, known to support a large population of Southern Brown Bandicoot, a federally listed fauna taxa, that is probably dispersing into this site and beyond.

- Heathy Woodland / Swamp Scrub habitat corridor in the north east sector. This site, not directly assessed due to site access limitations, is likely to be acting as a valuable habitat corridor connecting the Gardens to Heathy Woodland habitats within neighbouring precinct to the east and to the Westernport Ramsar wetlands.

- Smaller, disjunct Habitat Zones within the golf course in the north-west sector. These patches, in combination with roadside remnants, offer a disjunct link through the study area to habitats west of the precinct and the Gardens. There is an opportunity to incorporate linking habitat between fairways and through the golf course.

- A modified drainage line in the north-west sector. There is a low-lying drainage depression in the north west (at 60 Ballarto Road; PFI 46245) which, if left undisturbed, is likely to regenerate into a Swamp Scrub habitat corridor thereby further extending habitat links with the Gardens to habitat values west of this site.

- Patches of Sedge Wetland (EVC 136) and drainage lines. There are several patches of Sedge Wetland fringing farm dams within the southern half of the precinct offering valuable wetland habitat in an otherwise depauperate sector. These sites are also linked by drainage lines which, if left undisturbed, are likely to regenerate into Swamp Scrub habitat corridors.

In addition there are areas of native (non-indigenous) and exotic (introduced) vegetation, including areas of regenerating Swamp Scrub that do not meet the DNRE (2002) threshold for consideration under Victoria's *Native Vegetation Management Framework*. Many of these sites, whilst highly modified or immature, comprise relatively complex vegetation structures and floristic diversity and are considered habitat for threatened fauna species (Part 2 Figure 3).

Non-indigenous habitat comprises planted Eucalypts and other established tree species along fence-lines and roadsides, as well as established trees within gardens and plantation areas (Part 2 Figure 3). In addition, some drainage lines and roadsides are dominated by exotic vegetation and woody weed thickets which offer habitat for ground fauna. Areas dominated by grassy weed and drainage lines vegetated with semi-aquatic exotics (in particular Drain Flat-sedge **Cyperus eragrostis*) also offer modified habitat for threatened wetland birds and amphibians (Part 2 Figure 3).

The remainder of the study area comprises large areas of agricultural land with little or no native vegetation cover.

It is estimated that about 7% of former native vegetation remains within the City of Casey, of which a significant proportion has been highly modified (McMillan et al. 2003). Patterns of vegetation clearance within the study area are consistent with those undertaken historically throughout the City of Casey, whereby, the majority of the study area has been cleared for agriculture, and remaining native vegetation has been modified to varying degrees. All remnant vegetation and all remaining habitat, both indigenous and non-indigenous, is therefore significant as a local source of biodiversity.

Roadsides within the City of Casey are often the only remaining indigenous habitat within an area and are critically important as habitat corridors for fauna throughout the municipality (Lane 2008). Native vegetation distribution within the study area is consistent with general patterns of vegetation distribution within the City of Casey, in that roadsides comprise greater biodiversity compared to surrounding agricultural land. All roadsides within the study area, regardless of native vegetative cover, are particularly significant, given the occurrence of threatened species, including Southern Toadlet and Glossy Grass Skink in these areas.

Large trees containing hollows and canopy habitat are common as scattered indigenous trees and as planted exotic and non-indigenous Eucalypts along fence-lines and roadsides. Established trees, especially Eucalypts provide habitat for threatened woodland birds. All other areas of habitat, both indigenous and non-indigenous, including roadsides, wetlands, drainage-lines and areas of woodland provide habitat for a range of indigenous fauna.

Wetlands and associated wetland vegetation within the study area are particularly important areas of faunal habitat, including habitat for threatened wetland birds.

One threatened flora species: Wetland Blown-grass Lachnagrostis filiformis was recorded within the study area. At least two nationally significant species, River Swamp Wallaby-grass *Amphibromus fluitans* and Matted Flax-lily *Dianella amoena,* are considered to have a medium likelihood of occurrence within the study area. In addition, three species, Powelltown Correa *Correa reflexa* var*. lobata*, Southern Bristle-sedge *Chorizandra australis* and Upright Panic *Entolasia stricta* are considered to have a medium likelihood of occurrence, whilst a fourth, Wetland Blown-grass *Lachnagrostis filiformis* var. 2, is considered to have a medium-high likelihood of occurrence within the study area.

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Flora Appendix 1. Flora Species recorded on databases

Flora species detected within a five kilometres from the study area boundary on DSE's *Flora Information System* (DSE 2009d). Relevant species listed on EPBC Protected Matters Search Tool (DEWHA 2009a) also included.

Likelihood of Occurrence:

Low: Few aspects of habitat requirements are met on site.
Moderate: Some aspects of habitat requirements are met on site.
High: Optimal habitat present.

Conservation Status Codes (EPBC and FFG Acts):

EN – Endangered under the National EPBC Act (very high risk of extinction in the wild)

VU – Vulnerable under the National EPBC Act (high risk of extinction in the wild)

f–Listed as threatened under the Flora and Fauna Guarantee Act

Victorian Conservation Status Codes(DSE 2005a):

e – Endangered (at risk of becoming extinct);
v – Vulnerable (at risk of becoming endangered);
r –Rare (rare but not considered otherwise threatened);
k –poorly known (accurate distribution information is inadequate to allocate to one of the conservation status categories);

FFG	EPBC	DSE	Common Name	Scientific Name	Family Name	Likelihood of Occurrence	Database	Freq (FIS only)	NumSite (FIS only)	Date of last record	Likelihood Reasoning	Habitat
		v	Annual Bitter-cress	*Cardamine paucijuga s.s.*	Brassicaceae	Low	FIS	0.10%	1		Unlikely	Scatterd populations, primarily in southern Victoria including Portland, Grampions and Wilsons Promontory (Walsh & Entwistle 1996). Occurs in riparian and swamp scrub in rich soil in dry or moist conditions (Australian Plants Society 2001).
	VU		Clover Glycine	*Glycine latrobeana*	Fabaceae	Low	EPBC				Unlikely - closest record in Beaconsfield in the dividing range.	Widespread, infrequent populations in southern Victoria (Walsh & Entwistle 1996). Plains Grassland and Woodlands in moist well drained soils (Australian Plants Society 2001).
	EN		Cream Spider-orchid	*Caladenia fragrantissima subsp. orientalis*	Orchidaceae	Low	EPBC				Nearest record south Gipp	Populations limited to a small area of coastal far western Victoria and Southern Gippsland. Found in coastal heathlands and heathy woodlands on sandy soils (Walsh & Entwistle 1994).
	EN		Frankston Spider-orchid	*Caladenia robinsonii*	Orchidaceae	Low	EPBC				Scattered recs in Pines Flora and Fauna Reserve, but not recorded in recent bypass studies	Well drained sandy soils in Heathy or Grassy Woodlands. Known populations limited to the Mornington Peninsula area (Walsh & Entwistle 1994).
		r	Green Scentbark	*Eucalyptus fulgens*	Myrtaceae	Low	FIS	0.10%	1		Unlikely	Open forest areas, tollerating damp conditions. Found in areas east of Healseville and Woori Yallock to the Latrobe Valley (Walsh & Entwistle 1996).
f		e	Grey Billy-buttons	*Craspedia canens*	Asteraceae	Low	FIS	0.21%	2		Unlikely - 3 recs from intact wetland north of cranbourne	Few populations in south-east Victoria between Cranbourne and Traralgon. Grasslands, often around margins of swamps (Walsh & Entwistle 1999).
f	EN	e	Maroon Leek-orchid	*Prasophyllum frenchii*	Orchidaceae	Low	FIS/EPBC	0.10%	1		Nearest records on old Clyde rail corridor	Infrequent, widespread populations in south western Victoria. Grasslands heathlands and grassy woodlands on moist well drained soils, including roadsides or rail reserves (Jeanes and Backhouse 2006).
	EN		Matted Flax-lily	*Dianella amoena*	Hemerocallidaceae	Med	EPBC			na	Nearest records on old Clyde rail corridor	Confined to southern Victoria in vegetation types such as lowland grasslands, grassy woodlands and grassy wetlands. The species can tolerate well drained to seasonally wet soils (DEWHA 2009c).

FFG	EPBC	DSE	Common Name	Scientific Name	Family Name	Likelihood of Occurrence	Database	Freq (FIS only)	NumSite (FIS only)	Date of last record	Likelihood Reasoning	Habitat
	EN		Metallic Sun-orchid	*Thelymitra epipactoides*	Orchidaceae	Low	EPBC				Nearest record near Dandenong in 1980, nearest recent record in West Gipp	Uncommon small colonies in areas of southern Victoria, particularly near the coast (Walsh & Entwistle 1999). Greatly reduced populations due to decline in suitable habitat. Grows in coastal heathlands, grasslands and woodlands and in swampy depressions (Jeanes and Backhouse 2006).
		v	Naked Sun-orchid	*Thelymitra circumsepta*	Orchidaceae	Med	FIS/EPBC	0.43%	4	2008	1999 was the last record on FIS, there is a stable pop at RBGC. Poss to occur in quarry	Found around the margins of swamps, along sub-alpine streams and sphagnum bogs. Often in disturbed areas and exposed positions in woodlands, open forests and wet heathlands (Jeanes and Backhouse 2006).
		r	Orange-tip Finger-orchid	*Caladenia aurantiaca*	Orchidaceae	Low	FIS	0.21%	2		Rec's from RBGC	Southern Victoria, east of Melbourne in open forests, heathlands and heathy woodlands (Walsh & Entwistle 1999).
		v	Pale Swamp Everlasting	*Helichrysum aff. rutidolepis (Lowland Swamps)*	Asteraceae	Low	FIS	0.10%	1		Unlikely - recs from intact wetland north of cranbourne and Clyde rail corridor	Moist well drained sites in open grassy forest or woodland. Frequent, widespread populations across much of Victoria, excluding the north-west (Walsh & Entwistle 1999).
		r	Powelltown Correa	*Correa reflexa var. lobata*	Rutaceae	Med	FIS	0.10%	1		Rec's from RBGC - possible to occur in quarry	Locally common in areas south-east of Melbourne. Moist, open forests, often heathy. Also heathy woodlands (Walsh & Entwistle 1999).
	VU		River Swamp Wallaby-grass	*Amphibromus fluitans*	Poaceae	Med	FIS/EPBC	0.10%	1	1990	Possible - found north of Botanic Drv	Mostly confined to the north-central Victorian reach of the Murray River and is uncommon in southern Victoria. Occurs in natural and constructed wetlands such as farm dams, lagoons and swamp margins (DEWHA 2009b; Walsh & Entwistle 1994).
		k	Southern Bristle-sedge	*Chorizandra australis*	Cyperaceae	Med	FIS	0.10%	1		Found in remnant Riparian Scrub along Boggy Creek Langwarrin	Widespread, infrequent populations accros soputhern Victoria. Lowland swamps and waterholes of low-nutrient soils (Walsh & Entwistle 1994).
		r	Sticky Wattle	*Acacia howittii*	Mimosaceae	Low	FIS	0.10%	1		This is a probably a record of planted stock.	Confined to Eastern Victorian moist forests in areas from the upper Macalister River south to Yarrum (Walsh & Entwistle 1996).
	VU		Swamp Everlasting	*Xerochrysum palustre*	Asteraceae	Low	EPBC				nearest rec in Lyndhurst	Occurs in swamps usually found on basalt derived soils.
	VU	v	Swamp Fireweed	*Senecio psilocarpus*	Asteraceae	Low	FIS	0.10%	1		Unlikely - found along North Rd Langwarrin - very scattered occurrence in area	Rare isolated populations in south-west Victoria. Damp, herb-rich swampy areas on volcanic clays and peats .(Walsh & Entwistle 1999).
		k	Upright Panic	*Entolasia stricta*	Poaceae	Med-High	FIS	0.10%	1		Recorded very close to Botanic Drv in RBGC	Sandy soils in grassy low open forests. Distribution uncertain however recorded east of Bairnsdale and near Frankston and Stradbroke (Walsh & Entwistle 1994).
		k	Wetland Blown-grass	*Lachnagrostis filiformis var. 2*	Poaceae	Med	FIS	0.10%	1	1990	Possible - found Botanic Drv	Grows on the edges of wetlands.
		r	Yarra Gum	*Eucalyptus yarraensis*	Myrtaceae	Low	FIS	0.10%	1		Unlikely - very scattered occurrence in area	Uncommon and found in fragmented populations in areas west of Melbourne to Daylesford and Ballarat and east to Glengarry (Walsh & Entwistle 1996).

Flora Appendix 2. Habitat Hectare Results

Habitat Zone			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
PFI			R621921	R621921	53056303	53056303	53056303	150230043	50233193	208012129	208012129	208012129	53002885	603724	604531	604531	604533	604533	604539	608658	633461	R621919
Site ID			3	3	3	1	2	1	1	1	2	4	2	2	1	2	1	2	1	2	1	2
Zone ID			A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
EVC Name (Initials)			DHW	HW	HW	HW	HW	HW	SW	WF	HW	HW	DHW	DHW	SS	SS	PGW	SW	SW	HW	SW	GW
EVC Number			GipP0793	GipP0048	GipP0048	GipP0048	GipP0048	GipP0048	GipP0136	GipP0074	GipP0048	GipP0048	GipP0793	GipP0793	GipP0053	GipP0053	GipP0055	GipP0136	GipP0136	GipP0048	GipP0136	GipP0175
Total Area of Habitat Zone (ha)		**(#.#)**	0.17	0.14	0.08	0.23	0.05	1.77	0.42	0.06	0.01	0.18	0.14	0.14	0.02	0.02	0.05	0.40	0.15	0.70	0.11	0.13
		Max Score	**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**	9	9	9	9	9	6	0	0	0	2	9	9	0	0	0	0	0	0	0	0
	Canopy Cover	**5**	2	2	4	4	4	3	0	0	2	0	2	2	0	0	0	0	0	0	0	0
	Lack of Weeds	**15**	4	4	0	0	0	4	7	7	4	4	4	4	0	7	4	4	4	0	7	7
	Understorey	**25**	5	5	0	5	5	5	5	0	5	5	5	5	5	5	5	15	15	5	15	10
	Recruitment	**10**	6	6	5	5	5	1	0	0	0	0	6	6	5	5	3	3	3	0	3	0
	Organic Matter	**5**	5	3	4	4	4	5	4	0	5	3	5	5	5	3	3	5	5	2	5	5
	Logs	**5**	4	2	0	0	0	0	0	0	0	2	4	4	0	0	0	0	0	0	0	0
	Total Score	**75**	**35**	**31**	**22**	**27**	**27**	**24**	**21.76**	**7**	**16**	**16**	**35**	**35**	**18.75**	**25**	**15**	**36.72**	**36.72**	**7**	**40.8**	**22**
Landscape Score		**25**	10	10	6	6	6	5	4	5	5	5	10	10	5	5	1	1	1	5	1	5
Habitat Score#		**100**	45	41	28	33	33	29	25.76	12	21	21	45	45	23.75	30	16	38	38	12	42	27
Habitat Score as above = #/100		**0.##**	0.45	0.41	0.28	0.33	0.33	0.29	0.26	0.12	0.21	0.21	0.45	0.45	0.24	0.30	0.16	0.38	0.38	0.12	0.42	0.27
Habitat Hectares		**(#.#)**	**0.077**	**0.057**	**0.022**	**0.076**	**0.017**	**0.513**	**0.108**	**0.007**	**0.002**	**0.038**	**0.063**	**0.063**	**0.005**	**0.006**	**0.008**	**0.151**	**0.057**	**0.084**	**0.046**	**0.035**
Bioregion			GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP
EVC Conservation Status			V	LC	LC	LC	LC	LC	V	E	LC	LC	V	V	E	E	E	V	V	LC	V	E
Conservation Significance	**Conservation Status x Habitat Score**		High	Low	Low	Low	Low	Low	Medium	High	Low	Low	High	High	High	High	High	High	High	Low	High	High
	Threatened Species Rating		High	High	High	High	High	Very High	Very High	High	Very High	Very High	High	Very High	High	High	High	Very High	Very High	Very High	Very High	High
	Other Site Attribute Rating		High	High																		
	Overall Conservation Significance (highest rating)		**High**	**High**	**High**	**High**	**High**	**Very High**	**Very High**	**High**	**Very High**	**Very High**	**High**	**Very High**	**High**	**High**	**High**	**Very High**	**Very High**	**Very High**	**Very High**	**High**
Other Site Atribute Rating	**Which biosite, if any, does the site cover?**												5095					4813		4813		
	City of Casey Biodiversity Emhancement Strategy Area of Regional Significance							Yes	Yes									Yes	Yes		Yes	
Trees within patches	**VLOT**		1						2				3									
	LOT		5					1	1				6					4	3			1
	MOT		1						6				3					6	1			2

Habitat Zone			21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
PFI			R621919	R621919	R621921	R621925	R621939	R622246	R622246	204471619	204471619	209772433	209772433	209772433	209772433	209772433	209772433	209772433	209772433	209772433	209772433	209772433	209772433
Site ID			3	4	1	1	2	1	2	1	2	1	1	2	3	4	5	6	7	8	9	10	11
Zone ID			A	A	A	A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A
EVC Name (Initials)			GW	GW	DHW	DHW	HW	SS	SS	GW	GW	SS	HW	HW	HW	HW	HW	HW	HW	HW	HW	HW	HW
EVC Number			GipP0175	GipP0175	GipP0793	GipP0793	GipP0048	GipP0053	GipP0053	GipP0175	GipP0175	GipP0053	GipP0048	GipP0048	GipP0048	GipP0048	GipP0048	GipP0048	GipP0048	GipP0048	GipP0048	GipP0048	GipP0048
Total Area of Habitat Zone (ha)		**(#.#)**	0.04	0.03	0.13	0.14	0.05	0.02	0.02	0.51	0.15	0.25	0.15	0.02	0.25	0.01	0.03	0.47	0.10	0.04	0.12	0.02	0.05
		Max Score	**Score**	**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**	0	0	9	9	9	0	0	0	0	0	5	0	0	0	0	3	0	0	0	0	9
	Canopy Cover	**5**	0	0	2	2	2	0	0	2	2	0	4	0	0	0	0	0	0	0	0	0	2
	Lack of Weeds	**15**	7	7	4	4	7	0	0	0	0	7	0	0	0	0	0	2	0	0	0	0	2
	Understorey	**25**	5	5	5	5	5	5	5	5	5	5	0	5	5	5	5	5	5	5	5	5	5
	Recruitment	**10**	0	0	6	6	0	5	5	0	0	0	5	5	5	5	5	5	5	5	5	5	5
	Organic Matter	**5**	5	3	5	5	5	3	2	3	3	5	4	5	5	5	5	4	5	5	5	5	4
	Logs	**5**	0	0	4	4	0	0	0	2	2	0	4	0	0	0	0	0	0	0	0	0	4
	Total Score	**75**	**17**	**15**	**35**	**35**	**28**	**16.25**	**15**	**12**	**12**	**17**	**22**	**15**	**15**	**15**	**15**	**19**	**15**	**15**	**15**	**15**	**31**
Landscape Score		**25**	5	0	10	10	5	5	5	5	5	0	0	0	0	0	0	0	0	0	0	0	0
Habitat Score#		**100**	22	15	45	45	33	21.25	20	17	17	17	22	15	15	15	15	19	15	15	15	15	31
Habitat Score as above = #/100		**0.##**	0.22	0.15	0.45	0.45	0.33	0.21	0.20	0.17	0.17	0.17	0.22	0.15	0.15	0.15	0.15	0.19	0.15	0.15	0.15	0.15	0.31
Habitat Hectares		**(#.#)**	**0.009**	**0.005**	**0.059**	**0.063**	**0.017**	**0.004**	**0.004**	**0.087**	**0.026**	**0.043**	**0.033**	**0.003**	**0.038**	**0.002**	**0.005**	**0.089**	**0.015**	**0.006**	**0.018**	**0.003**	**0.016**
Bioregion			GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP
EVC Conservation Status			E	E	V	V	LC	E	E	E	E	E	LC	LC	LC	LC	LC	LC	LC	LC	LC	LC	LC
Conservation Significance	**Conservation Status x Habitat Score**		High	High	High	High	Low	High	High	High	High	High	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
	Threatened Species Rating		High	High	High	High	High	High	High	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High	High	High	High	High	High	High
	Other Site Attribute Rating					High					Medium												
	Overall Conservation Significance (highest rating)		**High**	**High**	**High**	**High**	**High**	**High**	**High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**High**	**High**	**High**	**High**	**High**	**High**
Other Site Atribute Rating	**Which biosite, if any, does the site cover?**											4813			4813	4813			5095	5095			
	City of Casey Biodiversity Emhancement Strategy Area of Regional Significance											Yes Site Number 146			Yes Site Number 100								
Trees within patches	**VLOT**		1			1		1	1			15	1	1			14						
	LOT		1		2	5		6	4			4		1	2	6	38		1	1	1		
	MOT		11		3	6		3	6			57		3		8			12	12	5		

Habitat Zone			42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62
PFI			209772433	209772433	209772433	209772433	R151949687	R151949687	R151949687	R621891	R621891	R621891	R621892	R621892	R621892	R621892	R621919	46245	46245	46245	50232515	50232515	50232515
Site ID			11	12	13	14	1	2	3	1	9	10	1	2	3	4	1	2	3	5	1	2	3
Zone ID			B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
EVC Name (Initials)			HW	HW	GW	GW	GW	GW	GW	SS	HW	SS	SS	SS	SS	SS	GW	HW	SS	HW	HW	HW	HW
EVC Number			GipP0048	GipP0048	GipP0175	GipP0175	GipP0175	GipP0175	GipP0175	GipP0053	GipP0048	GipP0053	GipP0053	GipP0053	GipP0053	GipP0053	GipP0175	GipP0048	GipP0053	GipP0048	GipP0048	GipP0048	GipP0048
Total Area of Habitat Zone (ha)		**(#.#)**	0.50	0.08	0.91	0.23	0.02	0.01	0.02	0.45	0.08	0.10	0.03	0.03	0.03	0.01	0.03	0.12	0.30	0.18	0.21	0.11	0.33
		Max Score	**Score**	**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**	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	9	9
	Canopy Cover	**5**	2	0	2	2	0	0	0	2	0	0	5	5	5	5	0	0	0	0	0	2	2
	Lack of Weeds	**15**	7	0	0	0	4	7	7	0	7	7	0	0	0	0	7	7	7	7	4	7	7
	Understorey	**25**	0	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0	15	15	15
	Recruitment	**10**	10	5	0	0	0	0	0	5	0	0	3	3	3	3	0	0	0	0	3	3	3
	Organic Matter	**5**	5	5	3	3	3	5	5	3	5	3	3	3	3	3	5	5	3	3	5	3	5
	Logs	**5**	5	0	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	4
	Total Score	**75**	**34**	**15**	**14**	**12**	**12**	**17**	**17**	**15**	**17**	**15**	**16**	**16**	**16**	**16**	**17**	**17**	**15**	**10**	**35**	**43**	**45**
Landscape Score		**25**	0	0	0	5	5	5	5	5	4	4	0	0	0	0	5	4	4	4	5	5	10
Habitat Score#		**100**	34	15	14	17	17	22	22	20	21	19	16	16	16	16	22	21	19	14	40	48	55
Habitat Score as above = #/100		**0.##**	0.34	0.15	0.14	0.17	0.17	0.22	0.22	0.20	0.21	0.19	0.16	0.16	0.16	0.16	0.22	0.21	0.19	0.14	0.40	0.48	0.55
Habitat Hectares		**(#.#)**	**0.170**	**0.012**	**0.127**	**0.039**	**0.003**	**0.002**	**0.004**	**0.090**	**0.017**	**0.019**	**0.005**	**0.005**	**0.005**	**0.002**	**0.007**	**0.025**	**0.057**	**0.025**	**0.084**	**0.053**	**0.182**
Bioregion			GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP
EVC Conservation Status			LC	LC	E	E	E	E	E	E	LC	E	E	E	E	E	E	LC	E	LC	LC	LC	LC
Conservation Significance	**Conservation Status x Habitat Score**		Low	Low	High	High	High	High	High	High	Low	High	High	High	High	High	High	Low	High	Low	Low	Low	Low
	Threatened Species Rating		High	High	High	High	High	High	High	Very High	Very High	Very High	High	High	High	High	High	High	High	Very High	High	High	High
	Other Site Attribute Rating												Medium	Medium	Medium	Medium				Medium		Medium	Medium
	Overall Conservation Significance (highest rating)		**High**	**High**	**High**	**High**	**High**	**High**	**High**	**Very High**	**Very High**	**Very High**	**High**	**High**	**High**	**High**	**High**	**High**	**High**	**Very High**	**High**	**High**	**High**
Other Site Attribute Rating	**Which biosite, if any, does the site cover?**							4813	4813	4813	4813	4813								5095			
	City of Casey Biodiversity Emhancement Strategy Area of Regional Significance			Yes Site Number 167				Yes Site Number 100	Yes Site Number 100	Yes Site Number 146	Yes Site Number 100	Yes Site Number 145											
Trees within patches	**VLOT**									1										1			
	LOT						1	1	1	2	5	4								1	1		
	MOT		29	12			1	12	12		2	5		35	29					1	1		

Habitat Zone			63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83
PFI			50232515	50232515	50232515	50232515	50232515	50232515	50232515	50232515	50232515	50232515	50232515	50232515	601760	601760	601760	601760	601760	601760	601760	601760	602010
Site ID			3	4	4	5	5	5	5	6	7	8	9	10	1	1	2	4	5	5	6	7	2
Zone ID			B	A	B	A	B	C	D	A	A	A	A	A	A	B	A	A	A	B	A	A	A
EVC Name (Initials)			HW	HW	HW	SS	GW	GW	SS	GW	SS	WF	WF	HW	HW	SS	HW	HW	HW	HW	SS	HW	SS
EVC Number			GipP0048	GipP0048	GipP0048	GipP0053	GipP0175	GipP0175	GipP0053	GipP0175	GipP0053	GipP0074	GipP0074	GipP0048	GipP0048	GipP0053	GipP0048	GipP0048	GipP0048	GipP0048	GipP0053	GipP0048	GipP0053
Total Area of Habitat Zone (ha)		**(#.#)**	0.05	0.09	0.04	0.10	0.10	0.03	0.07	0.12	0.12	0.09	0.07	0.08	0.02	0.41	0.07	0.11	0.02	0.18	0.14	0.12	0.54
		Max Score	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**0**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**
Site Condition	**Large Old Trees**	**10**	9	9	9	0	0	0	0	0	0	0	0	7	0	0	7	9	0	9	0	10	0
	Canopy Cover	**5**	2	2	2	5	0	0	0	0	0	0	0	2	2	0	2	2	0	2	0	3	5
	Lack of Weeds	**15**	4	4	4	7	7	6	4	4	4	9	7	0	7	7	0	0	7	0	0	0	7
	Understorey	**25**	15	15	5	5	15	15	5	5	15	25	25	0	5	15	5	5	0	5	15	5	5
	Recruitment	**10**	6	1	6	5	3	5	6	5	6	0	0	5	5	6	5	5	5	5	6	3	5
	Organic Matter	**5**	5	3	5	5	5	5	5	5	5	0	0	5	3	3	3	3	3	3	5	3	5
	Logs	**5**	3	2	3	0	0	0	0	2	0	0	0	4	0	0	2	0	0	4	0	2	0
	Total Score	**75**	**44**	**36**	**34**	**27**	**30**	**31**	**20**	**21**	**30**	**24**	**32**	**23**	**22**	**31**	**24**	**24**	**15**	**28**	**26**	**26**	**27**
Landscape Score		**25**	10	5	10	5	5	5	5	5	5	5	5	10	5	5	5	5	5	5	5	5	5
Habitat Score#		**100**	54	41	44	32	35	36	25	26	35	29	37	33	27	36	29	29	20	33	31	31	32
Habitat Score as above = #/100		**0.##**	0.54	0.41	0.44	0.32	0.35	0.36	0.25	0.26	0.35	0.29	0.37	0.33	0.27	0.36	0.29	0.29	0.20	0.33	0.31	0.31	0.32
Habitat Hectares		**(#.#)**	**0.027**	**0.037**	**0.018**	**0.032**	**0.035**	**0.011**	**0.018**	**0.031**	**0.042**	**0.026**	**0.026**	**0.026**	**0.005**	**0.148**	**0.020**	**0.032**	**0.004**	**0.059**	**0.043**	**0.037**	**0.173**
Bioregion			GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP
EVC Conservation Status			LC	LC	LC	E	E	E	E	E	E	E	E	LC	LC	E	LC	LC	LC	LC	E	LC	E
Conservation Significance	**Conservation Status x Habitat Score**		Low	Low	Low	High	High	High	High	High	High	High	High	Low	Low	High	Low	Low	Low	Low	High	Low	High
	Threatened Species Rating		High	High	High	Very High	High	High	Very High	High	Very High	Very High	Very High	High	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High
	Other Site Attribute Rating		Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium			Medium	High	Medium		Medium	Medium	Medium	Medium	Medium	Medium	Medium
	Overall Conservation Significance (highest rating)		**High**	**High**	**High**	**Very High**	**High**	**High**	**Very High**	**High**	**Very High**	**Very High**	**Very High**	**High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**
Other Site Atribute Rating	**Which biosite, if any, does the site cover?**					4813			4813		4813	4813	4813		4813	4813	4813			4813	4813	4813	4813
	City of Casey Biodiversity Emhancement Strategy Area of Regional Significance					Yes Site Number 145			Yes Site Number 146			Yes	Yes		Yes Site Number 100	Yes Site Number 145	Yes Site Number 100			Yes Site Number 100			Yes Site Number 145
Trees within patches	**VLOT**					14			3							13							14
	LOT				2	38			7							35							36
	MOT					53			1							5				1			54

Habitat Zone			84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103
PFI			602010	602010	602010	602010	602010	602010	602010	602010	602010	602010	R621881	R621881	R621881	R621881	R621881	R621881	R621881	R621881	R621881	R621881
Site ID			2	3	3	3	4	4	4	4	4	6	1	1	2	2	2	3	3	4	5	6
Zone ID			B	A	B	C	A	B	C	D	E	A	B	C	A	C	D	A	B	A	A	A
EVC Name (Initials)			HW	SS	HW	HW	HW	SS	HW	HW	HW	HW	SS	HW	HW	SS	HW	HW	GW	SS	GW	GW
EVC Number			GipP0048	GipP0053	GipP0048	GipP0048	GipP0048	GipP0053	GipP0048	GipP0048	GipP0048	GipP0048	GipP0053	GipP0048	GipP0048	GipP0053	GipP0048	GipP0048	GipP0175	GipP0053	GipP0175	GipP0175
Total Area of Habitat Zone (ha)		**(#.#)**	1.89	0.35	0.15	1.76	0.33	0.42	1.68	0.88	2.05	0.24	0.05	0.07	0.09	0.03	0.08	0.16	0.07	0.06	0.04	0.09
		Max Score	**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**	9	0	9	9	0	0	9	0	9	9	0	0	7	0	0	9	9	0	0	0
	Canopy Cover	**5**	2	5	2	2	2	0	2	0	2	2	0	2	2	0	2	2	2	0	2	0
	Lack of Weeds	**15**	4	0	0	4	4	4	7	11	4	7	0	0	4	0	0	0	0	0	0	0
	Understorey	**25**	15	5	5	15	5	5	15	15	5	5	5	15	15	5	5	5	5	5	5	5
	Recruitment	**10**	3	5	1	6	0	1	3	6	6	3	6	10	6	6	5	3	3	6	6	1
	Organic Matter	**5**	5	5	4	5	3	5	5	5	5	5	3	3	5	3	3	2	5	5	5	5
	Logs	**5**	0	0	0	0	4	0	0	0	3	0	0	2	2	0	4	4	4	0	2	0
	Total Score	**75**	**38**	**20**	**21**	**41**	**18**	**15**	**41**	**37**	**34**	**31**	**14**	**32**	**41**	**14**	**19**	**25**	**28**	**16**	**20**	**11**
Landscape Score		**25**	10	5	5	10	10	10	10	10	10	5	10	10	10	5	10	5	5	5	5	5
Habitat Score#		**100**	48	25	26	51	28	25	51	47	44	36	24	42	51	19	29	30	33	21	25	16
Habitat Score as above = #/100		**0.##**	0.48	0.25	0.26	0.51	0.28	0.25	0.51	0.47	0.44	0.36	0.24	0.42	0.51	0.19	0.29	0.30	0.33	0.21	0.25	0.16
Habitat Hectares		**(#.#)**	**0.907**	**0.088**	**0.039**	**0.898**	**0.092**	**0.105**	**0.857**	**0.414**	**0.902**	**0.086**	**0.012**	**0.029**	**0.046**	**0.006**	**0.023**	**0.048**	**0.023**	**0.013**	**0.010**	**0.014**
Bioregion			GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP
EVC Conservation Status			LC	E	LC	LC	LC	E	LC	LC	LC	LC	E	LC	LC	E	LC	V	E	E	E	E
Conservation Significance	**Conservation Status x Habitat Score**		Low	High	Low	Low	Low	High	Low	Low	Low	Low	High	Low	Low	High	Low	High	High	High	High	High
	Threatened Species Rating		Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High
	Other Site Attribute Rating		Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
	Overall Conservation Significance (highest rating)		**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**
Other Site Atribute Rating	**Which biosite, if any, does the site cover?**		4813	4813	4813	4813			4813	4813	4813	4813	4813	4813	4813		4813			4813		
	City of Casey Biodiversity Emhancement Strategy Area of Regional Significance			Yes Site Number 145	Yes Site Number 100	Yes Site Number 100		Yes					Yes			Yes			Yes	Yes	Yes	Yes
Trees within patches	**VLOT**			3							1					1	2					
	LOT			15		1				1	2			3			4		1		1	1
	MOT			16		2					1	1		5		3	6					

Flora Appendix 3. Scattered Trees

ID	Scientific Name*	Common Name*	Tree Size	EVC^	Conservation Status	best or remaining 50% habitat for TS	Other Attributes	Conservation Significance	PFI
1	*E. cephalocarpa*	Mealy Stringybark	LT	Damp Heathy Woodland	Vulnerable	remaining		High	603726
2	*E. cephalocarpa*	Mealy Stringybark	VL	Damp Heathy Woodland	Vulnerable	remaining		High	603726
3	*E. cephalocarpa*	Mealy Stringybark	MT	Damp Heathy Woodland	Vulnerable	remaining		High	603726
4	*E. cephalocarpa*	Mealy Stringybark	LT	Damp Heathy Woodland	Vulnerable	remaining		High	603726
5	*E. viminalis subsp pryoriana*	Coast Manna Gum	LT	Damp Heathy Woodland	Vulnerable	remaining		High	603726
6	*E. cephalocarpa*	Mealy Stringybark	VL	Damp Heathy Woodland	Vulnerable	remaining		High	603726
7	*E. cephalocarpa*	Mealy Stringybark	MT	Damp Heathy Woodland	Vulnerable	remaining		High	603726
8	*E. cephalocarpa*	Mealy Stringybark	LT	Damp Heathy Woodland	Vulnerable	remaining		High	603726
9	*E. cephalocarpa*	Mealy Stringybark	MT	Damp Heathy Woodland	Vulnerable	remaining		High	603726
10	*E. viminalis subsp pryoriana*	Coast Manna Gum	MT	Damp Heathy Woodland	Vulnerable	remaining		High	603726
11	*E. viminalis subsp pryoriana*	Coast Manna Gum	LT	Damp Heathy Woodland	Vulnerable	remaining		High	603726
12	*E. ovata subsp ovata*	Swamp gum	MT	Swampy Riparian Woodland	Endangered	remaining		High	603726
13	*E. ovata subsp ovata*	Swamp gum	MT	Swampy Riparian Woodland	Endangered	remaining		High	603726
14	*E. ovata subsp ovata*	Swamp gum	ST	Swampy Riparian Woodland	Endangered	remaining		High	603726
15	*E. viminalis subsp pryoriana*	Coast Manna Gum	ST	Damp Heathy Woodland	Vulnerable	remaining		High	603726
16	*E. viminalis subsp pryoriana*	Coast Manna Gum	ST	Damp Heathy Woodland	Vulnerable	remaining		High	603726
17			MT	Heathy Woodland	Endangered	remaining		High	R621921
18			LT	Heathy Woodland	Endangered	remaining		High	R621921
19			LT	Heathy Woodland	Endangered	remaining		High	150230043
20			LT	Heathy Woodland	Endangered	remaining		High	150230043
21			MT	Heathy Woodland	Endangered	remaining		High	150230043
22			ST	Heathy Woodland	Endangered	remaining		High	150230043
23			ST	Heathy Woodland	Endangered	remaining		High	150230043
24			MT	Heathy Woodland	Endangered	remaining		High	150230043
25			LT	Heathy Woodland	Endangered	remaining		High	150230043
26			ST	Heathy Woodland	Endangered	remaining		High	150230043
27			VL			remaining		High	150230043
28			ST			remaining		High	150230043
29			ST	Heathy Woodland	Endangered	remaining		High	208012129
30	*E. cephalocarpa*	Mealy Stringybark	ST	Damp Heathy Woodland	Vulnerable	remaining		High	53056303
31	*E. cephalocarpa*	Mealy Stringybark	MT	Damp Heathy Woodland	Vulnerable	remaining		High	53056303
32	*E. cephalocarpa*	Mealy Stringybark	ST	Damp Heathy Woodland	Vulnerable	remaining		High	53056303
33	*E. cephalocarpa*	Mealy Stringybark	ST	Damp Heathy Woodland	Vulnerable	remaining		High	53056303
34	*E. cephalocarpa*	Mealy Stringybark	ST	Damp Heathy Woodland	Vulnerable	remaining		High	53056303
35	*E. cephalocarpa*	Mealy Stringybark	ST	Damp Heathy Woodland	Vulnerable	remaining		High	53056303
36	*E. cephalocarpa*	Mealy Stringybark	LT	Damp Heathy Woodland	Vulnerable	remaining		High	53056303
37	*E. cephalocarpa*	Mealy Stringybark	ST	Damp Heathy Woodland	Vulnerable	remaining		High	53056303
38	*E. cephalocarpa*	Mealy Stringybark	MT	Damp Heathy Woodland	Vulnerable	remaining		High	53056303
39	*E. cephalocarpa*	Mealy Stringybark	MT	Damp Heathy Woodland	Vulnerable	remaining		High	53056303
40	*E. cephalocarpa*	Mealy Stringybark	ST	Damp Heathy Woodland	Vulnerable	remaining		High	53056303
41	*E. cephalocarpa*	Mealy	ST	Damp Heathy Woodland	Vulnerable	remaining		High	53056303

