

FINAL REPORT:

Addendum Biodiversity Assessment for Lots 2, 3, 13, 14, 19, 20 and 21 within Area 40, 'Wyndham Vale', Wyndham Vale

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The following Ecology Partners Pty Ltd employees either undertook the field assessments and/or contributed to the preparation of this report: Warren Tomlinson, Daniel Weller, Jenna Forbes, Ross Dennis, Bryan Roberts, Aaron Organ, Simon Scott and Amanda Feetham

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EXECUTIVE SUMMARY

Introduction

Ecology Partners Pty Ltd was commissioned by the GAA and engaged by three private landowners within Precinct Structure Plan area 40 – Wyndham Vale to undertake general flora and fauna surveys and targeted searches for threatened flora. These surveys were required to complete the assessment of the biodiversity values in PSP 40.

Ecology Partners Pty Ltd was commissioned to assess seven Lots:

- Lots 2 and 3 Hobbs Road, Wyndham Vale; and,
- Lots 13, 14, 19, 20 and 21 Wollahra Rise, Wyndham Vale.

The scope of works for each Lot was limited to the following tasks:

- A general flora and fauna assessment, and targeted flora survey for Lots 2, 3, 13, 14, 19 and 21; and,
- A targeted flora survey for Lot 20.

A detailed Vegetation Quality Assessment was undertaken by AECOM in 2010 across all lots in the PSP 40 area (AECOM 2010) and this data has been used for the Time Stamping data set. As such, a Vegetation Quality Assessment has not been included as part of this report.

The Precinct is located approximately 30 kilometres south west of the Melbourne Central Business District. The precinct contains land with multiple ownerships and a variety of uses that include residential and agriculture. The land on which Ecology Partners conducted their assessment is currently used for hobby farming, cropping, horse agistment and housing.

All flora and fauna assessments were conducted in accordance with the Biodiversity Precinct Structure Planning Kit and the GAA's contract specification for Biodiversity Mapping.

Methods

The following resources and databases were reviewed over the duration of the project:

- The Atlas of Victorian Wildlife (AVW) and Flora Information System (FIS) databases.
- Department of Sustainability and Environment (DSE) Biodiversity Interactive Maps showing historic and current Ecological Vegetation Classes (EVCs).
- Sites of Biological Significance (BioSites) (DSE).
- Aquatic Fish Database and 'DSE verified unpublished aquatic records' (sent by Clare White, Senior Biodiversity Officer, DSE, 5 October).

- Department of Sustainability, Environment, Water, Population and Communities Protected (SEWPaC) Matters Search Tool providing matters of National Environmental Significance (NES) (e.g. listed taxa and ecological communities, Ramsar wetlands) protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- Planning Schemes Online providing the current zone and overlays.
- Relevant legislation and policies.

Ecological reports relevant to the study area, including the *Biodiversity Assessment Report (Native Vegetation) PSP 40: Wyndham Vale* (AECOM 2010) and the Hobbs Road, Wyndham Vale, Biodiversity Assessment (CPG Australia 2010) reports.

Liaison was undertaken with the GAA and DSE to confirm the extent and intensity of the proposed methodology.

Site assessments were undertaken wherever access was granted. Biodiversity assessment methods followed the methodology stipulated within the DSE Biodiversity Precinct Structure Planning Kit, and included the following:

- *General flora and fauna survey*: Flora and fauna species observed within the precinct during the assessments were recorded. Detailed fauna assessments, were also conducted, including the following:
 - Terrestrial and Arboreal Mammal surveys;
 - Bird Census;
 - ANABAT surveys;
 - Reptile and Amphibian surveys;
 - Invertebrate surveys.
- *Targeted flora assessment*: Targeted flora surveys were undertaken in summer. While much of the study area is highly modified and supports few areas of potentially suitable habitat for significant flora species, targeted surveys for the following species were undertake:
 - Small Scurf Pea, Button Wrinklewort, Sunshine Diuris, Small Golden Sun Moth Orchid, Tough Surf Pea, Basalt Sun Orchid, Swollen Swamp Wallaby Grass, Large Fruit Fireweed, River Swamp Wallaby Grass, Slender Tick Trefoil, Clover Glycine, Small Milkwort, Austral Toadflax, Basalt Peppergrass, Swamp Fireweed, Basalt Podolepis, Swamp Everlasting, Matted Flax Lilly and Spiny Rice Flower.

Results

Flora

A total of 123 taxa of plants (49 indigenous, 74 exotics) were recorded during the present assessment throughout the study area.

One threatened flora species, Slender Bindweed *Convolvulus angustissimus* subsp. *omnigracilis* was recorded within the study area during the assessment.

The majority of native vegetation within the study area has been modified as a result of previous land use activities (i.e. agriculture) and three EVCs identified within the study area Plains Grassland (EVC 132), Plains Sedgy Wetland (EVC 647) and Plains Grassy Wetland (EVC 125) are generally of a poor condition, however both are considered to be Endangered within the Victorian Volcanic Plain bioregion.

One ecological community (Natural Temperate Grassland of the Victorian Volcanic Plain), listed as nationally critically endangered under the EPBC Act was recorded on all Lots, the community was found to be of a poor condition due to previous and ongoing modification. Natural Temperate Grassland of the Victorian Volcanic Plain is also listed as threatened (Western (Basalt) Plains Grassland) under the FFG.

Fauna

Eighty-eight fauna species were recorded during the general fauna surveys, comprising 60 birds (54 native and six introduced), 13 mammals (eight native and five introduced), four native frog species, three native reptiles and eight butterflies (Appendix 3.1).

No national, state or regionally significant fauna species were recorded within the study area during the assessment. There is suitable habitat for:

- Three fauna species of National significance: Plains Wanderer, Golden Sun Moth and Striped Legless Lizard;
- Three fauna species of State significance: Red-chested Button-quail, Eastern Great Egret and Royal Spoonbill;
- One fauna species of Regional significance: Fat-tailed Dunnart.

The greater study area supports six broad habitat types: Modified grassland, scattered remnant trees, ephemeral drainage lines, planted vegetation, artificial waterbodies and introduced pasture grass and crops.

Additional Requirements

A Native Vegetation Precinct Plan is required and this is considered appropriate to provide a clear direction regarding the extent of native vegetation removal within the Wyndham Vale PSP and to inform the planning process.

A permit from the Wyndham City Council is currently required for removal of native vegetation within the study area. However, once the NVPP has been prepared and the PSP is incorporated into the local planning scheme, this will preclude the requirement for a planning permit to clear or remove remnant native vegetation if it is in accordance with the NVPP.

For impacts on Matters of National Environmental Significance (NES) within the PSP (primarily Natural Temperate Grassland of the Victorian Volcanic Plain), the Melbourne Strategic Assessment program and when approved, the Biodiversity Conservation Strategy will be used to determine impacts and defines responses to clear or impact upon the community of other Matters of NES.

An FFG Act permit will be required for the removal of protected flora species or communities under the Act, if protected species are located on public land within threatened communities.

There are opportunities to enhance ecological values within the study area, principally through allowing the regeneration of native vegetation, revegetation and weed control. There are also opportunities to create additional fauna habitat such as wetlands.

1 INTRODUCTION

1.1 Background

Ecology Partners Pty Ltd was commissioned by the GAA and engaged by three private landowners within Precinct Structure Plan area 40 – Wyndham Vale to undertake general flora and fauna surveys and targeted searches for threatened flora. These surveys were required to complete the assessment of the biodiversity values in PSP 40.

Ecology Partners Pty Ltd was commissioned to assess seven Lots by three different landowners:

- Lots 2 (parcel PFI 1786403) and 3 (parcel PFI 1786392) Hobbs Road, Wyndham Vale – approximately 85 hectares (Investa Property Group);
- Lots 13 (parcel PFI 1809953), 14 (parcel PFI 1809954), 20 (parcel PFI 1809960) and 21 (parcel PFI 50242676) Wollahra Rise, Wyndham Vale – approximately 48 hectares (Bosco Jonson); and,
- Lot 19 (parcel PFI 1809959) Wollahra Rise, Wyndham Vale – approximately 12 hectares (Taylors Development Strategists).

The seven Lots are collectively known within this report as the study area (Figure 2).

All flora and fauna assessments were conducted in accordance with the Biodiversity Precinct Structure Planning Kit and the GAA’s contract specification for Biodiversity Mapping.

A detailed Vegetation Quality Assessment was undertaken by AECOM in 2010 across all lots in the PSP 40 area (AECOM 2010) and this data has been used for the Time Stamping data set. The AECOM (2010) report includes other relevant information, such as detailed vegetation mapping and EVC descriptions (AECOM 2010). As such, a Vegetation Quality Assessment has not been included as part of the current report.

1.2 Objectives

The objectives of the assessment were to:

- Identify, assess and map significant flora, fauna and habitat within the study area and the level of conservation significance for any species or habitat found;
- Collect data at a sufficient detail and standard to enable the development of a Precinct Structure Plan (PSP) and Biodiversity Plan;
- Provide advice on any works or management measures that may reduce adverse impacts of the development on species known or likely to occur in the study area; and,
- Ensure that development of the study area complies with legislative requirements regarding the protection of indigenous flora and fauna species and communities.

The purpose of the current assessment is to survey properties not previously accessed and undertake additional surveys to complete the biodiversity assessment in the PSP. This report is independent of the AECOM (2010), investigation, however a desktop review of that work has been undertaken to inform the current scope of works. The current report constitutes an addendum to the AECOM (2010) report.

1.3 Scope of Assessment

Available literature, such as existing spatial (e.g. BioSites, biodiversity interactive maps, previous ecological assessments) and biological databases (e.g. Victorian Biodiversity Atlas) were reviewed in relation to the study area.

The scope of work required for each of these allotments included:

1.3.1 Lots 2 and 3 Hobbs Road and Lots 13, 14, 19 and 21 Wollahra Rise, Wyndham Vale

- General Flora and Fauna Survey.
- Targeted Flora Assessment for the following species:
 - Small Scurf Pea, Button Wrinklewort, Sunshine Diuris, Small Golden Sun Moth Orchid, Tough Surf Pea, Basalt Sun Orchid, Swollen Swamp Wallaby Grass, Large Fruit Fireweed, River Swamp Wallaby Grass, Slender Tick Trefoil, Clover Glycine, Small Milkwort, Austral Toadflax, Basalt Peppercross, Swamp Fireweed, Basalt Podolepis, Swamp Everlasting, Matted Flax Lilly and Spiny Rice Flower.