ID	Scientific Name*	Common Name*	Tree Size	EVC^	Conservation Status	best or remaining 50% habitat for TS	Other Attributes	Conservation Significance	PFI
		Stringybark							
42	*E. cephalocarpa*	Mealy Stringybark	LT	Damp Heathy Woodland	Vulnerable	remaining		High	603724
43	*dead*		MT			remaining		High	603724
44			LT	Plains Grassy Woodland	Endangered	remaining		High	604533
45			MT	Heathy Woodland	Endangered	remaining		High	R621924
46			VL	Heathy Woodland	Endangered	remaining		High	R621924
47			ST	Heathy Woodland	Endangered	remaining		High	R621924
48			ST	Heathy Woodland	Endangered	remaining		High	R621924
49			LT			remaining		High	204471531
50			ST	Grassy Woodland	Endangered	remaining		High	204471531
51			ST	Grassy Woodland	Endangered	remaining		High	204471531
52			ST	Grassy Woodland	Endangered	remaining		High	204471531
53			ST	Grassy Woodland	Endangered	remaining		High	204471531
54			ST	Grassy Woodland	Endangered	remaining		High	204471619
55			ST	Grassy Woodland	Endangered	remaining		High	204471619
56			LT			remaining		High	209772433
57			LT			remaining		High	209772433
58			MT			remaining		High	209772433
59			LT	Heathy Woodland	Endangered	remaining		High	209772433
60			MT	Heathy Woodland	Endangered	remaining		High	209772433
61			LT	Heathy Woodland	Endangered	remaining		High	209772433
62			LT	Heathy Woodland	Endangered	remaining		High	209772433
63			MT			remaining		High	209772433
64			MT			remaining		High	209772433
65			LT	Swamp Scrub	Endangered	remaining		High	R621891
66			VL	Swamp Scrub	Endangered	remaining		High	R621891
67			LT	Swamp Scrub	Endangered	remaining		High	R621891
68			ST	Swamp Scrub	Endangered	remaining		High	R621891
69			MT	Swamp Scrub	Endangered	remaining		High	R621891
70			LT	Swamp Scrub	Endangered	remaining		High	R621891
71			LT	Swamp Scrub	Endangered	remaining		High	R621891
72			MT	Swamp Scrub	Endangered	remaining		High	R621891
73			LT	Swamp Scrub	Endangered	remaining		High	R621891
74			LT	Swamp Scrub	Endangered	remaining		High	R621891
75			LT	Swamp Scrub	Endangered	remaining		High	R621891
76			MT	Swamp Scrub	Endangered	remaining		High	R621891
77			MT	Swamp Scrub	Endangered	remaining		High	R621891
78			MT	Swamp Scrub	Endangered	remaining		High	R621891
79			LT	Swamp Scrub	Endangered	remaining		High	R621891
80			VL	Swamp Scrub	Endangered	remaining		High	R621891
81			VL	Swamp Scrub	Endangered	remaining		High	R621891
82			LT	Swamp Scrub	Endangered	remaining		High	R621891
83			LT	Swamp Scrub	Endangered	remaining		High	R621891
84			ST	Swamp Scrub	Endangered	remaining		High	R621891
85			VL	Swamp Scrub	Endangered	remaining		High	R621891
86			VL	Swamp Scrub	Endangered	remaining		High	R621891
87			VL	Swamp Scrub	Endangered	remaining		High	46245
88			VL	Swamp Scrub	Endangered	remaining		High	46245
89			ST	Swamp Scrub	Endangered	remaining		High	46245
90			LT	Swamp Scrub	Endangered	remaining		High	46245
91			VL	Heathy Woodland	Endangered	remaining		High	46245
92			VL	Swamp Scrub	Endangered	remaining		High	46245
93			VL	Swamp Scrub	Endangered	remaining		High	46245
94			MT	Grassy Woodland	Endangered	remaining		High	46246
95			LT	Heathy Woodland	Endangered	remaining		High	50232515
96			VL	Heathy Woodland	Endangered	remaining		High	50232515

ID	Scientific Name*	Common Name*	Tree Size	EVC^	Conservation Status	best or remaining 50% habitat for TS	Other Attributes	Conservation Significance	PFI
97			ST	Swamp Scrub	Endangered	remaining	Biosite 4813	High	601760
98			VL	Heathy Woodland	Endangered	remaining	Biosite 4813	High	601760
99			MT	Heathy Woodland	Endangered	remaining	Biosite 4813	High	601760
100			LT	Heathy Woodland	Endangered	remaining	Biosite 4813	High	601760
101			LT	Heathy Woodland	Endangered	remaining	Biosite 4813	High	601760
102			MT	Heathy Woodland	Endangered	remaining	Biosite 4813	High	601760
103			ST	Heathy Woodland	Endangered	remaining	Biosite 4813	High	601760
104			ST	Heathy Woodland	Endangered	remaining	Biosite 4813	High	601760
105			ST	Heathy Woodland	Endangered	remaining	Biosite 4813	High	601760
106			LT	Swamp Scrub	Endangered	remaining	Biosite 4813	High	601760
107			LT	Swamp Scrub	Endangered	remaining	Biosite 4813	High	601760
108			VL	Heathy Woodland	Endangered	remaining	Biosite 4813	High	602010
109			MT	Heathy Woodland	Endangered	remaining	Biosite 4813	High	602010
110			MT	Heathy Woodland	Endangered	remaining	Biosite 4813	High	602010
111			MT	Heathy Woodland	Endangered	remaining	Biosite 4813	High	602010
112			VL	Heathy Woodland	Endangered	remaining	Biosite 4813	High	602010
113			MT	Heathy Woodland	Endangered	remaining	Biosite 4813	High	602010
114			MT	Heathy Woodland	Endangered	remaining	Biosite 4813	High	602010
115			MT	Heathy Woodland	Endangered	remaining	Biosite 4813	High	602010
116			MT	Heathy Woodland	Endangered	remaining	Biosite 4813	High	602010
117			MT	Heathy Woodland	Endangered	remaining		High	602010
118			LT	Heathy Woodland	Endangered	remaining	Biosite 4813	High	602010
119			LT	Heathy Woodland	Endangered	remaining	Biosite 4813	High	602010
120			VL	Heathy Woodland	Endangered	remaining	Biosite 4813	High	602010
121			MT	Heathy Woodland	Endangered	remaining	Biosite 4813	High	602010
122			ST			remaining	Biosite 4813	High	R621881
123			ST			remaining		High	R621881
124			ST			remaining		High	R621881
125			ST			remaining		High	R621881
126			ST			remaining		High	R621881
127			LT			remaining		High	R621881
128			MT	Grassy Woodland	Endangered	remaining		High	R621881
129			ST	Grassy Woodland	Endangered	remaining		High	R621881
130			MT	Grassy Woodland	Endangered	remaining		High	R621881
131			MT	Swamp Scrub	Endangered	remaining	Biosite 4813	High	R621881
132			LT			remaining		High	R621891

***** **Scientific names and common names of scattered trees were not recorded during the 08/09 survey, as per the GAA NVMP project brief**

^ **Some scattered tree EVCs were not recorded due to an unknown data entry or data processing error.**

Flora Appendix 4. Conservation Significance Ratings decisions

Habitat Zone			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PFI			R621921	R621921	53056303	53056303	53056303	150230043	50233193	208012129	208012129	208012129	53002885	603724	604531	604531	604533	604533
EVC Name (Initials)			DHW	HW	HW	HW	HW	HW	SW	WF	HW	HW	DHW	DHW	SS	SS	PGW	SW
EVC Number			GipP0793	GipP0048	GipP0048	GipP0048	GipP0048	GipP0048	GipP0136	GipP0074	GipP0048	GipP0048	GipP0793	GipP0793	GipP0053	GipP0053	GipP0055	GipP0136
Total Area of Habitat Zone (ha)		**(#.#)**	0.17	0.14	0.08	0.23	0.05	1.77	0.42	0.06	0.01	0.18	0.14	0.14	0.02	0.02	0.05	0.40
Habitat Score as above = #/100		**0.##**	0.45	0.41	0.28	0.33	0.33	0.29	0.26	0.12	0.21	0.21	0.45	0.45	0.24	0.30	0.16	0.38
Habitat Hectares		**(#.#)**	**0.077**	**0.057**	**0.022**	**0.076**	**0.017**	**0.513**	**0.108**	**0.007**	**0.002**	**0.038**	**0.063**	**0.063**	**0.005**	**0.006**	**0.008**	**0.151**
EVC Conservation Status			V	LC	LC	LC	LC	LC	V	E	LC	LC	V	V	E	E	E	V
Conservation Significance	**Conservation Status x Habitat Score**		High	Low	Low	Low	Low	Low	Medium	High	Low	Low	High	High	High	High	High	High
	Threatened Species Rating		High	High	High	High	High	Very High	Very High	High	Very High	Very High	High	Very High	High	High	High	Very High
	Other Site Attribute Rating		High	High														
	Overall Conservation Significance (highest rating)		**High**	**High**	**High**	**High**	**High**	**Very High**	**Very High**	**High**	**Very High**	**Very High**	**High**	**Very High**	**High**	**High**	**High**	**Very High**
Threatened Species Rating	**Presence of threatened/rare flora species.** **Bold Text:** Best 50% of habitat Standard Text: Remaining 50% of habitat		Powelltown correa, Upright panic	River Swamp Wallaby-grass, Naked Sun-orchid, Wetland Blown-grass	Powelltown correa, Upright panic	River Swamp Wallaby-grass, Naked Sun-orchid, Wetland Blown-grass	Matted Flax-lily	Naked Sun-orchid, Southern Bristle-sedge, Wetland Blown-grass	Powelltown correa, Upright panic	Matted Flax-lily	Matted Flax-lily	Powelltown correa, Upright panic	Powelltown correa, Upright panic	Naked Sun-orchid, Southern Bristle-sedge, Wetland Blown-grass	Powelltown correa, Upright panic	Powelltown correa, Upright panic	**Lachnagrostis filiformis Var 2**, Powelltown correa, Upright panic	**Lachnagrostis filiformis Var 2.** River Swamp Wallaby-grass,
	Status (highest status of likley spp.)		Rare	Vulnerable	Rare	Vulnerable	Endangered	Vulnerable	Rare	Endangered	Endangered	Rare	Rare	Vulnerable	Rare	Rare	Rare	Rare
	Presence of threatened/rare fauna species. **Bold Text:** Best 50% of habitat Standard Text: Remaining 50% of habitat		Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	**Swamp Skink, Glossy Grass Skink,** Australasian Shoveler, Cape Barren Goose, Hardhead, Latham's Snipe, Royal Spoonbill, Baillon's Crake, Growling Grass Frog, Blue-billed Duck, Little Bittern, Pied Comorant, White-bellied Sea-Eagle, Dwarf Galaxias, Southern Toadlet, Southern Brown Bandicoot	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin, Southern Toadlet, Swamp Skink, Glossy Grass Skink	**Swamp Skink, Glossy Grass Skink, Australasian Shoveler, Cape Barren Goose, Hardhead, Latham's Snipe, Royal Spoonbill,** Baillon's Crake, Blue-billed Duck, Little Bittern, Pied Comorant, White-bellied Sea-Eagle, Dwarf Galaxias, Southern Toadlet, Southern Brown Bandicoot, Growling Grass Frog	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin, Black Falcon	Swamp Skink, Glossy Grass Skink, Southern Toadlet, Southern Brown Bandicoot	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin, Black Falcon	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin, Black Falcon	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	S**wamp Skink, Glossy Grass Skink, Southern Toadlet**, Southern Brown Bandicoot	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,
	Status (highest status of likley spp.)		Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered

Habitat Zone		17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
PFI		604539	608658	633461	R621919	R621919	R621919	R621921	R621925	R621939	R622246	R622246	204471619	204471619	209772433	209772433	209772433
EVC Name (Initials)		SW	HW	SW	GW	GW	GW	DHW	DHW	HW	SS	SS	GW	GW	SS	HW	HW
EVC Number		GipP0136	GipP0048	GipP0136	GipP0175	GipP0175	GipP0175	GipP0793	GipP0793	GipP0048	GipP0053	GipP0053	GipP0175	GipP0175	GipP0053	GipP0048	GipP0048
Total Area of Habitat Zone (ha)	**(#.#)**	0.15	0.70	0.11	0.13	0.04	0.03	0.13	0.14	0.05	0.02	0.02	0.51	0.15	0.25	0.15	0.02
Habitat Score as above = #/100	**0.##**	0.38	0.12	0.42	0.27	0.22	0.15	0.45	0.45	0.33	0.21	0.20	0.17	0.17	0.17	0.22	0.15
Habitat Hectares	**(#.#)**	**0.057**	**0.084**	**0.046**	**0.035**	**0.009**	**0.005**	**0.059**	**0.063**	**0.017**	**0.004**	**0.004**	**0.087**	**0.026**	**0.043**	**0.033**	**0.003**
EVC Conservation Status		V	LC	V	E	E	E	V	V	LC	E	E	E	E	E	LC	LC
Conservation Significance	**Conservation Status x Habitat Score**	High	Low	High	High	High	High	High	High	Low	High	High	High	High	High	Low	Low
	Threatened Species Rating	Very High	Very High	Very High	High	High	High	High	High	High	High	High	Very High	Very High	Very High	Very High	Very High
	Other Site Attribute Rating								High					Medium			
	Overall Conservation Significance (highest rating)	**Very High**	**Very High**	**Very High**	**High**	**High**	**High**	**High**	**High**	**High**	**High**	**High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**
Threatened Species Rating	**Presence of threatened/rare flora species.** **Bold Text:** Best 50% of habitat Standard Text: Remaining 50% of habitat	Matted Flax-lily	Naked Sun-orchid, Southern Bristle-sedge, Wetland Blown-grass	Naked Sun-orchid, Southern Bristle-sedge, Wetland Blown-grass		Powelltown correa, Upright panic				Matted Flax-lily	Powelltown correa, Upright panic	Powelltown correa, Upright panic	Powelltown correa, Upright panic	Naked Sun-orchid, Southern Bristle-sedge, Wetland Blown-grass	Powelltown correa, Upright panic	Powelltown correa, Upright panic	Powelltown correa, Upright panic
	Status (highest status of likley spp.)	Endangered	Vulnerable	Vulnerable		Rare				Endangered	Rare	Rare	Rare	Vulnerable	Rare	Rare	Rare
	Presence of threatened/rare fauna species. **Bold Text:** Best 50% of habitat Standard Text: Remaining 50% of habitat	**Southern Brown Bandicoot**, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin, Black Falcon	Swamp Skink, Glossy Grass Skink, Southern Toadlet, Southern Brown Bandicoot	**Swamp Skink, Glossy Grass Skink, Southern Toadlet**, Southern Brown Bandicoot	Swift Parrot	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	**Swamp Skink, Glossy Grass Skink, Australasian Shoveler, Cape Barren Goose, Hardhead, Latham's Snipe, Royal Spoonbill,** Baillon's Crake, Blue-billed Duck, Little Bittern, Pied Comorant, White-bellied Sea-Eagle, Dwarf Galaxias, Southern Toadlet, Growling Grass Frog	Swift Parrot	Swift Parrot	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin, Black Falcon	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	**Swamp Skink, Glossy Grass Skink, Southern Toadlet**, Southern Brown Bandicoot	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin, Southern Toadlet, Swamp Skink, Glossy Grass Skink
	Status (highest status of likley spp.)	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered

Habitat Zone		33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
PFI		209772433	209772433	209772433	209772433	209772433	209772433	209772433	209772433	209772433	209772433	209772433	209772433	209772433	R151949687	R151949687	R151949687
EVC Name (Initials)		HW	HW	HW	HW	HW	HW	HW	HW	HW	HW	HW	GW	GW	GW	GW	GW
EVC Number		GipP0048	GipP0048	GipP0048	GipP0048	GipP0048	GipP0048	GipP0048	GipP0048	GipP0048	GipP0048	GipP0048	GipP0175	GipP0175	GipP0175	GipP0175	GipP0175
Total Area of Habitat Zone (ha)	**(#.#)**	0.25	0.01	0.03	0.47	0.10	0.04	0.12	0.02	0.05	0.50	0.08	0.91	0.23	0.02	0.01	0.02
Habitat Score as above = #/100	**0.##**	0.15	0.15	0.15	0.19	0.15	0.15	0.15	0.15	0.31	0.34	0.15	0.14	0.17	0.17	0.22	0.22
Habitat Hectares	**(#.#)**	**0.038**	**0.002**	**0.005**	**0.089**	**0.015**	**0.006**	**0.018**	**0.003**	**0.016**	**0.170**	**0.012**	**0.127**	**0.039**	**0.003**	**0.002**	**0.004**
EVC Conservation Status		LC	LC	LC	LC	LC	LC	LC	LC	LC	LC	LC	E	E	E	E	E
Conservation Significance	**Conservation Status x Habitat Score**	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	High	High	High	High	High
	Threatened Species Rating	Very High	Very High	Very High	High	High	High	High	High	High	High	High	High	High	High	High	High
	Other Site Attribute Rating																
	Overall Conservation Significance (highest rating)	**Very High**	**Very High**	**Very High**	**High**	**High**	**High**	**High**	**High**	**High**	**High**	**High**	**High**	**High**	**High**	**High**	**High**
Threatened Species Rating	**Presence of threatened/rare flora species.** **Bold Text:** Best 50% of habitat Standard Text: Remaining 50% of habitat	Powelltown correa, Upright panic	Powelltown correa, Upright panic	Powelltown correa, Upright panic	Matted Flax-lily	Powelltown correa, Upright panic	Powelltown correa, Upright panic	Powelltown correa, Upright panic	Naked Sun-orchid, Southern Bristle-sedge, Wetland Blown-grass	Naked Sun-orchid, Southern Bristle-sedge, Wetland Blown-grass	Matted Flax-lily	Matted Flax-lily	River Swamp Wallaby-grass, Naked Sun-orchid, Wetland Blown-grass, Southern Bristle-sedge	Powelltown correa, Upright panic	Powelltown correa, Upright panic	Powelltown correa, Upright panic	Powelltown correa, Upright panic
	Status (highest status of likley spp.)	Rare	Rare	Rare	Endangered	Rare	Rare	Rare	Vulnerable	Vulnerable	Endangered	Endangered	Vulnerable	Rare	Rare	Rare	Rare
	Presence of threatened/rare fauna species. **Bold Text:** Best 50% of habitat Standard Text: Remaining 50% of habitat	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin, Southern Toadlet, Swamp Skink, Glossy Grass Skink	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin, Black Falcon	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	Swamp Skink, Glossy Grass Skink, Southern Toadlet, Southern Brown Bandicoot	Swamp Skink, Glossy Grass Skink, Southern Toadlet, Southern Brown Bandicoot	**Southern Brown Bandicoot**, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin, Black Falcon	**Southern Brown Bandicoot**, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin, Black Falcon	Australasian Shoveler, Cape Barren Goose, Hardhead, Latham's Snipe, Royal Spoonbill, Baillon's Crake, Blue-billed Duck, Little Bittern, , Pied Comorant, White-bellied Sea-Eagle, Dwarf Galaxias, Southern Toadlet, Southern Brown Bandicoot, Swamp Skink, Glossy Grass Skink, Musk Duck	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,
	Status (highest status of likley spp.)	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered

		49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
Habitat Zone		49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
PFI		R621891	R621891	R621891	R621892	R621892	R621892	R621892	R621919	46245	46245	46245	50232515	50232515	50232515	50232515	50232515
EVC Name (Initials)		SS	HW	SS	SS	SS	SS	SS	GW	HW	SS	HW	HW	HW	HW	HW	HW
EVC Number		GipP0053	GipP0048	GipP0053	GipP0053	GipP0053	GipP0053	GipP0053	GipP0175	GipP0048	GipP0053	GipP0048	GipP0048	GipP0048	GipP0048	GipP0048	GipP0048
Total Area of Habitat Zone (ha)	**(#.#)**	0.45	0.08	0.10	0.03	0.03	0.03	0.01	0.03	0.12	0.30	0.18	0.21	0.11	0.33	0.05	0.09
Habitat Score as above = #/100	**0.##**	0.20	0.21	0.19	0.16	0.16	0.16	0.16	0.22	0.21	0.19	0.14	0.40	0.48	0.55	0.54	0.41
Habitat Hectares	**(#.#)**	**0.090**	**0.017**	**0.019**	**0.005**	**0.005**	**0.005**	**0.002**	**0.007**	**0.025**	**0.057**	**0.025**	**0.084**	**0.053**	**0.182**	**0.027**	**0.037**
EVC Conservation Status		E	LC	E	E	E	E	E	E	LC	E	LC	LC	LC	LC	LC	LC
Conservation Significance	**Conservation Status x Habitat Score**	High	Low	High	High	High	High	High	High	Low	High	Low	Low	Low	Low	Low	Low
	Threatened Species Rating	Very High	Very High	Very High	High	High	High	High	High	High	High	Very High	High	High	High	High	High
	Other Site Attribute Rating				Medium	Medium	Medium	Medium				Medium		Medium	Medium	Medium	Medium
	Overall Conservation Significance (highest rating)	**Very High**	**Very High**	**Very High**	**High**	**High**	**High**	**High**	**High**	**High**	**High**	**Very High**	**High**	**High**	**High**	**High**	**High**
Threatened Species Rating	**Presence of threatened/rare flora species.** **Bold Text:** Best 50% of habitat Standard Text: Remaining 50% of habitat	Naked Sun-orchid, Southern Bristle-sedge, Wetland Blown-grass	Powelltown correa, Upright panic	Powelltown correa, Upright panic	Powelltown correa, Upright panic	Matted Flax-lily	Matted Flax-lily	Matted Flax-lily	Naked Sun-orchid, Southern Bristle-sedge, Wetland Blown-grass	Naked Sun-orchid, Southern Bristle-sedge, Wetland Blown-grass	Matted Flax-lily	Powelltown correa, Upright panic	Powelltown correa, Upright panic	Powelltown correa, Upright panic	Powelltown correa, Upright panic	Powelltown correa, Upright panic	Powelltown correa, Upright panic
	Status (highest status of likley spp.)	Vulnerable	Rare	Rare	Rare	Endangered	Endangered	Endangered	Vulnerable	Vulnerable	Endangered	Rare	Rare	Rare	Rare	Rare	Rare
	Presence of threatened/rare fauna species. **Bold Text:** Best 50% of habitat Standard Text: Remaining 50% of habitat	**Swamp Skink, Glossy Grass Skink, Southern Toadlet**, Southern Brown Bandicoot	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin, Black Falcon	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin, Black Falcon	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin, Black Falcon	Swamp Skink, Glossy Grass Skink, Southern Toadlet, Southern Brown Bandicoot	**Swamp Skink, Glossy Grass Skink, Southern Toadlet**, Southern Brown Bandicoot	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin, Black Falcon	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,
	Status (highest status of likley spp.)	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered

Habitat Zone		65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
PFI		50232515	50232515	50232515	50232515	50232515	50232515	50232515	50232515	50232515	50232515	601760	601760	601760	601760	601760	601760
EVC Name (Initials)		HW	SS	GW	GW	SS	GW	SS	WF	WF	HW	HW	SS	HW	HW	HW	HW
EVC Number		GipP0048	GipP0053	GipP0175	GipP0175	GipP0053	GipP0175	GipP0053	GipP0074	GipP0074	GipP0048	GipP0048	GipP0053	GipP0048	GipP0048	GipP0048	GipP0048
Total Area of Habitat Zone (ha)	**(#.#)**	0.04	0.10	0.10	0.03	0.07	0.12	0.12	0.09	0.07	0.08	0.02	0.41	0.07	0.11	0.02	0.18
Habitat Score as above = #/100	**0.##**	0.44	0.32	0.35	0.36	0.25	0.26	0.35	0.29	0.37	0.33	0.27	0.36	0.29	0.29	0.20	0.33
Habitat Hectares	**(#.#)**	**0.018**	**0.032**	**0.035**	**0.011**	**0.018**	**0.031**	**0.042**	**0.026**	**0.026**	**0.026**	**0.005**	**0.148**	**0.020**	**0.032**	**0.004**	**0.059**
EVC Conservation Status		LC	E	E	E	E	E	E	E	E	LC	LC	E	LC	LC	LC	LC
Conservation Significance	**Conservation Status x Habitat Score**	Low	High	High	High	High	High	High	High	High	Low	Low	High	Low	Low	Low	Low
	Threatened Species Rating	High	Very High	High	High	Very High	High	Very High	Very High	Very High	High	Very High	Very High	Very High	Very High	Very High	Very High
	Other Site Attribute Rating	Medium	Medium	Medium	Medium	Medium	Medium			Medium	High	Medium		Medium	Medium	Medium	Medium
	Overall Conservation Significance (highest rating)	**High**	**Very High**	**High**	**High**	**Very High**	**High**	**Very High**	**Very High**	**Very High**	**High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**
Threatened Species Rating	**Presence of threatened/rare flora species.** **Bold Text:** Best 50% of habitat Standard Text: Remaining 50% of habitat	Powelltown correa, Upright panic	Powelltown correa, Upright panic	Naked Sun-orchid, Southern Bristle-sedge, Wetland Blown-grass	Matted Flax-lily	Powelltown correa, Upright panic	River Swamp Wallaby-grass, Naked Sun-orchid, Wetland Blown-grass	Naked Sun-orchid, Southern Bristle-sedge, Wetland Blown-grass	River Swamp Wallaby-grass,Matted Flax-lily	River Swamp Wallaby-grass,Matted Flax-lily	Powelltown correa, Upright panic	Naked Sun-orchid, Southern Bristle-sedge, Wetland Blown-grass	Powelltown correa, Upright panic	Matted Flax-lily	Matted Flax-lily	Naked Sun-orchid, Southern Bristle-sedge, Wetland Blown-grass	Matted Flax-lily
	Status (highest status of likley spp.)	Rare	Rare	Vulnerable	Endangered	Rare	Vulnerable	Vulnerable	Endangered	Endangered	Rare	Vulnerable	Rare	Endangered	Endangered	Vulnerable	Endangered
	Presence of threatened/rare fauna species. **Bold Text:** Best 50% of habitat Standard Text: Remaining 50% of habitat	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	Swamp Skink, Glossy Grass Skink, Southern Toadlet, Southern Brown Bandicoot	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin, Black Falcon	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	**Swamp Skink, Glossy Grass Skink, Australasian Shoveler, Cape Barren Goose, Hardhead, Latham's Snipe, Royal Spoonbill,** Baillon's Crake, Blue-billed Duck, Little Bittern, Pied Comorant, White-bellied Sea-Eagle, Dwarf Galaxias, Southern Toadlet, Growling Grass Frog	**Swamp Skink, Glossy Grass Skink, Southern Toadlet**, Southern Brown Bandicoot	**Southern Brown Bandicoot**, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin, Black Falcon	**Southern Brown Bandicoot**, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin, Black Falcon	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	**Swamp Skink, Glossy Grass Skink, Southern Toadlet**, Southern Brown Bandicoot	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin, Black Falcon	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin, Black Falcon	**Swamp Skink, Glossy Grass Skink, Southern Toadlet**, Southern Brown Bandicoot	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin, Black Falcon
	Status (highest status of likley spp.)	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered

Habitat Zone	81	82	83	84	85	86	87	88
PFI	601760	601760	602010	602010	602010	602010	602010	602010
EVC Name (Initials)	SS	HW	SS	HW	SS	HW	HW	HW
EVC Number	GipP0053	GipP0048	GipP0053	GipP0048	GipP0053	GipP0048	GipP0048	GipP0048
Total Area of Habitat Zone (ha) (#.#)	0.14	0.12	0.54	1.89	0.35	0.15	1.76	0.33
Habitat Score as above = #/100 0.##	0.31	0.31	0.32	0.48	0.25	0.26	0.51	0.28
Habitat Hectares (#.#)	**0.043**	**0.037**	**0.173**	**0.907**	**0.088**	**0.039**	**0.898**	**0.092**
EVC Conservation Status	E	LC	E	LC	E	LC	LC	LC
Conservation Significance: Conservation Status x Habitat Score	High	Low	High	Low	High	Low	Low	Low
Conservation Significance: Threatened Species Rating	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High
Conservation Significance: Other Site Attribute Rating	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Conservation Significance: Overall Conservation Significance (highest rating)	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**
Threatened Species Rating: Presence of threatened/rare flora species. **Bold Text:** Best 50% of habitat Standard Text: Remaining 50% of habitat	Powelltown correa, Upright panic	Naked Sun-orchid, Southern Bristle-sedge, Wetland Blown-grass	Powelltown correa, Upright panic	Naked Sun-orchid, Wetland Blown-grass, Southern Bristle-sedge	Powelltown correa, Upright panic	Naked Sun-orchid, Wetland Blown-grass, Southern Bristle-sedge	Powelltown correa, Upright panic	Powelltown correa, Upright panic
Status (highest status of likley spp.)	Rare	Vulnerable	Rare	Vulnerable	Rare	Vulnerable	Rare	Rare
Threatened Species Rating: Presence of threatened/rare fauna species. **Bold Text:** Best 50% of habitat Standard Text: Remaining 50% of habitat	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	**Swamp Skink, Glossy Grass Skink, Southern Toadlet**, Southern Brown Bandicoot, rowling Grass Frog, Australasian Shoveler, Cape Barren Goose, Hardhead, Latham's Snipe, Royal Spoonbill	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	**Australasian Shoveler, Cape Barren Goose, Hardhead, Latham's Snipe, Royal Spoonbill,** Baillon's Crake, Blue-billed Duck, Little Bittern, Pied Comorant, White-bellied Sea-Eagle, Dwarf Galaxias, Southern Toadlet, Southern Brown Bandicoot, Swamp Skink, Glossy Grass Skink, Musk Duck, Growling Grass Frog	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	**Australasian Shoveler, Cape Barren Goose, Hardhead, Latham's Snipe, Royal Spoonbill,** Baillon's Crake, Blue-billed Duck, Little Bittern, Pied Comorant, White-bellied Sea-Eagle, Dwarf Galaxias, Southern Toadlet, Southern Brown Bandicoot, Swamp Skink, Glossy Grass Skink, Musk Duck, Growling Grass Frog	Southern Brown Bandicoot, Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,
Status (highest status of likley spp.)	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered

Habitat Zone	89	90	91	92	93	94	95	96
PFI	602010	602010	602010	602010	602010	R621881	R621881	R621881
EVC Name (Initials)	SS	HW	HW	HW	HW	SS	HW	HW
EVC Number	GipP0053	GipP0048	GipP0048	GipP0048	GipP0048	GipP0053	GipP0048	GipP0048
Total Area of Habitat Zone (ha) (#.#)	0.42	1.68	0.88	2.05	0.24	0.05	0.07	0.09
Habitat Score as above = #/100 0.##	0.25	0.51	0.47	0.44	0.36	0.24	0.42	0.51
Habitat Hectares (#.#)	**0.105**	**0.857**	**0.414**	**0.902**	**0.086**	**0.012**	**0.029**	**0.046**
EVC Conservation Status	E	LC	LC	LC	LC	E	LC	LC
Conservation Significance: Conservation Status x Habitat Score	High	Low	Low	Low	Low	High	Low	Low
Conservation Significance: Threatened Species Rating	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High
Conservation Significance: Other Site Attribute Rating	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Conservation Significance: Overall Conservation Significance (highest rating)	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**
Threatened Species Rating: Presence of threatened/rare flora species. **Bold Text:** Best 50% of habitat Standard Text: Remaining 50% of habitat	Naked Sun-orchid, Southern Bristle-sedge, Wetland Blown-grass	Naked Sun-orchid, Southern Bristle-sedge, Wetland Blown-grass	Powelltown correa, Upright panic	Powelltown correa, Upright panic	Powelltown correa, Upright panic	Powelltown correa, Upright panic	Powelltown correa, Upright panic	Naked Sun-orchid, Southern Bristle-sedge, Wetland Blown-grass
Status (highest status of likley spp.)	Vulnerable	Vulnerable	Rare	Rare	Rare	Rare	Rare	Vulnerable
Threatened Species Rating: Presence of threatened/rare fauna species. **Bold Text:** Best 50% of habitat Standard Text: Remaining 50% of habitat	S**wamp Skink, Glossy Grass Skink, Southern Toadlet**, Southern Brown Bandicoot	S**wamp Skink, Glossy Grass Skink, Southern Toadlet**, Southern Brown Bandicoot	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	**Swamp Skink, Glossy Grass Skink, Southern Toadlet**, Southern Brown Bandicoot
Status (highest status of likley spp.)	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered

Habitat Zone			97	98	99	100	101	102	103
PFI			R621881	R621881	R621881	R621881	R621881	R621881	R621881
EVC Name (Initials)			SS	HW	HW	GW	SS	GW	GW
EVC Number			GipP0053	GipP0048	GipP0048	GipP0175	GipP0053	GipP0175	GipP0175
Total Area of Habitat Zone (ha)		**(#.#)**	0.03	0.08	0.16	0.07	0.06	0.04	0.09
Habitat Score as above = #/100		**0.##**	0.19	0.29	0.30	0.33	0.21	0.25	0.16
Habitat Hectares		**(#.#)**	**0.006**	**0.023**	**0.048**	**0.023**	**0.013**	**0.010**	**0.014**
EVC Conservation Status			E	LC	V	E	E	E	E
Conservation Significance	**Conservation Status x Habitat Score**		High	Low	High	High	High	High	High
	Threatened Species Rating		Very High	Very High	Very High	Very High	Very High	Very High	Very High
	Other Site Attribute Rating		Medium	Medium	Medium	Medium	Medium	Medium	Medium
	Overall Conservation Significance (highest rating)		**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**	**Very High**
Threatened Species Rating	**Presence of threatened/rare flora species.** **Bold Text:** Best 50% of habitat Standard Text: Remaining 50% of habitat		Powelltown correa, Upright panic	Powelltown correa, Upright panic	Naked Sun-orchid, Southern Bristle-sedge, Wetland Blown-grass	Naked Sun-orchid, Southern Bristle-sedge, Wetland Blown-grass	Naked Sun-orchid, Southern Bristle-sedge, Wetland Blown-grass	Naked Sun-orchid, Southern Bristle-sedge, Wetland Blown-grass	Naked Sun-orchid, Southern Bristle-sedge, Wetland Blown-grass
	Status (highest status of likley spp.)		Rare	Rare	Vulnerable	Vulnerable	Vulnerable	Vulnerable	Vulnerable
	Presence of threatened/rare fauna species. **Bold Text:** Best 50% of habitat Standard Text: Remaining 50% of habitat		**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	**Southern Brown Bandicoot,** Brown Quail, Swift Parrot, Spotted Harrier, Chestnut-rumped Heathwren, Grey Goshawk, Hooded Robin,	S**wamp Skink, Glossy Grass Skink, Southern Toadlet**, Southern Brown Bandicoot	Swamp Skink, Glossy Grass Skink, Southern Toadlet, Southern Brown Bandicoot	S**wamp Skink, Glossy Grass Skink, Southern Toadlet**, Southern Brown Bandicoot	Swamp Skink, Glossy Grass Skink, Southern Toadlet, Southern Brown Bandicoot	Swamp Skink, Glossy Grass Skink, Southern Toadlet, Southern Brown Bandicoot
	Status (highest status of likley spp.)		Endangered	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered

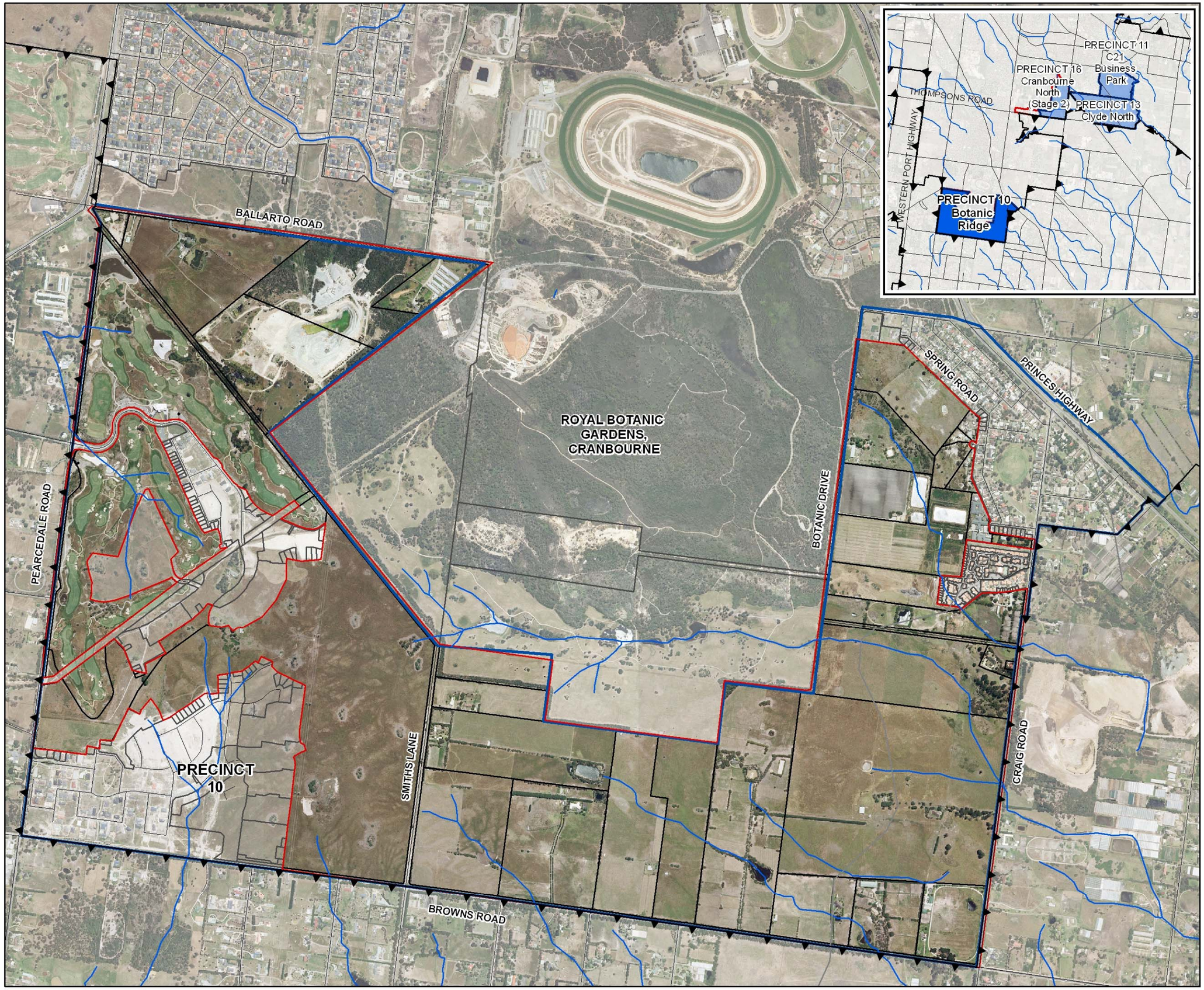
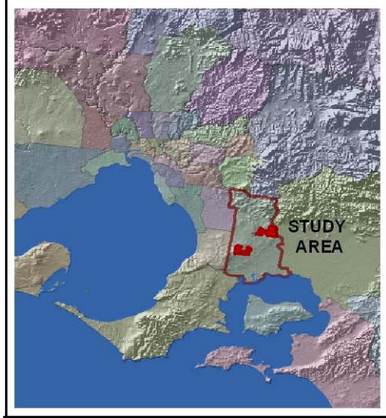


FIGURE 1
Context Map of PSP Areas
Biodiversity Assessment Report
Flora Assessment and Mapping
Botanic Ridge
Growth Areas Authority

LEGEND

- Roads
- Watercourses
- Urban Growth Boundary
- Property Boundary
- Study Area Boundary
- Precinct Boundary



MAP AND SURVEY DETAILS
Mapping by: Staci Timms, May '09
Generated from: GIS layers and Aerial Photography, supplied by DSE, GAA, ESRI and Geosciences Australia.