1.3.2 Lot 20 Wollahra Rise, Wyndham Vale

- Targeted Flora Assessment for the following species:
 - Small Scurf Pea, Button Wrinklewort, Sunshine Diuris, Small Golden Sun Moth Orchid, Tough Surf Pea, Basalt Sun Orchid, Swollen Swamp Wallaby Grass, Large Fruit Fireweed, River Swamp Wallaby Grass, Slender Tick Trefoil, Clover Glycine, Small Milkwort, Austral Toadflax, Basalt Peppercross, Swamp Fireweed, Basalt Podolepis, Swamp Everlasting, Matted Flax Lilly and Spiny Rice Flower.

The type of survey undertaken and extent of the general flora and fauna survey and targeted flora survey is shown in Figure 2.

1.4 Study Area

Precinct Structure Plan area 40 – Ballan Road, Wyndham Vale is located approximately 30 kilometres south west of the Melbourne Central Business District (Figure 1). The precinct contains land with multiple ownerships and a variety of uses that include residential and

agriculture. The land on which Ecology Partners conducted their assessment (the study area) is currently used for hobby farming, horse agistment and housing.

The landform of the study area is largely flat, with several low rises containing small rock outcrops and knolls within the northern Lots. The Werribee River is adjacent to the east of the study area.

According to the Department of Sustainability and Environment's (DSE) Biodiversity Interactive Map (DSE 2011a) the study area occurs within the Victorian Volcanic Plain (VVP). The study area falls within the jurisdiction of the Port Phillip and Western port Catchment Management Authority and the Wyndham City Council municipality.

The majority of the land within study area has been subject to some modification through intensive agricultural use including grazing and cropping. The vegetation of the study area consists of a mixture of pasture dominated by native perennial grasses, highly modified exotic dominated vegetation (i.e. crops and pasture), planted trees and shrubs. Remnant vegetation while widespread is generally considered not to be of a natural state due to past modification and agricultural uses. Current land use includes agriculture (grazing, cropping) within the undeveloped areas, and low-density residential use and hobby farms.

The study area is zoned Urban Growth (UGZ). There are no overlays pertinent to this study affecting the seven Lots.

2 METHODS

2.1 Nomenclature

Common and scientific names of vascular plants follow the Flora Information System (FIS) (FIS 2009) and the Census of Vascular Plants of Victoria (Walsh and Stajsic 2007). Vegetation community names follow DSE's Ecological Vegetation Class (EVC) benchmarks (DSE 2011a) and Oates and Taranto (2001). The names of terrestrial vertebrate fauna (mammals, birds, reptiles, amphibians) follow the Victorian Biodiversity Atlas (DSE 2010).

2.2 Desktop Assessment

The following resources and databases were reviewed:

- The VBA (DSE 2010) and FIS (2009) databases for historic flora and fauna records;
- Museum of Victoria's online butterfly database, available at <http://museumvictoria.com.au/bioinformatics/butter/>
- DSE's Biodiversity Interactive Maps showing historic and current EVCs (DSE 2011a);
- Information relating to matters of National Environmental Significance (NES) (listed taxa and ecological communities) protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) was obtained from the Protected Matters Search Tool (SEWPaC 2011);
- Planning Schemes Online to ascertain current zoning and environmental overlays (DSE 2011a);
- Relevant environmental legislation and policies; and,
- Previous reports relating to the Precinct area, including the *Biodiversity Assessment Report (Native Vegetation) PSP 40: Wyndham Vale* (AECOM 2010) and the Hobbs Road, Wyndham Vale, Biodiversity Assessment (CPG Australia 2010) reports.

2.3 Flora

Flora assessments were undertaken on the 15, 16, 20, 21 and 22 December 2010 on all seven Lots, to obtain information on terrestrial flora values within the study area. General flora and fauna and targeted flora survey methods were undertaken consistent with the Biodiversity Precinct Structure Planning Kit guidelines (DSE 2010b) and the GAA 2010 – 2011 contract specification for the Biodiversity Mapping Project. The entire study area was assessed on foot, with all observed vascular plants recorded, any significant records mapped and the overall condition of vegetation noted. Remnant vegetation in the local area was also reviewed to assist in determining the original vegetation within the study area.

2.4 Fauna

The general fauna surveys were undertaken by two qualified and experienced zoologists on 1, 4, 5 and 8 April 2011, to obtain information on terrestrial fauna values within the study area. Survey conditions were clear and warm with a light breeze on all survey days. The entire area was traversed by foot and car and active searches were undertaken in areas of suitable habitat.

Fauna survey methodology was consistent with the Biodiversity Precinct Structure Planning Kit guidelines (DSE 2010a).

2.4.1 Terrestrial mammals

Active searching and visual identification was undertaken in all habitats available within each of the properties. This included rock rolling, looking under refuse such as pieces of wood and tin, and general visual searches across the landscape with binoculars.

Intensive survey techniques such as trapping and a hair-tube program were not implemented given that no suitable habitat for any National or State significant species was identified on any of the properties within the study area.

2.4.2 Arboreal mammals

Subsequent to database searches, active searching was undertaken in all areas supporting habitat for arboreal mammals. While nocturnal spotlighting is usually conducted to identify arboreal mammals in areas of extensive remnant woodland vegetation, it was not undertaken during these surveys as there is minimal remnant woodland vegetation present.

Diurnal active searching was undertaken to identify signs of habitation such as scratch marks on tree trunks or around hollows, scats on the ground, and other incidental evidence, which was used to determine fauna species currently using areas of suitable habitat. Based on the amount and type of vegetation present within the study area, this survey effort was deemed adequate in identifying the presence of all species likely to be using available habitats.

2.4.3 Bats

Four Anabat bat recording devices (Titley Electronics), were deployed and left on-site for five consecutive nights (5 to 9 April 2011), and set to record from dusk until dawn. Bat recordings were analysed by Rob Gratton from Ecological Consulting Services using his reference call collection. Due to the homogeneity of the habitat available on all surveyed properties, and lack of flyways, harp trapping was not undertaken. Wherever suitable, bat results are presented according to standards recommended by the Australasian Bat Society (ABS 2012).

2.4.4 Birds

A census was undertaken on two separate days (5 and 8 April 2011) at different times (i.e. in the morning and late afternoon) in each habitat type (i.e. grassland, adjacent to shelter belts)

during optimal weather conditions. Active searching, visual identification and vocalisation identification was undertaken in all habitats available within each of the properties.

Binoculars were used to scan the area for birds, and observers also listened for calls and searched for other incidental signs such as nests, feathers, remains of dead animals, droppings and footprints.

The presence of hollow-bearing trees, areas of ephemeral marsh, and wetlands was noted.

2.4.5 Reptiles and amphibians

Active searching, visual identification and vocalisation identification were undertaken in all habitats available within each of the properties. This included rock rolling, searching under refuse such as pieces of wood and tin, fallen vegetation and leaf litter. Potential habitat areas including rocky outcrops, spider and cricket burrows, fallen trees, dams, and low lying or wetter areas were also identified.

All frog species heard during active searches or while on-site conducting other fauna surveys, were recorded. Each water body and drainage line was inspected and depending on condition, surveyed for approximately 30 minutes.

2.4.6 Invertebrates

All adult butterflies seen while undertaking other diurnal terrestrial fauna surveys were identified and recorded.

Zoologists looked for both actively flying species as well as species that were flushed from ground-level vegetation.

2.4.7 Fish

No surveys for fish species were undertaken. Werribee River is not within the study area, and all waterbodies within the study area are unsuitable for native fish species.

2.5 Fauna Habitats

Habitat features, including ground cover composition and structure, and the presence of hollows and fallen ground debris was noted. The presence of hollows in isolated trees was also noted, as well as any other features likely to be important for native fauna species.

While vegetation found within the study area has been classified using EVCs (AECOM 2010), most fauna habitats can encompass a range of similar EVCs. As such, habitat types located within the study area have been assigned a general designation by grouping similar EVCs together. However, some habitat types do not relate to any EVC (e.g. introduced pasture, artificial dams), due to them not reaching native vegetation thresholds set by the DSE, or being based on general habitat characteristics and not vegetation type. Criteria used to assess habitat value are provided in Appendix 1.3.

2.6 Assessment Qualifications and Limitations

The assessment was undertaken outside the period considered optimal for a flora survey (spring). As with any assessment, a greater amount of time on the site would increase the likelihood of recording additional flora species. The short duration of the survey meant that some fauna, including migratory, transitory or uncommon fauna species may also have been missed.

The general flora and fauna assessment and targeted survey for Lot 13 were partially completed as access was denied by the tenant (Figure 2).

Notwithstanding the above, terrestrial flora and fauna data collected during the field assessment, and information obtained from relevant sources (e.g. biological databases and relevant literature) provides an assessment to achieve the purposes of the report.

3 RESULTS

3.1 Flora Species

3.1.1 Database searches and other information

Additional flora species that have been recorded within the study area, listed as potentially occurring or listed as having potentially occurring habitat within a 10 kilometre radius of the study area are listed in Table A2.2 (VBA 2010; SEWPaC 2011). The significant flora derived from respective Commonwealth and State databases and their likelihood of occurrence are listed in Appendix 2.2 (Figure 3).

3.1.2 Current assessment

A total of 123 taxa of plants (49 indigenous, 74 exotics) were recorded during the present assessment throughout the study area (Appendix 2.1).

3.2 Significant Flora Species and Communities

No flora listed under the EPBC Act or FFG Act were recorded within the study area. One flora species listed under the DSE's *Advisory list of rare and threatened plants* (DSE 2005a) was recorded within the study area. The EPBC listed critically endangered Natural Temperate Grassland of the Victorian Volcanic Plain is also present within the study area.

National and state significant flora species recorded within 10 kilometres of the study area and their likelihood of occurrence are provided in Appendix 2.2. Based on the overall site condition (generally of poor condition) it is unlikely that any further significant flora species would occur within the study area.

3.2.1 National

Five nationally significant flora species have previously been documented within close proximity to the study area (FIS 2009, VBA 2010). Two other nationally significant flora species also have the potential to occur within the area (SEWPaC 2011) and are listed in Appendix 2.2.

Given the highly modified condition of the study area, the degree of survey effort and number of records for species listed under the EPBC Act within the local area, it is considered unlikely that any flora species of national significance occur within the study area.

3.2.2 State

One state significant flora species was recorded within the study area, Slender Bindweed listed as poorly known was recorded widely across the entire study area (Figure 5). Slender Bindweed is a small, trailing herb, with pink flowers and small lobed leaves. The species is locally common and its distribution is scattered across the Werribee Plains, occurring in

disturbed sites as a colonising species. It is widespread throughout the study area in a low density.

Nine flora species listed under the FFG Act and twenty three flora species listed on DSE's *Advisory list of rare and threatened plants* (DSE 2005a), have previously been documented within close proximity to the study area (VBA 2010) and are listed in Appendix 2.2 along with their likelihood of occurrence.

3.2.3 Regional and local

No species of regional conservation significance within the Victorian Volcanic Plain bioregion were recorded in the study area (Appendix 2.1). All other indigenous species are considered to be of local significance.

3.2.4 Significant communities

The EPBC Act listed ecological community Natural Temperate Grassland of the Victorian Volcanic Plain was recorded incidentally on all Lots within the study area. Natural Temperate Grassland of the Victorian Volcanic Plain is associated with areas of remnant vegetation mapped as *Heavier Soils Plains Grassland* (EVC 132 61). The ecological community within the study area is generally of a poor condition with a simplistic floristic composition and presence of a large number of high impact weeds.

Within the study area, all Natural Temperate Grassland of the Victorian Volcanic Plain recorded was of a poor condition, due to its general simplistic floristic composition, lack of structure, presence of high threat weeds and poor habitat value. However, it does meet threshold conditions (i.e. greater than 50% cover of native perennial grasses) to be considered the nationally critically endangered community. Previous modifications within the study area such as grazing and cropping are evident, including in areas of Natural Temperate Grassland of the Victorian Volcanic Plain are now present. Previous studies by AECOM (2010) and CPG (2010) failed to find areas of Natural Temperate Grassland of the Victorian Volcanic Plain within some Lots of the study area in which it was recorded during the current assessment. A return to above average rainfall during spring 2010, has seen grass growth not experienced in previous drought years, therefore this has increased the cover of native perennial grasses which may not have been present during previous studies.

The ecological community is also listed under the FFG Act as Western (Basalt) Plains Grassland, and is considered Endangered by the DSE within the Victorian Volcanic Plain bioregion (DSE 2011a).

The critically endangered Grassy Eucalypt Woodland of the Victorian Volcanic Plain and endangered Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands ecological communities are likely to occur with a 10 kilometre radius of the study area (SEWPac 2011). However, neither community were recorded within the study area or is likely to be present.

3.3 Vegetation Condition

The overall condition of native vegetation in the study area is poor to moderate due to previous disturbance from ongoing cropping and heavy grazing. Areas constituting the Natural Temperate Grassland of the Victorian Volcanic Plain ecological community contain various species of perennial grasses, including Common Wallaby-grass *Austrodanthonia caespitosa*, Bristly Wallaby-grass *Austrodanthonia setacea*, Kneed Spear-grass *Austrostipa bigeniculata*, Rough Spear-grass *Austrostipa scabra* subsp. *falcata*, Red-leg Grass *Bothriochloa macra* and Windmill Grass *Chloris truncata*. Grasses occupy a large percentage of the total vegetation cover, displacing herbs and other smaller graminoids.

Native herbs present include Berry Saltbush *Atriplex semibaccata*, Nodding Saltbush *Einadia nutans*, Grassland Wood-sorrel *Oxalis perennans*, Clammy Goosefoot *Chenopodium pumilo* and Slender Bindweed *Convolvulus angustissimus* subsp. *omnigracilis*. A ground fern Narrow Rock fern *Cheilanthes sieberi* was also recorded in rocky outcrops. Herbs present are indicative of colonising species or those with the ability to be able to tolerate grazing.

Exotic flora is widespread and occupies large areas, including Cats ear *Hypochoeris radicata*, Patersons Curse *Echium plantagineum*, Spear Thistle *Cirsium vulgare*, African Thistle *Berkheya rigida*, Big Herron's-bill *Erodium botrys*, Galenia *Galenia pubescens*, Common Peppergrass *Lepidium africanum*, African Box-thorn *Lycium ferocissimum*, Capeweed *Arctotheca calendula*, Buck's-horn Plantain *Plantago coronopus*, Ribwort *Plantago lanceolata* and Horehound *Marrubium vulgare*. Several exotic grass species were recorded as individuals or small scattered patches, including Couch *Cynodon dactylon*, Chilean Needle Grass *Nassella neesiana*, Serrated Tussock *Nassella trichotoma*, Paspalum *Paspalum dilatatum* and Toowoomba Canary-grass *Phalaris aquatica*.

3.4 Fauna

3.4.1 Database searches and other information

The AVW (2011) and VBA (2010) contain records of 346 fauna species that have been recorded in the local area (i.e. within 10 km of the study area) (Appendix 3.1; Figure 4). The majority of records are for birds, with relatively low numbers of mammals, reptiles and frogs.

This data suggests the local area supports a broad range of fauna species, some of which are expected to use the study area either as residents, or visitors on a regular or irregular basis. It should also be noted that a large number of wetland dependent birds and migratory shorebirds have been identified in the database searches due to the proximity of the Precinct to the Western Treatment Plant and Werribee River estuary.

Targeted surveys for Striped Legless Lizard and Golden Sun Moth were conducted by CPG Australia Pty Ltd on two and three Hobbs Lane over Spring/Summer 2009/2010, although neither species was recorded on these properties during the surveys (CPG Australia Pty Ltd 2010).

3.4.2 Current assessment

Eighty-eight fauna species were recorded during the general fauna surveys, comprising 60 birds (54 native and six introduced), thirteen mammals (eight native and five introduced), four native frog species, three native reptiles and eight butterflies (Appendix 3.1). A large proportion of the bird species recorded during the assessment were observed in the vicinity of the Werribee River, which provides many additional habitat opportunities to those available within the greater study area. An additional bird species, Southern Boobook *Ninox novaeseelandiae*, is a known resident along the Werribee River corridor and is likely to use habitats within the properties located at two and three Hobbs Lane, Wyndham Vale (Author pers. comm.).

Six microbat species were detected by the Anabat bat detectors and subsequently positively identified: White-striped Freetail Bat *Tadarida australis*, Gould's Wattled Bat *Chalinolobus gouldi*, Chocolate Wattled Bat *Chalinolobus morio*, Large Forest Bat *Vespadelus darlingtoni*, Little Forest Bat *Vespadelus vulturnus* and Mormopterus spp. *Mormopterus sp2* or *sp4* (Appendices 3.1 and 3.2). All of these species are common throughout Victoria. 461 or 38% of calls recorded were identified to species level, with a further 196 or 15% being identified to call complex level (Appendix 3.2). Sample time versus frequency graphs for each identified species are presented in Appendix 3.4.

No national, state or regionally significant fauna species were recorded within the study area during the assessment.

3.5 Significant Fauna

3.5.1 National Significance

No national significant fauna species were recorded within the study area during the assessment. Twelve nationally listed fauna species have previously been recorded within the local area (within 10 km of the study area) (VBA 2010) (Figure 5). The likelihood of occurrence of nationally significant fauna species within the study area is outlined in Appendix 3.2. These species include:

- Three mammals: Grey-headed Flying-fox *Pteropus poliocephalus*, Eastern Barred Bandicoot *Perameles gunnii*, Southern Brown Bandicoot *Isodon obesulus obesulus*;
- One grassland dependent bird: Plains Wanderer *Pedionomus torquatus*;
- One coastal associated bird: Orange bellied Parrot *Neophema chrysogaster*;
- One woodland dependent bird: Swift Parrot *Lathamus discolor*;
- Two wetland dependent birds: Australasian Bittern *Botaurus poiciloptilus* and Australian Painted Snipe *Rostratula australis*;
- Two reptiles: Striped Legless Lizard *Delma impar* and Grassland Earless Dragon *Tympanocryptis pinguicolla*;

- One frog: Growling Grass Frog *Litoria raniformis*; and,
- One invertebrate: Golden Sun Moth *Synemon plana*.

No fauna species of National significance were recorded within the greater study area during the assessment. A single record of Eastern Barred Bandicoot exists on Lot 19, Wollahra Rise, although this species is known to be extinct in the wild in Victoria.

There is suitable habitat for three species of National significance; Plains Wanderer, Golden Sun Moth and Striped Legless Lizard (Figure 6). There is modified grassland habitat present on all of the properties surveyed during the assessment, which supports characteristics favourable for these species. Targeted regional surveys for these species have been commissioned by the GAA and conducted on a broad scale throughout the greater study area. Based on habitat availability, condition and connectivity, and proximity to existing records, there is a moderate likelihood of occurrence for Golden Sun Moth and Striped Legless Lizard, and a low likelihood of occurrence for Plains Wanderer.

Despite the presence of several moderate size waterbodies, there is no suitable habitat for Growling Grass Frog. However, given the connectivity to known sites within the local area, especially to the south (i.e. Western Treatment Plant), there is a low likelihood that this species may use habitat within the study area for foraging or dispersal purposes.

Swift Parrot and Grey-headed Flying Fox may fly over the study area on an occasional basis or visit planted windrows for foraging purposes (Appendix 3.2), however it is unlikely that Swift Parrot or Grey-headed Flying-fox would reside within the study area for extended periods or on a frequent basis.

There is a low likelihood of occurrence for any additional fauna species of National significance within the study area (Appendix 3.2).

Habitat for an additional four species is predicted to occur within the study area (SEWPaC 2010). These species include:

- Two mammals: Spot-tailed Quoll *Dasyurus maculatus* and New Holland Mouse *Pseudomys novaehollandiae*; and,
- Two fish: Australian Grayling *Prototroctes maraena*, Dwarf Galaxias *Galaxiella pusilla*.

There is no suitable habitat for these species within the greater study area.

3.5.2 State Significance

No state significant fauna species were recorded within the greater study area during the field assessments. The VBA (2010) contains records of thirty two state significant fauna previously recorded from within 10 kilometres of the study area (Figure 5) (Appendix 3.2).

The likelihood of occurrence of state significant fauna species within the study area is outlined in Appendix 3.2.