DATUM: GDA 94 MGA Zone 55

N

NOTES:
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VERSION	01	DATE	29/06/09

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FIGURE 2A
Native Vegetation Within Precinct 10 Study Area
Biodiversity Assessment Report
Flora Assessment and Mapping
Botanic Ridge

LEGEND

- Roads
- Property Boundary
- Watercourses
- Precinct Boundary
- Study Area Boundary
- Urban Growth Boundary

Scattered Tree Locations

- Small Tree
- Medium Old Tree
- Large Old Tree
- Very Large Old Tree

Habitat Zone EVCs

- EVC 48: Heathy Woodland
- EVC 53: Swamp Scrub
- EVC 74: Wetland Formation
- EVC 175: Grassy Woodland

Other Vegetation Categories

- Degraded Treeless Vegetation as defined for NVMP surveys

MAP AND SURVEY DETAILS
Surveyed by: Joy MacDonald, Mark Shepherd, Peter Gannon, Greg James and David Fairbridge, Oct '08-May'09
Mapping by: Staci Timms and Jo Henry, May '09
Generated from: data collected in the field using Trimble and IPAQ PDAs and aerial photograph interpretation. GIS layers and Aerial Photography supplied by DSE and GAA.

DATUM: GDA 94 MGA Zone 55

N

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Metres

1:5,000

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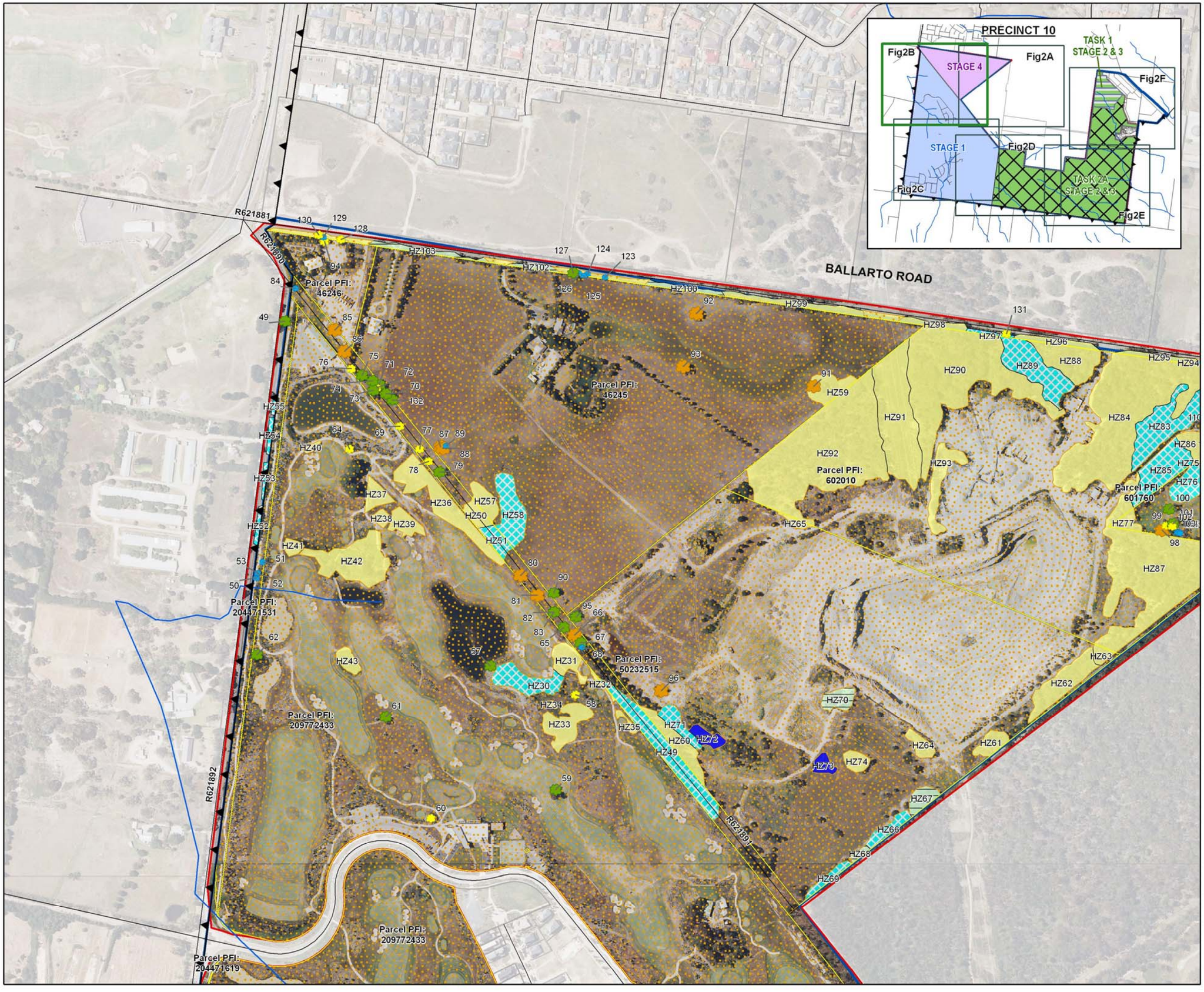

FIGURE 2B
Native Vegetation Within Precinct 10 VARIATION Study Area
Biodiversity Assessment Report
Flora Assessment and Mapping
Botanic Ridge

LEGEND

- Roads
- Property Boundary
- Watercourses
- Precinct Boundary
- Study Area Boundary
- Urban Growth Boundary

Scattered Tree Locations

- Small Tree
- Medium Old Tree
- Large Old Tree
- Very Large Old Tree

Habitat Zone EVCs

- EVC 48: Heathy Woodland
- EVC 53: Swamp Scrub
- EVC 74: Wetland Formation
- EVC 175: Grassy Woodland

Other Vegetation Categories

- Degraded Treeless Vegetation as defined for NVMP surveys

MAP AND SURVEY DETAILS

Surveyed by: Joy MacDonald, Mark Shepherd, Peter Gannon, Greg James and David Fairbridge, Oct '08-May'09
Mapping by: Staci Timms and Jo Henry, May '09
Generated from: data collected in the field using Trimble and IPAQ PDAs and aerial photograph interpretation. GIS layers and Aerial Photography supplied by DSE and GAA.

DATUM: GDA 94 MGA Zone 55

N

0 50 100 150 200 250
Metres

1:5,000

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VERSION	01	DATE	15/06/10

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enquiries@practicalecology.com.au

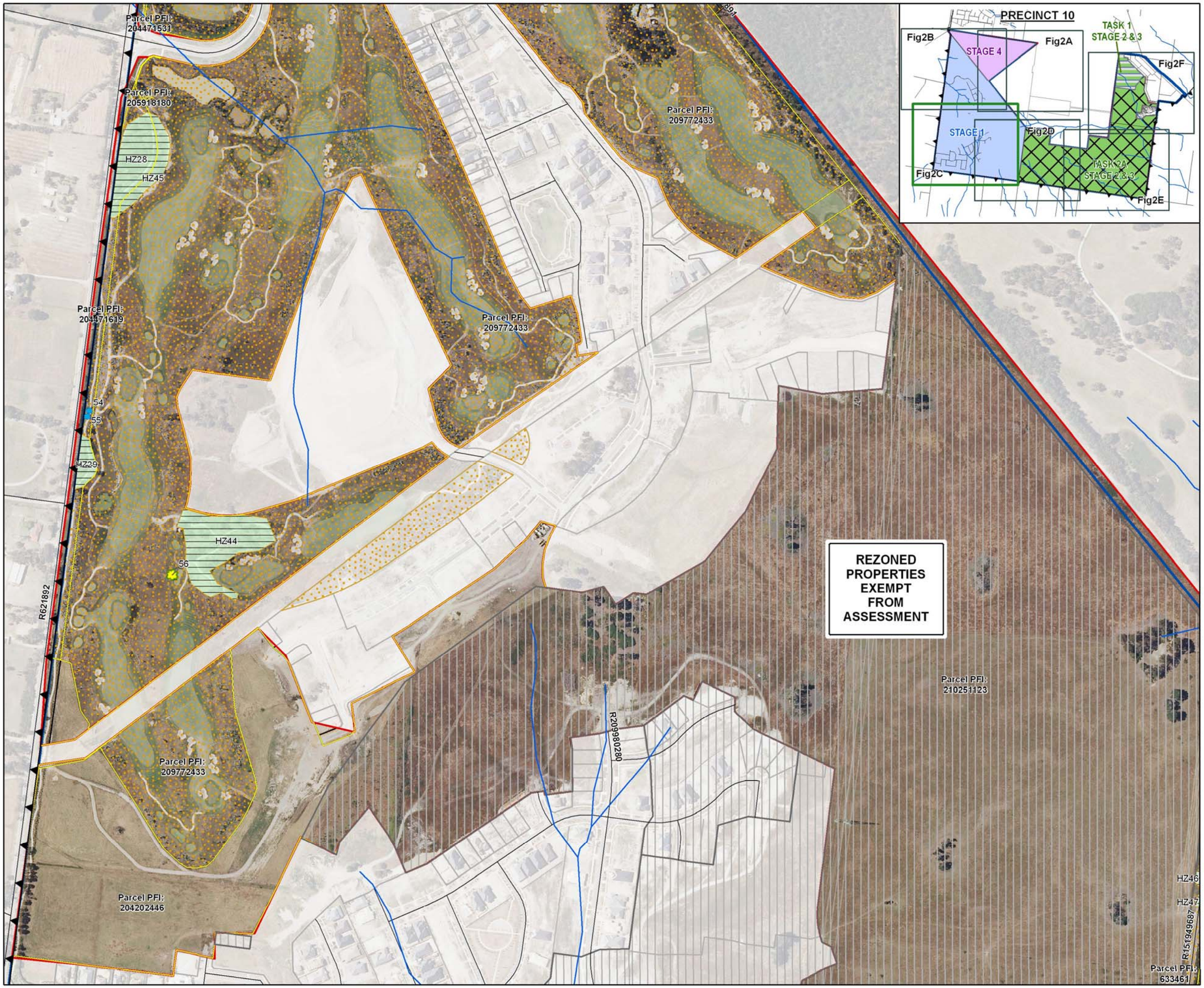

FIGURE 2C
Native Vegetation Within Precinct 10 Study Area
Biodiversity Assessment Report
Flora Assessment and Mapping
Botanic Ridge

LEGEND

- Roads
- Property Boundary
- Watercourses
- Precinct Boundary
- Study Area Boundary
- Urban Growth Boundary

Scattered Tree Locations

- Small Tree
- Medium Old Tree
- Large Old Tree
- Very Large Old Tree

Habitat Zone EVCs

- EVC 175: Grassy Woodland

Other Vegetation Categories

- Degraded Treeless Vegetation as defined for NVMP surveys

Property Assessment Status

- Property Not Assessed
- Access to Property Denied

MAP AND SURVEY DETAILS
Surveyed by: Joy MacDonald, Mark Shepherd, Peter Gannon, Greg James and David Fairbridge, Oct '08-May'09
Mapping by: Staci Timms and Jo Henry, May 2009. Modifications by Staci Timms, June 2010
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DATUM: GDA 94 MGA Zone 55

N

0 50 100 150 200 250
Metres

1:5,000

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VERSION	02	DATE	15/06/10

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FIGURE 2D
Native Vegetation Within Precinct 10 Study Area
VARIATION
Biodiversity Assessment Report
Flora Assessment and Mapping
Botanic Ridge

REZONED PROPERTIES EXEMPT FROM ASSESSMENT

PRECINCT 10
Fig2B
Fig2A
STAGE 4
TASK 1 STAGE 2 & 3
Fig2F
STAGE 1
Fig2D
Fig2C
TASK 2A STAGE 2 & 3
Fig2E

Parcel PFI: 52521354
Parcel PFI: 633462
Parcel PFI: 633461
Parcel PFI: 210251123
Parcel PFI: 2099
Parcel PFI: 2098
Parcel PFI: 604542
Parcel PFI: 604539

R151949687
HZ46
HZ47
HZ19
HZ17
HZ48
HZ56
HZ20
HZ21
R621919
R622262
R622247

LEGEND

- Roads
- Property Boundary
- Watercourses
- Precinct Boundary
- Study Area Boundary
- Urban Growth Boundary

DSE Modelled Native Vegetation Assessments

- Highly Likely Native Vegetation - Structurally modified
- Highly Likely Native Vegetation - Woody
- Wetland Habitat
- No Native Vegetation

Scattered Tree Location

- Small Tree
- Medium Old Tree
- Large Old Tree
- Very Large Old Tree

Habitat Zone EVCs

- EVC 136: Sedge Wetland

Other Vegetation Categories

- Degraded Treeless Vegetation as defined for NVMP surveys
- Non Native Vegetation as defined for BMP surveys

Property Assessment Status

- Property Not Assessed
- Access to Property Denied

MAP AND SURVEY DETAILS
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N

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Metres
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FIGURE 2E
Native Vegetation Within Precinct 10 Study Area
Biodiversity Assessment Report
Flora Assessment and Mapping
Botanic Ridge

LEGEND

- Roads
- Property Boundary
- Watercourses
- Precinct Boundary
- Study Area Boundary
- Urban Growth Boundary

DSE Modelled Native Vegetation Assessments

- Highly Likely Native Vegetation - Woody

Scattered Tree Location

- Small Tree
- Medium Old Tree
- Large Old Tree
- Very Large Old Tree

Habitat Zone EVCs

- EVC 48: Heathy Woodland
- EVC 136: Sedge Wetland

Other Vegetation Categories

- Degraded Treeless Vegetation as defined for NVMP surveys
- Non Native Vegetation as defined for BMP surveys

Property Assessment Status

- Property Not Assessed
- Access to Property Denied

MAP AND SURVEY DETAILS
Surveyed by: Joy MacDonald, Mark Shepherd, Peter Gannon, Greg James and David Fairbridge, Oct '08-May'09
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0 50 100 150 200 250

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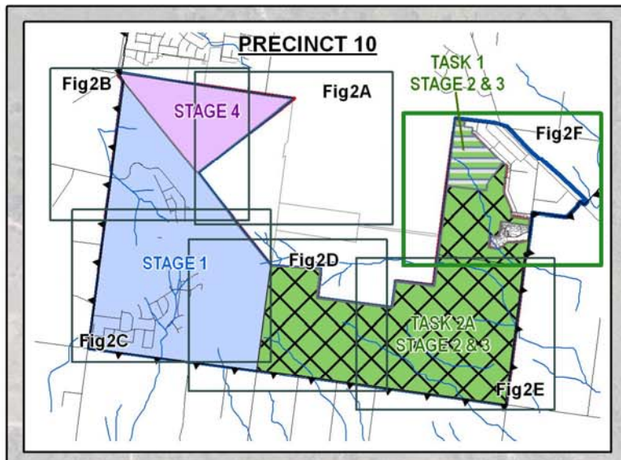

FIGURE 2F
Native Vegetation Within Precinct 10 Study Area

Biodiversity Assessment Report
Flora Assessment and Mapping
Botanic Ridge

LEGEND

- Roads
- Property Boundary
- Watercourses
- Precinct Boundary
- Study Area Boundary
- Urban Growth Boundary

DSE Modelled Native Vegetation Assessments

- Highly Likely Native Vegetation - Woody

Scattered Tree Location

- Small Tree
- Medium Old Tree
- Large Old Tree
- Very Large Old Tree

Habitat Zone EVCs

- EVC 48: Heathy Woodland
- EVC 74: Wetland Formation
- EVC 136: Sedge Wetland
- EVC 793: Damp Heathy Woodland

Other Vegetation Categories

- Degraded Treeless Vegetation as defined for BMP surveys
- Degraded Treeless Vegetation as defined for NVMP surveys
- Non Native Vegetation as defined for BMP surveys

Property Assessment Status

- Property Not Assessed
- Access to Property Denied

MAP AND SURVEY DETAILS

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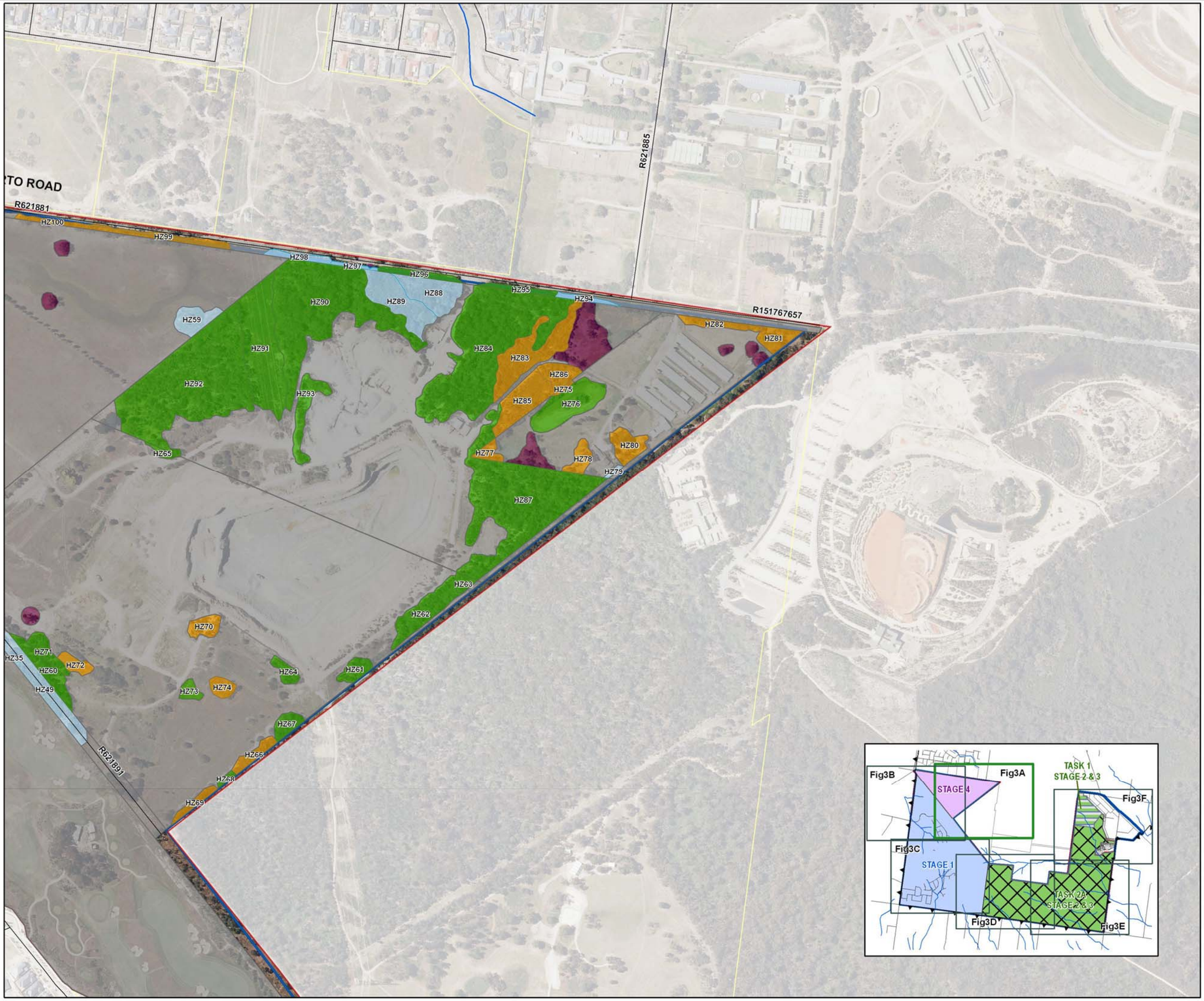

FIGURE 3A

Vegetation Quality of Habitat Zones Within Precinct 10 Study Area

VARIATION

Biodiversity Assessment Report
Flora Assessment and Mapping
Cranbourne North (Stage 2)

LEGEND

- Roads
- Watercourses
- Property Boundary
- Precinct Boundary
- Study Area Boundary
- Urban Growth Boundary
- Scattered Tree Zones

Property Assessment Status

- Property Not Assessed
- Access to Property Denied

Vegetation Quality of Habitat Zones

Site Condition Scores

- 0
- 1 - 19.99
- 20 - 29.99
- 30 - 100

MAP AND SURVEY DETAILS

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DATUM: GDA 94 MGA Zone 55

N

0 50 100 150 200 250

Metres

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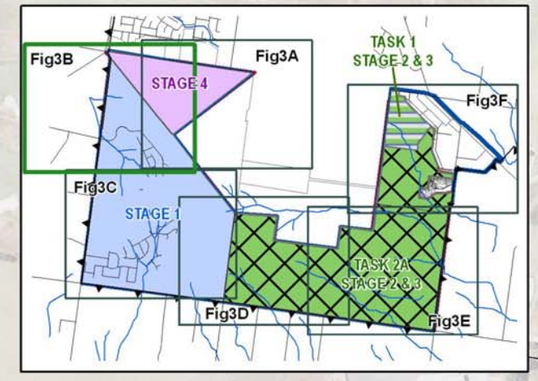

FIGURE 3B
Vegetation Quality of Habitat Zones Within Precinct 10 Study Area
VARIATION
Biodiversity Assessment Report
Flora Assessment and Mapping
Cranbourne North (Stage 2)

LEGEND

- Roads
- Watercourses
- Property Boundary
- Precinct Boundary
- Study Area Boundary
- Urban Growth Boundary
- Scattered Tree Zones

Property Assessment Status

- Property Not Assessed
- Access to Property Denied

Vegetation Quality of Habitat Zones
Site Condition Scores

- 0
- 1 - 19.99
- 20 - 29.99
- 30 - 100

MAP AND SURVEY DETAILS
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DATUM: GDA 94 MGA Zone 55

N

0 50 100 150 200 250
Metres

1:5,000

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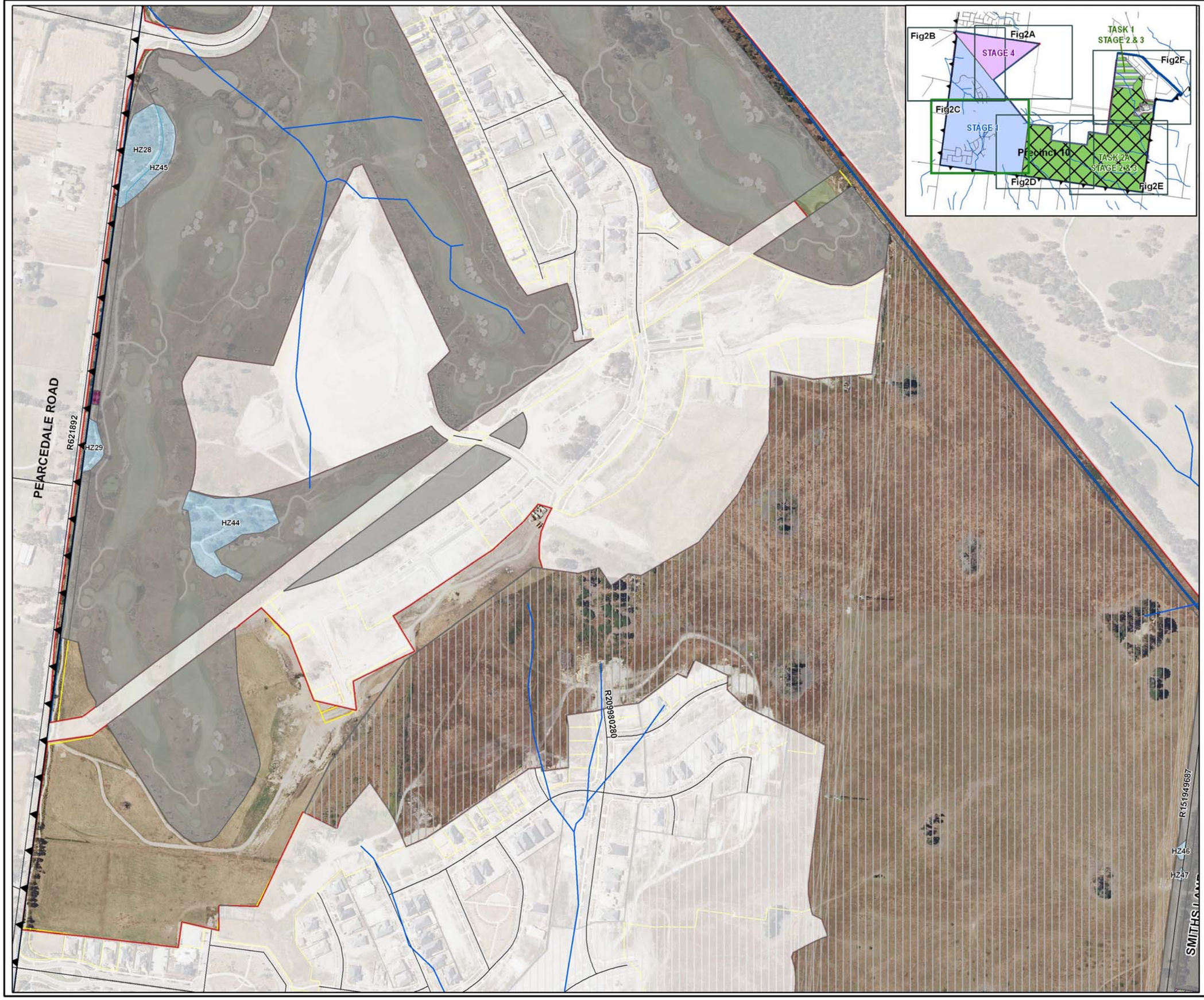

FIGURE 3C
Vegetation Quality of Habitat Zones Within Precinct 10 Study Area
VARIATION
Biodiversity Assessment Report
Flora Assessment and Mapping
Cranbourne North (Stage 2)

LEGEND

- Roads
- Watercourses
- Property Boundary
- Precinct Boundary
- Study Area Boundary
- Urban Growth Boundary
- Scattered Tree Zones

Property Assessment Status

- Property Not Assessed
- Access to Property Denied

Vegetation Quality of Habitat Zones
Site Condition Scores

- 0
- 1 - 19.99
- 20 - 29.99
- 30 - 100

MAP AND SURVEY DETAILS
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N

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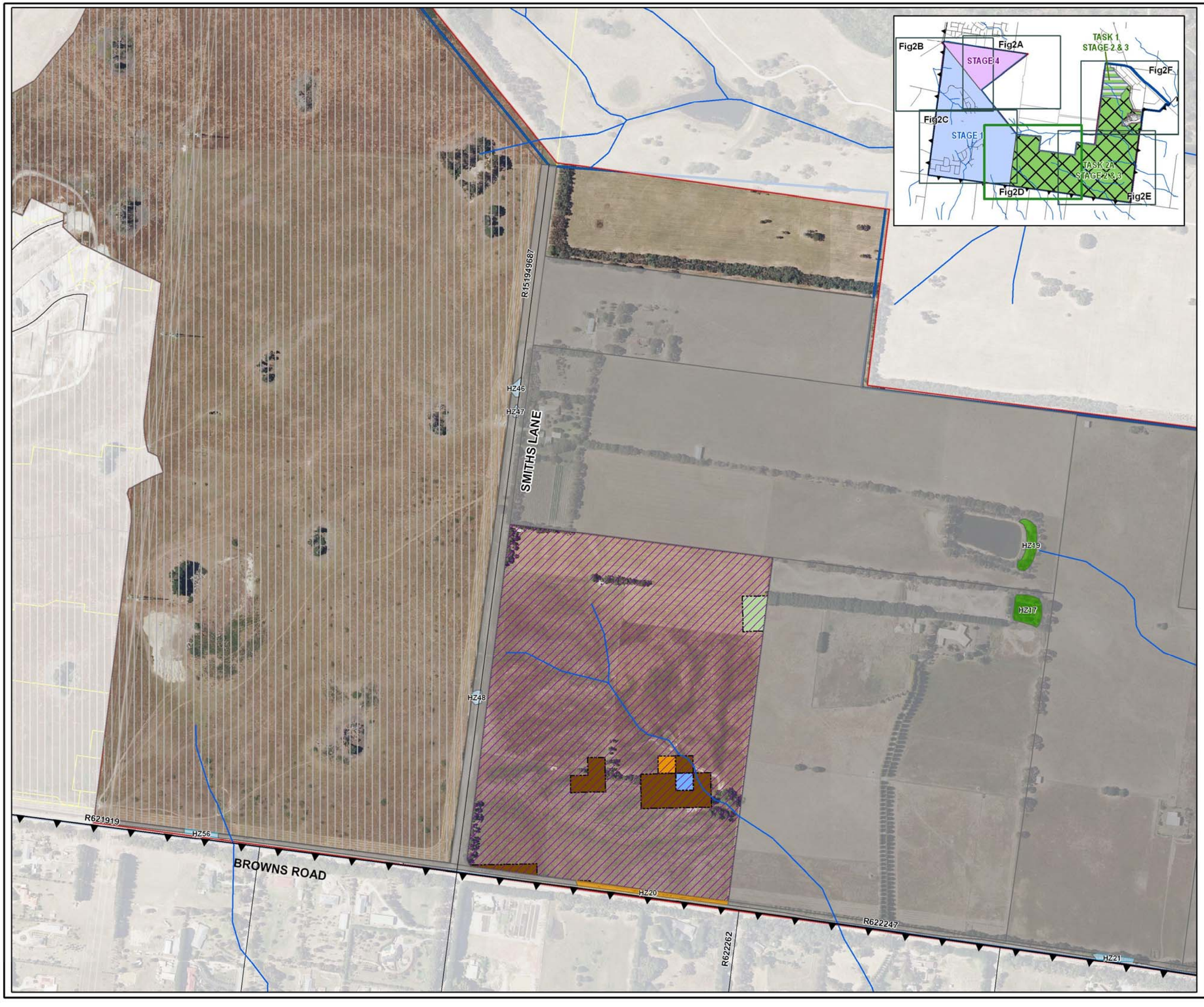

FIGURE 3D
Vegetation Quality of Habitat Zones Within Precinct 10 Study Area
VARIATION
Biodiversity Assessment Report
Flora Assessment and Mapping
Cranbourne North (Stage 2)

LEGEND

- Roads
- Watercourses
- Property Boundary
- Precinct Boundary
- Study Area Boundary
- Urban Growth Boundary
- Scattered Tree Zones

Property Assessment Status

- Property Not Assessed
- Access to Property Denied

DSE Modelled Native Vegetation Assessments

- Highly Likely Native Vegetation - Structurally modified
- Highly Likely Native Vegetation - Woody
- Wetland Habitat
- No Native Vegetation

Vegetation Quality of Habitat Zones
Site Condition Scores

- 0
- 1 - 19.99
- 20 - 29.99
- 30 - 100

MAP AND SURVEY DETAILS
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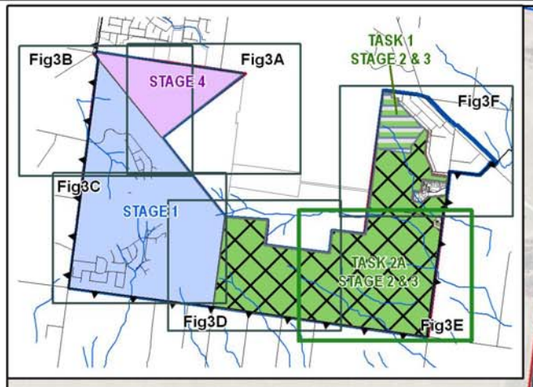

FIGURE 3E
Vegetation Quality of Habitat Zones Within Precinct 10 Study Area
VARIATION
Biodiversity Assessment Report
Flora Assessment and Mapping
Cranbourne North (Stage 2)

LEGEND

- Roads
- Watercourses
- Property Boundary
- Precinct Boundary
- Study Area Boundary
- Urban Growth Boundary
- Scattered Tree Zones

Property Assessment Status

- Property Not Assessed
- Access to Property Denied

DSE Modelled Native Vegetation Assessments

- Highly Likely Native Vegetation - Woody

Vegetation Quality of Habitat Zones
Site Condition Scores

- 0
- 1 - 19.99
- 20 - 29.99
- 30 - 100

MAP AND SURVEY DETAILS
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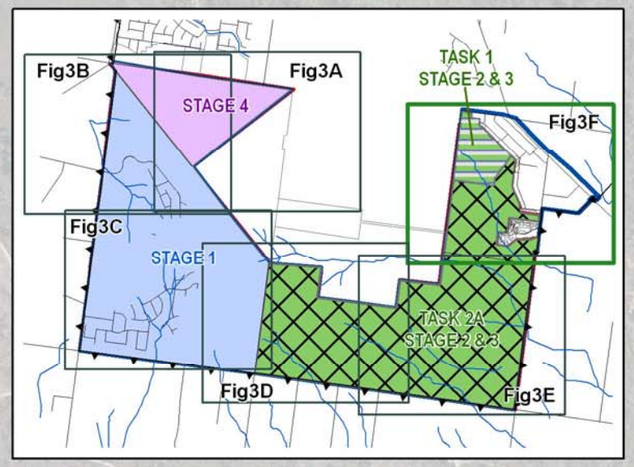

FIGURE 3F

Vegetation Quality of Habitat Zones Within Precinct 10 Study Area

VARIATION

Biodiversity Assessment Report
Flora Assessment and Mapping
Cranbourne North (Stage 2)

LEGEND

- Roads
- Watercourses
- Property Boundary
- Precinct Boundary
- Study Area Boundary
- Urban Growth Boundary
- Scattered Tree Zones

Property Assessment Status

- Property Not Assessed
- Access to Property Denied

DSE Modelled Native Vegetation Assessments

- Highly Likely Native Vegetation - Woody

Vegetation Quality of Habitat Zones
Site Condition Scores

- 0
- 1 - 19.99
- 20 - 29.99
- 30 - 100

MAP AND SURVEY DETAILS

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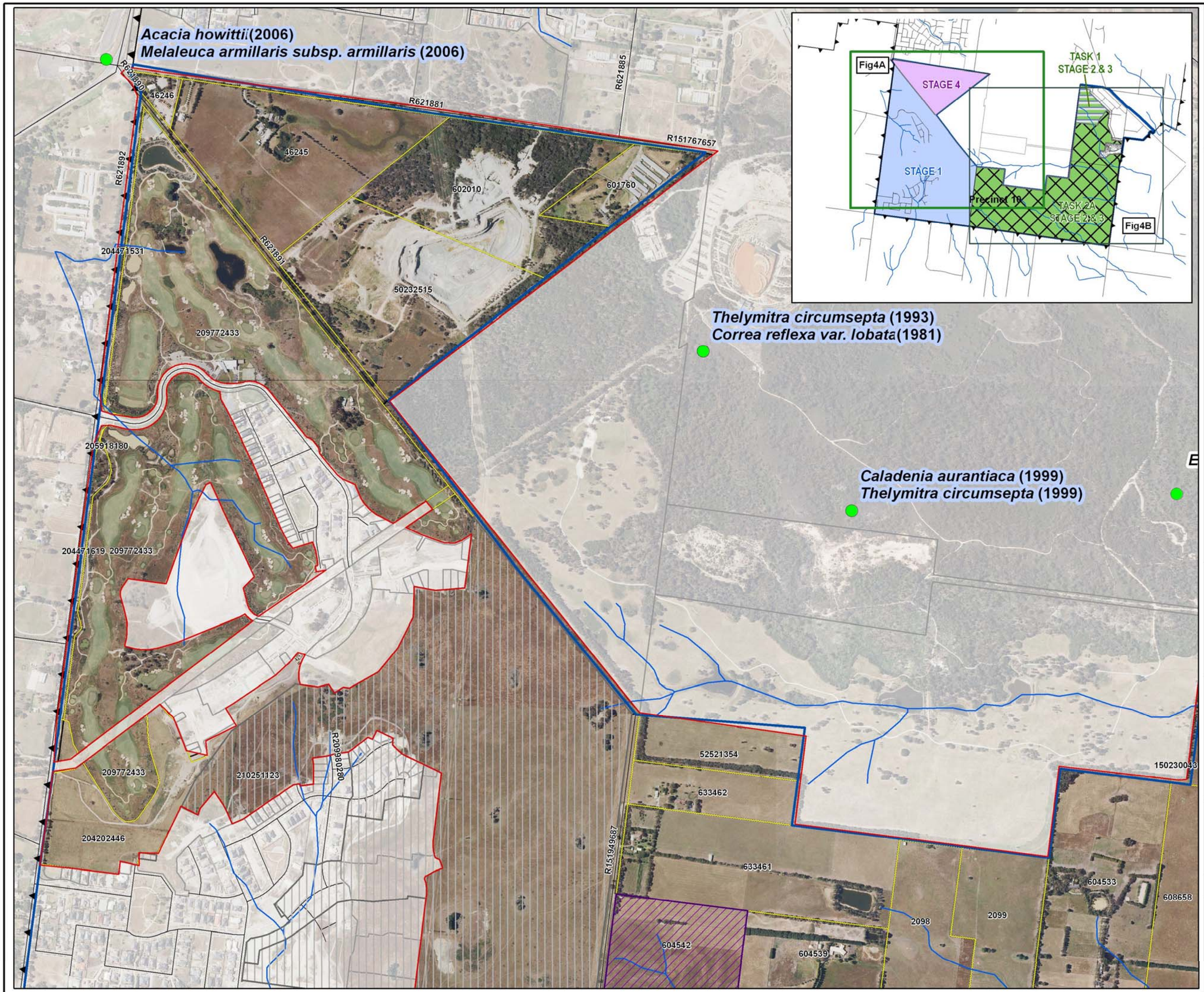

FIGURE 4A
Significant Species Distribution
Precinct 10 Study Area
Biodiversity Assessment Report
Flora Assessment and Mapping
Botanic Ridge
Growth Areas Authority

LEGEND

- Roads
- Watercourses
- Study Area Boundary
- Property Boundary
- Precinct Boundary
- Urban Growth Boundary

Property Assessment Status

- Property Not Assessed
- Access to Property Denied

633479 Parcel PFI

R539084 Road PFI

Thelymitra circumsepta (1998) State Significant Species and Date of Record

Dianella amoena (2004) Nationally Significant Species and Date of Record

Significant Flora Species

- Database Records of Species of National Significance
- Database Records of Species of State Significance
- Surveyed Records of Species of National Significance
- Surveyed Records of Species of State Significance

MAP AND SURVEY DETAILS
Surveyed by: Joy MacDonald, Mark Shepherd, Peter Gannon, Greg James and David Fairbridge, Oct '08-May'09
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DATUM: GDA 94 MGA Zone 55