These species include:

- Two nocturnal raptors: Barking Owl *Ninox connivens* and Masked Owl *Tyto novaehollandiae*;
- Three diurnal raptors: Black Falcon *Falco subniger*, Grey Goshawk *Accipiter novaehollandiae* and White-bellied Sea-Eagle *Haliaeetus leucogaster*;
- Fourteen wetland associated birds: Baillon's Crake *Porzana pusilla*, Lewin's Rail *Lewinia pectoralis*, Australian Shoveler *Anas rhynchotis*, Brolga *Grus rubicunda*, Blue-billed Duck *Oxyura australis*, Hardhead *Aythya australis*, Little Egret *Egretta garzetta*, Intermediate Egret *Egretta intermedia*, Eastern Great Egret *Ardea modesta*, Little Bittern *Ixobrychus minutus dubius*, Gull-billed Tern *Gelochelidon nilotica macrotarsa*, Freckled Duck *Stictonetta naevosa*, Magpie Goose *Anseranas semipalmata*, Musk Duck *Biziura lobata*, and Royal Spoonbill *Platalea regia*.
- Four woodland associated birds: Brown Treecreeper *Climacteris picumnus victoriae*, Diamond Firetail *Stagonopleura guttata*, Hooded Robin *Melanodryas cucullata* and Speckled Warbler *Chthonicola sagittata*;
- Ten coastal birds: Black-tailed Godwit *Limosa limosa*, Common Sandpiper *Actitis hypoleucos*, Wood sandpiper *Tringa glareola*, Great Knot *Calidris tenuirostris*, Fairy Tern *Sternula nereis nereis*, Little Tern *Sternula albifrons sinensis*, Caspian Tern *Sterna caspia*, Greater Sand Plover, Lesser Sand Plover and Terek Sandpiper *Xenus cinereus*;
- One grassland associated bird: Red- chested Button-quail *Turnix pyrrhothorax*; and,
- One frog species: Brown Toadlet *Pseudophryne bibronii*.

No fauna species of State significance were recorded during the assessment.

Four fauna species are likely to use habitat within the study area on a transient basis. These species include Red-chested Button-quail, Black Falcon, Eastern Great Egret and Royal Spoonbill. Red-chested Button-quail, Eastern Great Egret and Royal Spoonbill have been recorded in proximity to the study area and may use habitats within the study area when conditions are suitable (VBA 2010; Figure 5).

There is no suitable habitat for any state significant fauna species in the study area (Appendix 3.2).

3.5.3 Regional and Local Significance

No regionally significant fauna species were recorded within the study area during the field assessment. The VBA (2010) contains records of twenty-two state significant fauna previously recorded from within 10 kilometres of the study area (Appendix 3.2).

These species include:

- One mammal: Fat-tailed Dunnart *Sminthopsis crassicaudata*;
- Seven wetland associated birds: Brown Quail *Coturnix ypsilophora*, Australian Pratincole *Stiltia isabella*, Whiskered Tern *Chlidonias hybridus*, White-winged Black Tern, Glossy Ibis *Plegadis faclinellus*, Latham's Snipe, and Nankeen Night Heron *Nycticorax caledonicus*;
- Two grassland associated birds: Cape Barren Goose *Cereopsis novaehollandiae*, and Little Button-quail *Turnix velox*;
- Ten coastal associated birds: Black-faced Cormorant, Pied Cormorant, Sooty Oystercatcher *Haematopus fuliginosus*, Pectoral Sandpiper, Eastern Curlew *Numenius madagascariensis*, Red Knot *Calidris canutus*, Long-toed Stint, Grey Plover *Pluvialis squatarola* and Pacific Golden Plover *Pluvialis fulva*, Pacific Gull *Larus*;
- One diurnal raptor: Spotted Harrier *Circus assimilis*; and,
- One fish: River Blackfish.

No fauna species of Regional significance were recorded during the assessment.

Nankeen Night Heron, River Blackfish, Latham's Snipe, Brown Quail and Fat-tailed Dunnart have been recorded in proximity to the greater study area previously (VBA 2010). Latham's Snipe, Brown Quail and Nankeen Night Heron may use waterbodies and their surrounding grassland habitat for foraging purposes.

Based on suitable habitat being present across much of the study area, and proximity of the site to recent records, there is a moderate-high likelihood of occurrence for Fat-tailed Dunnart.

The likely use of the study area by the above listed species is provided in Appendix 3.2.

All other native fauna (primarily grassland dependent birds) are of local significance, as they are not listed as rare or threatened on a national, state and/or regional level.

3.6 Fauna Habitats

Fauna habitats located within the overall study area have been assigned a general designation by grouping similar EVCs together. Some habitat types do not relate to any EVC (i.e. introduced pasture, artificial dams), as they are based on general habitat characteristics and not vegetation type.

The greater study area supports six broad habitat types: Modified grassland, scattered remnant trees, ephemeral drainage lines, planted vegetation, artificial waterbodies and introduced pasture grass and crops.

3.6.1 Modified grassland (Corresponding EVC: Plains Grassland)

Overall habitat value - Remnant modified grassland is of **moderate to high** habitat value for native fauna. While the majority of remnants in the study area are floristically and structurally deficient, lacking key habitat components such as a diversity of flora species and suitable refuge sites, they are likely to act as ‘stepping stone’ habitats for ground-dwelling birds, mammals and reptiles. Patches of native grassland habitat are also likely to facilitate fauna movement between sites of higher value throughout the local landscape.

Description - Characterised by the dominance of native grasses and herbs, such as Red-leg Grass *Bothriochloa macra*, Windmill Grass *Chloris truncata*, wallaby grasses *Austrodanthonia* spp. and Spear Grasses *Austrostipa* spp., these areas provide key habitat attributes contiguous with the surrounding area.

Terrestrial fauna - Modified grassland remnants within the greater study area provide important habitat for native herpetofauna such as Common Blue-tongued Lizard *Tiliqua scincoides* and Garden Skink *Lampropholis guichenoti*. Common open country species (primarily birds) are also likely to use this habitat, as are the following significant species; Striped Legless Lizard, Golden Sun Moth, Plains Wanderer and Fat-tailed Dunnart. Larger patches are likely to support a suite of grassland birds such as Zebra Finch *Taeniopygia guttata*, Superb Fairy Wren *Malurus cyaneus* and Willie Wagtail *Rhipidura leucophrys*, which were all recorded within the study area during the assessment.

Modified grasslands also provide foraging habitat for diurnal raptors (e.g. Nankeen Kestrel *Falco cenchroides*, Black-shouldered Kite *Elanus axillaris* and Brown Falcon *Falco berigora*).

3.6.2 Scattered remnant trees (Corresponding EVCs: Grassy Woodland)

Overall habitat value – Scattered remnant trees are of **moderate** habitat value for fauna. This habitat is likely to facilitate fauna movement between habitats throughout an otherwise cleared landscape.

Description - This habitat type occurs as individual remnant trees, supporting mature eucalypts to 15 metres, and is located at the eastern end of number two, Hobbs Lane. Some of these trees currently provide large numbers of hollows that vary in size and shape. The understorey is largely comprised of predominantly introduced vegetation.

Terrestrial fauna – Brush-tailed Possum *Trichosurus vulpecular*, Common Ring-tailed Possum *Pseudocheirus peregrines* and Sulphur-crested Cockatoos *Cacatua galarita* are likely to use this habitat for breeding or foraging habitat. Common bat species such as the White-striped Freetail-bat *Tadarida australis* and Chocolate Wattled Bat *Chalinolobus morio* are likely to use hollows refuge during the day and forage around the canopy for insects at night.

However, this habitat was found to support a wide range of native bird species in which the majority of hollow bearing trees were used by pest species such as Common Starlings *Sturnus vulgaris* and Common Mynas *Acridotheres tristis*.

Remnant trees also provide habitat for diurnal raptors (e.g. Nankeen Kestrel, Black-shouldered Kite), which use trees for perching, roosting and foraging activities. When in flower, remnant woodland trees are also likely to provide food resources for a variety of honeyeaters, corellas, rosellas and lorikeets.

3.6.3 Ephemeral drainage lines (Corresponding EVC: None)

Overall habitat value – Ephemeral drainage lines within the greater study area are considered to provide **low** habitat value for fauna species within the study area, but are especially valuable to frogs.

Description – During the field assessment several drainage lines were identified. The majority of these lead to and act as overflow runoff from farm dams, creating dispersal habitat for frog species. Ephemeral drainage lines are not likely to contain water during warmer months and therefore are not likely to act as potential fauna habitat when dry. Additionally, drainage lines lack an extensive cover of fringing aquatic and semi-aquatic vegetation, and suitable refuge sites such as logs. The surrounding vegetation typically comprises introduced grasses for the majority of the study area.

Terrestrial fauna – Ephemeral drainage lines may provide foraging habitat for several native fauna species including waterbirds such as Straw-necked Ibis *Threskiornis spinicollis*, White-faced Heron *Egretta novaehollandiae* and Pacific Black Duck *Anas superciliosa*.

Spotted Marsh Frog *Limnodynastes tasmaniensis*, Striped Marsh Frog *Limnodynastes peroni*, Common Froglet *Crinia signifera* and Southern Banjo Frog *Limnodynastes dumerili* were heard calling within drainage lines during the assessment.

3.6.4 Artificial waterbodies (farm dams) (Corresponding EVC: None)

Overall habitat value – Artificial waterbodies are considered to be of **low to moderate** habitat value for fauna.

Description – Nine waterbodies exist within the study area. They currently support limited amounts of emergent macrophytes and aquatic vegetation, with few refuge sites such as logs or rocks. The surrounding vegetation typically comprises introduced modified grassland, or exotic pasture.

Terrestrial fauna – Waterbirds such as Australian Wood Duck *Chenonetta jubata* or Pacific Black Duck *Anas superciliosa*, Chestnut Teal *Anas castanea*, Masked Lapwing *Vanellus miles* and frog species such as Common Froglet and Spotted Marsh Frog are expected to use this habitat for breeding or foraging purposes on a regular basis.

3.6.5 Planted vegetation/Windrows/Gardens (Corresponding EVC: None)

Overall habitat value – Habitat value for planted vegetation ranges from **low** for immature plantings, to **moderate** for mature plantings.

Description – A range of native and introduced trees and shrubs have been planted throughout the greater study area. Many of these trees are mature and reach a height of up to 10-15 metres, some supporting small hollows. The understorey generally consists of predominantly introduced vegetation.