N

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Metres

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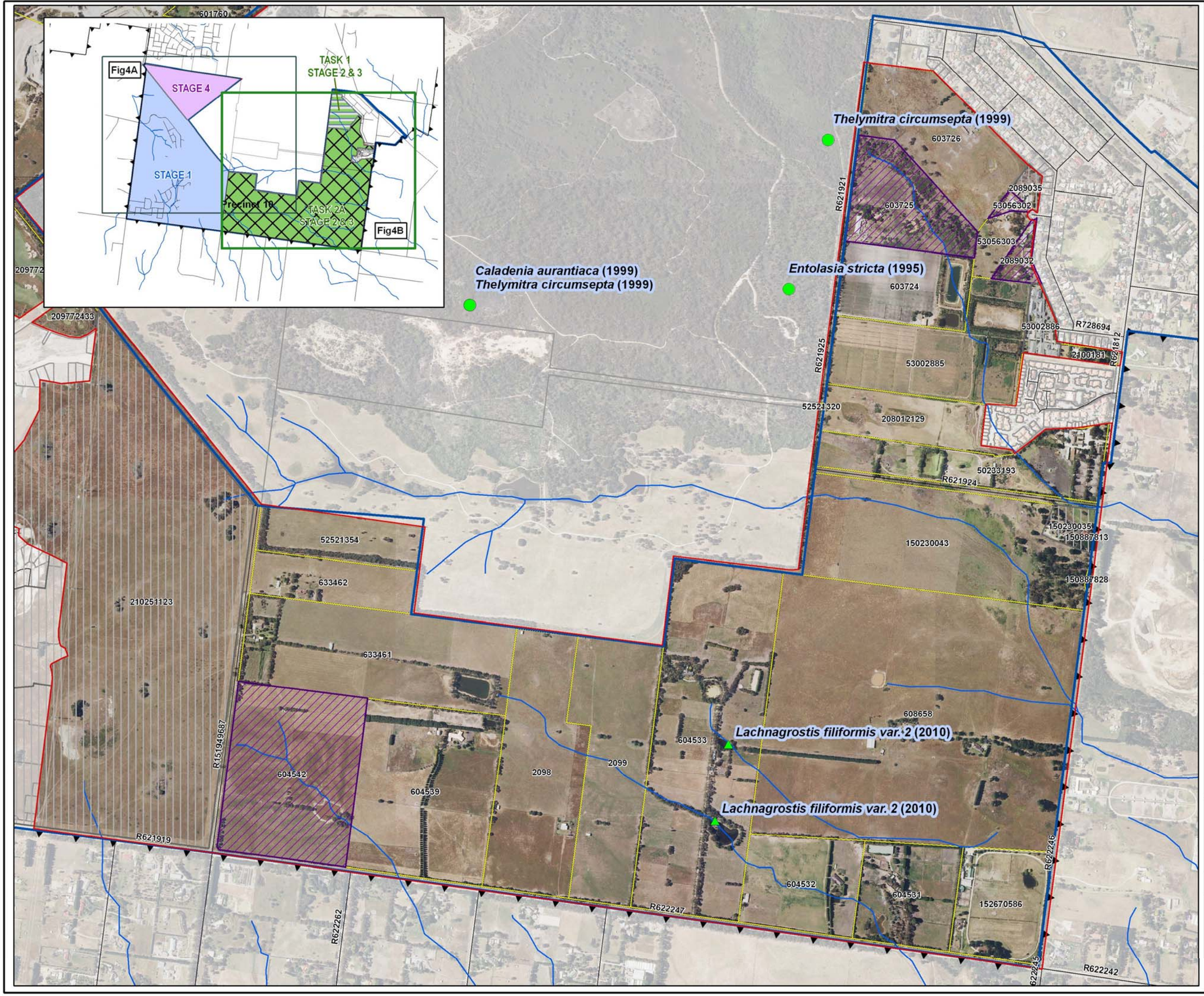

FIGURE 4B
Significant Species Distribution
Precinct 10 Study Area
VARIATION
Biodiversity Assessment Report
Flora Assessment and Mapping
Botanic Ridge

LEGEND

- Roads
- Watercourses
- Study Area Boundary
- Property Boundary
- Precinct Boundary
- Urban Growth Boundary

Property Assessment Status

- Property Not Assessed
- Access to Property Denied
- 633479 Parcel PFI
- R539084 Road PFI
- *Thelymitra circumsepta* (1998) State Significant Species and Date of Record
- *Dianella amoena* (2004) Nationally Significant Species and Date of Record

Significant Flora Species

- Database Records of Species of National Significance
- Database Records of Species of State Significance
- Surveyed Records of Species of National Significance
- Surveyed Records of Species of State Significance

MAP AND SURVEY DETAILS
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DATUM: GDA 94 MGA Zone 55

N

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Metres

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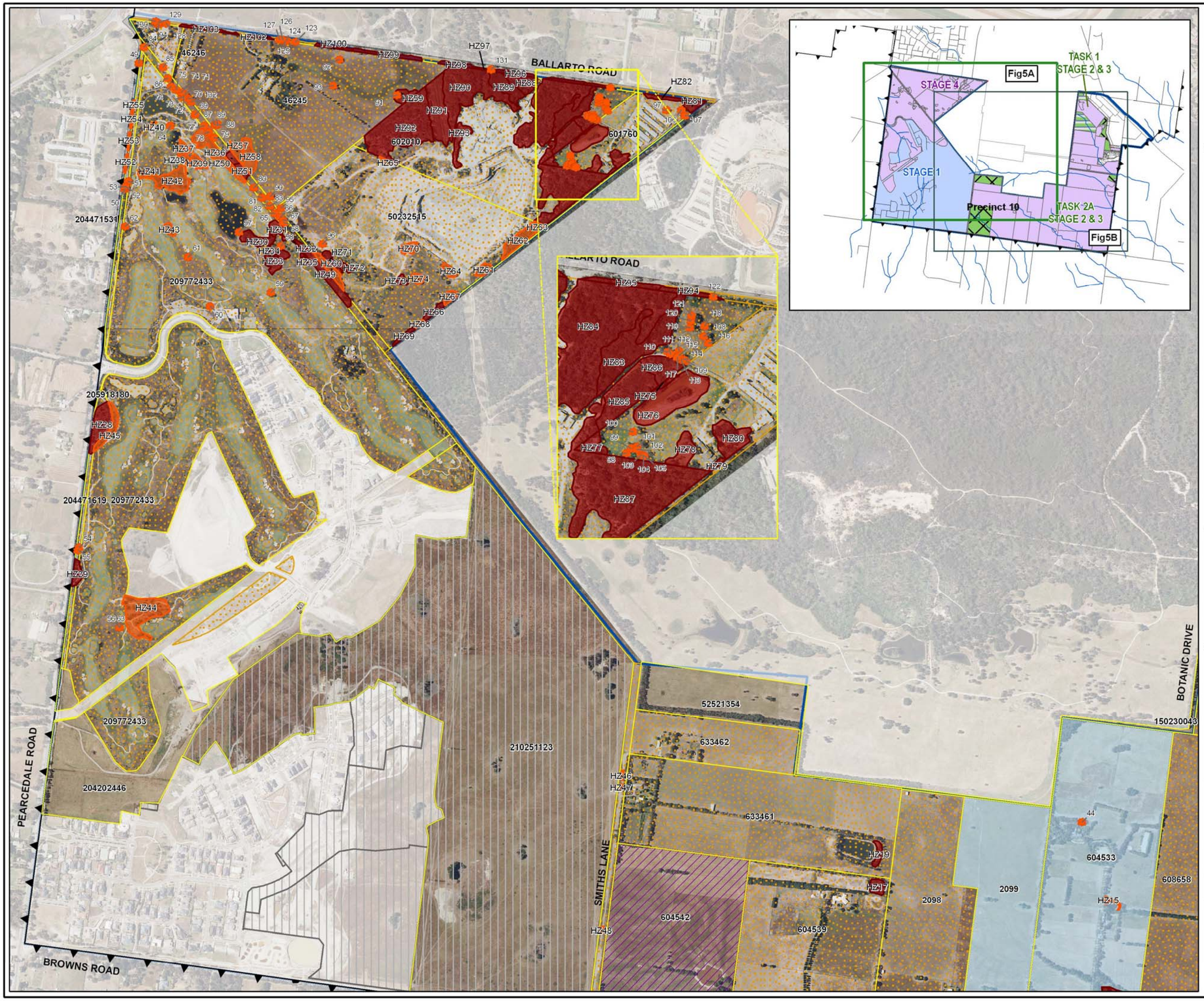

FIGURE 5A
Conservation Significance
Precinct 10 Study Area

Biodiversity Assessment Report
Flora Assessment and Mapping
Botanic Ridge
Growth Areas Authority

LEGEND

- Roads
- Watercourses
- Property Boundary
- Study Area Boundary
- Precinct Boundary
- Urban Growth Boundary
- 633479 Parcel PFI
- R539084 Road PFI
- Degraded Treeless Vegetation as defined for NVMP surveys
- Non Native Vegetation as defined for NVMP surveys

Property Assessment Status

- Property Not Assessed
- Access to Property Denied

Conservation Significance

- Very High
- High
- Medium
- Low

MAP AND SURVEY DETAILS

Surveyed by: Joy MacDonald, Mark Shepherd, Peter Gannon, Greg James and David Fairbridge, Oct '08-May'09

Mapping by: Staci Timms and Jo Henry, May '09

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DATUM: GDA 94 MGA Zone 55

N

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Metres

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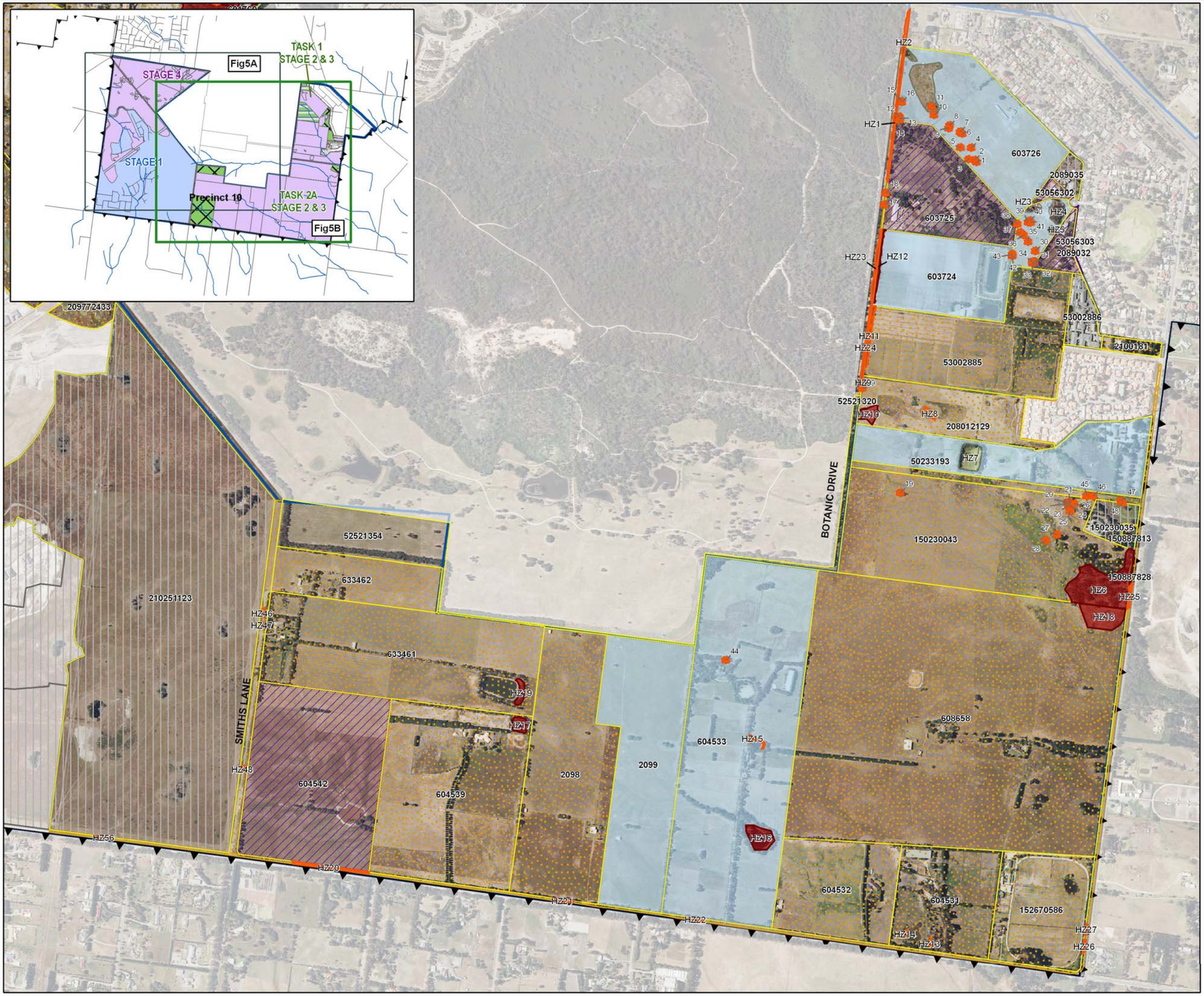

FIGURE 5B
Conservation Significance
Precinct 10 Study Area
Biodiversity Assessment Report
Flora Assessment and Mapping
Botanic Ridge
Growth Areas Authority

LEGEND

- Roads
- Watercourses
- Property Boundary
- Study Area Boundary
- Precinct Boundary
- Urban Growth Boundary
- 633479 Parcel PFI
- R539084 Road PFI
- Degraded Treeless Vegetation as defined for NVMP surveys
- Degraded Treeless Vegetation as defined for BMP surveys
- Non Native Vegetation as defined for BMP surveys

Property Assessment Status

- Property Not Assessed
- Access to Property Denied

Conservation Significance

- Very High
- High
- Medium
- Low

MAP AND SURVEY DETAILS

Surveyed by: Joy MacDonald, Mark Shepherd, Peter Gannon, Greg James and David Fairbridge, Oct '08-May'09

Mapping by: Staci Timms and Jo Henry, May '09

Generated from: data collected in the field using Trimble and IPAQ PDAs and aerial photograph interpretation. GIS layers and Aerial Photography supplied by DSE and GAA.

DATUM: GDA 94 MGA Zone 55

N

0 100 200 300 400 500

Metres

1:10,000

NOTES:

Practical Ecology bears no responsibility for the accuracy and completeness of this information and any decisions or actions taken on the basis of the map. While information appears accurate at publication, nature and circumstances are constantly changing.

VERSION	02	DATE	18/06/10

Practical Ecology Pty Ltd

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Part 3

Targeted Fauna Survey

Precinct Structure Plan Area 10;

Botanic Ridge

10. FAUNA INTRODUCTION

Practical Ecology Pty Ltd was commissioned by Growth Areas Authority to undertake a targeted fauna survey and fauna habitat assessment of Precinct Structure Plan area 10; *Botanic Ridge*, referred to hereafter as *Precinct 10*, in Cranbourne South, Victoria. The primary objectives of this study are to establish the distribution, abundance and significance of fauna and fauna habitats within the study area and to present the information within the context of relevant legislation and policy.

This report provides information on the fauna and fauna habitat within Precinct 10 by:

- establishing the study area's known biological values with regard to fauna
- documenting significant fauna species that occur or have potential to occur within the study area
- assessing all fieldwork data and information from relevant literature and databases against relevant policy and legislation
- providing recommendations to ensure the study area's significant values are maintained within the context of the proposed future land use.

11. FAUNA METHODS

Fauna taxonomy is consistent with the Victorian Wildlife Atlas database (also called Victorian Fauna Database (VFD), when accessed through Viridans software (DSE 2007a). Existing Information

Previous studies including McCaffrey et al. (in prep), Lane (2008), and Nicolson et al (1999) were reviewed. Existing information on the DSE's Victorian Fauna Database (VFD) July 2005 edition for a five kilometre radius around the study area was retrieved. In addition, a report was generated from the Department of Environment, Water Heritage and the Act's (DEWHA) *Protected Matters Search Tool* for a five kilometre radius from the study area boundary (DEWHA 2009a). The *Protected Matters Search Tool* uses habitat modelling to predict the presence of nationally significant species within five kilometres of the study area.

11.1.1 New Information

The study area, excluding private properties to which access was denied, was surveyed by Malcolm Legg of Mal's Environmental and Ecological Services between 11 February and 10 May 2009, and by Joanne North, Joanne Henry and Jeremy Neal of Practical Ecology between 2 and 3 April 2009. Targeted searches were commissioned for seven species, listed as threatened under State and Federal legislation (Table 3).

Table 2. Threatened Species Targeted for Fauna Survey

FFG	EPBC	DSE (2007)	Common name	Scientific name
L	VU	v	Australian Grayling	*Prototroctes maraena*
L	VU	v	Dwarf Galaxias	*Galaxiella pusilla*
		n	Glossy Grass Skink	*Pseudemoia rawlinsoni*
L	VU	e	Growling Grass Frog	*Litoria raniformis*
I	EN	n	Southern Brown Bandicoot	*Isoodon obesulus obesulus*
		v	Southern Toadlet	*Pseudophryne semimarmorata*
L		v	Swamp Skink	*Egernia coventryi*

Australian Grayling and Dwarf Galaxias

Australian Grayling *Prototroctes maraena* and Dwarf Galaxias *Galaxiella pusilla* were targeted using rectangular bait traps baited with White Bait placed in appropriate habitat, near reeds and sedges. Two traps were deployed at each survey location. Traps were checked two-three times before midnight, after which they were left overnight and re-checked again the following morning. Dip-nets were also used near the banks of waterways in and around reeds and sedges in random searches at each survey location.

Glossy Grass Skink

Glossy Grass Skink *Pseudemoia rawlinsoni* was surveyed by using 30cm by 30cm pieces of colour-bond tin placed at 20 meter intervals along six transects, within suitable habitat. Habitat included roadsides, drainage lines and Settlers Run Golf Course. The tin pieces were lifted the

following morning prior to 11am and reptiles sheltering under the tin for warmth were caught or observed. Surveys were undertaken in all weather.

Growling Grass Frog

Potential Growling Grass Frog *Litoria raniformis* habitat was identified using aerial photography followed by habitat assessment in the field. Potential Growling Grass Frog habitat attributes, according to Tyler (1989); Cogger (2000) and Clemann & Gillespie (2004) were assessed, including:

- Wetland type and permanency (ephemeral farm dam, permanent / semi-permanent creek line or quarry lagoon).
- The presence of emergent, submergent and floating vegetation (for male calling platforms, sheltering and tadpole protection)
- The presence of rocks and fallen timber (for basking and sheltering) within and adjacent to potential sites.
- The presence of soil cracking and fringing vegetation (for refuge and foraging).
- Distance of survey sites to the nearest suitable water body. Note; this species is highly mobile and can move up to one kilometre within 24 hours (DEWHA 2009a; Clemann & Gillespie 2004).

Growling Grass Frog surveys commenced approximately 30 minutes after sunset. Eight wetlands within precinct 10 at the *Settlers Run Golf Course* were surveyed using a call playback to elicit a response by any resident adult male frogs. This was followed by quiet listening for several minutes. If no frogs were heard, each area was scanned using two 50-watt spotlights to search for frogs on the banks, on floating vegetation and in areas of emergent vegetation. The surrounding terrestrial habitat within 10 metres of the water body was also searched. The time spent at each site was determined by size and habitat complexity of wetland. All other incidental frog and other fauna species were recorded during the surveys. Survey tracks and call playback surveys were mapped using a hand held GPS in the field.

Temperature and general weather conditions were recorded at the commencement and conclusion of each survey. Sites were surveyed during cool-mild, still and slightly damp conditions (minimum temperature recorded was 12°C). All other incidental frog and other fauna species were recorded during the surveys.

Southern Brown Bandicoot

Potential Southern Brown Bandicoot *Isoodon obesulus obesulus* habitat was traversed on foot for signs of Bandicoot diggings and scats. Seventeen individual property parcels, including roadsides were searched. When diggings were located, infra red cameras were deployed for seven days and nights during the full or new moon cycles. Infrared cameras are triggered by an infrared sensor that detects the movement of heat. The cameras record 30 seconds of motion using Infrared light at night. The cameras record 30 seconds of standard colour video during the day. Infrared cameras were deployed at eight suitable sites. Cameras were deployed at eight suitable sites.

Ten hair tubes were deployed at six suitable Bandicoot habitat sites for seven days and nights. Peanut butter, oats and honey was used as an attractant to the hair tubes and cameras.

Southern Toadlet

Six areas of potential Southern Toadlet *Pseudophryne semimarmorata* habitat within the study area, including roadsides and drainage lines were traversed on foot to identify Southern Toadlet calls during wet weather. When, calls were identified, Southern Toadlet was caught for positive identification. Six transects were searched for Southern Toadlet.

Swamp Skink

Swamp Skink *Egernia coventryi* was surveyed using 15 Elliot traps, which were deployed along four transects within suitable habitat, including roadsides and drainage lines and Settlers Run Golf Course. Peanut butter, oats and honey were used as bait. Traps were left out two nights during mild-warm weather and were checked each morning. Swamp Skink also had the potential to be detected during targeted survey for Glossy Grass Skink.

Incidental Survey

Non-target amphibians, reptiles, birds and mammals were subject to incidental survey during targeted searches undertaken with a particular emphasis placed on threatened species using the following methods:

- Birds were identified by sight and vocalisation. Wetland birds were surveyed throughout the day. Woodland birds were surveyed between dawn and midday and in the hour preceding nightfall.
- Reptiles were identified by sight during general inspection of habitat.
- Reptiles and small mammals, including White-footed Dunnart *Sminthopsis leucopus* can be detected using the Glossy Grass Skink methods detailed above.
- Mammals were identified by sight.
- Amphibians were identified by vocalisation and sight, including spotlighting and fish trapping within a selection of appropriate amphibian habitat during Growling Grass Frog surveys.

A fauna species list (or defined area list) for the entire study area was compiled for each property and for the entire study area. This included species recorded in the study area and those flying over or heard close to the study area.

Assessments of fauna habitat were made by direct observation during the assessment.

11.2 Additional flora and fauna survey 2009-2010

Growth Areas Authority engaged Practical Ecology to undertake additional flora and fauna survey within Botanic Ridge in October 2009. This additional work is hereafter referred to as *Variation # 1.* Variation # 1 had two primary objectives:

- To undertake an assessment in properties previously unable to be accessed due to lack of landowner permission during the 2008/2009 survey period,
- To undertake targeted flora surveys throughout the PSP, and
- To record scattered tree species.

11.2.1 Methods

The Variation #1 flora survey period commenced in early November 2009 and concluded 15 December 2009. The fauna survey component of Variation #1 comprised targeted fauna survey, as described below.

Fauna assessment at 20 and 60 Botanic Drive.

Practical Ecology was engaged to undertake targeted a fauna assessment of properties at 20 & 60 Botanic Drive, Cranbourne East (properties previously unable to be accessed) using the *Biodiversity Mapping Project* (BMP) 2009-2011 assessment specifications. BMP 2009-2011 Specifications can be obtained from Growth Areas Authority upon request. Access was denied to 60 Botanic Drive before fauna survey commenced.

Targeted fauna surveys were undertaken for the following species:

Fauna Species

a. Dwarf Galaxias

b. Swamp Skink

c. Glossy Grass Skink

d. Southern Toadlet

Targeted fauna surveys at 20 Botanic Drive were undertaken in areas that were deemed suitable habitat and most likely to support each of the target species. Targeted surveys for Swamp Skinks and Glossy Grass Skinks were undertaken within roadside vegetation to the west of the property. A Dwarf Galaxias survey was conducted within a dam in the central western section of the property. Southern Toadlet surveys were conducted within the roadside vegetation and across the entire property.

11.2.2 Research permit

All fauna sampling within the study area was carried out under Research Permit Numbers 10002918 (Practical Ecology) and 10004056 (Mal's Environmental and Ecological Services).

11.3 Data Handling and Storage

11.3.1 Database Entry, Validation and Submission

All species of fauna recorded are coded using the DSE Biodiversity Information Group standards as part of Practical Ecology's data-sharing agreement with DSE. Lists of all fauna taxa detected throughout the survey within the study area were submitted to DSE as a contribution to the Atlas of Victoria Wildlife for future reference. These records are submitted in the standardised spreadsheet provided by DSE Biodiversity Information Group.

11.4 Mapping

Geographic data collection in the field for the purposes of map display was carried out with a handheld GPS for recording significant fauna species locations. Determination of habitat boundaries in Figure 3 was undertaken by a combination of ground-truthing and aerial photography interpretation. All maps were produced using ArcView ArcGIS V.9.

12. FAUNA LIMITATIONS

12.1 General fauna survey limitations

Fauna surveys were undertaken only for targeted species listed in table 3 and only within properties for which permission to access was granted to Practical Ecology by landholders (Figure 3). No targeted fauna survey was commissioned by Growth Areas Authority for other threatened species which have potential to occur within the study area, including Swift Parrot *Lathamus discolor* and a suite of other threatened woodland and wetland birds.

No general fauna survey for non-threatened species was commissioned by Growth Areas Authority, including trapping, spotlighting, bat detection, frog and owl call-back detection. Non-target fauna and some threatened fauna were not adequately surveyed during the current assessment.

Fauna survey was carried out within a selection of properties that displayed suitable habitat. A sample approach to fauna survey was undertaken due to the large size of the study area and the time constraints. Not all properties for which permission was granted were surveyed; however, an assessment of the habitat suitability for particular fauna species within unassessed properties was undertaken, based on the results of assessments undertaken in nearby similar habitats.

12.2 Fauna habitat mapping

Practical Ecology was not commissioned by Growth Areas Authority to map potential habitat for fauna species known or expected to occur within the study area. In addition, at the time of fauna survey, Practical Ecology had not been commissioned to prepare biodiversity reports, and we were therefore not required at the time to consider fauna habitat or record the likelihood of occurrence for threatened species. Areas of high faunal habitat significance shown in Figure 3 were determined by a combination of our recollection of the sites assessed and aerial photography interpretation. No habitat mapping using hand-held GPS was undertaken in the field. Furthermore, Habitat Zones described in Part 2 of this report do not constitute all fauna habitat within the study area. Practical Ecology was not engaged at the time of our field assessments to map non-indigenous habitat, within which many fauna species may occur.

12.3 Survey timing

The timing of the survey was less than optimal for most of the targeted threatened species. Detailed surveying to determine the likely presence or absence of species is best undertaken throughout all seasons of a typical year. The timing of surveys was undertaken outside the optimal breeding period for Growling Grass Frog. Optimal breeding and calling season for Growling Grass Frog is between September and December and is usually triggered by rain events (DEWHA 2009b). This means that detectability for this species may be reduced outside this period, particularly in areas where species numbers may be reduced and populations may have retracted over time.

12.4 Access

The owners of five properties refused Practical Ecology permission to undertake surveys or were unable to be contacted to gain permission.

- 4 Shaw Road, Junction Village (PFI: 2089032).
- 2 Shaw Road, Junction Village (PFI: 53056302).
- 79-81 Browns Road, Cranbourne South (PFI: 152670586).
- 105-107 Browns Road, Cranbourne South (PFI: 604542).
- 860 Ballarto Road, Cranbourne South (PFI: 96245)

12.5 Limitations of additional flora and fauna survey 2009-2010

20 Botanic Drive comprised little suitable habitat for the targeted threatened species specified in the project brief. However, roadside vegetation was dominated by indigenous species and was considered potential habitat for threatened species. The majority of fauna survey undertaken during *Variation* #1 was therefore located in the roadsides adjacent to 20 Botanic Drive.

13. FAUNA RESULTS

13.1 Fauna records from the current assessment

A total of 91 fauna species were recorded within the study area during the current assessment, comprising six amphibians, 9 reptiles, 63 birds, two fish and 11 mammals. Eighty species (89%) are native, while 10 species (11%) are introduced. Fauna records from the current assessment are provided in Appendices 2, 3 and 4).

13.1.1 Significant species recorded during the current assessment

Three state significant species; Southern Toadlet *Pseudophryne semimarmorata*, Swamp Skink *Lampropholis guichenoti* and the Pacific Gull *Larus pacificus* pacificus. One nationally significant species; Southern Brown Bandicoot *Isoodon obesulus* was recorded during the current assessment (Figure 2 Table 4). A further eighteen species recorded within the current assessment are considered to be of regional significance (Table 4). Methods for defining conservation significance are described in Appendix 1. Significant fauna records are described in more detail in Appendix 2.

Table 3. Significant native fauna recorded during the current assessment

EPBC	FFG	DSE (2007)	Common Name	Scientific Name	Conservation Significance
			Eastern-three-lined Skink	*Acritoscincus duperreyi*	Regional
			Tree Dragon	*Amphibolurus muricatus*	Regional
			Little Corella	*Cacatua sanguinea*	Regional
			Swamp Harrier	*Circus approximans*	Regional
			Eastern Small-eyed Snake	*Cryptophis nigrescens*	Regional
			Black Swan	*Cygnus atratus*	Regional
	L	v	Swamp Skink	*Egernia coventryi*	State
			Black-fronted Dotterel	*Elseyorinis melanops*	Regional
			Eastern Yellow Robin	*Eopsaltria australis*	Regional
			Musk Lorikeet	*Glossopsitta concinna*	Regional
EN	L	n	Southern Brown Bandicoot	*Isoodon obesulus*	State
			Delicate Skink	*Lampropholis delicata*	Regional
		n	Pacific Gull	*Larus pacificus pacificus*	State
			Striped Marsh Frog	*Limnodynastes peroni*	Regional
			Blue-winged Parrot	*Neophema chrysostoma*	Regional
			Red-rumped Parrot	*Pesphotus haematonotus*	Regional
			Common Bronzewing	*Phaps chalcoptera*	Regional
			Koala	*Phascolarctos cinereus*	Regional
		v	Southern Toadlet	*Pseudophryne semimarmorata*	State
			Swamp Rat	*Rattus lutreolus ssp. Lutreolus*	Regional
			Weasel Skink	*Saproscincus mustelinus*	Regional

	Short-beaked Echidna	*Tachyglossus aculeatus*	Regional

Codes for status within Victoria:

- v vulnerable in Victoria (DSE 2007)
- e endangered in Victoria (DSE 2007) or Australia (EPBC Act)
- n near threatened in Victoria (DSE 2007)
- L listed as threatened under FFG Act 1988
- I Invalid or ineligible under FFG Act 1988

State and nationally significant species recorded within the study area are discussed in section 13.4. Areas of habitat within the study areas for national and state significant species found in the study area are shown in Figure 3 and discussed in section 4.4.

13.1.2 Incidental species recorded during the current assessment

Incidental records compiled during site visits resulted in 90 fauna species, including 18 regionally significant species discussed in section 13.1.1 above. Incidental records comprised five amphibians, nine reptiles, 65 birds and 11 mammals. Incidental fauna records for the study area and their conservation status are presented in Appendix 3. Fauna recorded within each property is listed in Appendix 4.

13.2 Database Records and Previous Surveys

A total of 242 fauna species are documented on DSE's VFD (DSE 2005a) from within 5 km of the study area boundary. These records comprise 222 (92%) indigenous species and 20 (8%) introduced species. Fifty-one national and state significant fauna species recorded or predicted to occur within five kilometres of the study area are documented on the Victorian Fauna Database (DSE 2005a) and EPBC Protected Matters Search Tool (Appendix 5).

In determining the 'likelihood of occurrence' and utilisation of the study site by national or state significant fauna, the following factors were considered.

- The conservation status of the species and its distribution.
- Previous recordings of species in the local area.
- The quality, distribution and availability of suitable habitat for individual species.
- The generally fragmented and highly modified nature of fauna habitat surrounding the study area.

Based on the review criteria detailed above, six species recorded on AVW and EPBC searches are considered to have a high likelihood of occurrence within the study area. A further 14 species are considered to have at least a low-medium likelihood of occurrence within the study area (Appendix 5). The habitat requirements for significant species detected on AVW and EPBC searches are discussed in Appendix 5. A summary of nationally and state listed threatened species with at least a low-medium likelihood of occurrence is presented in table 5 below.

Table 4. Nationally or state listed threatened species with at least medium likelihood of occurrence recorded or predicted to occur within 5km

FFG	EPBC	DSE	Mig.	Regional Signficance	Common Name	Scientific Name	Family Name	Likelihood of Occurrence	Database	Freq (AVW only)	NumSite (AVW only)
		v		S, R2	Australasian Shoveler	*Anas rhynchotis*	Anatidae	high	AVW	0.44%	3
L		v		S, R2	Baillon's Crake	*Porzana pusilla*	Rallidae	high	AVW	0.44%	3
		v		S, R1, R2	Black Falcon	*Falco subniger*	Falconidae	med	AVW	0.14%	1
	m			R1, R2, R3	Black-faced Monarch	*Monarcha melanopsis*	Dicruridae	med	EPBC		
L		e		S, R2	Blue-billed Duck	*Oxyura australis*	Anatidae	med	AVW	0.14%	1
		n		S, R1, R2	Brown Quail	*Coturnix ypsilophora*	Phasianidae	high	AVW	1.04%	7
		n		S, R2	Cape Barren Goose	*Cereopsis novaehollandiae*	Anatidae	high	AVW	0.44%	3
	m		J, C	R2, R3	Cattle Egret	*Ardea ibis*	Ardeidae	high	EPBC		
L		v		S, R1, R2	Chestnut-rumped Heathwren	*Calamanthus pyrrhopygius*	Pardalotidae	high	AVW	0.59%	4
	m		J, C, R	R1, R2, R3	Fork-tailed Swift	*Apus pacificus*	Apodidae	high	EPBC		
L		v		S, R2	Grey Goshawk	*Accipiter novaehollandiae*	Accipitridae	med	AVW	0.59%	4
L	VU	v		N, S, R2	Grey-headed Flying-fox	*Pteropus poliocephalus*	Pteropodidae	med	EPBC		
L	V	e		N, S, R2	Growling Grass Frog	*Litoria raniformis*	Hylidae	med	EPBC/AVW	0.14%	1
		v		S, R2	Hardhead	*Aythya australis*	Anatidae	high	AVW	1.49%	10
L		n		S, R2	Hooded Robin	*Melanodryas cucullata*	Petroicidae	med	AVW	0.14%	1
		n		S, R2	Latham's Snipe	*Gallinago hardwickii*	Scolopacidae	high	EPBC/AVW	0.44%	3
L		v		S, R2	Lewin's Rail	*Lewinia pectoralis*	Rallidae	high	AVW	0.14%	1
L		e		S, R2	Little Bittern	*Ixobrychus minutus*	Ardeidae	med	AVW	0.29%	2
		n		S R2	Pacific Gull	*Larus pacificus pacificus*	Laridae	med	AVW	9.38%	63
		n		S R2	Pied Cormorant	*Phalacrocorax varius*	Phalacrocoracidae	med	AVW	0.14%	1
L		v		S, R1, R2	Powerful Owl	*Ninox strenua*	Strigidae	med	AVW	0.14%	1
	m		J	R1, R2, R3	Rainbow Bee-eater	*Merops ornatus*	Meropidae	med	EPBC		
	EN, m		J	S R1 R2 R3	Regent Honeyeater	*Anthochaera phrygia*	Meliphagidae	med	EPBC		
		v		S R2	Royal Spoonbill	*Platalea regia*	Threskiornithidae	high	AVW	0.59%	4
	m			R2	Rufous Fantail	*Rhipidura rufifrons*	Dicruridae	high	EPBC		
	m			R2 R3	Satin Flycatcher	*Myiagra cyanoleuca*	Dicruridae	med	EPBC		
	E	n		N S R2	Southern Brown Bandicoot	*Isoodon obesulus obesulus*	Peramelidae	high	EPBC/AVW	4.76%	32
		v		S R2	Southern Toadlet	*Pseudophryne semimarmorata*	Myobatrachidae	high	AVW	0.59%	4
		n		S R2 R3	Spotted Harrier	*Circus assimilis*	Accipitridae	med	AVW	0.29%	2
L		v		S	Swamp Skink	*Egernia coventryi*	Scincidae	high	AVW	1.63%	11
L	E	e		N S R1 R2	Swift Parrot	*Lathamus discolor*	Psittacidae	high	EPBC/AVW	0.14%	1
L	m	v	C	S R2 R3	White-bellied Sea-Eagle	*Haliaeetus leucogaster*	Accipitridae	med	EPBC/AVW	0.14%	1
	m		J, C, R	R2 R3	White-throated Needletail	*Hirundapus caudacutus*	Apodidae	high	EPBC		

See appendix 2 key for conservation status and significance definitions

13.3 Fauna habitats

The majority of the study area has been highly modified by grazing, urbanisation and the construction of a quarry. Large open paddocks lined with planted exotic vegetation dominate the precinct. However, native vegetation is common in roadsides, along drainage lines and wetlands and within the north-east and north-west of the study area. The largest area of remnant native vegetation occurs as Heathy Woodland and Swamp Scrub in the north-west of the study area, within the quarry property at 860 Ballarto Road.

Many trees within the study area, especially within woodland remnants in the north-west and east of the study area are likely to have formed hollows, due to their large diameter (Appendix 2). Hollow bearing trees may support a suite of hollow dependant species such as parrots, rosellas, lorikeets, owls, arboreal mammals and microbats.

Areas of regenerating and remnant Swamp Scrub EVC and exotic vegetation with Swamp Scrub components found within roadsides and drainage-lines are excellent habitat for amphibians, reptiles, birds, mammals and invertebrates, including threatened species (Figure 3).

Habitat dominated by non-indigenous vegetation also occurs in roadsides and fence-lines as exotic trees and shrubs and supports many animals, including woodland birds, Swamp Rat *Rattus lutreolus* and potentially arboreal mammals. Drainage lines dominated by introduced flora are likely to be habitat for native amphibians (figure 3).

Wetlands, drainage lines and seasonally wet areas within the study area hold particular habitat value for wetland birds, including migratory and threatened species. A wetland complex and associated drainage lines within the *Settlers Run Golf Course* are habitat for at least one threatened species and potential habitat for a suite of other birds, reptiles, and amphibians, including some threatened species.

The determination of areas classified as having high faunal habitat values is based on all or any of the following factors.

- The area is a representative or remnant vegetation community.
- The area constitutes a wildlife corridor.
- The area contains important breeding sites.
- The area has high floristic diversity.

The study area has been divided up into five fauna habitat types:

- Woodlands
- Wetlands
- Drainage-lines
- Swamp Scrub

- Farmland and exotic vegetation.

An evaluation of each of these habitat types is described below and presented in Figure 3.

Woodlands

Remnant woodlands within the study area include a large stand of Heathy Woodland within the quarry and a smaller stand within a private property at 51a Craig Road, Cranbourne South.

Remnant woodlands in the north-west of the study area are contiguous with the RBGC and are therefore highly significant as part of one of the most extensive areas of state and regionally significant remnant habitat, south-east of Melbourne (DSE 2005b; McMillan et al 2003). The majority of woodlands in the north-west of the study area are included in regional Biosite 4813; *Cranbourne Woodland* which reflects their conservation significance.

Some of the trees within woodlands at the study area have hollows suitable for hollow-dependent fauna such as arboreal mammals, bats and birds. There are some logs present from fallen branches and trees, which provide habitat for skinks, invertebrates and small mammals. However, large logs are noticeably absent in many areas of woodland, as evident in many of the habitat hectare scores (Part 2 Appendix 2).

Many fence-lines and private roadsides within the study area are lined with planted trees and shrubs, including non-indigenous Eucalypts, **Cypress* spp, **Pinus* spp and European trees. While these areas do not hold the floristic diversity of remnant woodlands, they may offer food and shelter resources for fauna, including woodland birds and arboreal mammals (Bennett et al 2000).