Terrestrial fauna – Many of these trees provide foraging resources for species adapted to modified environments such as Magpies, wattlebirds, and honeyeaters. Additionally, low growing shrubs would be used by smaller passerine species such as wrens, thornbills, and fantails for nesting and foraging purposes.

3.6.6 Introduced pasture (Corresponding EVC: None)

Overall habitat value - Exotic grasslands are of **low** habitat value for fauna. Ungrazed pasture grasses, which in some places grows up to one metre high, provides habitat for birds adapted to agricultural landscapes, and ground dwelling mammals, reptiles and frogs.

Description - This habitat occurs throughout parts of the overall study area and comprises mostly of improved pasture dominated by pasture grasses, with environmental weeds also present. Some native grasses tolerant to disturbances such as grazing (i.e. Common Wallaby Grass) were also present within some areas.

Terrestrial fauna - Common open country species (primarily birds) recorded using this habitat included grassland birds such as Australian Magpie *Gymnorhina tibicen*, Little Raven *Corvus mellori*, and Australasian Pipit *Anthus novaeseelandiae*. Exotic grasslands also provide foraging habitat for diurnal raptors (e.g., Nankeen Kestrel *Falco cenchroides*, Black-shouldered Kite *Elanus axillaris*, and Brown Falcon *Falco berigora*).

3.7 Ecological Significance

Based on the available information and the results of the site assessment, the vegetation remnants within the study area are considered to be of **regional** conservation significance (see Appendix 1 for significance ratings) due to:

- The presence of one nationally listed ecological community (Natural Temperate Grassland of the Victorian Volcanic Plain of a poor condition, listed as critically endangered under the EPBC Act. Natural Temperate Grassland of the Victorian Volcanic Plain is also listed as threatened (Western (Basalt) Plains Grassland) under the FFG.
- The presence of one state listed flora species (Slender Bindweed);

- Remnant vegetation associated with two EVCs (Plains Grassland and Plains Grassy Wetland) listed as Endangered in the VVP; and,
- The presence of suitable habitat for three national listed fauna species, three State listed fauna species and one regionally listed fauna species.

4 LEGISLATIVE IMPLICATIONS

This section discusses the implications of relevant environmental legislation and policies within the three tiers of government; Commonwealth, State and local.

4.1 Commonwealth

4.1.1 *Environment Protection and Biodiversity Conservation Act 1999*

The EPBC Act establishes a Commonwealth process for assessment of proposed actions that are likely to have a significant impact on matters of NES, or on Commonwealth land. An action (i.e. project, development, undertaking, activity, or series of activities), unless otherwise exempt, requires approval from the Commonwealth Environment Minister if they are considered likely to have an impact on any matters of NES. A referral under the EPBC Act is required if a proposed action is likely to have a ‘significant impact’ on any of the following matters of NES:

- World Heritage properties
- National heritage places
- Ramsar wetlands of international significance
- Threatened species and ecological communities
- Migratory and marine species
- Commonwealth marine area
- Nuclear actions (including uranium mining)
- Great Barrier Reef Marine Park

4.1.2 *Matters of National Environmental Significance*

World Heritage properties and national heritage places

The study area is not located within or near a World heritage property or national heritage property.

Ramsar wetlands of international significance

One wetland of international significance occurs in the vicinity or in the catchment of the study area: Port Phillip Bay (Western Shoreline) and Bellarine Peninsula (SEWPaC 2011), however, it is not likely to be impacted by any proposed development within the study area.

Listed flora and fauna species, and ecological communities

An action requires approval from the Commonwealth Environment Minister if it will, or if it is likely to, have a significant impact on an endangered or critically endangered species, or on an ‘important population’ or critical habitat of a listed vulnerable species.

Flora – No flora species listed under the EPBC Act have been recorded during previous studies or were recorded within the study area during the current assessment. The likelihood of occurrence of species previously recorded within the local area or having habitat predicted to occur within the local area is provided in Appendix 2.2. However, the highly modified nature of the study area means that it is highly unlikely that the study area provides habitat for any flora listed under the EPBC Act.

Fauna – No EPBC Act-listed fauna species were recorded during the assessment. A single record of Eastern Barred Bandicoot exists on Lot 19, Wollahra Rise, although this species is known to be extinct in the wild in Victoria.

Based on habitat availability, condition and connectivity, and proximity to existing records, there is a moderate to high likelihood of occurrence for Golden Sun Moth and Striped Legless Lizard, and a low likelihood of occurrence for Plains Wanderer.

Despite the presence of several moderate size waterbodies, there is limited suitable habitat for Growling Grass Frog. However, given the connectivity to known sites within the local area, especially to the south (i.e. Western Treatment Plant), there is a low likelihood that this species may use habitat within the study area for foraging or dispersal purposes.

Swift Parrot and Grey-headed Flying Fox may fly over the study area on an occasional basis or visit planted windrows for foraging purposes (Appendix 3.2), however it is unlikely that Swift Parrot or Grey-headed Flying-fox would reside within the study area for extended periods or on a frequent basis.

An additional ten nationally listed fauna species have previously been recorded within the local area (within 10 kilometres of the study area) (VBA 2010) or are predicted to occur in the local area (SEWPaC 2010) (Figure 5). However, there is no suitable breeding habitat for any of the remaining EPBC Act listed fauna species within the study area.

Ecological Communities – One ecological community, Natural Temperate Grassland of the Victorian Volcanic Plain, occurs within the study area across all Lots. The condition of the ecological community is poor based on species composition, structure and weed presence, while evidence of previous modification such as intensive grazing and cropping is present. No further ecological communities listed under the EPBC Act occur within the study area.

Listed migratory and marine species

Several migratory and marine species have been recorded from the local area (DSE 2010c). However, there is no important wetland or marine habitats within the study area, and therefore the study area is unlikely to support an ecologically significant population of any migratory and/or marine species.

Implications for the proposed development

An EPBC Act referral is required where there is to be impacts on listed flora, fauna, ecological communities or protected areas. Given the presence of an ecological community

listed as critically endangered exists across all Lots of the study area, the development may need to be referred. However, as the study area falls within a PSP area, the likely assessment path will be through the Melbourne Strategic Assessment (MSA) (DSE 2009) and the Biodiversity Conservation Strategy (BCS) (DSE 2011b) once the latter replaces the MSA.

Melbourne Strategic Assessment

As part of the MSA (DSE 2009), prescriptions have been developed for managing several Matters of NES which will be impacted as a result of the Victorian *Government's Delivering Melbourne's Newest Sustainable Communities* program. These prescriptions identify decision guidelines on what habitat must be retained and what can be cleared. They also identify how impacts are to be mitigated, including through the provision of appropriate offsets. The prescriptions are to be used in the Precinct Structure Planning process, as required by the Precinct Structure Planning Guidelines, and in approvals required for transport infrastructure (including Regional Rail Link), extractive industries and other development approvals within the program.

Biodiversity Conservation Strategy

The Draft Biodiversity Conservation Strategy (BCS) is due to replace the Melbourne Strategic Assessment for matters of National Environmental Significance once it is approved. Under the Strategy, payments for the loss of nationally significant flora and fauna species and their habitats are required. The total offset cost for the removal of a nationally significant species or habitat is \$6,000 to \$8,000 per hectare, as well as \$137,500 per habitat hectare for removal of remnant native vegetation. Draft Sub-regional Species Strategies (SRS) for Growling Grass Frog, Southern Brown Bandicoot and Golden Sun Moth have been prepared under the BCS. The SRSs will be used to inform the preparation of Precinct Structure Plans by identifying important populations and habitat, as well as offset requirements for the relevant species (DSE 2011b).

4.2 State

4.2.1 *Planning and Environment Act 1987*

All planning schemes contain native vegetation provisions at Clause 52.17. A planning permit is required under the *Planning and Environment Act 1987* to remove, destroy or lop native vegetation on a site of more than 0.4 hectares, unless:

- The application is exempt under the schedule to Clause 52.17; or
- A Native Vegetation Precinct Plan (NVPP) applies.

Clause 52.16 applies to land where a NVPP, corresponding to that land, is incorporated into the local planning scheme. Where an NVPP applies, a permit is required to remove destroy or lop native vegetation, except where it is in accordance with that NVPP. Although a NVPP can stand alone, it typically forms part of a PSP. The purpose of a NVPP is to protect and conserve native vegetation to reduce the impacts associated with future development, to provide habitat for flora and fauna species, and to enable other areas of native vegetation to be

removed in accordance with the NVPP. The NVPP may require specified works to be undertaken or specified payments to be made to offset the removal, destruction or lopping of remnant native vegetation. Where a NVPP is incorporated and listed in the schedule to clause 52.17 Native Vegetation, no permit is required under c52.17.

Planning schemes may contain other provisions in relation to the removal of native vegetation. A permit to remove destroy or lop vegetation may still be required under an applicable overlay, such as an environmental significance overlay (ESO) depending on the requirements of the schedule to that overlay. However, planning overlays are often removed during the PSP.

Implications and Recommendations

A planning permit is currently required from City of Wyndham to clear/disturb native vegetation within the study area. However, once the NVPP has been prepared and is an incorporated document under the planning scheme, Clause 52.16 applies to the protection and removal of native vegetation.

4.2.2 Flora and Fauna Guarantee Act 1988

The primary legislation for the protection of flora and fauna in Victoria is the FFG Act. The Act builds on broader national and international policy in the conservation of biodiversity.

The broad objectives of the FFG Act are to; 1) ensure native flora and fauna survive, flourish and maintain in situ evolutionary potential, 2) manage threatening processes, 3) encourage the conserving of flora and fauna through cooperative community endeavours, and 4) establish a regulatory structure for the conservation of flora and fauna in Victoria.

The Act contains protection procedures such as the listing of threatened species and/or communities of flora and fauna, and the preparation of action statements to protect the long-term viability of these values.

Flora - Nine flora species listed as threatened under the FFG Act have been recorded within a 10-kilometre radius of the study area (VBA 2010) (Appendix 2.2).

Vegetation Communities – One ecological community [Western (Basalt) Plain Grassland Floristic Community] listed as threatened under the FFG Act occurs within the study area. This community occurs through the study area including on adjacent roadsides on public land.