Woodlands in the study area provide minimal but potential habitat for a number of threatened fauna including Swift Parrot *Lathamus discolour* and Grey-headed Flying-fox *Pteropus poliocephalus.*

Wetlands (including surrounding vegetation)

The Settlers Run Golf Course supports a constructed wetland complex in the north-east of the study area (Figure 3). Six wetlands are located in the northern section of the grounds, north of Settlers Run Road, with the remaining two wetlands located south of Settlers Run Road. The wetlands were constructed approximately three years ago and provide excellent habitat for a range of fauna, including threatened species.

Six of these wetlands are medium to large in area (400 m2 – 800 m2). All except one wetland, have a moderately complex vegetation structure, comprising moderate to high quantities of emergent and floating vegetation. All wetlands have a buffer of between one to five metres of fringing vegetation, which either fronts relatively recent plantings/revegetation or mown lawn (golf course). Emergent vegetation primarily consists of Cumbungi *Typha* spp., Common Reed *Phragmites* spp., Club-rush *Schoenoplectus* spp., Spike-rushes *Eleocharis acuta* and *Eleocharis speculata*, and Twig-sedge *Baumea* spp. Floating vegetation consists of Water Ribbon *Triglochin* spp., present in sparsely distributed patches, and small quantities of algae are also present. No sub-mergent vegetation was observed. Fringing vegetation comprised mostly dense plantings of Purple loosestrife *Lythrum* spp., and Rushes *Juncus* spp.

One of the *Settlers Run* wetlands consists of five small (10 m x 2 m) linear ponds. These ponds are configured with two ponds connected to three ponds adjacent with each other by an overflow earthern channel, approximately 30 m in length. The two northern ponds were in a drying phase, while the overflow channel and southern ponds were completely dry with soil cracking evident.

Farm dams throughout the study area also offer habitat of varying quality for significant fauna (Figure 3). Dams with fringing native vegetation offer high quality habitat for wetland birds and amphibians (Pizzey & Knight 2007; Hero et al 1991). Some dams hold little fringing vegetation due to impacts by stock and are therefore less valuable. However, these dams may also be utilised by wetland birds, including threatened species. All wetlands in the study area are potential habitat for birds, amphibians, reptiles and insects.

Drainage lines

An extensive network of drainage lines occur throughout the study area provide excellent potential habitat for Glossy Grass Skink *Pseudemoia rawlinsoni*, and a range of other reptiles, birds, amphibians and invertebrates. Swamp Skink *Egernia coventryi* and Southern Toadlet *Pseudophryne semimarmorata* were recorded within drainage-lines and other wet areas within the study area. Drainage lines may also serve as migratory routes for Dwarf Galaxias during times of flood. Drainage-lines were generally dominated by introduced vegetation; however, some drainage lines supported native vegetation that did not meet DSE's (2004) cover threshold.

Swamp Scrub

Remnant and regenerating Swamp Scrub occurs in significant stands in the north-west of the study area, including within the quarry and within roadsides (Part 2 Figure 2). Swamp scrub also occurs in small patches in the south-east of the study area. Many roadsides dominated by exotic vegetation contain the floristic components of Swamp Scrub but do not meet DSE native vegetation cover thresholds in order to be determined to be a 'patch' of native vegetation (DSE 2004). Many of these roadside areas are potential fauna habitat, for lifeforms such as birds, reptiles and amphibians in many parts of the study area.

Roadsides comprising Swamp Scrub within the study area include the northern section of Pearcedale Road and the western section of Ballarto Road. These roadsides are known habitat for Swamp Skinks and potential habitat for Glossy Grass Skink and Southern Toadlet, in addition to a suite of other reptiles, amphibians, mammals, invertebrates and birds.

Other patches of roadside vegetation are dominated by exotic plantings and introduced shrubs such as Boxthorn **Lycium ferocissimum*. Exotic plantings and weed infestations such as Boxthorn thickets provide potential habitat for woodland birds and other ground dwelling species and arboreal mammals.

Farmland and exotic vegetation

Areas of farmland and exotic vegetation serve a less important role as habitat for most native species. However, Great Egret *Ardea alba* and Cape Barron Goose *Cereopsis novaehollandiae*

were observed within the nearby Precinct 13 – *Clyde North* in such habitats. These species were recorded in seasonally wet open fields, near drainage lines and in wetlands in the north of Precinct 13. A number of the more generalist bird species and raptors were recorded throughout farmland within the Precinct 10 study area (especially where large stands of indigenous and exotic gums have been planted). Open farmland areas and open areas fringing vegetation are important hunting grounds for raptors such as Black-shouldered Kite *Elanus axillaris*, Whistling Kite *Haliastur sphenurus* and Nankeen Kestrel *Falco cenchroides* (Pizzey and Knight 2007).

The Southern Brown Bandicoot is also known to utilise areas of exotic vegetation on farms and within roadsides for feeding. Nesting sites of the Southern Brown Bandicoot have been observed under rubbish and material dumps in the adjacent Cranbourne Botanic Gardens (McCaffrey & Legg 2007) and these types habitats also exist within the Precinct 10 study area. Some of these areas, such as blackberry thickets are too small to be mapped from aerial photography and are therefore not identified in Figure 3 (see fauna limitations section 12).

Many roadsides in the study area are dominated by exotic grasses, exotic shrubs with occasional trees. These areas may support retiles and ground-dwelling mammals and are potentially important dispersal routes for fauna. Roadside drains are important for threatened species such Glossy Grass Skink, Southern Toadlet and Swamp Skink and for fauna species represents the last remaining habitat corridors within the study area.

13.3.1 Habitat Links

Habitat links are recognised as mechanisms to address the impacts of habitat fragmentation as a consequence of development within the vicinity of the Cranbourne Botanic Gardens (Bennett 2003). Habitat links can increase flora seed dispersal and fauna movement between patches, increase population sizes and gene flows between populations and providing refuge from predators such as domestic pets and feral animals, such as foxes (Bennett 2003). Precinct 10 adjoins the state significant Cranbourne Botanic Gardens on three boundaries. The incorporation of habitat links into the precinct design could facilitate the linkage of core habitat within the Cranbourne Botanic Gardens to habitat throughout the Westernport region (McCaffrey et al. in prep).

Potential biolinks identified for Precinct 10 by a number of authors including McCaffrey et al. (in prep), Marshall (2008), Lane (2008) and City of Casey (2005) consistently include properties that coincide with a drainage-line to the east of Cranbourne Botanic Gardens that would link the gardens with remnant vegetation in Devon Meadows, to the east of Precinct 10 (see section 6.1.4).

Southern Brown Bandicoot *Isoodon obesulus* was recorded during the current assessment and has a known stable population within the adjacent RBGC. The linking of core areas of habitat between Cranbourne Botanic Gardens, Langwarrin Flora and Fauna Reserve and Western Port Bay is considered an important for long-term Southern Brown Bandicoot population viability (Coates et al. 2008).

Two threatened species; Southern Toadlet and Swamp Skink were recorded within lineal roadside reservations within the study area (Figure 2), which demonstrates that fauna exist within roadsides and drainage-lines that may not be identified as Habitat Zones. These records also

demonstrate that fauna can disperse through narrow and modified corridors. Habitat such as narrow roadsides and drainage-lines therefore hold greater conservation significance compared to surrounding agricultural land within the study area.

13.4 Threatened species occurring or likely to occur

13.4.1 Threatened species recorded during the current assessment

Four state significant species; Southern Brown Bandicoot *Isoodon obesulus*, Swamp Skink *Egernia coventryi*, Southern Toadlet *Pseudophryne semimarmorata* and Pacific Gull *Larus pacificus pacificus* were recorded within the study area during the current assessment (table 6). The significance of these records within the study area and species' habitat requirements are discussed below.

Table 5. Threatened fauna species recorded within the study area

		Conservation Status					
Common Name	**Scientific Name**	**EPBC**	**FFG**	**DSE (2007)**	**Area Observed**	**Number of individuals**	**Date**
Southern Brown Bandicoot	*Isoodon obesulus*	EN	L	n	Ballarto Road reserve adjacent to 860 Ballarto road quarry.	up to 5 diggings	12/3/2009
					Ballarto Rd reserve near RBG entrance.	3 diggings	12/3/2009
Southern Toadlet	*Pseudophryne semimarmorata*			v	Pearcedale Rd along Electricity Road Reserve in gutter	2	18/3/2009
					Settlers Run Golf Course in drainage line.	2	19/3/2009
Swamp Skink	*Egernia coventryi*		L	v	Ballarto Road opposite quarry under cardboard.	1	12/03/09
					Ballarto Road opposite quarry in Elliot trap (male).	1	13/03/09
					Settlers Run Golf Course in paperbark thicket.	1	19/03/09
Pacific Gull	*Larus pacificus pacificus*			n	20 Botanic Drive near northern boundary	12	22/04/2010

Southern Brown Bandicoot *Isoodon obesulus*

Southern Brown Bandicoot is listed as endangered under the EPBC Act 1999 and as near threatened on DSE's *Advisory List of Threatened Vertebrate Fauna in Victoria* (DSE 2007).

Southern Brown Bandicoot is a small to medium sized ground dwelling mammal. It is dark grey to brown in colour and weighs between 400 to 1600 grams (Braithwaite 1995). This species is commonly found in scrub type vegetation or in areas with a closed understorey. These habitats include heathy forests, heath and coastal scrub. Southern Brown Bandicoot appears to favour habitat that has been burnt at fairly regular intervals (5–10yrs), which provides the species with a variety of food and nesting resources (Braithwaite 1995).

Southern Brown Bandicoot is solitary, territorial and mostly nocturnal; however it can be seen foraging during the day (Braithwaite 1995). The species has an omnivorous diet; digging within the topsoil for arthropods, tubers and fungi (Braithwaite 1995). The species shelters in nests of vegetation beneath dense cover (Menkhorst 2001).

Southern Brown Bandicoot is considered one of a suite of mammals that are categorised as *Critical Weight Range m*ammals that are significantly impacted by predation of foxes (Dexter and Murray 2009). Dexter and Murray (2009) have demonstrated that this species will significantly increase in numbers after broad scale fox baiting. Fox predation and habitat destruction are cited as one of the main causes for the decline and local extinction of this species, followed by inappropriate fire regimes (DEWHA 2009c).

The RBGC supports a stable population of Southern Brown Bandicoot, due the active management of, and permanent reservation of suitable remnant heathland habitats within the

Gardens. The Bandicoot population at RBGC is the only remaining stable population within a secure nature reserve in the region (Coates et al. 2008).

Southern Brown Bandicoot diggings were recorded in road reserves on Ballarto Road, within several hundred metres of RBGC during the current assessment. Large areas of Heathy Woodland EVC exist within 860 Ballarto Road, adjacent to the road reserve within which the species was recorded; however, the owners of this property refused to grant practical Ecology permission to undertake targeted surveys for threatened species. The species has however been observed within RBGC within several metres of the shared boundary with 860 Ballarto road by RBGC ecologist Terry Coates in recent years and it is likely that the species would occur within 860 Ballarto road property (Terry Coates pers comm.). Areas of Heathy Woodland and Swamp Scrub occur within 980 Ballarto Road, which is located between the previously mentioned quarry and RBGC and is used as a poultry farm. The owners of the poultry farm reported sighting Southern Brown Bandicoot in a shed on the property (Malcolm Legg pers comm.). Extensive fox control has been undertaken in areas surrounding RBGC. It is therefore likely that Southern Brown Bandicoot also occurs with other properties contiguous with RBGC where suitable vegetative cover exists.

Southern Toadlet *Pseudophryne semimarmorata*

Southern Toadlet is listed as vulnerable in DSE's *Advisory List of Threatened Vertebrate Fauna in Victoria* (DSE 2007). Southern Toadlet is a small frog of 22-32mm. The species has bright orange/yellow colouration on its throat, hind limbs and lower belly, and has a distinct band of black and white marbling on the belly. It occurs throughout southern Victoria, extending into South Australia and Tasmania (Wiltshire and Bull 1977, Hero et al. 1991). Southern Toadlet is found in a variety of habitats including grassland, shrubland, dry forest, woodland and heaths, it is a ground dwelling frog often found under leaf litter (Wiltshire and Bull 1977, Hero et al. 1991).

The Southern Toadlet is an autumn breeder and will spawn eggs into ponds, moist soaks or water-filled depressions (Hero et al. 1991). Tadpoles are aquatic and are found in ponds, flooded grasslands and areas where there is pooled water (Hero et al. 1991).

Southern Toadlet was seen and heard during fauna survey for targeted species within the Pearsons Road reserve and the *Settlers Run Golf Course* during the current assessment (Figure 2). Extensive habitat for this species is also found within drainage lines and roadsides throughout the study area (Figure 3).

Swamp Skink *Egernia coventryi*

Swamp Skink is considered threatened under the Flora and Fauna Guarantee Act 1988 and vulnerable under the DSE *Advisory List of Threatened Vertebrate Fauna in Victoria* (DSE 2007).

Swamp Skink is found along the southern coastline from south eastern South Australia to south eastern Victoria (Wilson and Swan 2003). Swamp Grass Skink is a smooth scaled skink, it is very shiny, with highly variable markings; the skinks reach up to 100mm (not including tail length) (Wilson and Swan 2003). The Swamp Skink is found in wetlands and swampy habitats such as tea-tree thickets and tidal salt marsh; it is always associated with dense vegetation cover (Wilson and Swan 2003). It lives in burrows and is a secretive species (Wilson and Swan 2003).

Swamp Skink was recorded within the *Settlers Run Golf Course* and within the Ballarto Road reserve in the north-west of the study area. Swamp Skink has also been recorded within in a number of wetlands at the adjacent RBGC (McCaffrey and Legg 2007). A recent study by Homan (2006) has recorded Swamp Skinks in weed-infested, non-swampy habitats, which suggest many areas of roadside and modified drainage-lines including roadside gutters within the study area are potential habitat for the species, providing that core habitat, such as Swamp Scrub EVC or Riparian Scrub EVC is located nearby (Homan 2006).

Pacific Gull *Larus pacificus pacificus*

The Pacific Gull is listed as near threatened on DSE's *Advisory List of Threatened Vertebrate Fauna in Victoria* (DSE 2007).

The Pacific Gull is a coastal species that has a distribution from south western to south eastern Australia, including the coasts of Tasmania. The subspecies *pacificus* is found in south eastern Australia while *georgii* is found in southern and south western Australia (Morcombe 2000). The head, neck, rump and underbody of this species is white. It is black-backed, has a black band on a white tail and a large yellow bill with a red tip (Higgins and Davies 1996).

In Port Phillip Bay, Western Port Bay and Corner Inlet the Pacific Gulls habitat includes intertidal mudflats and nearby rubbish tips with smaller flocks using estuaries, beaches and other intertidal habitat (Higgins and Davies 1996). In Victoria, the subspecies usually breeds on islands in Bass Strait and off the coast of Tasmania with small numbers known to breed on islands off Wilsons Promontory. Nests are built on the ground or on the tops of steep sided islands (Higgins and Davies 1996).

The Pacific Gull was recorded in flight over 20 Botanic Drive towards the northern boundary of the property. It is likely the flock was travelling inland from the coast to feed at a nearby rubbish tip, where they have been frequently recorded. It is unlikely that the species would utilise the study area for anything more than a fly-over route.

13.4.2 Significant fauna likely to occur within the study area

Fifty-one species of national, state or regional significance have been recorded within the local area (5km from the study area boundary) or have been predicted to occur by DEWHA (2009a) (Appendix 5). Thirty-five of these species are considered likely to have at least a medium likelihood to utilise the study area or find critical habitat within the study area. Species considered to have at least a medium likelihood of occurrence within the study area are discussed below. All species occurring or predicted to occur within 5km are briefly discussed in Appendix 5.

Australasian Shoveler *Anas rhynchotis*

Australasian Shoveler occurs mainly on large well vegetated wetlands and lakes, occasionally including areas with saline waters. Populations are found in higher numbers on permanent, well-vegetated freshwater swamps with areas of open water (Rogers 1990). This species nest in grass nests on the ground, usually in dense cover and near water (Pizzey and Knight 2007).

Australian Shoveler has been assigned a high likelihood of occurrence within the study area. The species has been recorded three times from within five kilometres of the study area (DSE 2005a). In addition, Australian Shoveler was recorded by Practical Ecology in 2008 during a separate ecological investigation within five kilometres north of Precinct 10, in wetlands near Thompsons road, Cranbourne East (Fairbridge & Appleby (2009).

Baillon's Crake *Porzana pusilla*

Baillon's Crake is a summer migrant to Victoria. It inhabits freshwater wetlands and floodwaters usually containing floating plants or tall emergent vegetation. Baillon's Crake feeds in shallow water, mud and emergent aquatic plants. It has been found to nest in clumps or tussocks of vegetation surrounded by water (Pizzey and Knight 2007).

Baillon's Crake has been assigned a high likelihood of occurrence within the study area. The species has been recorded three times from within five kilometres of the study area (DSE 2005a).

Black Falcon *Falco subniger*

Black Falcon has its' stronghold in inland Australia. Most Victorian records come from the lowlands and only occasionally from the foothills. It occurs mainly over croplands, grasslands and wooded farmlands. To catch flushed prey, Black Falcon sweep low over croplands and grasslands and are often attracted by smoke from grassfires and late-summer burning off. This species nests in trees in old stick-nests of other birds (Marchant, S. and Higgins, P.J. (eds) 1993).

Black Falcon has been assigned a medium likelihood of occurrence within the study area. The species has not been recorded within 5km (DSE 2005a), but is predicted to occur within the study area by DEWHA (2009a).

Black-faced Monarch *Monarcha melanopsis*

Black-faced Monarch is a summer migrant to the south-east coastal areas (Pizzey and Knight 2007). It is found in the understorey of rainforest, densely wooded areas, mangroves and areas with a dense canopy (Pizzey and Knight 2007).

Black-faced Monarch has been assigned a medium likelihood of occurrence within the study area. The species has not been recorded within 5km (DSE 2005a), but is predicted to occur within the study area by DEWHA (2009a).

Blue-billed Duck *Oxyura australis*

This species inhabits deep, permanent, well-vegetated swamps, but at times (especially in winter) may occur in large numbers on large open wetlands (Pizzey and Knight 2007). The Blue-billed Duck catches food while diving or occasionally by feeding from the water surface. Their nests are built on trampled swamp vegetation around the base of established stands of reeds and rushes, often over water or on small islands (Rogers 1990).

Blue-billed Duck has been assigned a medium likelihood of occurrence within the study area and has been recorded once within five kilometres of the study area (DSE 2005a).

Brown Quail *Coturnix ypsilophora*

Brown Quail is widespread in Victoria, however suitable habitats are quite localised. It has been reported from grass and sedge flats, often adjacent to rivers and swamps. Along major rivers in northern Victoria they occur in River Red Gum forests and in eastern Victoria they inhabit wet woodlands and forests containing grasses and sword-sedges. It has also been observed in bracken, lucerne pastures, and potato crops. It feeds and nests on the ground (Marchant, S. and Higgins, P.J. (eds) 1993).

Brown Quail has been assigned a high likelihood of occurrence within the study area and has been recorded seven times within five kilometres (DSE 2005a).

Cape Barren Goose *Cereopsis novaehollandiae*

Cape Barren Goose occurs on coastal islands or on open wetlands and pastures on the mainland. Although some breeding birds remain throughout the year on islands off Wilsons Promontory (where they nest on the ground in tussock grasslands), young geese move away after the breeding seasons due to diminished food supply. These birds usually form feeding flocks in improved pastures on the mainland with some individuals moving farther afield (Rogers 1990).

Cape Barren Goose has been assigned a high likelihood of occurrence and has been recorded three times within five kilometres of the study area (DSE 2005a). Cape Barron Goose was recorded by Practical Ecology in the nearby Precinct Structure Plan area 16: *Cranbourne North (stage 2)* during fauna survey commissioned by GAA in 2009.

Cattle Egret *Ardea ibis*

Cattle Egret is a migratory species. Cattle Egret occurs in many types of wetlands; from tidal flats in estuaries and bays to the margins of inland lakes, swamps and rivers (Pizzey and Knight 2007). They also use farm dams, mangroves, flooded areas, and artificial wetlands created by irrigation. Cattle Egret are often seen foraging away from water in crops and pasture, they build stick-nests in trees, usually surrounded by water or dense treed cover, or occasionally in reed-beds (O'Brien 1990). The species nests colonially, often with other waterbirds. Egrets have become threatened due to development and removal habitat used for nesting sites.

Cattle Egret has been assigned a high likelihood of occurrence within the study area. A number of wetlands throughout the study area offer suitable habitat for Cattle Egret. This species was predicted to occur on DEWHA's *Protected Matters Search Tool* (DEWHA 2009a).

Chestnut-rumped Heathwren *Calamanthus pyrrhopygius*

Chestnut-rumped Heathwren mainly inhabits heathy woodlands or wet heaths and scrubs with emergent eucalypts or banksias in the lowlands and foothills. It will occasionally enter samphire shrublands with adjacent eucalyptus woodlands. The species may also occur locally in box-ironbark, stringybark and peppermint forests, mainly where there are scattered shrub layers and sparse tree cover. Occasionally recorded in peppermint forests and Snow Gum woodlands at high elevations (to 1200m) in rocky rain-shadow areas but do not occur in treeless heaths or dense forests (except sometimes in early regeneration stages). They feed on bare dry ground, in low shrubs and occasionally low trees, especially where abundant fallen branches or rocks are present. Their nests are built near the ground in shrubs or grass tussocks. (Marchant, S. and Higgins, P.J. (eds) 1993).

Fork-tailed Swift *Apus pacificus*

Fork-tailed Swift is a migratory species occurring throughout Australia. This species is almost entirely aerial, however it is known to roost on cliffs or in very large trees (Pizzey and Knight 2007).

Fork-tailed Swift has been assigned a high likelihood of occurrence within the study area and has been predicted to occur by DEWHA (2009a).

Grey Goshawk *Accipiter novaehollandiae*

Grey Goshawk, particularly the white form, has a stronghold in the Otway Ranges, where wet forests and gullies containing Mountain Grey Gum adjoin partly cleared farmlands. They occur in lower densities in similar habitats in the Strzelecki Ranges, Gippsland Plains and Otway Plains. Elsewhere in the State they are occasionally seen in woodlands, dry forests, suburban parks and wooded farmlands (Marchant, S. and Higgins, P.J. (eds) 1993).

Grey Goshawk has been assigned a medium likelihood of occurrence within the study area. The species has been recorded four times within five kilometres (DSE 2005a).

Grey-headed Flying-fox *Pteropus poliocephalus*

Grey-headed Flying-fox occurs in various forest habitats in close proximity to plentiful supplies of nectar producing flowers and fleshy fruit. Large camps can be found roosting in the branches of tall trees in a range of vegetation types, including rainforest patches, Melaleuca stands, mangroves, riparian woodland and modified vegetation in urban areas (Richards 1983).

Grey-headed Flying-fox has been assigned a medium likelihood of occurrence within the study area and has been predicted to occur by DEWHA (2009a).

Growling Grass Frog *Litoria raniformis*

Growling Grass-frog often inhabitants water bodies with a diverse assemblage of aquatic vegetation, including emergent species such as sedges *Gahnia* spp., submergent species such as curly pondweed *Potamageton* spp., floating species such as water ribbon *Triglochin* spp. and filamentous algae (Hamer and Organ 2006, Heard et al. 2004a). Aquatic vegetation provides sites for male frogs to call from, sites for eggs to be deposited and remain relatively safe during development, and for food and shelter for tadpoles. Dense submergent vegetation is especially important to protect eggs and tadpoles from predation (Heard et al. 2004).

Growling Grass Frog has been assigned medium likelihood of occurrence within the study area and has been recorded within wetlands at the RBGC during the 1980's (DSE 2005a). Growling Grass Frog habitat is considered to be of moderate quality within wetlands at the Settlers Run Golf Course. This species is also predicted to occur by DEWHA (2009a).

Hardhead *Aythya australis*

Hardheads inhabit deep to shallow wetlands with open water and fringing emergent vegetation (Pizzey and Knight 2007). The species feeds by diving in deep water and occasionally by dabbling just under the water surface (Rogers 1990). Nests are built in thick vegetation such as reeds, lignum and cumbungi, usually over water (Rogers 1990; Halse et al. 2005). These birds

are most common in the wetland systems of inland Australia (Halse et al. 2005). Birds visit Victoria from these areas in spring and summer, returning as the northern wetlands are replenished by rain (Halse et al. 2005). However, some birds are present in Victoria all year round depending on the suitability of wetland habitats (Pizzey and Knight 2007).

Hardhead has been assigned a high likelihood of occurrence and has been recorded ten times within five kilometres of the study area (DSE 2005a). Hardhead was also recorded within the study area in 1999, 2000 and 2001 (DSE 2005a). Hardhead was recorded by Practical Ecology in the nearby Precinct Structure Plan area 16: *Cranbourne North (stage 2)* during fauna survey commissioned by GAA in 2009.

Hooded Robin *Melanodryas cucullata*

Hooded Robin occurs at highest densities in semi-arid north-western Victoria where they inhabit mallee scrubs, cypress pine (Callitris) woodlands, mallee heaths with scattered trees and box-ironbarks forests. The species is uncommon in southern Victoria where they occur in a range of lightly timbered habitats containing tall shrubs. These habitats include Yellow Box (*E. melliodora*) woodlands, coastal heaths and heathy woodlands (Marchant, S. and Higgins, P.J. (eds) 1993). Hooded-Robin forage on bare ground, using vantage points such as dead limbs or fence posts to detect prey. Nests are built in trees, shrubs, stumps or cavities of dead tree trunks (Pizzey and Knight 2007).

Hooded Robin has been assigned a medium likelihood of occurrence and has been recorded once within five kilometres of the study area (DSE 2005a).

Latham's Snipe *Gallinago hardwickii*

Latham's Snipe is a migratory species. The species migrates to Victoria from breeding grounds in Japan. In Victoria this species is widely distributed in a range of habits including heavily vegetated freshwater swamps, and pools or ditches in heaths or subalpine herblands (Pizzey and Knight 2007). Lathams's Snipe also occurs in small ephemeral wetlands such as wet depressions after floods recede. They generally roost in thick vegetation during the day, sometimes under shrubs away from wetlands, and will feed in swamps at night. They are occasionally seen feeding during the day. This species feeds by probing in soft mud and rarely moves far from concealing vegetation (Higgins and Davies 1996).

Latham's Snipe has been assigned a high likelihood of occurrence within the study area. The species has been recorded three times within five kilometres of the study area (DSE 2005a) and is predicted to occur by DEWHA (2009a).

Lewin's Rail *Lewinia pectoralis*

Lewin's Rail is a secretive species that inhabits areas of heavily vegetated swamps, such as coastal saltmarshes, rush dominated ditches and swampy streams. The species occasionally ventures quite far from water. It feeds from the surface of wet mud, usually among dense woody-stemmed vegetation. The species constructs nests that are generally found near the ground in dense cover (Marchant, S. and Higgins, P.J. (eds) 1993).

Lewin's Rail has been assigned a high likelihood of occurrence within the study area and has been recorded once within five kilometres (DSE 2005a).

Little Bittern *Ixobrychus minutus*

Little Bittern occurs mainly in northern Victoria in wetlands and floodplains along the Murray River and tends to inhabit emergent vegetation and reedbeds. It also utilises floating masses of aquatic vegetation in freshwater wetlands. This species is rarely seen due to it using dense vegetation as preferred habitat. The Little Bittern will feed in shallow water in dense vegetation and their platform nests are built in low dense swampy vegetation (Marchant, S. and Higgins, P.J. (eds)1990).

Little Bittern has been assigned a medium likelihood of occurrence within the study area and has been recorded twice within five kilometres (DSE 2005a). The species was recorded within the quarry in the study area in 2002 (DSE 2005a).

Pacific Gull *Larus pacificus pacificus*

Pacific Gull is one of the largest gulls within the Australian and New Zealand territories, confined to the coast where flocks occur on intertidal mudflats and nearby rubbish tips in Port Phillip Bay, Western Port and Corner Inlet, with smaller numbers elsewhere on estuaries, along beaches and on other intertidal habitats (Higgins and Davies 1996). This species breeds mainly on islands in Bass Strait and off Tasmania. Smaller numbers breed on islands off Wilsons Promontory. Their nests are built on the ground on the tops of steep-sided islands (Higgins and Davies 1996).

Pacific Gull has been assigned a medium likelihood of occurrence and has been recorded within the study area in 1999 and 2000 (DSE 2005a). The species has been recorded 63 times within five kilometres (DSE 2005a).

Pied Cormorant *Phalacrocorax varius*

Pied Cormorant is most often found along the coast, however Pied Cormorant are also known to use inland wetlands including billabongs, deep and open swamps and rivers (large freshwater and saline wetlands). They nest in colonies, building platforms nests in mangroves or other trees (Pizzey and Knight 2007).

Pied Cormorant has been assigned a medium likelihood of occurrence within the study area. The species has been recorded once within five kilometers of the study area (DSE 2005a).

Powerful Owl *Ninox strenua*

Powerful Owl is widespread in foothill and coastal forests where they tend to favour gullies with peppermint and manna gum forests. They are occasionally seen in wetter mountain forests, drier box-ironbark forests, open woodlands, and softwood plantations. This species requires very large hollows for breeding (Higgins 1999).

Powerful owl has been assigned a medium likelihood of occurrence and has been recorded once within five kilometres (DSE 2005a).

Rainbow Bee-eater *Merops ornatus*

Rainbow Bee-eater is a migratory species. It occurs in many types of habitat including woodland, shrubland, semi-cleared land and farmland, however it mainly occurs where

eucalyptus species are dominant (Higgins 1999). It is almost entirely insectivorous and mostly occurs near to permanent water (Higgins 1999).

Rainbow Bee-eater has been assigned a medium likelihood of occurrence and has been predicted to occur by DEWHA (2009a).

Regent Honeyeater *Anthochaera phrygia*

Regent Honeyeater occurs mainly in box-ironbark forests and woodlands north of the Great Divide (Pizzey and Knight 2007). This species is highly nomadic, their movements are determined by the flowering of eucalypts (Pizzey and Knight 2007).

Regent Honeyeater has been assigned a medium likelihood of occurrence and has been predicted to occur by DEWHA (2009a).

Royal Spoonbill *Platalea regia*

Royal Spoonbill inhabits the shallow parts of fresh and saline wetlands; these birds are gregarious and are often found in small flocks. They are mostly common on intertidal mudflats in coastal bays. Their stick-nests are built in reeds, shrubs or trees, singly or in loose colonies and are often seen with other species (Rogers 1990).

Royal Spoonbill was recorded within the study area in 1978 (DSE 2005a). Royal spoonbill has been assigned a high likelihood of occurrence within the study area. The species has been recorded four times within five kilometres of the study area (DSE 2005a).

Rufous Fantail *Rhipidura rufifrons*

Rufous Fantail is migratory and can be found in a variety of habitats including swampy woodland, rainforest, mangrove, dense wet forests. It is generally found where there is dense shade and thick understorey shrubs and bushes and is often seen close to the ground. It can be found in less dense habitats during migration and has been seen in many urban sites (Australian Museum 2008).

Rufous Fantail has been assigned a high likelihood of occurrence and has been predicted to occur by DEWHA (2009a).

Satin Flycatcher *Myiagra cyanoleuca*

Satin Flycatcher is a migratory bird and occurs in Victoria during the spring/summer months. It is generally found in wet dense forests and gullies (Australian Museum 2008).

Satin Flycatcher has been assigned a medium likelihood of occurrence and has been predicted to occur by DEWHA (2009a).

Southern Brown Bandicoot *Isoodon obesulus obesulus*

Southern Brown Bandicoot is found in heathy forest, heath and coastal scrub. It shelters in a nest of vegetation beneath dense cover, it eats fungi, tubers and arthropods (Menkhorst and Knight 2001).

Southern Brown Bandicoot was recorded within the study area during the current assessment (see section 13.4.1 for a more detailed description of habitat requirements). Southern brown Bandicoot was also recorded in 1995 within the quarry at 860 Ballarto Road (DSE 2005a).

Southern Toadlet *Pseudophryne semimarmorata*

Southern Toadlet can be found in dry forest, woodland, shrubland, grassland and heaths. It shelters under leaf litter and other debris in moist soaks and depressions. Their eggs are spawned in shallow burrows under organic litter in low areas close to water (Hero et al. 1991).

Southern Toadlet was recorded within the study area during the current assessment (Section 13.4.1). The species has been recorded four times within five kilometres of the study area, of which the most recent was in 2001 (DSE 2005a).

Spotted Harrier *Circus assimilis*

Spotted Harrier occurs in open grasslands, open shrublands, saltbush, open woodlands, crops and similar low vegetation that allows for hunting. Their stick nests are built in low trees (Pizzey and Knight 2007).

Spotted Harrier has been assigned a medium likelihood of occurrence within the study area. The species has been recorded twice within five kilometres of the study area (DSE 2005a).

Swamp Skink *Egernia coventryi*

Swamp Skink can be found in cool temperate, low-lying wetlands including swamp margins, tea-tree thickets and tidal salt-marshes. This species is secretive, and often found in dense low vegetation. It shelters in burrows.(Wilson, S. and Swan, G. 2003)

Swamp Skink was recorded within the study area during the current assessment (Section 13.4.1). The species has been recorded eleven times within five kilometers of the study area, including within RBGC (DSE 2005a).

Swift Parrot *Lathamus discolor*

Swift Parrot is a winter migrant to Victoria (Swift Parrot Recovery Team 2001) from their breeding areas in Tasmania, however small numbers of non-breeding birds may remain here during summer (Higgins 1999, Swift Parrot Recovery Team 2001). They are nomadic, and follow the flowering of trees and psyllid infestations. In Victoria their distribution is centred on box-ironbark forests, but they are often seen in town parks and occur sporadically elsewhere in dry forests, dry woodlands and wooded farmlands but are seldom seen in treeless areas, rainforests or wet forests (Higgins 1999, Pizzey and Knight 2007). They feed mainly in winter-flowering plants in Victoria, especially Red Ironbarks and ornamental trees and shrubs (Higgins 1999, Swift Parrot Recovery Team 2001).

Swift Parrot has been assigned a high likelihood of occurrence within the study area. The species has been recorded once within five kilometers of the study area. This species is also predicted to occur by DEWHA (2009a).

White-bellied Sea-Eagle *Haliaeetus leucogaster*

White-bellied Sea-eagle mainly occurs along the coast, but may travel along some inland rivers and lakes (Pizzey and Knight 2007).

White-bellied Sea-Eagle has been assigned a medium likelihood of occurrence within the study area. The species has been recorded once within five kilometers of the study area. This species is also predicted to occur by DEWHA (2009a).

White-throated Needletail *Hirundapus caudacutus*

White Throated Needletail is a migratory species. It is almost entirely aerial and occurs over many types of habitat (Pizzey and Knight 2007).

White-throated Needletail has been assigned a high likelihood of occurrence within the study area. No records are listed on DSE's AVW within five kilometers (DSE 2005a). The species is however, predicted to occur by DEWHA (2009a).

13.5 Relevant Policy and Legislation

The following section explores the two primary *Acts* pertaining to native fauna from national level and state jurisdictions.

Environment Protection and Biodiversity Conservation Act 1999

The *EPBC Act 1999* applies to sites where proposed developments or projects may have a *significant impact* on *matters of National environmental significance*.

Under the EPBC Act, the proponent must refer proposed actions that may require approval, to the Commonwealth Environment Minister. The Minister then decides which assessment and reporting option is applied. The Minister may approve a 'controlled action' allowing the development to proceed provided conditions are applied to mitigate significant impacts protected by this act.

One species listed as threatened under the EPBC Act 1999; Southern Brown bandicoot, was recorded within the study area during the current assessment.

Using the DEWHA's *Protected Matters Search Tool* (DEWHA 2009a), 23 threatened species of national significance were predicted to occur within a 5km radius from the centre of the study area (Table 5). Six EPBC listed species were recorded within 5km of the study area on DSE's AVW (DSE 2007). No listed threatened communities were recorded during this survey.

Eleven species listed as either migratory or threatened under the EPBC Act 1999 were assessed as having at least medium likelihood of occurrence within the study area (Section 13.2).

Any proposals for rezoning (or associated development) of the precinct need consider the potential impact on nationally significant fauna that occur or are have at least a medium likelihood of occurrence, and those that have been recorded within five kilometres of the study area. Given the occurrence of one EPBC listed species and that there are eleven EPBC listed species with at least medium likelihood of occurrence of five EPBC listed species to utilise the study area, proposed rezoning would likely trigger a referral to DEWHA under the EPBC Act 1999.

Flora and Fauna Guarantee Act 1988

The *FFG Act 1988* was legislated to ensure the continued survival of all Victorian species of flora and fauna and all Victorian communities of plants and animals. A key component of the FFG Act is to ensure the sustainable use of flora and fauna resources whether they are threatened or not.

The FFG Act lists:

- threatened species of flora and fauna
- threatened communities of flora and fauna
- protected flora
- potentially threatening processes.

Two species listed under the *FFG Act 1988*; Swamp Skink and Southern Brown Bandicoot were recorded during the current assessment. One species, Little Bittern *Ixobrychus minutus* was recorded within the study area in 2002 (DSE 2005a). There are no listed threatened communities known to occur within the study area.

Thirteen FFG listed species were assessed as having at least medium likelihood of occurrence within the study area (Section 13.4) (Appendix 5). Four of the thirteen FFG species likely to occur are also EPBC-listed (Appendix 5).

Any proposals for rezoning (or associated development) of the precinct need consider the potential impacts on FFG-listed threatened fauna that occur or have at least a medium likelihood to occur within the study area. Given that there at least two species known to occur and a further thirteen FFG listed species with at least a medium likelihood of occurrence within the study area, FFG permits would need to be attained as part of any rezoning process.

14. FAUNA CONCLUSION

Botanic Ridge currently supports at least three threatened fauna species and has the potential to support numerous other threatened species, including a suite of threatened wetland birds. Further survey at appropriate times of the year is required to gain a better understanding of threatened species presence within the study area.

Habitat for threatened species is confined primarily to roadsides, wetlands, drainage lines and the areas of woodland in the north-west of the study area. Large areas of agricultural land within the study area has limited habitat value for fauna, with the exception of pasture near existing drainage lines and wetlands, which may serve as foraging grounds for wetland birds (Marchant and Higgins 1990).

It is estimated that about 7% of former native vegetation remains within the City of Casey, of which a significant proportion has been highly modified (McMillan et al. 2003). Patterns of vegetation clearance within the study area are consistent with those undertaken historically throughout the City of Casey, whereby, the majority of the study area has been cleared and remaining native vegetation has been modified to varying degrees. All remnant vegetation and all remaining habitat, both indigenous and non-indigenous, is therefore significant as a local source of biodiversity.

Non-indigenous habitat comprises planted non-indigenous Eucalypts and other established tree species along fence-lines and roadsides (Figure 3). In addition, some drainage lines and roadsides are dominated by exotic vegetation which serves as habitat, including habitat for threatened wetland birds and amphibians (Figure 3). Established trees, especially Eucalypts are valueable habitat for threatened woodland birds. Some properties, including 60 Botanic Drive, are infested with weed species such as Gorse **Ulex europaeus* and Blackberry **Rubus fruticosus* spp. agg., which may be habitat for threatened fauna, such as Southern Brown Bandicoot.