Fauna – Thirty-seven fauna species listed as threatened under the FFG Act have previously been recorded from within the local area (i.e. within a 10 kilometre radius of the greater study area) (Appendix 3.2). In addition to those species listed under the EPBC Act which are mentioned above, there is suitable habitat for three fauna species, which are likely to use habitat within the study area on a transient basis. These species include Red-chested Button-quail, Black Falcon and Eastern Great Egret. Red-chested Button-quail and Eastern Great Egret have been recorded in proximity to the study area and may use habitats within the study area when conditions are suitable.

Threatening processes – Future development of the study area should consider FFG Act-listed threatening process such as invasion of native vegetation by environmental weeds.

Implications and Recommendations

One FFG Act listed flora community Western (Basalt) Plain Grassland Floristic Community was recorded within the study area. However, as the proposed development is not public land, then a Protected Flora License or Permit application to remove this vegetation is not required.

4.2.3 *Environment Effects Act 1978*

Environmental impacts or effects of a proposed development can be assessed according to the *Environment Effects Act 1978*. It is not an approval process itself, but a way of enabling Ministers, local government and statutory authorities to make informed decisions about whether a project with potentially significant environmental effects should proceed. The central part of the process is the preparation of an Environmental Effects Statement (EES). The proponent is responsible for preparing an EES if the Minister for Planning decides that one is required. After the EES is completed and released for public comment, the Minister provides an assessment to the relevant decision-makers. There are also opportunities for community involvement at certain stages of the process. The Department of Planning and Community Development coordinates the process, implementing Ministerial Guidelines that set out the details under the Act.

Recommendations and Implications

It is unlikely that an EES will be required for future development of the study area.

4.2.4 *Catchment and Land Protection Act 1994*

The CALP Act contains provisions relating to catchment planning, land management, noxious weeds and pest animals. This Act also provides a legislative framework for the management of private and public land and sets out the responsibilities of land managers, stating that they must take all reasonable steps to:

- Avoid causing or contributing to land degradation which causes or may cause damage to land of another land owner;
- Protect water resources;
- Conserve soil;
- Eradicate regionally prohibited weeds;
- Prevent the growth and spread of regionally controlled weeds; and
- Prevent the spread of, and as far as possible eradicate, established pest animals.

Essentially the Act establishes a framework for the integrated management and protection of catchments, and provides a framework for the integrated and coordinated management, which aims to ensure that the quality of the State's land and water resources and their associated plant and animal life are maintained and enhanced.

Implications and Recommendations

At least eight noxious weeds were recorded within the study area during site assessments (Appendix 2.1). Land owners are responsible to control any infestation of noxious weeds that may become established within the study area.

4.2.5 Wildlife Act 1975

The *Wildlife Act 1975* is the primary legislation in Victoria providing for protection and management of wildlife. The Act requires people engaged in wildlife research (e.g. fauna surveys, salvage and translocation activities) to obtain a permit under the Act to ensure that these activities are undertaken in a manner consistent with the appropriate controls.

The *Wildlife Act 1975* has the following objectives:

- To establish procedures for the promotion of protection and conservation of wildlife, the prevention of species extinctions, and the sustainable use and access to wildlife; and
- To prohibit and regulate the conduct of those involved in wildlife related activities.

Recommendation

While a permit will be required for removal of habitat within the study area, this could be in the form of a permit to remove native vegetation under the *Planning and Environment Act 1987*. Consequently, a separate permit to remove fauna for this project is unlikely to be required.

4.2.6 The Native Vegetation Framework

Since 1989, most proposals to clear native vegetation have required a planning permit from the local Council (Responsible Authority), under the native vegetation provisions of Clause 52.17 of the Victoria Planning Provisions ("VPPs"). In 2002, the Victorian Government released Victoria's Native Vegetation Management – A Framework for Action (NRE 2002) ("the Framework"), which establishes a 'strategic direction for the protection, enhancement and revegetation of native vegetation across the State'.

Amendment (VC19) to Victoria's Planning Provisions introduced the Framework in July 2003 as an incorporated document for all Victorian Planning Schemes. Clauses 11 and 15.09 in the State Planning Policy Framework provide the framework for considering native vegetation issues in the planning system.

These clauses require planning and responsible authorities to have regard to the Framework, which establishes the strategic direction for the protection, enhancement and revegetation of native vegetation across Victoria.

The Framework states that the primary goal 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’ (NRE 2002).

Net Gain is the overall outcome where native vegetation and habitat gains are greater than the losses and where losses are avoided, where possible.

When Net Gain is considered for potential impacts on native vegetation within all planning schemes, the Framework has defined a three-step approach for applying Net Gain to protection and clearance decisions. The three-step approach is:

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

The three-step approach to Net Gain is the first consideration for all planning permit applications and planning scheme amendments, with emphasis placed on the first two steps of avoidance and minimisation. Only after these two steps have been taken should offsets (actions undertaken to achieve commensurate gains) be considered (NRE 2002).

A detailed Net Gain (VQA) assessment for the PSP 40 area was undertaken by AECOM and is detailed in the *Biodiversity Assessment Report (Native Vegetation) PSP 40: Wyndham Vale* (AECOM 2010).

4.2.7 Port Phillip and Westernport Native Vegetation Plan

The *Port Phillip and Westernport Native Vegetation Plan* (PPWCMA 2006) is a guide for local government in assessing planning applications for vegetation removal and determining permit conditions (Net Gain requirements) to ensure that ecological values across the region are not compromised.

The Plan provides information on biodiversity values across the Region and gives guidance to local municipalities on how clearing applications should be assessed. The document also outlines actions to ensure there is a more strategic and coordinated approach to address ongoing degradation in quantity and quality of native vegetation throughout Victoria.

The recommendations made in the *Native Vegetation Plan*, should be taken into consideration in the planning phase of any proposed future works.

4.2.8 Victoria's Biodiversity Strategy

The Victorian Government endorses this strategy titled '*Victoria's Biodiversity – Directions in Management*' (NRE 1997) and represents a benchmark for biodiversity conservation and management throughout the state.

The Biodiversity Strategy encourages Victorians to better understand and appreciate flora and fauna and ecosystems throughout the state, and to take an active part in conservation and management to ensure biodiversity is managed in an ecologically sound and sustainable manner. The Strategy should be taken into account for any proposed developments.

4.3 Local

4.3.1 Wyndham City Council

Under the Wyndham City Council planning scheme the study area is Urban Growth Zone (UGZ). There are no overlays present that are relevant to the current study.

Implications and Recommendations

Once the NVPP has been prepared and the Wyndham Vale PSP is incorporated into the Wyndham City Council planning scheme, this will preclude the requirement for a planning permit to clear or remove remnant native vegetation.

5 POTENTIAL IMPACTS AND MITIGATION MEASURES

Any loss of ecological values should be viewed in the overall context of on-going loss, fragmentation, and deterioration in the quality of remnant vegetation throughout western Melbourne and the greater Victorian Volcanic Plain bioregions. The proposed development is likely to have a localised impact on indigenous flora and fauna species habitats, within an otherwise modified landscape.

Potential impacts caused by future development of the study area include:

- Loss of poor quality nationally critically endangered ecological community Natural Temperate Grassland of the Victorian Volcanic Plan;
- Loss of EVCs within the PSP considered endangered within the bioregion (AECOM 2010);
- Loss of state significant species Slender Bindweed and its habitat;
- Loss of a number of locally common flora species, which are becoming rare within the region;
- Loss of habitat for the Nationally significant Striped Legless Lizard, Golden Sun Moth and Plains Wanderer;
- Loss of low quality foraging habitat for the State significant Eastern Great Egret, Royal Spoonbill;
- Loss of habitat for the Regionally significant Fat-tailed Dunnart;
- Loss of grassland and pastures which provide low quality habitat for native birds and reptiles; and,
- Loss of waterbodies which provide habitat for common species of frog and potentially fish species.

5.1 Opportunities to Reduce Potential Impacts

Any proposed works have the potential to impact (direct and/or indirect) on indigenous flora and fauna species recorded within the study area. Measures to mitigate/ameliorate impacts of the proposed works upon the ecological values in the study area include:

- Any future development should address the first two principles of three-step approach of the Framework to ‘avoid’ and ‘minimise’ impacts to remnant native vegetation, which reduces the requirement for vegetation removal, and can reduce the Net Gain targets;
- Protection of remnant native vegetation areas in perpetuity, through on title agreements;
- Fencing around areas of ecological value (i.e. remnant trees and vegetation, dams) containing known flora and fauna habitat;
- Education of staff/contractors during construction to ensure they are aware of

ecological values to be protected or managed during construction;

- Ensure silt fences and appropriate run-off control measures are implemented to avoid impacts to fish and amphibian habitat if future development occurs near waterbodies such as the Werribee River;
- A Weed Management Plan should be developed to control weeds (particularly noxious species such as Boxthorn, Serrated Tussock and Chilean Needle Grass), targeting areas adjacent to native vegetation;
- Eradicate or control weeds appropriately to minimise the spread of material into, within and outside of the study area;
- The development of Construction Environmental Management Plans that include measures to avoid and minimise impacts to flora and fauna species, and associated habitats during construction, to ensure where possible that ecological values are not adversely impacted; and,
- A zoologist or wildlife handler should be present at the time of tree removal to salvage any fauna using trees, and if deemed appropriate, translocate the specimen to a suitable site in the local area.

5.2 Opportunities to Protect and Enhance Biodiversity Values

Habitat within the study area is fragmented, and remnant patches of vegetation are of a general poor quality. Where possible, opportunities to enhance biodiversity values within the study area include:

- Protection and management of retained vegetation;
- Allowing the natural regeneration of remnant native vegetation;
- The revegetation of appropriate areas (i.e. within existing patches of remnant native vegetation or connected to areas proposed to be retained), with site indigenous flora species that are appropriate for revegetation, and that are associated with the former EVCs; and,
- The control of noxious/environmental weeds and pest animals, particularly in areas of remnant native vegetation proposed to be retained.

6 CONCLUSION

Significant Species and Communities

Flora

A total of 123 (49 indigenous and 74 exotic) were recorded in the study area during the assessment. No nationally listed significant flora species was recorded within the study area. One state listed flora species (Slender Bindweed) was recorded during the targeted survey assessments.

Fauna

Eighty-eight fauna species were recorded during the general fauna surveys, comprising 60 birds (54 native and six introduced), 13 mammals (eight native and five introduced), four native frog species, three native reptiles and eight butterflies.

No national, state or regionally significant fauna species were recorded within the study area during the assessment.