Fauna habitat within *Botanic Ridge* is especially significant due to its proximity to a large intact remnant; the state significant RBGC. A number of threatened fauna species known to occur within the gardens have been recorded within the study area during the current assessment.

RBGC is considered a core area of habitat in the region. Previous studies that have identified habitat links within *Botanic Ridge* designed to connect RBGC to other core areas of habitat in the bioregion. A stable population of Southern Brown Bandicoot occurs within RBGC. Southern Brown Bandicoot was recorded within the north-west of the study area and it is also likely that Southern Brown Bandicoot occurs wherever adequate vegetative cover occurs within *Botanic Ridge* (Terry Coates *pers comm*.). The proposed rezoning of *Botanic Ridge* therefore has implications under the EPBC Act 1999 due to the future developments' potential impact on a matter of national environmental significance. Habitat links

Wetlands within the study area are particularly important areas of faunal habitat, including habitat for threatened wetland birds.

Roadsides are also particularly important habitat, given the occurrence of Swamp Skink and Southern Toadlet within roadside habitats, including within sites not mapped as meeting DSE (2004) native vegetation cover thresholds. Given the occurrence of threatened species within

these modified habitats, and the frequent occurrence of similar habitats throughout roadsides in the study area, roadsides are highly likely to be serving as dispersal corridors for a range of species, including threatened species that occur within the study area.

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Fauna Appendix 1. Methodology for Defining Significance

This section outlines the assessment methods or criteria used to determine the significance of species, plant communities, fauna habitats and sites. Criteria are consistent with government policies, legislation and publications.

Fauna

The level of significance for fauna species is determined according to the definitions below:

International Significance	Migratory species protected under international treaties (JAMBA, CAMBA, ROKAMBA and Bonn) or listed on the IUCN Red Data List 2006 as threatened
National Significance	Species listed under the *Environment Protection and Biodiversity Conservation Act 1999* as extinct, extinct in the wild, critically endangered, endangered or vulnerable.
State Significance	Species listed as Threatened under Schedule 2 of Victoria's *Flora and Fauna Guarantee Act 1988* Species listed as extinct, critically endangered, endangered, vulnerable in Victoria *Advisory List of Threatened Vertebrate Fauna in Victoria – 2007* (DSE 2007)
Regional Significance	Species listed as data deficient or near threatened in Victoria *Advisory List of Threatened Vertebrate Fauna in Victoria – 2007* (DSE 2007)
Local Significance	Species considered rare, threatened or uncommon within the local area (5km radius from the study area) by the authors with consideration given to previous studies. Many native species are considered to be locally significant within urban areas due to typically high levels of habitat alteration.

Fauna Appendix 2. Threatened species recorded during the current assessment

Botanic Ridge study area assessment period: 11/2/2009 to 10/5/2009. Fauna taxa recorded within the study area during this survey by Malcolm Legg of Mal's Ecological and Environmental Services and Joanne North, Joanne henry and Michael Reynolds of Practical Ecology.

		Conservation Status									
Common Name	**Scientific Name**	**EPBC**	**FFG**	**DSE (2007)**	**Area Observed**	**Number of individuals**	**Date**	**Time**	**Weather Conditions**	**GPS coordinates**	**Type of record**
Southern Brown Bandicoot	*Isoodon obesulus*	EN	L	n	Ballarto Road opposite quarry.	up to 5 diggings	12/3/2009	11.33am	Sunny around 22'C	38* 07'31.980"S 145*15'37.386"E	Diggings observed
					Ballarto Rd near RBGC entrance.	3 diggings	12/3/2009	11 .58am	Sunny around 22'C	38* 07'35.574"S 145*16'05.556"E	Diggings observed
Southern Toadlet	*Pseudophryne semimarmorata*			v	Pearcedale Rd along Electricity Road Reserve in gutter	2	18/3/2009	10.37am	Overcast with drizzle 19*C	38*08'23.964"S 145*14'49.602"E	Seen Heard
					Settlers Run Golf Course in drainage line.	2	19/3/2009	10.26am	Overcast to sunny around 23'C	38*07'47.964"S 145*15'15.666"E	Seen Heard
Swamp Skink	*Egernia coventryi*		L	v	Ballarto Road opposite quarry under cardboard.	1	12/03/09	10 .54am	Sunny around 22'C	38*07'32.232'S 145*15'39.402"E	Seen
					Ballarto Road opposite quarry in Elliot trap (male).	1	13/03/09	08 .45am	Sunny around 20'C	38*07'32.382"S 145*15'40.464"E	Trapped
					Settlers Run Golf Course in paperbark thicket.	1	19/03/09	11.34am	Overcast to sunny around 23'C	38*07'46.122"S 145*15'11.826"E	Seen
Pacific Gull	*Larus pacificus pacificus*			n	20 Botanic Drive	12	22/04/2010	9:00am	Sunny around 20'C	38*07'56.85"S 145*17'22.73"E	Seen

Codes for DSE (2007) Conservation Status

- E Endangered in Australia (EPBC Act)
- L Listed as threatened in Victoria (FFG Act)
- v vulnerable in Victoria (DSE 2007)
- n near threatened in Victoria (DSE 2007)

Fauna Appendix 3. Fauna recorded during the current assessment

Botanic Ridge study area assessment period: 11/2/2009 to 10/5/2009. Fauna taxa recorded incidentally and during targeted searches for threatened searches from within the study area during this survey by Malcolm Legg of Mal's Ecological and Environmental Services and Joanne North, Joanne henry and Michael Reynolds of Practical Ecology.

		Conservation Status			
Common Name	**Scientific Name**	**EPBC**	**FFG**	**DSE (2007)**	**Conservation Significance**
BIRDS					
Australasian Grebe	*Tachybaptus novaehollandiae*				Local
Australian Magpie	*Gymnorhina tibicen*				Local
Australian Raven	*Corvus coronoides*				Local
Australian White Ibis	*Threskiornis molucca*				Local
Australian Wood Duck	*Chenonetta jubata*				Local
Bell Miner	*Manorina melanophrys*				Local
Black Swan	*Cygnus atratus*				Regional
Black-fronted Dotterel	*Elseyorinis melanops*				Regional
Blue-winged Parrot	*Neophema chrysostoma*				Regional
Brown Goshawk	*Accipiter fasciatus*				Local
Brown Thornbill	*Acanthiza pusilla*				Local
Chestnut Teal	*Anas castanea*				Local
Clamerous Reed Warbler	*Acrocephalus stentoreus*				Local
Common Blackbird	**Turdus merula*				
Common Bronzewing	*Phaps chalcoptera*				Regional
Common Long-necked Tortoise	*Chelodina longicollis*				Local
Common Myna	**Acridotheres tristis*				
Common Starling	**Sturnus vulgaris*				
Crested Pigeon	*Ocyphaps lophotes*				Local
Dusky Woodswallow	*Artamus cyanopterus*				Local
Eastern Rosella	*Platycercus eximius*				Local
Eastern Yellow Robin	*Eopsaltria australis*				Regional
Eurasian Coot	*Fulica atra*				Local
Galah	*Eolophus roseicapillus*				Local
Golden Whistler	*Pachycephala pectoralis*				Local
Grey Butcherbird	*Cracticus torquatus*				Local
Grey Fantail	*Rhipidura fuliginosa*				Local
Grey Shrike Thrush	*Colluricincla harmonica*				Local
Hardhead	*Aythya australis*				Local
Laughing Kookaburra	*Dacelo novaehollandiae*				Local
Little Corella	*Cacatua sanguinea*				Regional
Little Grassbird	*Megalurus gramineus*				Local
Little Pied Cormorant	*Phalacrocorax melanoleucos*				Local
Little Raven	*Corvus mellori*				Local
Little Wattlebird	*Anthochaera chrysoptera*				Local
Magpie-lark	*Grallina cyanoleura*				Local
Masked Lapwing	*Vanellus miles*				Local
Musk Lorikeet	*Glossopsitta concinna*				Regional
New Holland Honeyeater	*Phylidonyris novaehollandiae*				Local
Noisy Miner	*Manorina melanocephala*				Local
Pacific Black Duck	*Anas superciliosa*				Local
Pacific Gull	*Larus pacificus pacificus*				State
Purple Swamphen	*Porphyrio porphyrio*				Local
Rainbow Lorikeet	*Trichoglossus haematodus*				Local
Red Wattlebird	*Anthochaera carunculata*				Local
Red-browed Finch	*Neochmia temporalis*				Local
Red-rumped Parrot	*Pesphotus haematonotus*				Regional
Silver Gull	*Chroicocephalus novaehollandiae*				Local
Silvereye	*Zosterops lateralis*				Local

Common Name	Scientific Name	Conservation Status			Conservation Significance
		EPBC	FFG	DSE (2007)	
Skylark	**Alauda arvensis*				
Spotted Pardalote	*Pardalotus punctatus*				Local
Spotted Turtle-Dove	**Streptopelia chinensis*				
Straw-necked Ibis	*Threskiornis spinicollis*				Local
Sulphur-crested Cockatoo	*Cacatua galerita*				Local
Superb Fairy-wren	*Malurus cyaneus*				Local
Swamp Harrier	*Circus approximans*				Regional
Tawny Frogmouth	*Podargus strigoides*				Local
Wedge-tailed Eagle	*Aquila audax*				Local
Welcome Swallow	*Hirundo neoxena*				Local
White-browed Scrubwren	*Sericornis frontalis*				Local
White-eared Honeyeater	*Lichenostomus leucotis*				Local
White-throated Needletail	*Hirundapus caudactus* race *caudactus*				Local
Willy Wagtail	*Rhipidura leucophrys*				Local
Yellow-faced Honeyeater	*Lichenostomus chrysops*				Local
Yellow-tailed Black-Cockatoo	*Calyptorhynchus funereus*				Local
AMPHIBIANS					
Common Froglet	*Crinia signifera*				Local
Southern Brown Tree Frog	*Litoria ewingii*				Local
Southern Toadlet	*Pseudophryne semimarmorata*			v	State
Spotted Marsh Frog	*Limnodynastes tasmaniensis*				Local
Striped Marsh Frog	*Limnodynastes peroni*				Regional
Whistling Treefrog	*Litoria verreauxii*				Local
REPTILES					
Delicate Skink	*Lampropholis delicata*				Regional
Eastern Small-eyed Snake	*Cryptophis nigrescens*				Regional
Eastern-three-lined Skink	*Acritoscincus duperreyi*				Regional
Garden Skink	*Lampropholis guichenoti*				Local
Lowland Copperhead	*Austrelaps superbus*				Local
Swamp Skink	*Egernia coventryi*		L	v	State
Tiger Snake	*Notechis scutatus*				Local
Tree Dragon	*Amphibolurus muricatus*				Regional
Weasel Skink	*Saproscincus mustelinus*				Regional
MAMMALS					
Common Brushtail Possum	*Trichosurus vulpecula*				Local
Common Ringtail Possum	*Pseudocheirus peregrinus*				Local
Eastern Grey Kangaroo	*Macropus giganteus*				Local
European Rabbit	**Oryctolagus cunniculus*				
Feral Cat	**Felis catus*				
House Mouse	**Mus musculus*				
Koala	*Phascolarctos cinereus*				Regional
Red Fox	**Vulpes vulpes*				
Short-beaked Echidna	*Tachyglossus aculeatus*				Regional
Southern Brown Bandicoot	*Isoodon obesulus*	EN	L	n	State
Swamp Rat	*Rattus lutreolus ssp. Lutreolus*				Regional

Table key:

Conservation status

v	vulnerable in Victoria (DSE 2007) and Australia (EPBC Act)
e	endangered in Victoria (DSE 2007) and Australia (EPBC Act)
n	near threatened in Victoria (DSE 2007)
L	listed as threatened under FFG Act 1988
I	Invalid or ineligible under FFG Act 1988
*	introduced species

Fauna Appendix 4. Fauna records during the current assessment: Property Records

Botanic Ridge study area assessment period: 11/2/2009 to 10/5/2009. Fauna taxa recorded incidentally and during targeted searches for threatened searches from within the study area during this survey by Malcolm Legg of Mal's Ecological and Environmental Services and Joanne North, Joanne henry and Michael Reynolds of Practical Ecology.

This Appendix presents records for individual properties within the study area.

Site 1- Ballarto Road –Road Reserve.

Common Name	Scientific Name	Conservation status within site.	Type of record
REPTILES			
Swamp Skink	*Egernia coventryi*	Rare	St
BIRDS			
Australian Magpie	*Gymnorhina tibicen*	Common	Lhs
Australian Raven	*Corvus coronoides*	Common	Lhs
Bell Miner	*Manorina melanophrys*	Common	Rhs
Blue-winged Parrot	*Neophema chrysostoma*	Rare	Rhs
Brown Goshawk	*Accipiter fasciatus*	Uncommon	Lhs
Brown Thornbill	*Acanthiza pusilla*	Common	Lhs
Common Blackbird	**Turdus merula*	Common	hs
Common Myna	**Acridotheres tristis*	Common	hs
Common Starling	**Sturnus vulgaris*	Common	hs
Eastern Rosella	*Platycercus eximius*	Common	Lhs
Eastern Yellow Robin	*Eopsaltria australis*	Rare	Rhs
Grey Fantail	*Rhipidura fuliginosa*	Common at times	Lhs
Laughing Kookaburra	*Dacelo novaehollandiae*	Uncommon	Lhs
Little Corella	*Cacatua sanguinea*	Uncommon	Lhs
Magpie-lark	*Grallina cyanoleura*	Common	Lhs
Masked Lapwing	*Vanellus miles*	Uncommon	Lhs
Musk Lorikeet	*Glossopsitta concinna*	Uncommon	HLhs
New Holland Honeyeater	*Phylidonyris novaehollandiae*	Uncommon	Lhs
Noisy Miner	*Manorina melanocephala*	Common	Lhs
Pacific Black Duck	*Anas supoerciliosa*	Uncommon	Lhs
Rainbow Lorikeet	*Trichoglossus haematodus*	Common	Lhs
Silvereye	*Zosterops lateralis*	Common	Lhs
Spotted Turtle-Dove	**Streptopelia chinensis*	Common	hs
Sulphur-crested Cockatoo	*Cacatua galerita*	Common	Lhs
Superb Fairy-wren	*Malurus cyaneus*	Common	Lhs
Welcome Swallow	*Hirundo neoxena*	Common	Lhs
White-browed Scrubwren	*Sericornis frontalis*	Common	Lhs
White-eared Honeyeater	*Lichenostomus leucotis*	Uncommon	HLhs
White-throated Needletail	*Hirundapus caudactus* race *caudactus*	Common at times	HLs
MAMMALS			
Common Brushtail Possum	*Trichosurus vulpecula*	Uncommon	Lhs
Common Ringtail Possum	*Pseudocheirus peregrinus*	Uncommon	LhsI
Short-beaked Echidna	*Tachyglossus aculeatus*	Rare	RsI
Southern Brown Bandicoot	*Isoodon obesulus*	Rare	NI
Swamp Rat	*Rattus lutreolus ssp. Lutreolus*	Uncommon	RtI
INTRODUCED MAMMALS			
European Rabbit	**Oryctolagus cunniculus*	Common	si
Feral Cat	**Felis catus*	Common	t
Red Fox	**Vulpes vulpes*	Uncommon	sI

Site 2- 950 Ballarto Road.

Common Name	Scientific Name	Conservation status within site.	Type of record
REPTILES			

Eastern-three-lined Skink	*Acritoscincus duperreyi*	Uncommon	Rs
BIRDS			
Australian Magpie	*Gymnorhina tibicen*	Common	Lhs
Australian Raven	*Corvus coronoides*	Common	Lhs
Australian Wood Duck	*Chenonetta jubata*	Common	Lhs
Bell Miner	*Manorina melanophrys*	Common	Rhs
Brown Goshawk	*Accipiter fasciatus*	Uncommon	Lhs
Brown Thornbill	*Acanthiza pusilla*	Common	Lhs
Common Blackbird	**Turdus merula*	Common	hs
Common Bronzewing	*Phaps chalcoptera*	Uncommon	HLhs
Common Myna	**Acridotheres tristis*	Common	hs
Common Starling	**Sturnus vulgaris*	Common	hs
Eastern Rosella	*Platycercus eximius*	Common	Lhs
Galah	*Eolophus roseicapillus*	Uncommon	Lhs
Grey Fantail	*Rhipidura fuliginosa*	Common at times	Lhs
Grey Shrike Thrush	*Colluricincla harmonica*	Rare	Lhs
Laughing Kookaburra	*Dacelo novaehollandiae*	Uncommon	Lhs
Little Corella	*Cacatua sanguinea*	Uncommon	Lhs
Little Wattlebird	*Anthochaera chrysoptera*	Uncommon	Lhs
Magpie-lark	*Grallina cyanoleura*	Common	Lhs
Masked Lapwing	*Vanellus miles*	Uncommon	Lhs
New Holland Honeyeater	*Phylidonyris novaehollandiae*	Uncommon	Lhs
Noisy Miner	*Manorina melanocephala*	Common	Lhs
Rainbow Lorikeet	*Trichoglossus haematodus*	Common	Lhs
Red Wattlebird	*Anthochaera carunculata*	Common	Lhs
Silvereye	*Zosterops lateralis*	Common	Lhs
Spotted Pardalote	*Pardalotus punctatus*	Common	Lhs
Spotted Turtle-Dove	**Streptopelia chinensis*	Common	hs
Sulphur-crested Cockatoo	*Cacatua galerita*	Common	Lhs
Superb Fairy-wren	*Malurus cyaneus*	Common	Lhs
Swamp Harrier	*Circus approximans*	Rare	Rs
Welcome Swallow	*Hirundo neoxena*	Common	Lhs
White-browed Scrubwren	*Sericornis frontalis*	Common	Lhs
White-eared Honeyeater	*Lichenostomus leucotis*	Uncommon	HLhs
White-throated Needletail	*Hirundapus caudactus* race *caudactus*	Common at times	HLs
Yellow-faced Honeyeater	*Lichenostomus chrysops*	Common	Lhs
MAMMALS			
Common Ringtail Possum	*Pseudocheirus peregrinus*	Uncommon	LhsI
Short-beaked Echidna	*Tachyglossus aculeatus*	Uncommon	RsI
Swamp Rat	*Rattus lutreolus ssp. Lutreolus*	Uncommon	RtI
INTRODUCED MAMMALS			
European Rabbit	**Oryctolagus cunniculus*	Common	si
Feral Cat	**Felis catus*	Uncommon	t
Red Fox	**Vulpes vulpes*	Uncommon	sI

Site 3- 980 Ballarto Road .

Common Name	Scientific Name	Conservation status within site.	Type of record
REPTILES			
Eastern-three-lined Skink	*Acritoscincus duperreyi*	Uncommon	Rs
BIRDS			
Australian Magpie	*Gymnorhina tibicen*	Common	Lhs
Australian Raven	*Corvus coronoides*	Common	Lhs
Bell Miner	*Manorina melanophrys*	Common	Rhs
Brown Thornbill	*Acanthiza pusilla*	Common	Lhs
Common Blackbird	**Turdus merula*	Common	hs
Common Bronzewing	*Phaps chalcoptera*	Uncommon	HLhs
Common Starling	**Sturnus vulgaris*	Common	hs
Eastern Rosella	*Platycercus eximius*	Common	Lhs
Eastern Yellow Robin	*Eopsaltria australis*	Rare	Rhs
Grey Butcherbird	*Cracticus torquatus*	Uncommon	Lhs
Grey Fantail	*Rhipidura fuliginosa*	Common at times	Lhs
Laughing Kookaburra	*Dacelo novaehollandiae*	Uncommon	Lhs

Little Corella	*Cacatua sanguinea*	Uncommon	Lhs
Magpie-lark	*Grallina cyanoleura*	Common	Lhs
New Holland Honeyeater	*Phylidonyris novaehollandiae*	Uncommon	Lhs
Noisy Miner	*Manorina melanocephala*	Common	Lhs
Rainbow Lorikeet	*Trichoglossus haematodus*	Common	Lhs
Red Wattlebird	*Anthochaera carunculata*	Common	Lhs
Red-browed Finch	*Neochmia temporalis*	Uncommon	Lhs
Spotted Turtle-Dove	**Streptopelia chinensis*	Common	hs
Sulphur-crested Cockatoo	*Cacatua galerita*	Common	Lhs
Superb Fairy-wren	*Malurus cyaneus*	Common	Lhs
Welcome Swallow	*Hirundo neoxena*	Common	Lhs
White-browed Scrubwren	*Sericornis frontalis*	Common	Lhs
White-throated Needletail	*Hirundapus caudactus* race *caudactus*	Common at times	HLs
Willy Wagtail	*Rhipidura leucophrys*	Uncommon	Lhs
Common Myna	**Acridotheres tristis*	Common	hs
MAMMALS			
Common Ringtail Possum	*Pseudocheirus peregrinus*	Uncommon	LhsI
Swamp Rat	*Rattus lutreolus ssp. Lutreolus*	Uncommon	RtI
INTRODUCED MAMMALS			
European Rabbit	**Oryctolagus cunniculus*	Common	si
Feral Cat	**Felis catus*	Common	t
Red Fox	**Vulpes vulpes*	Uncommon	sI

Sites 4- Electricity Road- Road Reserve.

Common Name	Scientific Name	Conservation status within site.	Type of record
AMPHIBIANS			
Southern Toadlet	*Pseudophryne semimarmorata*	Rare	Sh
Spotted Marsh Frog	*Limnodynastes tasmaniensis*	Uncommon	Lh
Southern Brown Tree Frog	*Litoria ewingii*	Uncommon	
REPTILES			
Garden Skink	*Lampropholis guichenoti*	Uncommon	Lt
BIRDS			
Australian Magpie	*Gymnorhina tibicen*	Common	Lhs
Australian Raven	*Corvus coronoides*	Common	Lhs
Bell Miner	*Manorina melanophrys*	Common	Rhs
Blue-winged Parrot	*Neophema chrysostoma*	Rare	Rhs
Brown Thornbill	*Acanthiza pusilla*	Common	Lhs
Chestnut Teal	*Anas castanea*	Uncommon	Lhs
Common Blackbird	**Turdus merula*	Common	hs
Common Myna	**Acridotheres tristis*	Common	hs
Common Starling	**Sturnus vulgaris*	Common	hs
Crested Pigeon	*Ocyphaps lophotes*	Uncommon	Lhs
Eastern Rosella	*Platycercus eximius*	Common	Lhs
Grey Butcherbird	*Cracticus torquatus*	Uncommon	Lhs
Grey Fantail	*Rhipidura fuliginosa*	Common at times	Lhs
Grey Shrike Thrush	*Colluricincla harmonica*	Rare	Lhs
Laughing Kookaburra	*Dacelo novaehollandiae*	Uncommon	Lhs
Little Grassbird	*Megalurus gramineus*	Uncommon	Lhs
Magpie-lark	*Grallina cyanoleura*	Common	Lhs
Musk Lorikeet	*Glossopsitta concinna*	Uncommon	HLhs
Noisy Miner	*Manorina melanocephala*	Common	Lhs
Purple Swamphen	*Porphyrio porphyrio*	Uncommon	Lhs
Rainbow Lorikeet	*Trichoglossus haematodus*	Common	Lhs
Red-rumped Parrot	*Pesphotus haematonotus*	Rare	Lhs
Spotted Turtle-Dove	**Streptopelia chinensis*	Common	hs
Sulphur-crested Cockatoo	*Cacatua galerita*	Common	Lhs
Superb Fairy-wren	*Malurus cyaneus*	Common	Lhs
White-throated Needletail	*Hirundapus caudactus* race *caudactus*	Common at times	HLs
Willy Wagtail	*Rhipidura leucophrys*	Uncommon	Lhs
MAMMALS			

Short-beaked Echidna	*Tachyglossus aculeatus*	Uncommon	RsI
INTRODUCED MAMMALS			
Red Fox	**Vulpes vulpes*	Common	sI

Sites 5- Settlement Run Golf Course (Pearcedale Road).

Common Name	Scientific Name	Conservation status within site.	Type of record
AMPHIBIANS			
Southern Brown Tree Frog	*Litoria ewingii*	Uncommon	Lh
Southern Toadlet	*Pseudophryne semimarmorata*	Rare	Sh
Spotted Marsh Frog	*Limnodynastes tasmaniensis*	Uncommon	Lh
Striped Marsh Frog	*Limnodynastes peroni*		
Whistling Treefrog	*Litoria verreauxii*		
REPTILES			
Common Long-necked Tortoise	*Chelodina longicollis*	Uncommon	Ls
Eastern-three-lined Skink	*Acritoscincus duperreyi*	Uncommon	Rs
Lowland Copperhead	*Austrelaps superbus*	Uncommon	HLs
Swamp Skink	*Egernia coventryi*	Rare	Ss
Tree Dragon	*Amphibolurus muricatus*	Uncommon	Rt
BIRDS			
Australasian Grebe	*Tachybaptus novaehollandiae*	Uncommon	Lhs
Australian Magpie	*Gymnorhina tibicen*	Common	Lhs
Australian Raven	*Corvus coronoides*	Common	Lhs
Australian Wood Duck	*Chenonetta jubata*	Common	Lhs
Black-fronted Dotterel	*Elseyorinis melanops*	Uncommon	Rs
Brown Goshawk	*Accipiter fasciatus*	Uncommon	Lhs
Brown Thornbill	*Acanthiza pusilla*	Common	Lhs
Chestnut Teal	*Anas castanea*	Uncommon	Lhs
Clamerous Reed Warbler	*Acrocephalus stentoreus*		
Common Blackbird	**Turdus merula*	Common	hs
Common Bronzewing	*Phaps chalcoptera*	Uncommon	HLhs
Common Myna	**Acridotheres tristis*	Common	hs
Common Starling	**Sturnus vulgaris*	Common	hs
Dusky Woodswallow	*Artamus cyanopterus*	Uncommon	Lhs
Eastern Rosella	*Platycercus eximius*	Common	Lhs
Eurasian Coot	*Fulica atra*	Uncommon	Lhs
Galah	*Eolophus roseicapillus*	Uncommon	Lhs
Grey Butcherbird	*Cracticus torquatus*	Uncommon	Lhs
Grey Fantail	*Rhipidura fuliginosa*	Common at times	Lhs
Grey Shrike Thrush	*Colluricincla harmonica*	Rare	Lhs
Hardhead	*Aythya australis*	Rare	Ss
Laughing Kookaburra	*Dacelo novaehollandiae*	Uncommon	Lhs
Little Pied Cormorant	*Phalacrocorax melanoleucos*	Rare	Ls
Little Corella	*Cacatua sanguinea*	Uncommon	Lhs
Magpie-lark	*Grallina cyanoleura*	Common	Lhs
Masked Lapwing	*Vanellus miles*	Uncommon	Lhs
Noisy Miner	*Manorina melanocephala*	Common	Lhs
Pacific Black Duck	*Anas supoerciliosa*	Uncommon	Lhs
Purple Swamphen	*Porphyrio porphyrio*	Uncommon	Lhs
Rainbow Lorikeet	*Trichoglossus haematodus*	Common	Lhs
Red Wattlebird	*Anthochaera carunculata*	Common	Lhs
Red-browed Finch	*Neochmia temporalis*	Uncommon	Lhs
Silvereye	*Zosterops lateralis*	Common	Lhs
Silver Gull	*Chroicocephalus novaehollandiae*		
Spotted Pardalote	*Pardalotus punctatus*	Common	Lhs
Spotted Turtle-Dove	**Streptopelia chinensis*	Common	hs
Sulphur-crested Cockatoo	*Cacatua galerita*	Common	Lhs
Superb Fairy-wren	*Malurus cyaneus*	Common	Lhs
Tawny Frogmouth	*Podargus strigoides*		
Welcome Swallow	*Hirundo neoxena*	Common	Lhs
White-browed Scrubwren	*Sericornis frontalis*	Common	Lhs
White-throated Needletail	*Hirundapus caudactus* race *caudactus*	Common at times	HLs
Willy Wagtail	*Rhipidura leucophrys*	Uncommon	Lhs

MAMMALS			
Common Ringtail Possum	*Pseudocheirus peregrinus*	Uncommon	Lhsl
Eastern Grey Kangaroo	*Macropus giganteus*	Uncommon	Lhs
House Mouse	*Mus musculus*		
Short-beaked Echidna	*Tachyglossus aculeatus*	Uncommon	Rsl
Swamp Rat	*Rattus lutreolus ssp. Lutreolus*	Uncommon	Rtl
INTRODUCED MAMMALS			
European Rabbit	**Oryctolagus cunniculus*	Common	si
Feral Cat	**Felis catus*	Common	t
Red Fox	**Vulpes vulpes*	Common	sl
	*Denotes introduced species		

Site 6- Smiths Lane Road Reserve

Common Name	Scientific Name	Conservation status within site.	Type of record
AMPHIBIANS			
Spotted Marsh Frog	*Limnodynastes tasmaniensis*	Uncommon	Lhs
BIRDS			
Australian Magpie	*Gymnorhina tibicen*	Uncommon	Lhs
Australian Raven	*Corvus coronoides*	Common	Lhs
Brown Thornbill	*Acanthiza pusilla*	Uncommon	Lhs
Common Blackbird	**Turdus merula*	Uncommon	hs
Common Myna	**Acridotheres tristis*	Common	hs
Common Starling	**Sturnus vulgaris*	Common	hs
Eastern Rosella	*Platycercus eximius*	Uncommon	Lhs
Galah	*Eolophus roseicapillus*	Uncommon	Lhs
Grey Butcherbird	*Cracticus torquatus*	Uncommon	Lhs
Little Raven	*Corvus mellori*	Uncommon	Lhs
Magpie-lark	*Grallina cyanoleura*	Uncommon	Lhs
Noisy Miner	*Manorina melanocephala*	Common	Lhs
Rainbow Lorikeet	*Trichoglossus haematodus*	Uncommon	Lhs
Spotted Turtle-Dove	**Streptopelia chinensis*	Common	hs
Sulphur-crested Cockatoo	*Cacatua galerita*	Uncommon	Lhs
Welcome Swallow	*Hirundo neoxena*	Uncommon	Lhs
White-throated Needletail	*Hirundapus caudactus* race *caudactus*	Common at times	HLs
Willy Wagtail	*Rhipidura leucophrys*	Uncommon	Lhs
MAMMALS			
Common Ringtail Possum	*Pseudocheirus peregrinus*	Uncommon	Lhsl
INTRODUCED MAMMALS			
European Rabbit	**Oryctolagus cunniculus*	Uncommon	si
Feral Cat	**Felis catus*	Common	t
Red Fox	**Vulpes vulpes*	Common	sl

Site 7- 268 Smiths Lane.

Common Name	Scientific Name	Conservation status within site.	Type of record
BIRDS			
Australian Magpie	*Gymnorhina tibicen*	Uncommon	Lhs
Australian Raven	*Corvus coronoides*	Common	Lhs
Brown Thornbill	*Acanthiza pusilla*	Uncommon	Lhs
Common Blackbird	**Turdus merula*	Common	hs
Common Myna	**Acridotheres tristis*	Common	hs
Common Starling	**Sturnus vulgaris*	Common	hs
Crested Pigeon	*Ocyphaps lophotes*	Uncommon	Lhs
Eastern Rosella	*Platycercus eximius*	Uncommon	Lhs
Galah	*Eolophus roseicapillus*	Uncommon	Lhs
Grey Butcherbird	*Cracticus torquatus*	Uncommon	Lhs
Magpie-lark	*Grallina cyanoleura*	Common	Lhs
Noisy Miner	*Manorina melanocephala*	Common	Lhs
Rainbow Lorikeet	*Trichoglossus haematodus*	Uncommon	Lhs
Red Wattlebird	*Anthochaera carunculata*	Uncommon	Lhs
Silvereye	*Zosterops lateralis*	Uncommon	Lhs

Spotted Turtle-Dove	**Streptopelia chinensis*	Common	hs
Sulphur-crested Cockatoo	*Cacatua galerita*	Uncommon	Lhs
Welcome Swallow	*Hirundo neoxena*	Uncommon	Lhs
White-throated Needletail	*Hirundapus caudactus* race *caudactus*	Common at times	HLs
Willy Wagtail	*Rhipidura leucophrys*	Uncommon	Lhs
MAMMALS			
Common Ringtail Possum	*Pseudocheirus peregrinus*	Uncommon	Lhsl
INTRODUCED MAMMALS			
Feral Cat	**Felis catus*	Common	t
Red Fox	**Vulpes vulpes*	Common	sl

Site 8- 99 Browns Road.

Common Name	Scientific Name	Conservation status within site.	Type of record
BIRDS			
Australian Magpie	*Gymnorhina tibicen*	Uncommon	Lhs
Australian Raven	*Corvus coronoides*	Uncommon	Lhs
Common Myna	**Acridotheres tristis*	Common	hs
Common Starling	**Sturnus vulgaris*	Common	hs
Galah	*Eolophus roseicapillus*	Uncommon	Lhs
Grey Butcherbird	*Cracticus torquatus*	Uncommon	Lhs
Magpie-lark	*Grallina cyanoleura*	Uncommon	Lhs
Masked Lapwing	*Vanellus miles*	Uncommon	Lhs
Rainbow Lorikeet	*Trichoglossus haematodus*	Uncommon	Lhs
Spotted Turtle-Dove	**Streptopelia chinensis*	Uncommon	hs
Sulphur-crested Cockatoo	*Cacatua galerita*	Uncommon	Lhs
Welcome Swallow	*Hirundo neoxena*	Uncommon	Lhs
Willy Wagtail	*Rhipidura leucophrys*	Uncommon	Lhs
MAMMALS			
INTRODUCED MAMMALS			
Red Fox	**Vulpes vulpes*	Common	sl
	*Denotes introduced species		

Site 9- 39 Craig Road-Junction Village

Common Name	Scientific Name	Conservation status within site.	Type of record
BIRDS			
Australian Magpie	*Gymnorhina tibicen*	Uncommon	Lhs
Australian Raven	*Corvus coronoides*	Common	Lhs
Brown Thornbill	*Acanthiza pusilla*	Uncommon	Lhs
Common Blackbird	**Turdus merula*	Common	hs
Common Myna	**Acridotheres tristis*	Common	hs
Common Starling	**Sturnus vulgaris*	Common	hs
Eastern Rosella	*Platycercus eximius*	Uncommon	Lhs
Galah	*Eolophus roseicapillus*	Uncommon	Lhs
Grey Butcherbird	*Cracticus torquatus*	Uncommon	Lhs
Laughing Kookaburra	*Dacelo novaehollandiae*	Uncommon	Lhs
Magpie-lark	*Grallina cyanoleura*	Uncommon	Lhs
Noisy Miner	*Manorina melanocephala*	Common	Lhs
Rainbow Lorikeet	*Trichoglossus haematodus*	Uncommon	Lhs
Red Wattlebird	*Anthochaera carunculata*	Uncommon	Lhs
Silvereye	*Zosterops lateralis*	Uncommon	Lhs
Spotted Turtle-Dove	**Streptopelia chinensis*	Common	hs
Sulphur-crested Cockatoo	*Cacatua galerita*	Uncommon	Lhs
Welcome Swallow	*Hirundo neoxena*	Uncommon	Lhs
White-throated Needletail	*Hirundapus caudactus* race *caudactus*	Common at times	HLs
Willy Wagtail	*Rhipidura leucophrys*	Uncommon	Lhs
MAMMALS			
Common Ringtail Possum	*Pseudocheirus peregrinus*	Uncommon	Lhsl
INTRODUCED MAMMALS			
Red Fox	**Vulpes vulpes*	Common	sl
Feral Cat	**Felis catus*	uncommon	t

Site 10- Browns Road, Road Reserve.

Common Name	Scientific Name	Conservation status within site.	Type of record
BIRDS			
Australasian Grebe	*Tachybaptus novaehollandiae*	Uncommon	Lhs
Australian Magpie	*Gymnorhina tibicen*	Uncommon	Lhs
Australian Raven	*Corvus coronoides*	Common	Lhs
Australian Wood Duck	*Chenonetta jubata*	Uncommon	Lhs
Brown Thornbill	*Acanthiza pusilla*	Uncommon	Lhs
Chestnut Teal	*Anas castanea*	Uncommon	Lhs
Common Blackbird	**Turdus merula*	Uncommon	hs
Common Myna	**Acridotheres tristis*	Common	hs
Common Starling	**Sturnus vulgaris*	Common	hs
Eastern Rosella	*Platycercus eximius*	Rare	Lhs
Eurasian Coot	*Fulica atra*	Uncommon	Lhs
Galah	*Eolophus roseicapillus*	Uncommon	Lhs
Grey Butcherbird	*Cracticus torquatus*	Uncommon	Lhs
Laughing Kookaburra	*Dacelo novaehollandiae*	Uncommon	Lhs
Magpie-lark	*Grallina cyanoleura*	Common	Lhs
Masked Lapwing	*Vanellus miles*	Uncommon	Lhs
Noisy Miner	*Manorina melanocephala*	Common	Lhs
Pacific Black Duck	*Anas supoerciliosa*	Uncommon	Lhs
Rainbow Lorikeet	*Trichoglossus haematodus*	Uncommon	Lhs
Red Wattlebird	*Anthochaera carunculata*	Uncommon	Lhs
Spotted Turtle-Dove	**Streptopelia chinensis*	Common	hs
Sulphur-crested Cockatoo	*Cacatua galerita*	Uncommon	Lhs
White-throated Needletail	*Hirundapus caudactus* race *caudactus*	Common at times	HLs
Willy Wagtail	*Rhipidura leucophrys*	Uncommon	Lhs
MAMMALS			
INTRODUCED MAMMALS			
Red Fox	**Vulpes vulpes*	Common	sl

Site 11- Craig Road –Road Reserve.