Significant communities

One nationally listed ecological communities, Natural Temperate Grassland of the Victorian Volcanic Plain (status: Critically Endangered) listed as critically endangered under the EPBC Act was recorded within the study area on all Lots surveyed in a poor condition.

Ecological Significance

Based on the available information and the results of the site assessment, the vegetation remnants within the study area are considered to be of **regional** conservation significance due to:

- The presence of one nationally listed ecological community (Natural Temperate Grassland of the Victorian Volcanic Plain) in a poor condition, listed as critically endangered under the EPBC Act. Natural Temperate Grassland of the Victorian Volcanic Plain is also listed as threatened (Western (Basalt) Plains Grassland) under the FFG.
- The presence of one state listed flora species (Slender Bindweed);
- Remnant vegetation associated with two EVCs (Plains Grassland and Plains Grassy Wetland) listed as Endangered in the VVP; and,
- The presence of suitable habitat for three national listed fauna species, three State listed fauna species and one regionally listed fauna species.

Additional Requirements

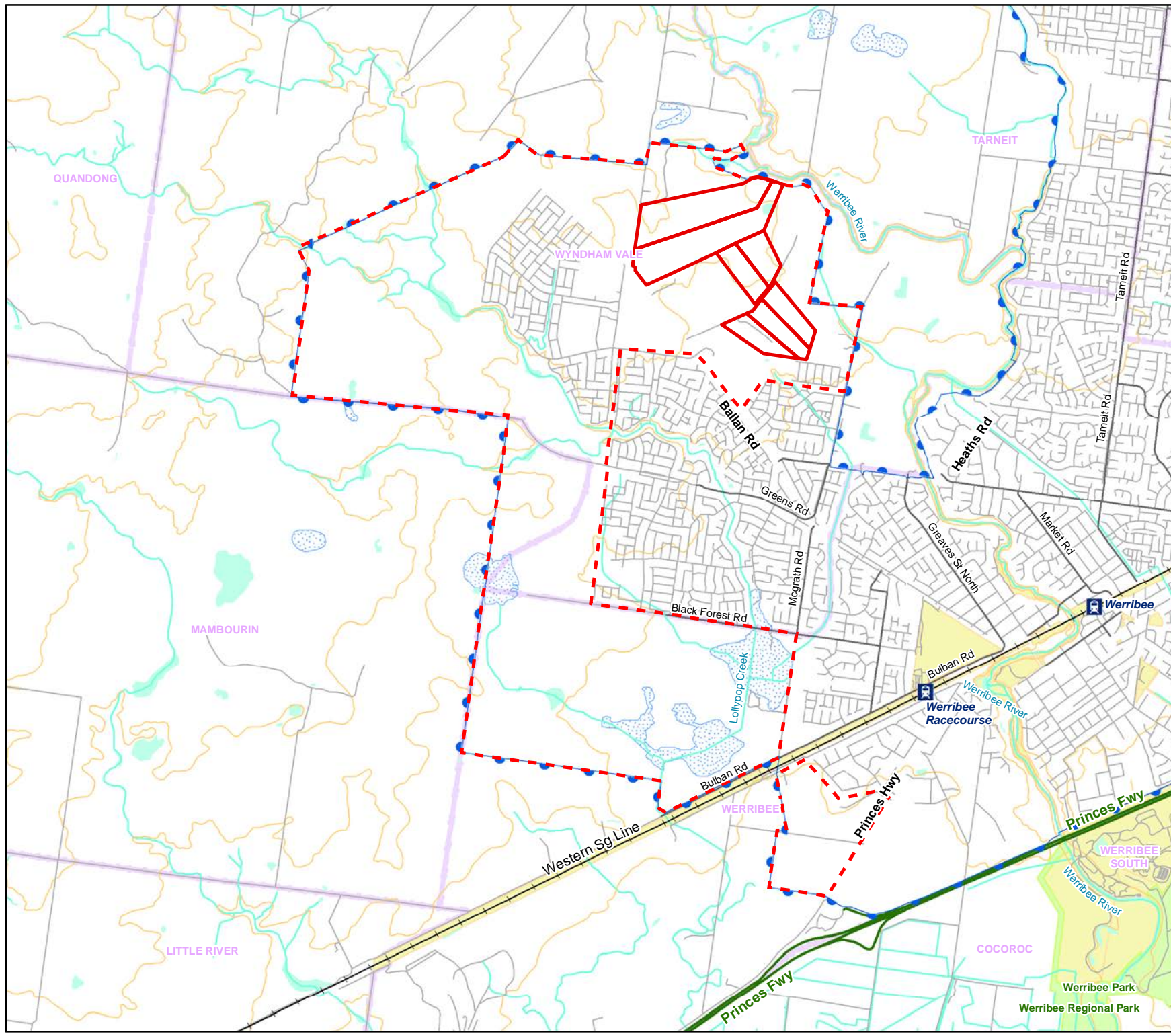
A Native Vegetation Precinct Plan is required and this is considered appropriate to provide a clear direction about the extent of native vegetation removal within the Wyndham Vale PSP and to inform the planning process. A permit from the Wyndham City Council is currently required for removal of native vegetation within the study area. However, once the NVPP has been prepared and the PSP is incorporated into the local planning scheme, this will preclude the requirement for a planning permit to clear or remove remnant native vegetation if it is in accordance with the NVPP.

For impacts on Matters of National Environmental Significance (NES) within the PSP (primarily Natural Temperate Grassland of the Victorian Volcanic Plain), the MSA program and when approved, the Biodiversity Conservation Strategy will be used to determine impacts and defines responses to clear or impact upon the community of other Matters of NES.

An FFG Act permit will be required for the removal of protected flora species or communities under the Act if protected species are located on public land within threatened communities.

There are opportunities to enhance ecological values within the study area, principally through allowing the regeneration of native vegetation, revegetation and weed control. There are also opportunities to create additional fauna habitat such as wetlands.

FIGURES



- ### Legend
- Ecology Partners Study Areas
 - PSP 40 - Ballan Road
 - Urban Growth Boundary
 - Railway Station
 - Railway
 - Freeway
 - Collector Road
 - Minor Road
 - Contour (10m)
 - Minor Watercourse
 - Permanent Waterbody
 - Land Subject to Inundation
 - Wetland/Swamp
 - Parks and Reserves
 - Crown Land
 - Localities

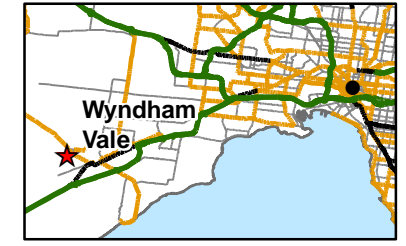
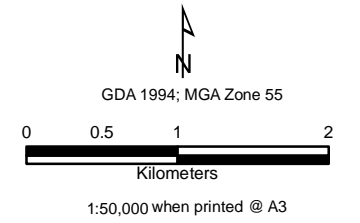
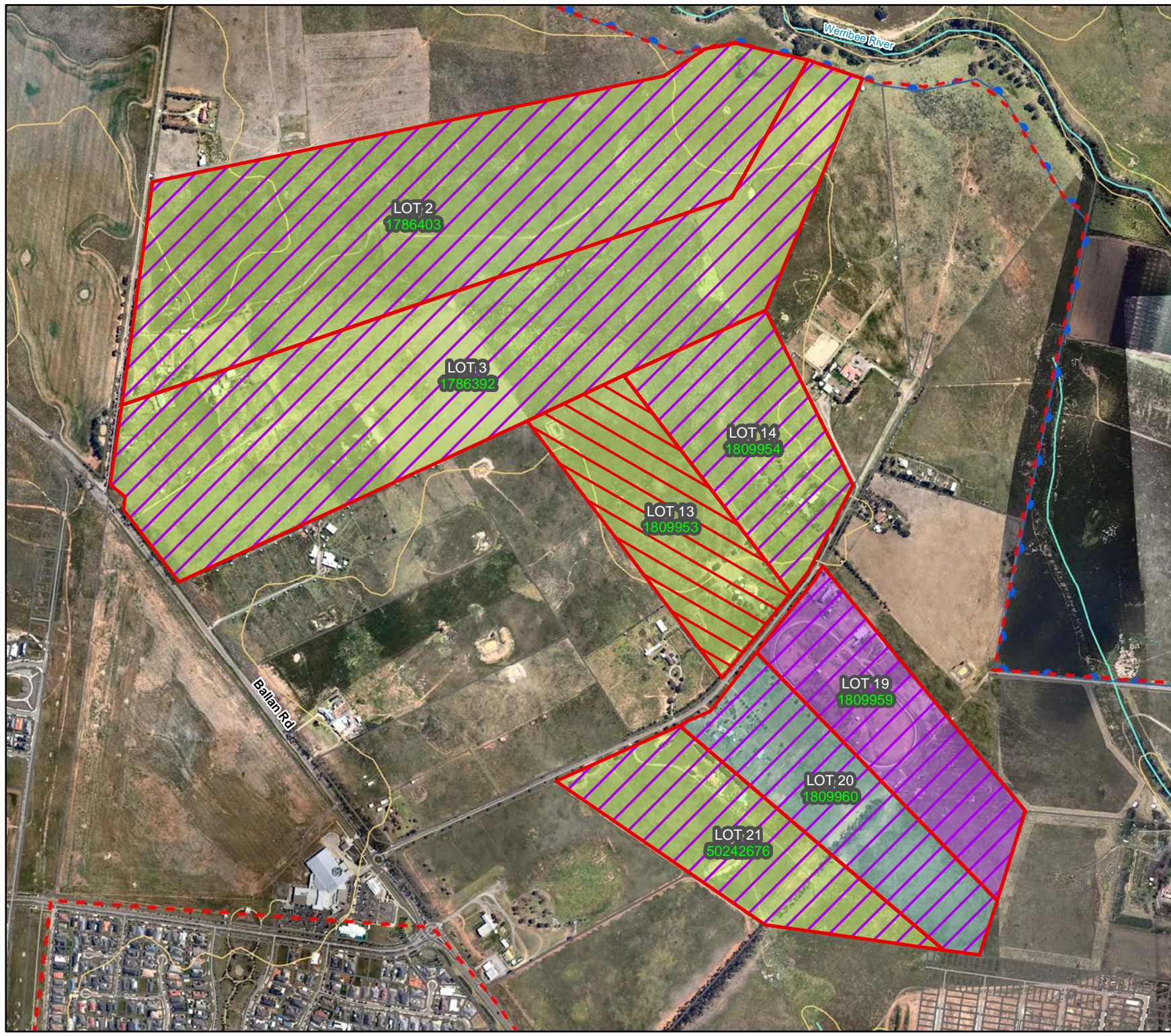