Common Name	Scientific Name	Conservation status within site.	Type of record
BIRDS			
Australian Magpie	*Gymnorhina tibicen*	Uncommon	Lhs
Australian Raven	*Corvus coronoides*	Common	Lhs
Common Blackbird	**Turdus merula*	Common	hs
Common Myna	**Acridotheres tristis*	Common	hs
Common Starling	**Sturnus vulgaris*	Common	hs
Eastern Rosella	*Platycercus eximius*	Uncommon	Lhs
Galah	*Eolophus roseicapillus*	Uncommon	Lhs
Grey Butcherbird	*Cracticus torquatus*	Uncommon	Lhs
Magpie-lark	*Grallina cyanoleura*	Common	Lhs
Masked Lapwing	*Vanellus miles*	Uncommon	Lhs
Noisy Miner	*Manorina melanocephala*	Common	Lhs
Rainbow Lorikeet	*Trichoglossus haematodus*	Uncommon	Lhs
Red Wattlebird	*Anthochaera carunculata*	Common	Lhs
Silvereye	*Zosterops lateralis*	Common	Lhs
Spotted Turtle-Dove	**Streptopelia chinensis*	Common	hs
Sulphur-crested Cockatoo	*Cacatua galerita*	Uncommon	Lhs
Welcome Swallow	*Hirundo neoxena*	Common	Lhs
White-throated Needletail	*Hirundapus caudactus* race *caudactus*	Common at times	HLs
Willy Wagtail	*Rhipidura leucophrys*	Uncommon	Lhs
MAMMALS			
INTRODUCED MAMMALS			
European Rabbit	**Oryctolagus cunniculus*	Uncommon	si
Feral Cat	**Felis catus*	Common	t
Red Fox	**Vulpes vulpes*	Common	sl

Site 12- 248 Smiths Lane

Common Name	Scientific Name	Conservation status within site.	Type of record
AMPHIBIANS			
Common Froglet	*Crinia signifera*	Common	Lh
Southern Brown Tree Frog	*Litoria ewingii*	Uncommon	Lh
Spotted Marsh Frog	*Limnodynastes tasmaniensis*	Uncommon	Lh
BIRDS			
Australian Magpie	*Gymnorhina tibicen*	Common	Lhs
Australian Raven	*Corvus coronoides*	Common	Lhs
Chestnut Teal	*Anas castanea*	Uncommon	Lhs
Common Blackbird	**Turdus merula*	Uncommon	hs
Common Myna	**Acridotheres tristis*	Common	hs
Common Starling	**Sturnus vulgaris*	Common	hs
Crested Pigeon	*Ocyphaps lophotes*	Uncommon	Lhs
Eastern Rosella	*Platycercus eximius*	Uncommon	Lhs
Grey Butcherbird	*Cracticus torquatus*	Uncommon	Lhs
Laughing Kookaburra	*Dacelo novaehollandiae*	Uncommon	Lhs
Magpie-lark	*Grallina cyanoleura*	Common	Lhs
Musk Lorikeet	*Glossopsitta concinna*	Uncommon	HLhs
Noisy Miner	*Manorina melanocephala*	Common	Lhs
Rainbow Lorikeet	*Trichoglossus haematodus*	Uncommon	Lhs
Spotted Turtle-Dove	**Streptopelia chinensis*	Common	hs
Sulphur-crested Cockatoo	*Cacatua galerita*	Uncommon	Lhs
White-throated Needletail	*Hirundapus caudactus* race *caudactus*	Common at times	HLs
Willy Wagtail	*Rhipidura leucophrys*	Uncommon	Lhs
MAMMALS			
INTRODUCED MAMMALS			
Red Fox	**Vulpes vulpes*	Uncommon	sI

Site 13- 101-105 Browns Road .

Common Name	Scientific Name	Conservation status within site.	Type of record
AMPHIBIANS			
Common Froglet	*Crinia signifera*	Common	Lh
Southern Brown Tree Frog	*Litoria ewingii*	Uncommon	Lh
Spotted Marsh Frog	*Limnodynastes tasmaniensis*	Uncommon	Lh
BIRDS			
Australian Magpie	*Gymnorhina tibicen*	Common	Lhs
Australian Raven	*Corvus coronoides*	Common	Lhs
Chestnut Teal	*Anas castanea*	Uncommon	Lhs
Common Blackbird	**Turdus merula*	Uncommon	hs
Common Myna	**Acridotheres tristis*	Common	hs
Common Starling	**Sturnus vulgaris*	Common	hs
Crested Pigeon	*Ocyphaps lophotes*	Uncommon	Lhs
Eastern Rosella	*Platycercus eximius*	Uncommon	Lhs
Grey Butcherbird	*Cracticus torquatus*	Uncommon	Lhs
Laughing Kookaburra	*Dacelo novaehollandiae*	Uncommon	Lhs
Magpie-lark	*Grallina cyanoleura*	Common	Lhs
Musk Lorikeet	*Glossopsitta concinna*	Uncommon	HLhs
Noisy Miner	*Manorina melanocephala*	Common	Lhs
Rainbow Lorikeet	*Trichoglossus haematodus*	Uncommon	Lhs
Spotted Turtle-Dove	**Streptopelia chinensis*	Common	hs
Sulphur-crested Cockatoo	*Cacatua galerita*	Uncommon	Lhs
White-throated Needletail	*Hirundapus caudactus* race *caudactus*	Common at times	HLs
Willy Wagtail	*Rhipidura leucophrys*	Uncommon	Lhs
MAMMALS			
INTRODUCED MAMMALS			
Red Fox	**Vulpes vulpes*	Uncommon	sI

Site 14- 97 Browns Road.

Common Name	Scientific Name	Conservation status within site.	Type of record
BIRDS			
Australian Magpie	*Gymnorhina tibicen*	Uncommon	Lhs
Australian Raven	*Corvus coronoides*	Uncommon	Lhs
Common Myna	**Acridotheres tristis*	Common	hs
Common Starling	**Sturnus vulgaris*	Common	hs
Galah	*Eolophus roseicapillus*	Uncommon	Lhs
Grey Butcherbird	*Cracticus torquatus*	Uncommon	Lhs
Magpie-lark	*Grallina cyanoleura*	Uncommon	Lhs
Masked Lapwing	*Vanellus miles*	Uncommon	Lhs
Rainbow Lorikeet	*Trichoglossus haematodus*	Uncommon	Lhs
Spotted Turtle-Dove	**Streptopelia chinensis*	Uncommon	hs
Sulphur-crested Cockatoo	*Cacatua galerita*	Uncommon	Lhs
Welcome Swallow	*Hirundo neoxena*	Uncommon	Lhs
Willy Wagtail	*Rhipidura leucophrys*	Uncommon	Lhs
MAMMALS			
INTRODUCED MAMMALS			
Red Fox	**Vulpes vulpes*	Common	sl

Site 15- Richard Taylors property Browns Road.

Scientific Name	Common Name	Conservation status within site.	Type of record
AMPHIBIANS			
Crinia signifera	Common Froglet	Common	Lh
Limnodynastes tasmaniensis	Spotted Marsh Frog	Uncommon	Lh
Litoria ewingii	Southern Brown Tree Frog	Uncommon	Lh
REPTILES			
Lampropholis guichenoti	Garden Skink	Uncommon	Lt
Austrelaps superbus	Lowland Copperhead	Rare	HLs
Cryptophis nigrescens	Eastern Small-eyed Snake	Rare	Rs
Notechis scutatus	Tiger Snake	Rare	HLs
BIRDS			
Little Pied Cormorant	*Phalacrocorax melanoleucos*	Rare	Lhs
Australasian Grebe	*Tachybaptus novaehollandiae*	Uncommon	Lhs
Black Swan	*Cygnus atratus*	Rare	Lhs
Chestnut Teal	*Anas castanea*	Uncommon	Lhs
Pacific Black Duck	*Anas superciliosa*	Uncommon	Lhs
Australian Wood Duck	*Chenonetta jubata*	Uncommon	Lhs
Purple Swamphen	*Porphyrio porphyrio*	Uncommon	Lhs
Australian White Ibis	*Threskiornis molucca*	Uncommon	Lhs
Straw-necked Ibis	*Threskiornis spinicollis*	Common	Lhs
Masked Lapwing	*Vanellus miles*	Uncommon	Lhs
Wedge-tailed Eagle	*Aquila audax*	Rare	HLhs
Brown Goshawk	*Accipiter fasciatus*	Rare	Lhs
Spotted Turtle-Dove	**Streptopelia chinensis*	Common	hs
Crested Pigeon	*Ocyphaps lophotes*	Uncommon	Lhs
Yellow-tailed Black-Cockatoo	*Calyptorhynchus funereus*	Common at times	HLhs
Galah	*Eolophus roseicapillus*	Uncommon	Lhs
Sulphur-crested Cockatoo	*Cacatua galerita*	Common	Lhs
Rainbow Lorikeet	*Trichoglossus haematodus*	Common	Lhs
Musk Lorikeet	*Glossopsitta concinna*	Uncommon	HLhs
Eastern Rosella	*Platycercus eximius*	Uncommon	Lhs
White-throated Needletail	*Hirundapus caudactus* race *caudactus*	Common at times	HLs
Laughing Kookaburra	*Dacelo novaehollandiae*	Uncommon	Lhs
Superb Fairy-wren	*Malurus cyaneus*	Rare	Lhs
Brown Thornbill	*Acanthiza pusilla*	Uncommon	Lhs
Noisy Miner	*Manorina melanocephala*	Common	Lhs
Grey Shrike Thrush	*Colluricincla harmonica*	Rare	Lhs
Golden Whistler	*Pachycephala pectoralis*	Rare	Lhs
Grey Fantail	*Rhipidura fuliginosa*	Common at times	Lhs

Willy Wagtail	*Rhipidura leucophrys*	Uncommon	Lhs
Magpie-lark	*Grallina cyanoleura*	Common	Lhs
Grey Butcherbird	*Cracticus torquatus*	Uncommon	Lhs
Australian Magpie	*Gymnorhina tibicen*	Common	Lhs
Australian Raven	*Corvus coronoides*	Common	Lhs
Welcome Swallow	*Hirundo neoxena*	Common	Lhs
Skylark	**Alauda arvensis*	Uncommon	hs
Common Blackbird	**Turdus merula*	Common	hs
Common Starling	**Sturnus vulgaris*	Common	hs
Common Myna	**Acridotheres tristis*	Common	hs
MAMMALS			
Short-beaked Echidna	*Tachyglossus aculeatus*	Uncommon	RsI
Koala	*Phascolarctos cinereus*	Rare	Rhs
Common Brushtail Possum	*Trichosurus vulpecula*	Uncommon	Lhs
Common Ringtail Possum	*Pseudocheirus peregrinus*	Uncommon	Lhs
INTRODUCED MAMMALS			
Red Fox	**Vulpes vulpes*	Common	sI
Feral Cat	**Felius catus*	Uncommon	sI

Site 16- 53-65 Craig Road.

Common Name	Scientific Name	Conservation status within site.	Type of record
AMPHIBIANS			
Common Froglet	*Crinia signifera*	Uncommon	Lh
Southern Brown Tree Frog	*Litoria ewingii*	Uncommon	Lh
REPTILES			
Garden Skink	*Lampropholis guichenoti*	Uncommon	Lt
BIRDS			
Australian Magpie	*Gymnorhina tibicen*	Common	Lhs
Australian Raven	*Corvus coronoides*	Common	Lhs
Bell Miner	*Manorina melanophrys*	Common	Rhs
Brown Thornbill	*Acanthiza pusilla*	Common	Lhs
Common Blackbird	**Turdus merula*	Common	hs
Common Myna	**Acridotheres tristis*	Common	hs
Common Starling	**Sturnus vulgaris*	Common	hs
Crested Pigeon	*Ocyphaps lophotes*	Uncommon	Lhs
Eastern Rosella	*Platycercus eximius*	Common	Lhs
Galah	*Eolophus roseicapillus*	Uncommon	Lhs
Grey Butcherbird	*Cracticus torquatus*	Uncommon	Lhs
Grey Fantail	*Rhipidura fuliginosa*	Common at times	Lhs
Laughing Kookaburra	*Dacelo novaehollandiae*	Uncommon	Lhs
Magpie-lark	*Grallina cyanoleura*	Common	Lhs
Masked Lapwing	*Vanellus miles*	Uncommon	Lhs
Musk Lorikeet	*Glossopsitta concinna*	Uncommon	HLhs
Noisy Miner	*Manorina melanocephala*	Common	Lhs
Rainbow Lorikeet	*Trichoglossus haematodus*	Common	Lhs
Spotted Turtle-Dove	**Streptopelia chinensis*	Common	hs
Sulphur-crested Cockatoo	*Cacatua galerita*	Uncommon	Lhs
White-throated Needletail	*Hirundapus caudactus* race *caudactus*	Common at times	HLs
Willy Wagtail	*Rhipidura leucophrys*	Uncommon	Lhs
Yellow-tailed Black-Cockatoo	*Calyptorhynchus funereus*	Common sometimes	HLhs
INTRODUCED MAMMALS			
Red Fox	**Vulpes vulpes*	Common	sI
European Rabbit	**Oryctolagus cuniculus*	Uncommon	sI

Site 17 - 20 Botanic Drive, Junction Village

Common Name	Scientific Name	Conservation status within site.	Type of record
AMPHIBIANS			
Common Froglet	*Crinia signifera*	Common at times	h
REPTILES			
Delicate Skink	*Lampropholis delicata*	Common	s

Garden Skink	*Lampropholis guichenoti*	Uncommon	s
Weasel Skink	*Saproscincus mustelinus*	Rare	s
BIRDS			
Australian Magpie	*Gymnorhina tibicen*	Common	hsl
Black-shouldered Kite	*Elanus axillaris*	Rare	sl
Common Blackbird	*Turdus merula*	Uncommon	hsl
Common Myna	*Acridotheres tristis*	Common	hsl
Common Starling	*Sturnus vulgaris*	Common	hsl
Grey Fantail	*Rhipidura albiscarpa*	Common	hsl
Laughing Kookaburra	*Dacelo novaeguineae*	Uncommon	shl
Little Raven	*Corvus mellori*	Common	hsl
Magpie-lark	*Grallina cyanoleuca*	Common	hsl
Pacific Gull	*Larus pacificus pacificus*	Rare	sl
Red Wattlebird	*Anthochaera carunculata*	Uncommon	hsl
Spotted Turtle-Dove	*Streptopelia chinensis*	Common	hsl
Sulphur-crested Cockatoo	*Cacatua galerita*	Uncommon	hsl
Superb Fairy-wren	*Malurus cyaneus*	Common	hsl
Whistling Kite	*Haliastur sphenurus*	Rare	sl
White-browed Scrubwren	*Sericornis frontalis*	Common	hsl
Willie Wagtail	*Rhipidura leucophrys*	Common	hsl
Yellow-tailed Black-Cockatoo	*Calyptorhynchus funereus*	Uncommon	hsl
MAMMALS			
Swamp Rat	*Rattus lutreolus*	Common	t
INTRODUCED MAMMALS			
House Mouse	*Mus musculus*	Common	t

Fauna Appendix 5. Significant Fauna Species in VFD and EPBC Databases

Fauna species detected within five kilometres of the study area boundary on DSE's Victorian Fauna Database (VFD) (DSE 2005a). Species listed on EPBC Protected Matters Search Tool also included, except for Listed Marine Species (not relevant). Habitat/Comments column also gives indication of location and year of records lodged with VFD.

FFG	EPBC	DSE	Mig.	Regional Signficance	Common Name	Scientific Name	Family Name	Habitat Notes	Likelihood of Occurrence	Database	Freq (AVW only)	NumSite (AVW only)
		v		S, R2	Australasian Shoveler	*Anas rhynchotis*	Anatidae	The Australasian Shoveler occurs mainly on large well vegetated wetlands and lakes, occasionally including areas with saline waters. Populations are found in higher numbers on permanent, well-vegetated freshwater swamps with areas of open water (Rogers 1990). This species nest in grass nests on the ground, usually in dense cover and near water. (Pizzey and Knight 2007).	high	AVW	0.44%	3
	VU			N, R2	Australian Grayling	*Prototroctes maraena*	Retropinnidae	This species only spends part of its life in freshwater streams, Australian Graylings migrate between freshwater streams and the ocean (Lake 1971; Bishop & Bell 1978). Streams where this species occur tend to be clear with gravel bottoms and a variety of instream habitat such as pools and riffles (Berra 1982). The upstream migration of this species has been effectively terminated in some rivers by dams (e.g. Tallowa Dam) (Bishop & Bell 1978).	low	EPBC		
L		v		S, R2	Baillon's Crake	*Porzana pusilla*	Rallidae	This species is a summer migrant to Victoria. It inhabits freshwater wetlands and floodwaters usually containing floating plants or tall emergent vegetation. The Baillon's Crake feeds in shallow water, mud and emergent aquatic plants. It has been found to nest in clumps or tussocks of vegetation surrounded by water(Pizzey and Knight 2007).	high	AVW	0.44%	3
		v		S, R1, R2	Black Falcon	*Falco subniger*	Falconidae	The Black Falcon has a stronghold in inland Australia. Most Victorian records come from the lowlands and only occasionally from the foothills. It occurs mainly over croplands, grasslands and wooded farmlands. To catch flushed prey, they sweep low over croplands and grasslands and are often attracted by smoke from grassfires and late-summer burning off. This species nests in trees in old stick-nests of other birds(Marchant, S. and Higgins, P.J. (eds) 1993).	med	AVW	0.14%	1
	m			R1, R2, R3	Black-faced Monarch	*Monarcha melanopsis*	Dicruridae	Black-faced Monarch is a summer migrant to the south-east coastal areas (Pizzeya nd Knight 2007. It is found in the understorey of rainforest, densley wooded areas, mangroves and areas with a dense canopy (Pizzey and Knight 2007).	med	EPBC		
L		e		S, R2	Blue-billed Duck	*Oxyura australis*	Anatidae	This species inhabits deep, permanent, well-vegetated swamps, but as times (especially in winter) may occur in large numbers on large open wetlands(Pizzey and Knight 2007). The Blue-billed Duck catches food while diving or occasionally by feeding from the water surface. Their nests are built on trampled swamp vegetation around the base of established stands of reeds/rushes, often over water or on small islands (Rogers 1990).	med	AVW	0.14%	1
		n		S, R1, R2	Brown Quail	*Coturnix ypsilophora*	Phasianidae	The Brown Quail is widespread in Victoria, however suitable habitats are quite localised. It has been reported from grass and sedge flats, often adjacent to rivers and swamps. Along major rivers in northern Victoria they occur in grassy River Red Gum forests and in eastern Victoria they inhabit wet woodlands and forests containing grasses, sword-sedges and gahnias. It has also been observed in bracken, lucerne pastures, and potato crops. It feeds and nests on the ground(Marchant, S. and Higgins, P.J. (eds) 1993).	high	AVW	1.04%	7

FFG	EPBC	DSE	Mig.	Regional Signficance	Common Name	Scientific Name	Family Name	Habitat Notes	Likelihood of Occurrence	Database	Freq (AVW only)	NumSite (AVW only)
		n		S, R2	Cape Barren Goose	*Cereopsis novaehollandiae*	Anatidae	The Cape Barren Goose occurs on coastal islands or on open wetlands and pastures on the mainland. Although some breeding birds remain throughout the year on islands off Wilsons Promonitory (where they nest on the ground in tussock grsslands), young geese move away after the breeding seasons due to diminished food supply. These usually form feeeding flocks in improved pastures on the neighbouring mainland but some individuals may move farther afield.(Rogers 1990)	high	AVW	0.44%	3
	m		J, C	R2, R3	Cattle Egret	*Ardea ibis*	Ardeidae	Cattle Egret is a migratory species. The species has a high likelihood of occurrence within the study area. Cattle Egret occurs in many types of wetlands; from tidal flats in estuaries and bays to the margins of inland lakes, swamps and rivers (Pizzey and Knight 2007). They also use farm dams, mangroves, flooded areas, and artificial wetlands created by irrigation. Cattle Egret are often seen foraging away from water in crops and pasture, they build stick-nests in trees, usually surrounded by water or dense treed cover, or occasionally in reed-beds (O'Brien 1990). The species nests colonially, often with other waterbirds. Egrets are threatened due to restricted nesting sites.	high	EPBC		
L		v		S, R1, R2	Chestnut-rumped Heathwren	*Calamanthus pyrrhopygius*	Pardalotidae	This species mainly inhabit heathy woodlands, or wet heaths and scrubs with emergent eucalypts or banksias in the lowlands and foothills. It will occasionally enter samphire shrublands with adjacent eucalyptus woodlands. May also occur locally in box-ironbark, stringybark and peppermint forests, mainly where there are scattered shrub layers and sparse tree cover. Occasionally recorded in peppermint forests and Snow Gum woodlands at high elevations (to 1200m) in rocky rainshadow areas but do not occur in treeless heaths or dense forests (except sometimes in early regeneration stages). They feed on bare dry ground, in low shrubs and occasionally low trees, especially where abundant fallen branches or rocks are present. Their nests are built near the ground in shrubs or grass tussocks.(Marchant, S. and Higgins, P.J. (eds) 1993)	high	AVW	0.59%	4
L	VU	v		N, S, R2	Dwarf Galaxias	*Galaxiella pusilla*	Galaxiidae	Occurs in vegetated margins of slow-flowing coastal creeks, drains and swamps. Rare in Victoria, however more abundant in the south-east of the state in Mornington Pennisula & Western Port areas (Museum Victoria 2006).	low	EPBC/AVW	0.29%	2
		n		S, R2	Eastern Curlew	*Numenius madagascariensis*	Scolopacidae	This species is a summer migrants to Victoria, from Siberian breeding grounds. Small numbers will over winter in coastal areas. During summer they occur regularly on tidal mudflats in Corner Inlet, Western Port and Port Phillip Bay. Small numbers occur elsewhere on coastal mudflats and, rarely, birds appear on muddy edges of inland saline lakes. They feed by probing in mudlfats, in rock pools and among seagrass and roost on spits, islets or in saltmarshes.(Marchant, S. and Higgins, P.J. (eds) 1996)	low	AVW	0.29%	2
L	m	v	J, C	S, R2, R3	Eastern Great Egret	*Ardea modesta*	Ardeidae	Eastern Great Egret is widespread in Australia and has been observed in a wide range of wetland habitats including swamps and marshes; margins of rivers and lakes; damp or flooded grasslands, pastures or agricultural lands; reservoirs; sewage treatment ponds; drainage channels; salt pans and salt lakes; salt marshes; estuarine mudflats, tidal streams; mangrove swamps; coastal lagoons; and offshore reefs (DEWHA 2009).	low	AVW	0.74%	5
	m		J, C, R	R1, R2, R3	Fork-tailed Swift	*Apus pacificus*	Apodidae	The Fork-tailed Swift is a migratory species occurring throughout Australia. This species is almost entirely aerial, however it is known to roost on cliffs or in very large trees (Pizzey and Knight 2007).	high	EPBC		

FFG	EPBC	DSE	Mig.	Regional Signficance	Common Name	Scientific Name	Family Name	Habitat Notes	Likelihood of Occurrence	Database	Freq (AVW only)	NumSite (AVW only)
		n		S, R2	Glossy Ibis	*Plegadis falcinellus*	Threskiornithidae	This species is a partial summer migrants to Victoria from northern Australia. They inhabit vegetated or muddy margins of freshwater wetlands and nearby grasslands and pastures. They forage in shallow water or mud on the margins of wetlands and occasionally from low vegetation and nest colonially, usually with other ibises. They build stick-nests in trees and shrubs low over water, in reedbeds or on islands. (Pizzey and Knight 2007)	low	AVW	0.14%	1
L	CR	e		N, S, R2	Golden Sun Moth	*Synemon plana*	Castniidae	It is generally found in temperate grasslands and open grassy woodlands where the ground layer is dominated by native Wallaby Grass. Optimal habitat is dominated by wallaby grasses Austrodanthonia spp with an open tussock structure (Dwyer 2000). It has also been recorded in grasslands dominated by Kangaroo Grass Themeda triandra and exotic dominated grasslands (ie Chilean Needlegrass).	low	EPBC		
L		v		S, R2	Grey Goshawk	*Accipiter novaehollandiae*	Accipitridae	The Grey Goshawk has a stronghold in Victoria, particularly the white form, in the Otway Ranges, where wet forests and gullies containing Mountain Grey Gum adjoin partly cleared farmlands. They occur in lower densities in similar habitats in the Strzelecki Ranges, Gippsland Plains and Otway Plains. Elsewhere in the State they are occasionally seen in woodlands, dry forests, suburban parks and wooded farmlands.(Marchant, S. and Higgins, P.J. (eds) 1993)	med	AVW	0.59%	4
L	VU	v		N, S, R2	Grey-headed Flying-fox	*Pteropus poliocephalus*	Pteropodidae	The Grey-headed Flying-fox occurs in various forest habitats in close proximity to plentiful supplies of nectar producing flowers and fleshy fruit. Large camps can be found roosting in the branches of tall trees in a range of vegetation, including rainforest patches, Melaleuca stands, mangroves, riparian woodland and modified vegetation in urban areas (Richards 1983).	med	EPBC		
L	V	e		N, S, R2	Growling Grass Frog	*Litoria raniformis*	Hylidae	TThe species often inhabitant water bodies with a diverse assemblage of aquatic vegetation, including emergent species such as sedges (Gahnia spp.), submergent species such as curly pondweed (Potamageton spp.), floating species such as water ribbon (Triglochin spp.) and filamentous algae (Hamer and Organ 2006, Heard et al. 2004). The aquatic vegetation provides sites for male frogs to call from, sites for eggs to be deposited and relatively safe development, and food and shelter for tadpoles. Dense submergent vegetation is especially important to protect eggs and tadpoles from predation (Heard et al. 2004).	med	EPBC/AVW	0.14%	1
		v		S, R2	Hardhead	*Aythya australis*	Anatidae	Hardheads inhabit deep to shallow wetlands with open water and fringing emergent vegetation (Pizzey and Knight 2007). The species feeds by diving in deep water and occasionally by dabbling just under the water surface (Rogers 1990). Nests are built in thick vegetation (e.g. reeds, lignum, cumbungi), usually over water (Rogers 1990, Halse et al. 2005). These birds are most common in the wetland systems of inland Australia (Halse et al. 2005). Birds do visit Victoria from these areas in spring and summer, returning as the northern wetlands is replenished by rain (Halse et al. 2005). However, some birds are present in Victoria all year round depending on the suitability of the wetland (Pizzey and Knight 2007).	high	AVW	1.49%	10

FFG	EPBC	DSE	Mig.	Regional Signficance	Common Name	Scientific Name	Family Name	Habitat Notes	Likelihood of Occurrence	Database	Freq (AVW only)	NumSite (AVW only)
L		n		S, R2	Hooded Robin	*Melanodryas cucullata*	Petroicidae	Highest density in semi-arid nw. Victoria where they inhabit mallee scrubs, cypress pine (*Callitris)* woodlands, mallee heaths with scattered trees and box-ironbarks forests. Uncommon in s. Vic where they occur in a range of lightly timbered habitats containing tall shrubs. These include Yellow Box (*E. melliodora*) woodlands, coastal heaths and heathy woodlands(Marchant, S. and Higgins, P.J. (eds) 1993) . Forage on bare ground, using vantage points such as dead limbs or fence posts to detect prey. Nests are built in tree, shrubs, stumps or cavities of dead tree trunks.(Pizzey and Knight 2007)	med	AVW	0.14%	1
		n		S, R2	Latham's Snipe	*Gallinago hardwickii*	Scolopacidae	Latham's Snipe is a migratory species. The species migrates to Victoria from breeding grounds in Japan. In Victoria this species is widely distributed in a range of habits including heavily vegetated freshwater swamps, and pools or ditches in heaths or subalpine herblands (Pizzey and Knight 2007). Also occurs in small ephemeral wetlands such as wet depressions after floods recede. Generally roosts in thick vegetation during the day, sometimes under shrubs away from wetlands, and will feed in swamps at night. They are occasionally seen feeding during the day. This species feeds by probing in soft mud and rarely moves far from concealing vegetation (Higgins and Davies 1996).	high	EPBC/AVW	0.44%	3
L		v		S, R2	Lewin's Rail	*Lewinia pectoralis*	Rallidae	The Lewin's Rail is secretive, it inhabits areas of heavily vegetated swamps, such as coastal saltmarshes, rushy ditches and swampy streams, it occasionally ventures quite far from water. It feeds from the surface of wet mud, usually among dense woody-stemmed vegetation. Nests are generally found near the ground in dense cover.(Marchant, S. and Higgins, P.J. (eds) 1993)	high	AVW	0.14%	1
L		e		S, R2	Little Bittern	*Ixobrychus minutus*	Ardeidae	This species occurs mainly in northern Victoria in wetlands and floodplains along the Murray River. It tends to inhabit emergent vegetation and reedbeds. It also utilises floating masses of aquatic vegetation in freshwater wetlands. This species is rarely seen due to it using dense vegetation as preferred habtiat. The Little Bittern will feed in shallow water in dense vegetation and their platform nests are built in low dense swampy vegetation.(Marchant, S. and Higgins, P.J. (eds)1990)	med	AVW	0.29%	2
	VU			N R2,	Long-nosed Potoroo (SE mainland)	*Potorous tridactylus tridactylus*	Potoroidae	The Long-nosed Potoroo is most commonly found in heathy coastal vegetation, dry and wet sclerophyll forests with a dense understorey with a sandy loamy soil. Their habitat tends to have some open areas with a grassy understorey for foraging. Preferred habitat has an understorey that may feature grass-trees, sedges, ferns or heath, or low shrubs of tea-trees or melaleucas (Johnson, 1995).	low	EPBC		
L		n		S R2	Magpie Goose	*Anseranas semipalmata*	Anseranatidae	Most of the populations of this species has been re-introduced. They breed colonially and build platform nests over water, usually among tall rushes or reedbeds. The Magpie Goose feeds by digging in mud or by up-ending in shallow water, they have also been see grazing and digging well away from water.(Marchant, S. and Higgins, P.J. (eds) 1990)	low	AVW	0.14%	1
		v		S R2	Musk Duck	*Biziura lobata*	Anatidae	Usually seen in small numbers on the deep waters of well vegetated fresh to saline lakes, swamps and occasionally shallow inlets and bays. Nests formed in low vegetation in areas sheltered by surrounding vegetation(Pizzey and Knight 2007).	low	AVW	0.14%	1
L		v		S R2	New Holland Mouse	*Pseudomys novaehollandiae*	Muridae	The New Holland Mouse is found in dry heath and open forest where understorey low growing and leaf-litter sparse They are nocturnal, gregarious, and shelters in burrow systems up to several metres long.(Kemper, C.. 1983)	low	AVW	0.29%	2

FFG	EPBC	DSE	Mig.	Regional Signficance	Common Name	Scientific Name	Family Name	Habitat Notes	Likelihood of Occurrence	Database	Freq (AVW only)	NumSite (AVW only)
	CR			N R2,	Orange-bellied Parrot	*Neophema chrysogaster*	Psittacidae	This species breed in South West Tasmania and are winter migrants to Victoria. They are are usually present in Victoria from late March to early November, inhabiting coastal saltmarshes and adjacent grasslands or shrublands.	low	EPBC		
		n		S R2	Pacific Gull	*Larus pacificus pacificus*	Laridae	The Pacific Gull is one of the largest gulls within the Australian and New Zealand territories, confined to the coast where flocks occur on intertidal mudflats and nearby rubbish tips in Port Phillip Bay, Western Port and Corner Inlet, with smaller numbers elsewhere on estuaries, along beaches and on other intertidal habtiats (Higgins and Davies 1996). This species breeds mainly on islands in Bass Strait and off Tasmania. Some smaller numbers breed on islands off Wilsons Promontory. Their nests are built on the ground on the tops of steep-sided islands (Higgins and Davies 1996).	med	AVW	9.38%	63
L		v		S R2	Painted Honeyeater	*Grantiella picta*	Meliphagidae	The Painted Honeyeater is a summer migrants to Victoria. They are generally found to inhabit box-ironbark, Broad-leaved Peppermint and Red Stringybark forests and box–buloke woodlands in the northern foothills of the great Divide. May also occur in Red Ironbark, Red Box forests in southern Victoria. They are occasionally found along Murray River valley to Hattah–Kulkyne NP where they inhabit Black Box woodlands. This species is usually found in open stands of old eucalypts that are infested with mistletoes.(Higgins et al. 2001)	low	AVW	0.14%	1
	m		C	R2, R3	Australian Painted Snipe	*Rostratula benghalensis s. lat.*	Rostratulidae	Hbe listed as vulnerable under the EPBC Act. This species is migratory. They usually occur in the lowlands on shallow freshwater swamps with emergent vegetation, and flooded saltmarshes (Pizzey and Knight 2007). They do not form flocks but loose groups are sometimes seen, either alone or with Latham's Snipe (Marchant and Higgins 1993). Painted Snipe forage on mud among dense swamp vegetation. Their nests are depressions or well made nest of twigs and reeds surrounded by shallow water and dense vegetation (Pizzey and Knight 2007).	low	EPBC		
		n		S R2	Pied Cormorant	*Phalacrocorax varius*	Phalacrocoracidae	This species is most often found along the coast, however are known to use inland wetlands including billabongs, deep and open swamps and rivers (large freshwater and saline wetlands). They nest in colonies, building platforms nests in mangroves or other trees (Pizzey and Knight 2007).	med	AVW	0.14%	1
L		v		S, R1, R2	Powerful Owl	*Ninox strenua*	Strigidae	The Powerful Owl is widespread in foothill and coastal forests where they tend to favour gullies with peppermint and manna gum forests. They are occasionally seen in wetter mountain forests, drier box-ironbark forests, open woodlands, and softwood plantations. This species requires very large hollows for breeding(Higgins 1999)	med	AVW	0.14%	1
	m		J	R1, R2, R3	Rainbow Bee-eater	*Merops ornatus*	Meropidae	The Rainbow Bee-eater is a migratory species. It occurs in many types of habitat including woodland, shrubland, semi-cleared land and farmland, however it mainly occurs where eucalyptus species are dominant (Higgins 1999). It is almost entirely insectivirous and mostly occurs near to permanent water (Higgins 1999).	med	EPBC		
	EN, m		J	S R1 R2 R3	Regent Honeyeater	*Anthochaera phrygia*	Meliphagidae	Occurs mainly in box-ironbark forests and woodlands north of the Great Divide (Pizzey and Knight 2007). This species is highly nomadic, their movements are determined by the flowering of eucalypts (Pizzey and Knight 2007).	med	EPBC		

FFG	EPBC	DSE	Mig.	Regional Signficance	Common Name	Scientific Name	Family Name	Habitat Notes	Likelihood of Occurrence	Database	Freq (AVW only)	NumSite (AVW only)
		v		S R2	Royal Spoonbill	*Platalea regia*	Threskiornithidae	The Royal Spoonbill inhabits the shallow parts of fresh and saline wetlands; these birds are gregarious in small flocks. They are mostly common on intertidal mudflats in coastal bays. Their stick-nests are built in reeds, shrubs or trees, singly or in loose colonies and are often seen with other species (Rogers 1990).	high	AVW	0.59%	4
	m			R2	Rufous Fantail	*Rhipidura rufifrons*	Dicruridae	The Rufous Fantail is migratory and can be found in a variety of habitats including swampy woodland, rainforest, mangrove, dense wet forests. It is generally found where there is dense shande and thick understorey shrubs and bushes and is often seen close to the ground. , It can be found in less dense habitats during migration and has been seen in many urban sites (Australian Museum 2008).	high	EPBC		
	m			R2 R3	Satin Flycatcher	*Myiagra cyanoleuca*	Dicruridae	The Satin Flycatcher is a migratory bird and occurs in Victoria during the spring/summer months. It is generally found in wet dense forests and gullies (Australian Museum 2008).	med	EPBC		
	EN			N R2,	Smoky Mouse	*Pseudomys fumeus*	Muridae	The Smoky Mouse occurs mainly in in dry sclerophyll forest on ridges with heath and tussock-grass understorey, coastal heath and subalpine heath (Menkhorst and Knight 2001). It shelters communally in a nest on the surface of the ground (Menkhorst and Knight 2001, Ford *et al.* 2003). It's preferred haibtat is dense heath, and it's diet consists of fungi, seeds and flowers (Ford et al. 2003). It has a patchy distribution and may have a successional pattern of occurence relating to time since fire .	low	EPBC		
	E	n		N S R2	Southern Brown Bandicoot	*Isoodon obesulus obesulus*	Peramelidae	The Southern Brown Bandicoot is found in heathy forest, heath and coastal scrub. It shelters in a nest of vegetation beneath dense cover, it eats fungi, tubers and arthropods (Menkhorst and Knight 2001).	high	EPBC/AVW	4.76%	32
		v		S R2	Southern Toadlet	*Pseudophryne semimarmorata*	Myobatrachidae	The Southern Toadlet can be found in dry forest, woodland, shrubland, grassland and heaths. It shelters under leaf litter and other debris in moist soaks and depressions. Their eggs are spawned in shallow burrows under organic litter in low areas close to water (Hero et al. 1991).	high	AVW	0.59%	4
	EN			N R2,	Spot-tailed Quoll	*Dasyurus maculatus maculatus (SE mainland population)*	Dasyuridae	The Spot-tailed quoll is found in many habitats including rainforest, wet and dry sclerophyll forest, coastal heath and scrub (Menkhorst and Knight 2001).	low	EPBC		
		n		S R2 R3	Spotted Harrier	*Circus assimilis*	Accipitridae	This species occurs in open grasslands, open shrublands, saltbush, open woodlands, crops and similar low vegetation that allows hunting. Their stick nests are built in low trees(Pizzey and Knight 2007)..	med	AVW	0.29%	2
L		v		S	Swamp Skink	*Egernia coventryi*	Scincidae	The Swamp Skink can be found in cool temperate, low-lying wetlands including swamp margins, tea-tree thickets and tidal salt-marshes. This species is secretive, and often found in dense low vegetation. It shelters in burrows.(Wilson, S. and Swan, G. 2003)	high	AVW	1.63%	11
L	E	e		N S R1 R2	Swift Parrot	*Lathamus discolor*	Psittacidae	The Swift Parrot is a winter migrant to Victoria (Swift Parrot Recovery Team 2001). Arriving from their breeding areas in Tasmania, however small numbers of non-breeding birds may remain here during summer (Higgins 1999, Swift Parrot Recovery Team 2001). They are nomadic, and follow the flowering of trees and psyllid infestations. In Victoria their distribution is centred on box-ironbark forests, but they are often seen in town parks and occur sporadically elsewhere in dry forests, dry woodlands and wooded farmlands but are seldom seen in treeless areas, rainforests or wet forests(Higgins 1999, Pizzey and Knight 2007). Feed mainly in winter-flowering plants, especially Red Ironbarks and ornamental trees and shrubs (Higgins 1999, Swift Parrot Recovery Team 2001).	high	EPBC/AVW	0.14%	1

FFG	EPBC	DSE	Mig.	Regional Signficance	Common Name	Scientific Name	Family Name	Habitat Notes	Likelihood of Occurrence	Database	Freq (AVW only)	NumSite (AVW only)
		n		S R2	Whiskered Tern	*Chlidonias hybridus*	Laridae	This is mainly a summer migrant to Victoria, although some remain here over winter. They inhabit shallow freshwater swamps and fresh or brackish lakes, favouring ares with emergent vegetation (Pizzey and Knight 2007). The Whiskered Tern build nests on the water in colonies among flooded or emergent vegetation (Pizzey and Knight 2007).	low	AVW	0.14%	1
L	m	v	C	S R2 R3	White-bellied Sea-Eagle	*Haliaeetus leucogaster*	Accipitridae	The White-bellied Sea-eagle mainly occurs along the coast, but may travel along some inland rivers and lakes (Pizzey and Knight 2007).	med	EPBC/AVW	0.14%	1
	m		J, C, R	R2 R3	White-throated Needletail	*Hirundapus caudacutus*	Apodidae	White Throated Needletail is a migratory species. It is almost entirely aerial and occurs over many types of habitat (Pizzey and Knight 2007).	high	EPBC		
	VU			N	Yarra Pygmy Perch	*Nannoperca obscura*	Percichthyidae	The Yarra Pygmy Perch occurs in both fresh and brackish water. It has mainly been found in slow moving or still water bodies with large amounts of aquatic (both emergent and submergent) vegetation and many logs, snags and rocks.	low	EPBC		

Table Key

Last record. Year fauna taxa was last recorded.

No. recs Number of sites in which the species is recorded in

EPBC Species listed as threatened in Australia under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC)

EX	Extinct
CR	Critically Endangered
EN	Endangered
VU	Vulnerable
CD	Conservation Dependent
m	Migratory species

Mig. Birds listed under bilateral migratory bird agreements listed below:

J	JAMBA (Japan-Australia Migratory Bird Agreement 1974)
C	CAMBA (China-Australia Migratory Bird Agreement 1986)
R	ROKAMBA (Republic of Korea-Australia Migratory Bird Agreement 2006)
CMS	Convention on Migratory Species or Bonn Convention. Birds listed under the Agreement on the Conservation of Albatrosses and Petrels (ACAP) 2006

Vic. cons. status Conservation status under DSE's *Advisory List Of Threatened Vertebrate Fauna in Victoria 2007* (DSE 2007)

ex	Extinct
r	Regionally Extinct
w	Extinct in the Wild
c	Critically Endangered
e	Endangered
v	Vulnerable
n	Near Threatened
d	Data Deficient
*	introduced species. Not listed in the advisory list above.

FFG Status under the Flora and Fauna Guarantee Act 1988 (FFG)

L	species listed as threatened
N	species nominated for listing as threatened but has not yet completed the listing process
I	Invalid or ineligible listing

Sig. Biological Significance

This is a rating of the contribution that biological assets of a site or species make towards the conservation of Australia's native biodiversity.

N	National	Species listed under the *Environment Protection and Biodiversity Conservation Act 1999* as extinct, extinct in the wild, critically endangered, endangered or vulnerable.
S1	State	Species listed as Threatened under Schedule 2 of Victoria's *Flora and Fauna Guarantee Act 1988* Species listed as extinct, critically endangered, endangered, vulnerable in Victoria *Advisory List of Threatened Vertebrate Fauna in Victoria - 2007* (DSE 2007)
R1	Regional	Regional according to Table 3. *Rare and restricted species in the greater Gippsland Plains* in Radford and Bennett (2005) – birds only.
R2	Regional	Regional according to Malcolm Legg (pers. comm.). Region is defined as the Mornington Peninsula and surrounding Western Port area.
R3	Regional	Species listed as data deficient or near threatened in Victoria *Advisory List of Threatened Vertebrate Fauna in Victoria - 2007* (DSE 2007) Birds listed under migratory bird agreements Species not listed in the above categories that have a limited range in a bioregion
L	Local	Local. All other native species are considered at least local significance due to the level of habitat depletion in the City of Casey.

Common Name According to Atlas of Victorian Wildlife

Scientific Name According to Atlas of Victorian Wildlife

International Significance	Migratory species protected under international treaties (JAMBA, CAMBA, ROKAMBA and Bonn) or listed on the IUCN Red Data List 2006 as threatened
National Significance	Species listed under the *Environment Protection and Biodiversity Conservation Act 1999* as extinct, extinct in the wild, critically endangered, endangered or vulnerable.
State Significance	Species listed as Threatened under Schedule 2 of Victoria's *Flora and Fauna Guarantee Act 1988* Species listed as extinct, critically endangered, endangered, vulnerable in Victoria *Advisory List of Threatened Vertebrate Fauna in Victoria - 2007* (DSE 2007)
Regional Significance	Species listed as data deficient or near threatened in Victoria *Advisory List of Threatened Vertebrate Fauna in Victoria - 2007* (DSE 2007)

	Species not listed in the above categories that have a limited range in a bioregion
Local Significance	Species considered rare, threatened or uncommon within the local area (5km radius from the study area) by the authors with consideration given to previous studies. Many native species are considered to be locally significant within urban areas due to typically high levels of habitat alteration.

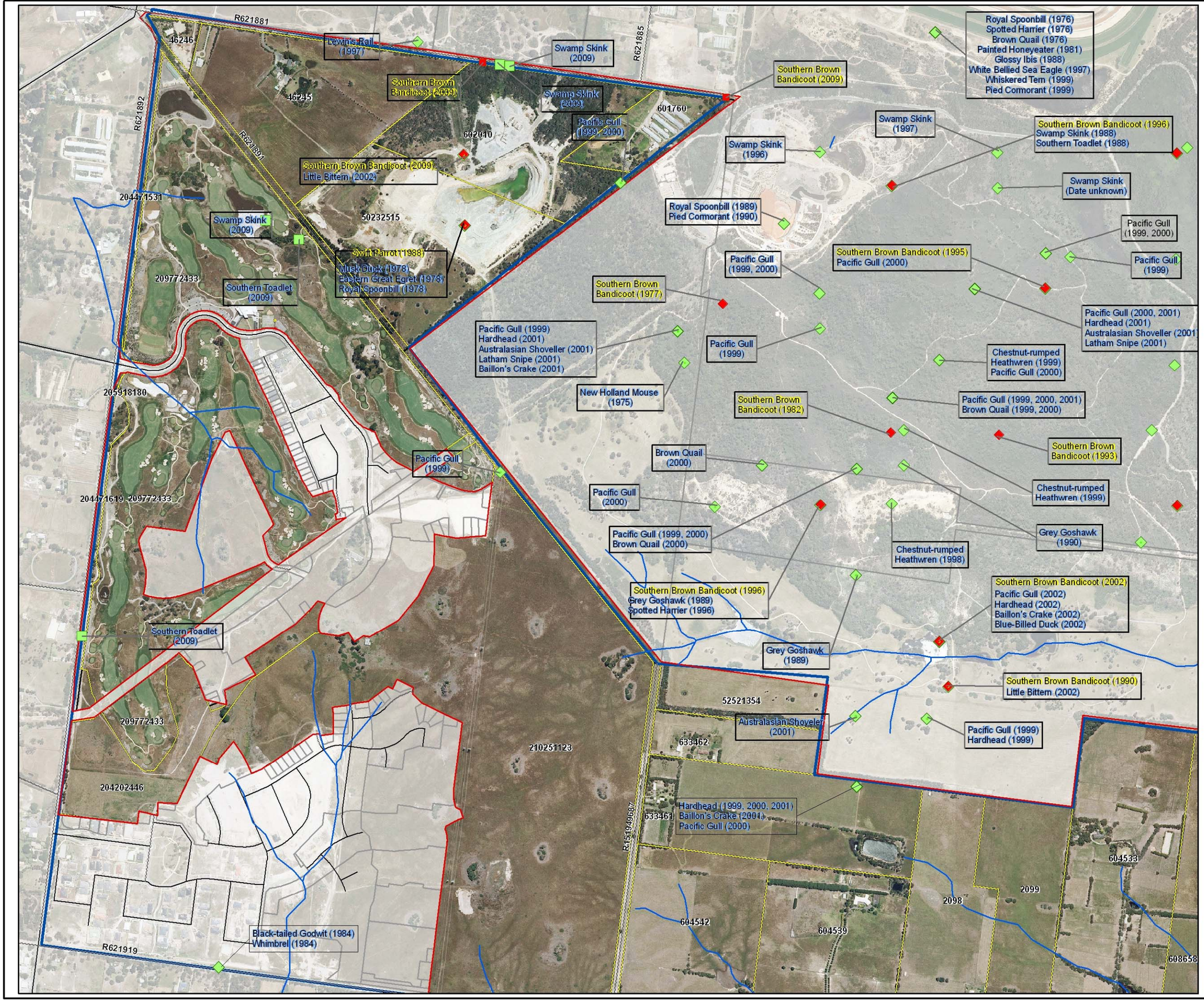

FIGURE 2A
Significant Species Distribution
Precinct 10 Study Area

Biodiversity Assessment Report
Fauna Assessment and Mapping
Botanic Ridge
Growth Areas Authority

LEGEND

- Roads
- Watercourses
- Study Area Boundary
- Property Boundary
- Precinct Boundary
- Urban Growth Boundary
- Property accessed for fauna surveys
- Property not accessed for fauna surveys
- 633479 Parcel PFI
- R539084 Road PFI
- Blue-billed Duck (1998) — State Significant Species and Date of Record
- Growling Grass Frog (2004) — Nationally Significant Species and Date of Record

Significant Species

- Database Records of Species of National Significance
- Database Records of Species of State Significance
- Surveyed Records of Species of National Significance
- Surveyed Records of Species of State Significance

MAP AND SURVEY DETAILS

Surveyed by: Joy MacDonald, Mark Shepherd, Peter Gannon, Greg James and David Fairbridge, Oct '08-May'09

Mapping by: Staci Timms and Jo Henry, May '09

Generated from: data collected in the field using Trimble and IPAQ PDAs and aerial photograph interpretation. GIS layers and Aerial Photography supplied by DSE and GAA.

DATUM: GDA 94 MGA Zone 55

N

0 100 200 300 400 500

Metres

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NOTES:

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VERSION	01	DATE	29/06/09

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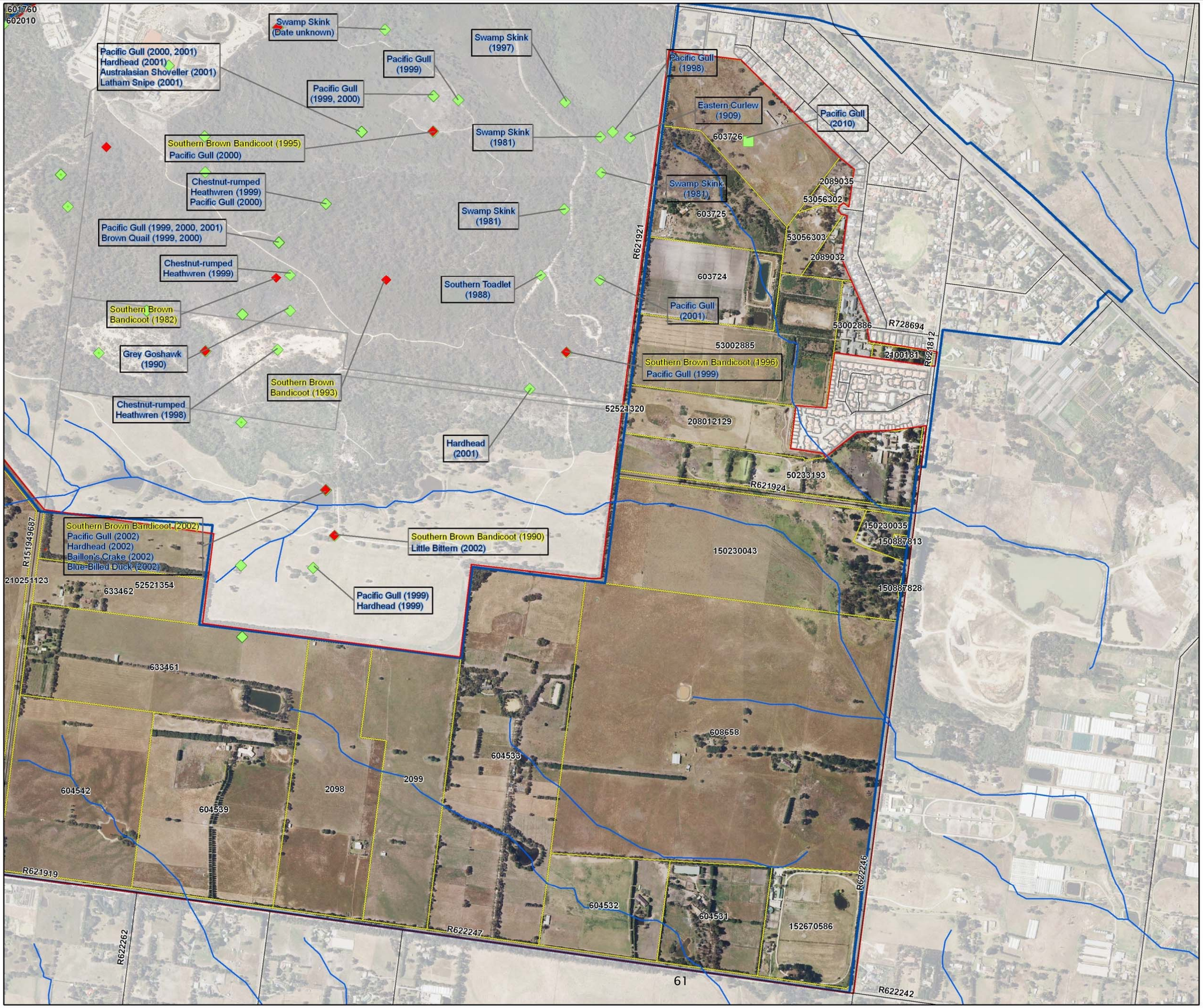
FIGURE 2B
Significant Species Distribution
Precinct 10 Study Area
VARIATION
Biodiversity Assessment Report
Fauna Assessment and Mapping
Botanic Ridge
Growth Areas Authority



LEGEND

- Roads
- Watercourses
- Study Area Boundary
- Property Boundary
- Precinct Boundary
- Urban Growth Boundary
- Property accessed for fauna surveys
- Property not accessed for fauna surveys
- 633479 Parcel PFI
- R539084 Road PFI
- Blue-billed Duck (1998) — State Significant Species and Date of Record
- Growling Grass Frog (2004) — Nationally Significant Species and Date of Record

Significant Species

- Database Records of Species of National Significance
- Database Records of Species of State Significance
- Surveyed Records of Species of National Significance
- Surveyed Records of Species of State Significance

MAP AND SURVEY DETAILS

Surveyed by: Joy MacDonald, Mark Shepherd, Peter Gannon, Greg James and David Fairbridge, Oct '08-May'09

Mapping by: Staci Timms and Jo Henry, May 2009. Modifications by Staci Timms, June 2010

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Metres

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FIGURE 3A

Areas of High Fauna Habitat Value for Significant Species
Precinct 10 Study Area
Biodiversity Assessment Report
Fauna Assessment and Mapping
Botanic Ridge
Growth Areas Authority

LEGEND

- Roads
- Watercourses
- Study Area Boundary
- Property Boundary
- Precinct Boundary
- Urban Growth Boundary
- Properties assessed
- Properties not assessed

Scattered Tree Locations

- Small Tree
- Medium Old Tree
- Large Old Tree
- Very Large Old Tree

Areas of High Faunal Habitat Value for Significant Species*

- Drainage Lines
- Swamp Scrub
- Wetland
- Woodland

* derived from existing information; flora mapping and aerial photography

MAP AND SURVEY DETAILS
Surveyed by: Joy MacDonald, Mark Shepherd, Peter Gannon, Greg James and David Fairbridge, Oct '08-May'09
Mapping by: Staci Timms and Jo Henry, May '09
Generated from: data collected in the field using Trimble and IPAQ PDAs and aerial photograph interpretation. GIS layers and Aerial Photography supplied by DSE and GAA.

DATUM: GDA 94 MGA Zone 55

N

0 50 100 150 200 250
Metres

1:5,000

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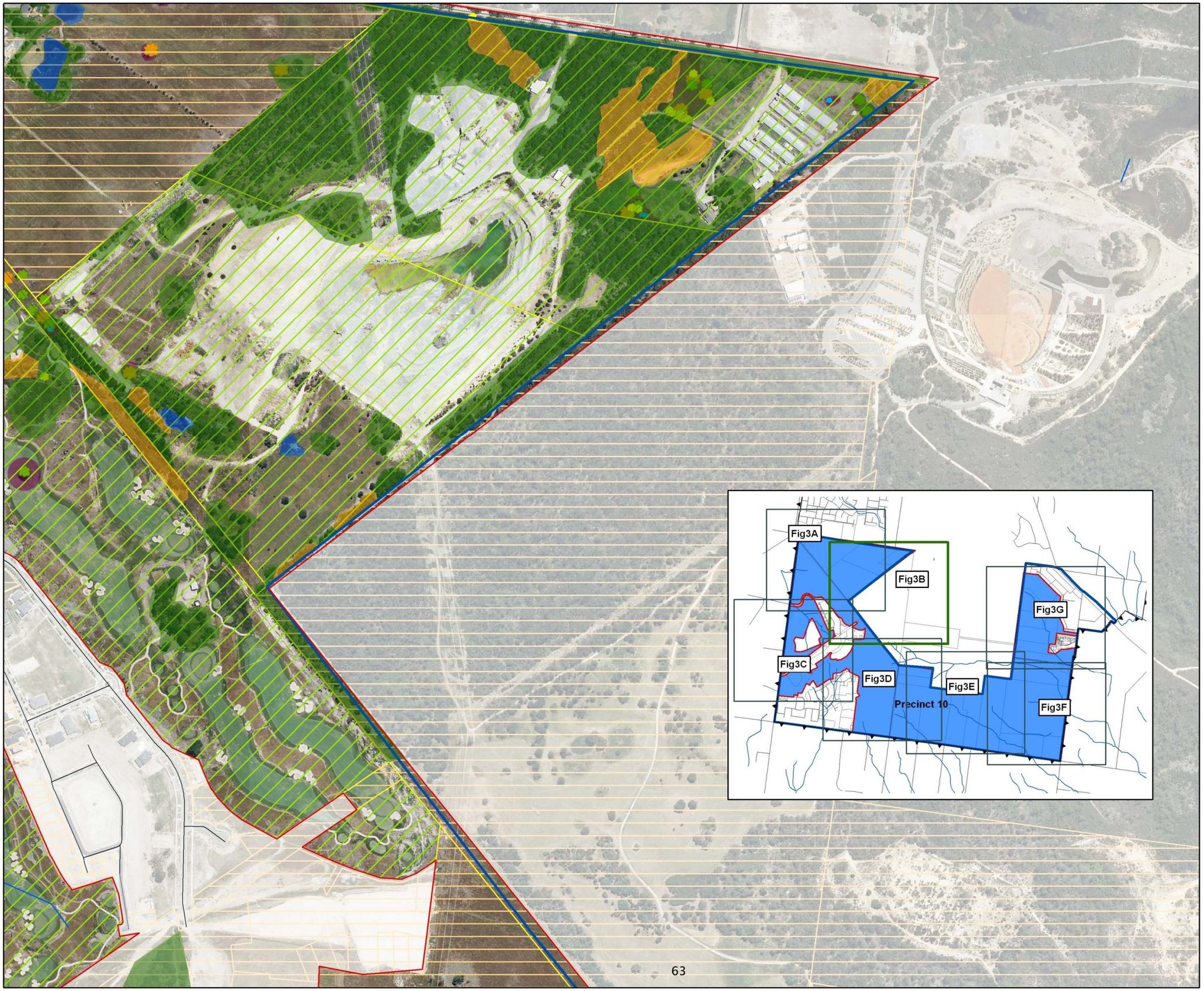

FIGURE 3B
Areas of High Fauna Habitat Value for Significant Species
Precinct 10 Study Area
Biodiversity Assessment Report
Fauna Assessment and Mapping
Botanic Ridge
Growth Areas Authority

LEGEND

- Roads
- Watercourses
- Study Area Boundary
- Property Boundary
- Precinct Boundary
- Urban Growth Boundary
- Properties assessed
- Properties not assessed

Scattered Tree Locations

- Small Tree
- Medium Old Tree
- Large Old Tree
- Very Large Old Tree

Areas of High Faunal Habitat Value for Significant Species*

- Drainage Lines
- Swamp Scrub
- Wetland
- Woodland

* derived from existing information; flora mapping and aerial photography

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N

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Metres

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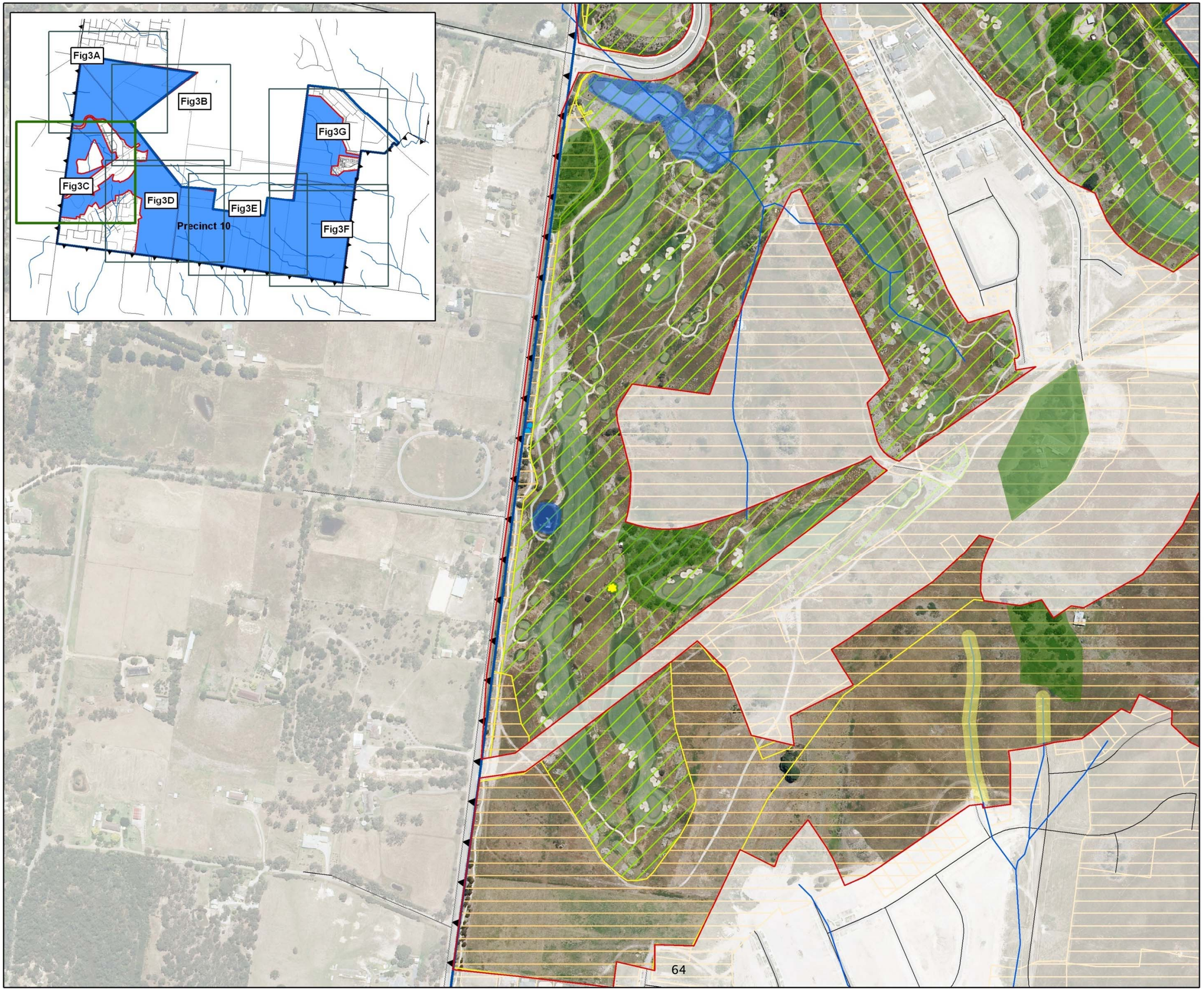

FIGURE 3C
Areas of High Fauna Habitat Value for Significant Species
Precinct 10 Study Area
Biodiversity Assessment Report
Fauna Assessment and Mapping
Botanic Ridge
Growth Areas Authority

LEGEND

- Roads
- Watercourses
- Study Area Boundary
- Property Boundary
- Precinct Boundary
- Urban Growth Boundary
- Properties assessed
- Properties not assessed

Scattered Tree Locations

- Small Tree
- Medium Old Tree
- Large Old Tree
- Very Large Old Tree

Areas of High Faunal Habitat Value for Significant Species*

- Drainage Lines
- Swamp Scrub
- Wetland
- Woodland

* derived from existing information; flora mapping and aerial photography

MAP AND SURVEY DETAILS
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N

0 50 100 150 200 250
Metres

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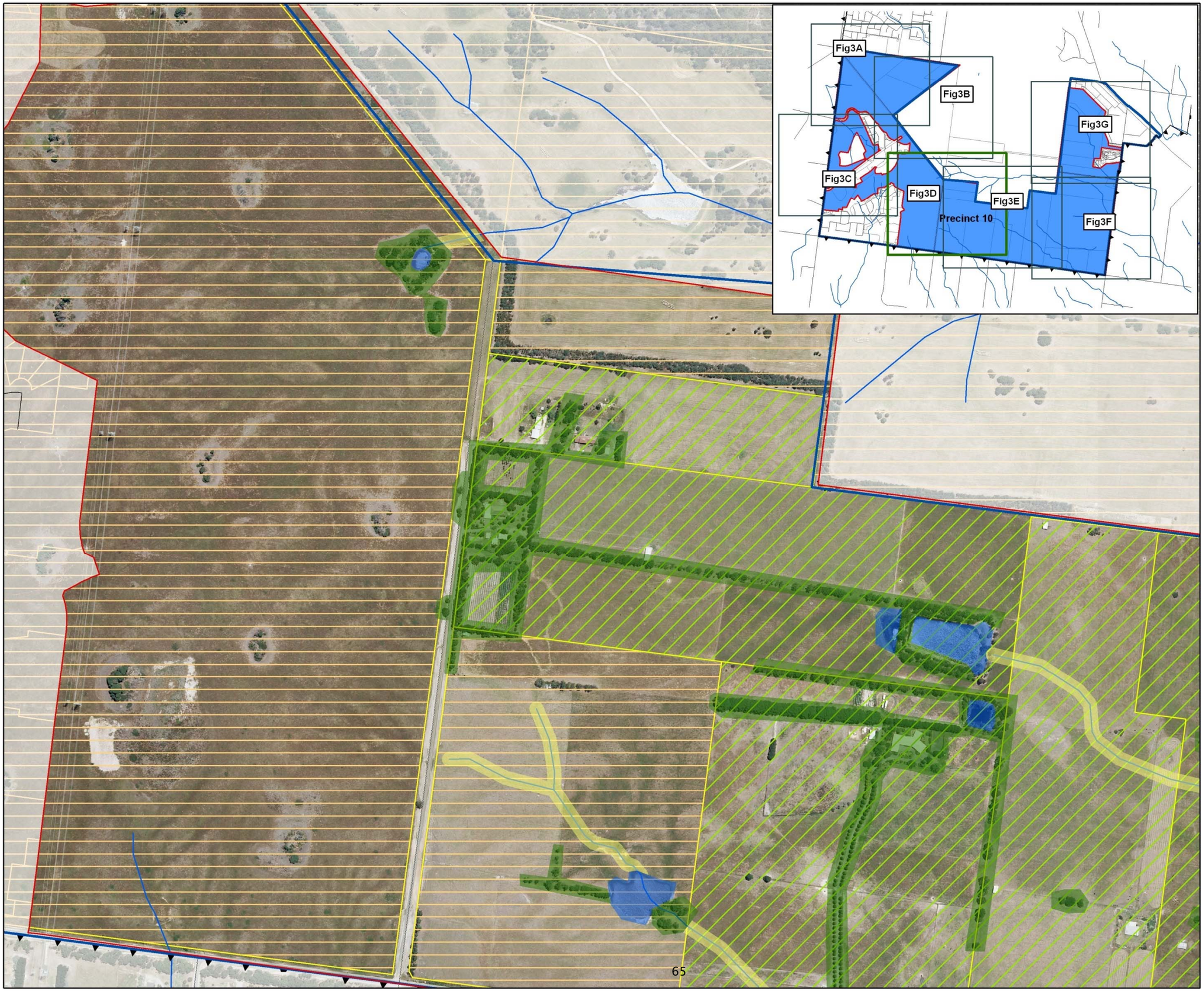

FIGURE 3D
Areas of High Fauna Habitat Value for Significant Species
Precinct 10 Study Area
Biodiversity Assessment Report
Fauna Assessment and Mapping
Botanic Ridge
Growth Areas Authority

LEGEND

- Roads
- Watercourses
- Study Area Boundary
- Property Boundary
- Precinct Boundary
- Urban Growth Boundary
- Properties assessed
- Properties not assessed

Scattered Tree Locations

- Small Tree
- Medium Old Tree
- Large Old Tree
- Very Large Old Tree

Areas of High Faunal Habitat Value for Significant Species*

- Drainage Lines
- Swamp Scrub
- Wetland
- Woodland

* derived from existing information; flora mapping and aerial photography

MAP AND SURVEY DETAILS
Surveyed by: Joy MacDonald, Mark Shepherd, Peter Gannon, Greg James and David Fairbridge,
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DATUM: GDA 94 MGA Zone 55

N

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Metres

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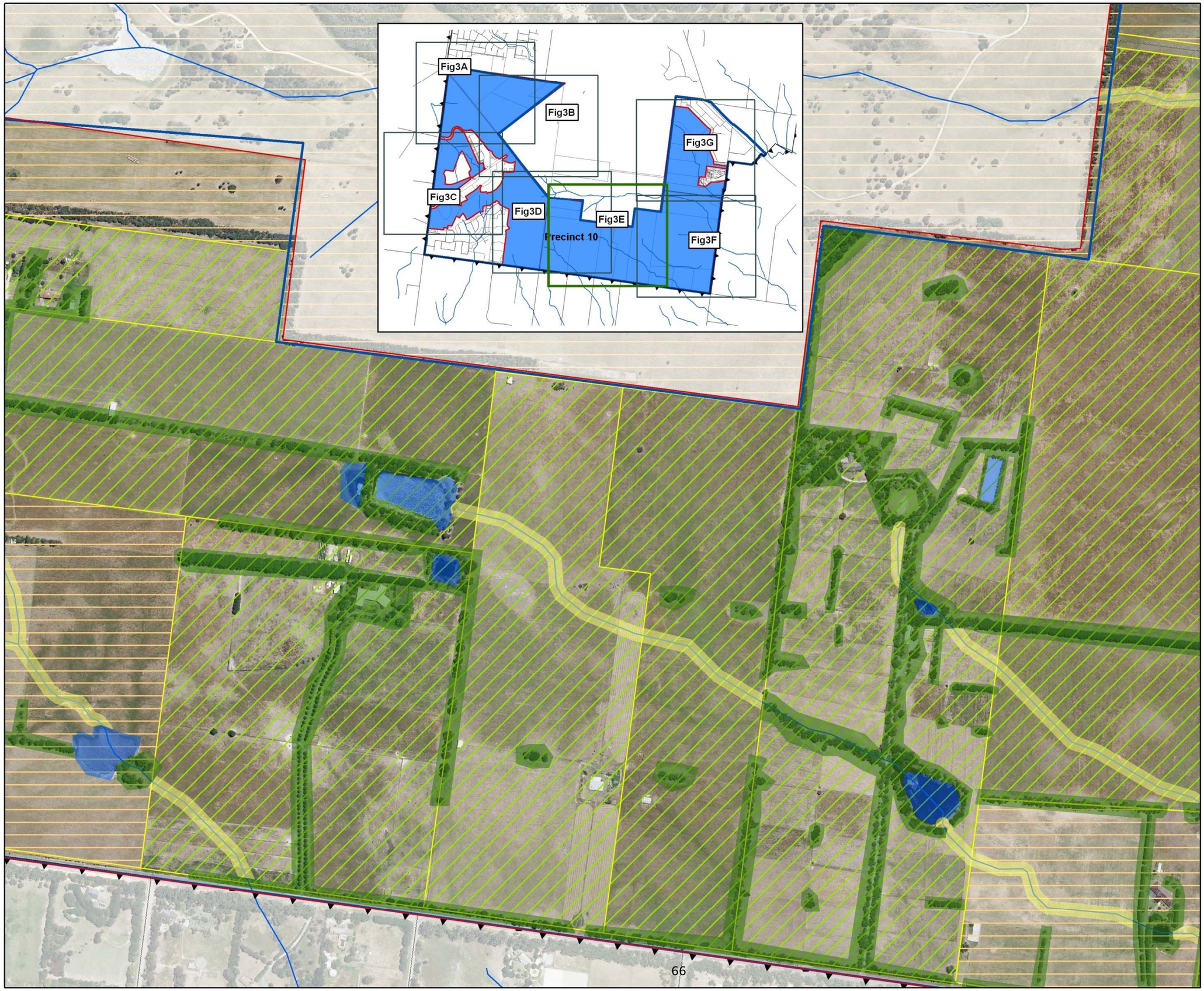

FIGURE 3E
Areas of High Fauna Habitat Value for Significant Species
Precinct 10 Study Area
Biodiversity Assessment Report
Fauna Assessment and Mapping
Botanic Ridge
Growth Areas Authority

LEGEND

- Roads
- Watercourses
- Study Area Boundary
- Property Boundary
- Precinct Boundary
- Urban Growth Boundary
- Properties assessed
- Properties not assessed

Scattered Tree Locations

- Small Tree
- Medium Old Tree
- Large Old Tree
- Very Large Old Tree

Areas of High Faunal Habitat Value for Significant Species*

- Drainage Lines
- Swamp Scrub
- Wetland
- Woodland

* derived from existing information; flora mapping and aerial photography

MAP AND SURVEY DETAILS
Surveyed by: Joy MacDonald, Mark Shepherd, Peter Gannon, Greg James and David Fairbridge, Oct '08-May'09
Mapping by: Staci Timms and Jo Henry, May '09
Generated from: data collected in the field using Trimble and IPAQ PDAs and aerial photograph interpretation. GIS layers and Aerial Photography supplied by DSE and GAA.

DATUM: GDA 94 MGA Zone 55

N

0 50 100 150 200 250
Metres

1:5,000

NOTES:
Practical Ecology bears no responsibility for the accuracy and completeness of this information and any decisions or actions taken on the basis of the map. While information appears accurate at publication, nature and circumstances are constantly changing.

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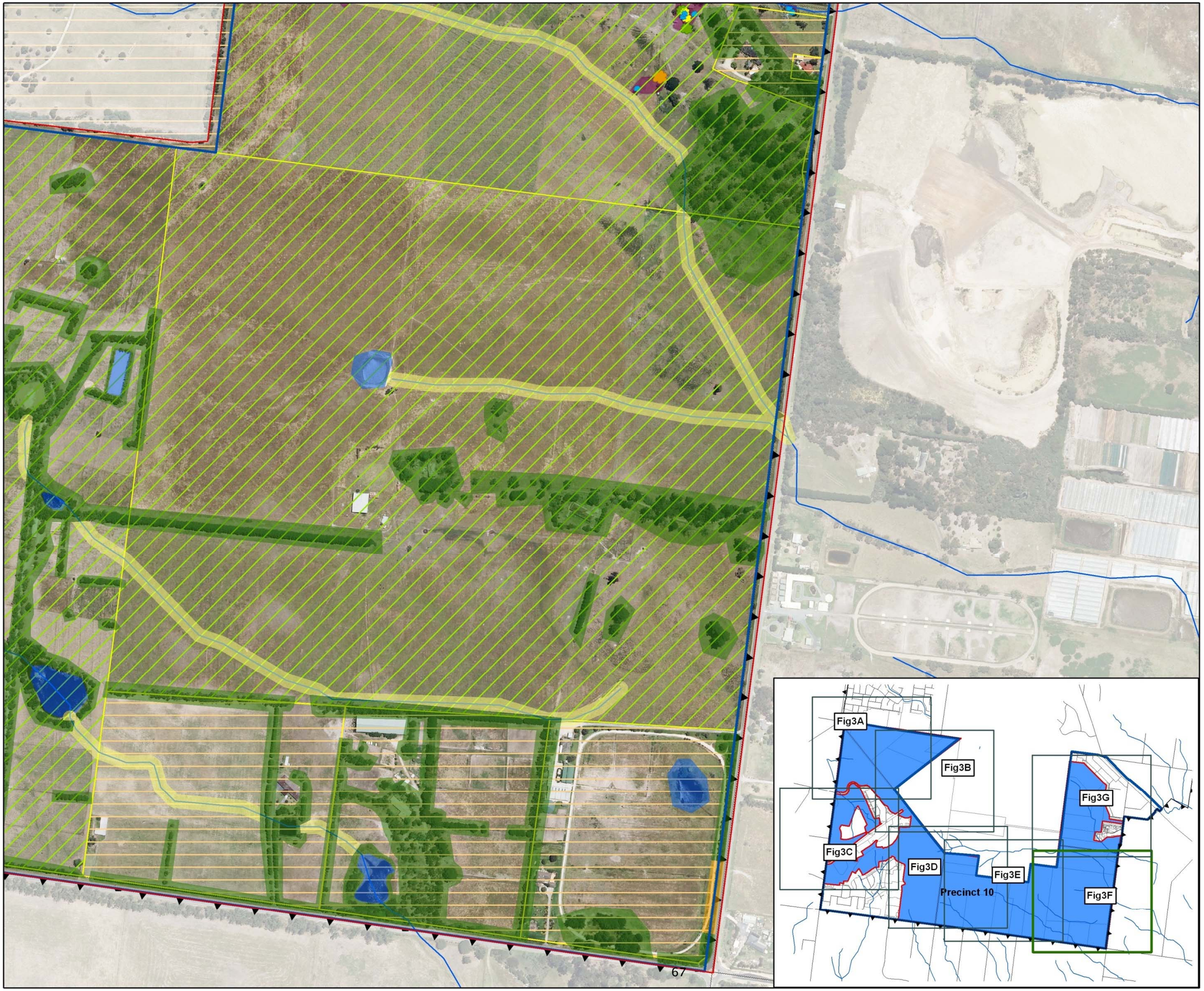

FIGURE 3F
Areas of High Fauna Habitat Value for Significant Species
Precinct 10 Study Area
Biodiversity Assessment Report
Fauna Assessment and Mapping
Botanic Ridge
Growth Areas Authority

LEGEND

- Roads
- Watercourses
- Study Area Boundary
- Property Boundary
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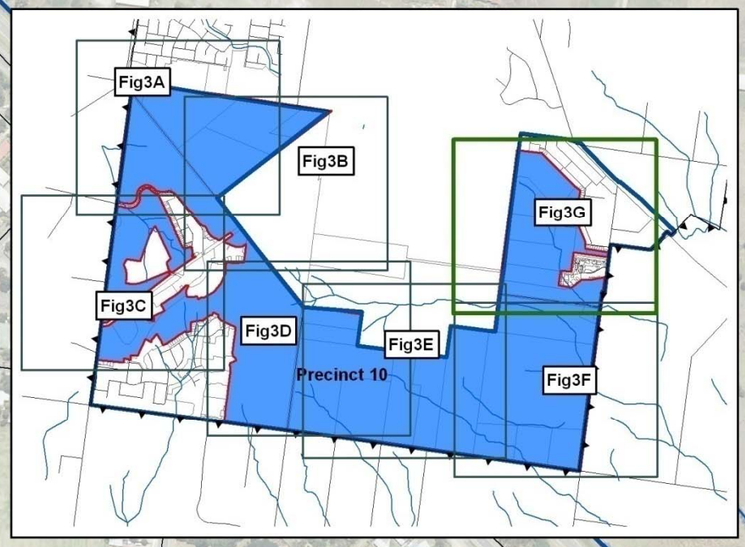

FIGURE 3G

Areas of High Fauna Habitat Value for Significant Species
Precinct 10 Study Area
Biodiversity Assessment Report
Fauna Assessment and Mapping
Botanic Ridge
Growth Areas Authority

LEGEND

- Roads
- Watercourses
- Study Area Boundary
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