Figure 1
 Location of Study Area
 PSP 40 Ballan Road





- ### Legend
- Ecology Partners Study Areas
 - PSP 40 - Ballan Road
 - Urban Growth Boundary
 - General Flora and Fauna and Targeted Flora
 - Targeted Flora
 - Vegetation Quality Assessment, General Flora and Fauna and Targeted Flora
 - Survey Completed
 - Survey Partially Completed (Access denied by Tenant)
- LOT2** = Lot Number
1786403 = Parcel PFI

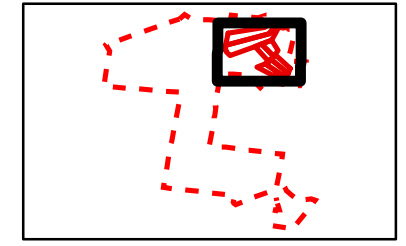
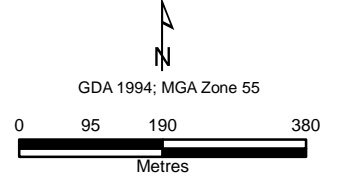
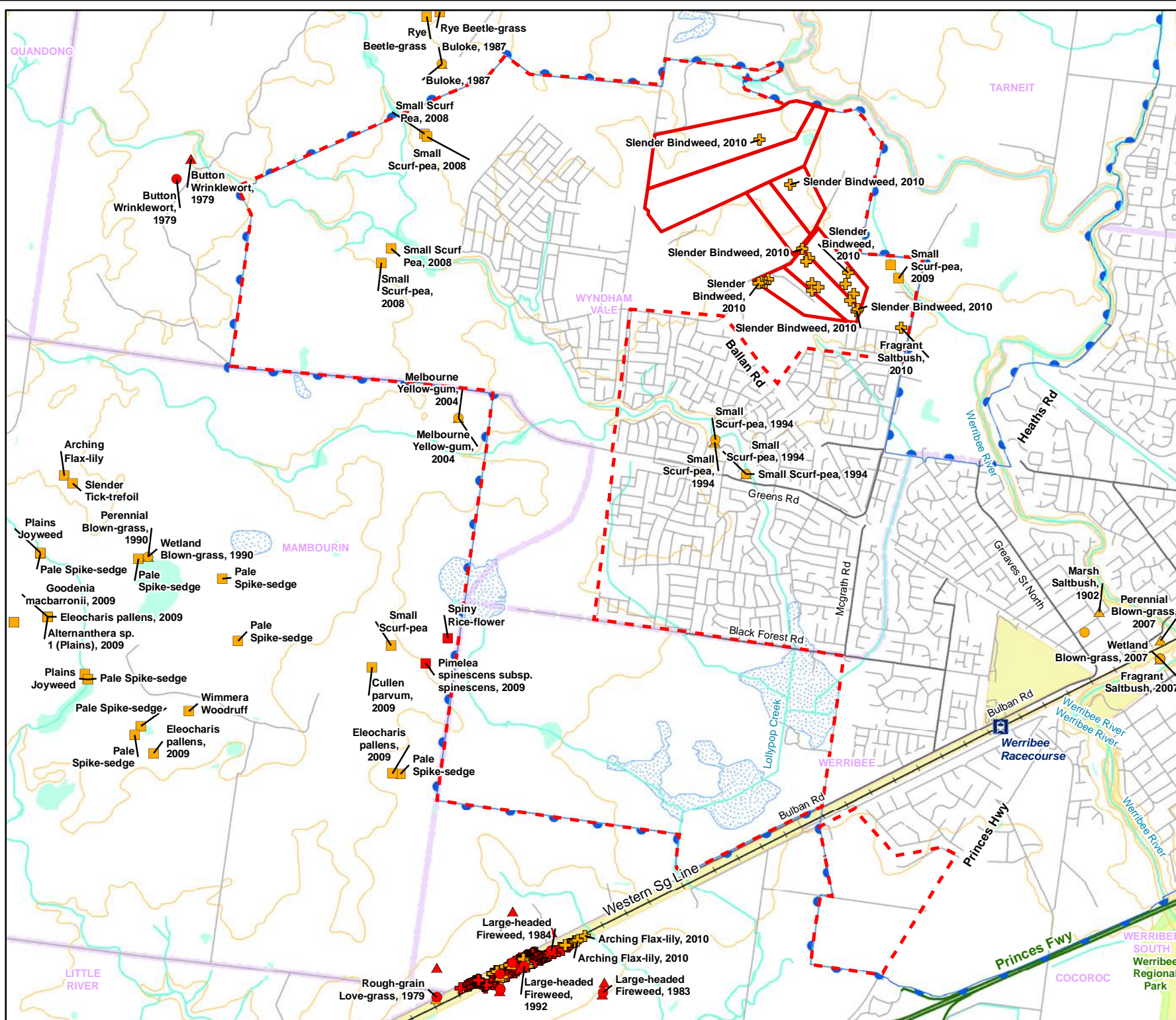


Figure 2
 Access Information and
 Survey Details
 PSP 40 Ballan Road



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- Ecology & Heritage Partners (2011)**
- ⊕ State Listed Species
 - ⊕ Nationally Listed Species
- Victorian Biodiversity Atlas (2011)**
- ▲ State Listed Species
 - ▲ Nationally Listed Species
- Flora Information System (2010)**
- State Listed Species
 - Nationally Listed Species
- AECOM (formerly ENSR, 2008)**
- State Listed Species
 - Nationally Listed Species
 - ▭ Ecology Partners Study Areas
 - ▭ PSP 40 - Ballan Road
 - Urban Growth Boundary

Matted Flax-lily, 1990^{*} = Species, year of record



Figure 3
Significant Flora Records
PSP 40 Ballan Road

N

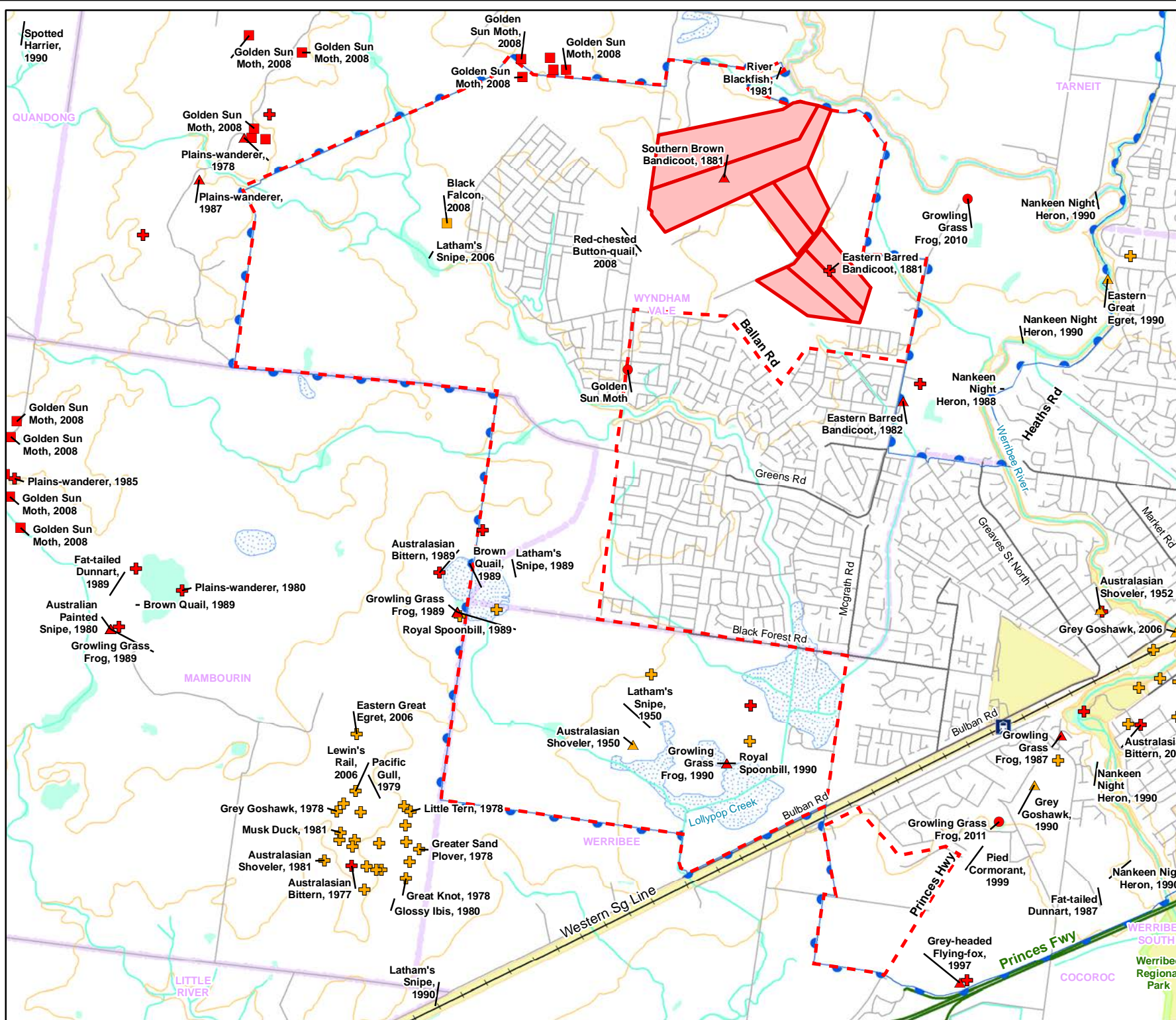
GDA 1994; MGA Zone 55

0 0.375 0.75 1.5

Kilometers

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- Ecology Partners Study Areas
 - Ecology & Heritage Partners (2011)**
 - National
 - Regional
 - Victorian Biodiversity Atlas (2010)**
 - + National
 - + State
 - Atlas of Victorian Wildlife (2009)**
 - ▲ National
 - ▲ State
 - AECOM (formally ENSR, 2008)**
 - National
 - State
- Brown Quail, 1990 = Species, year of record

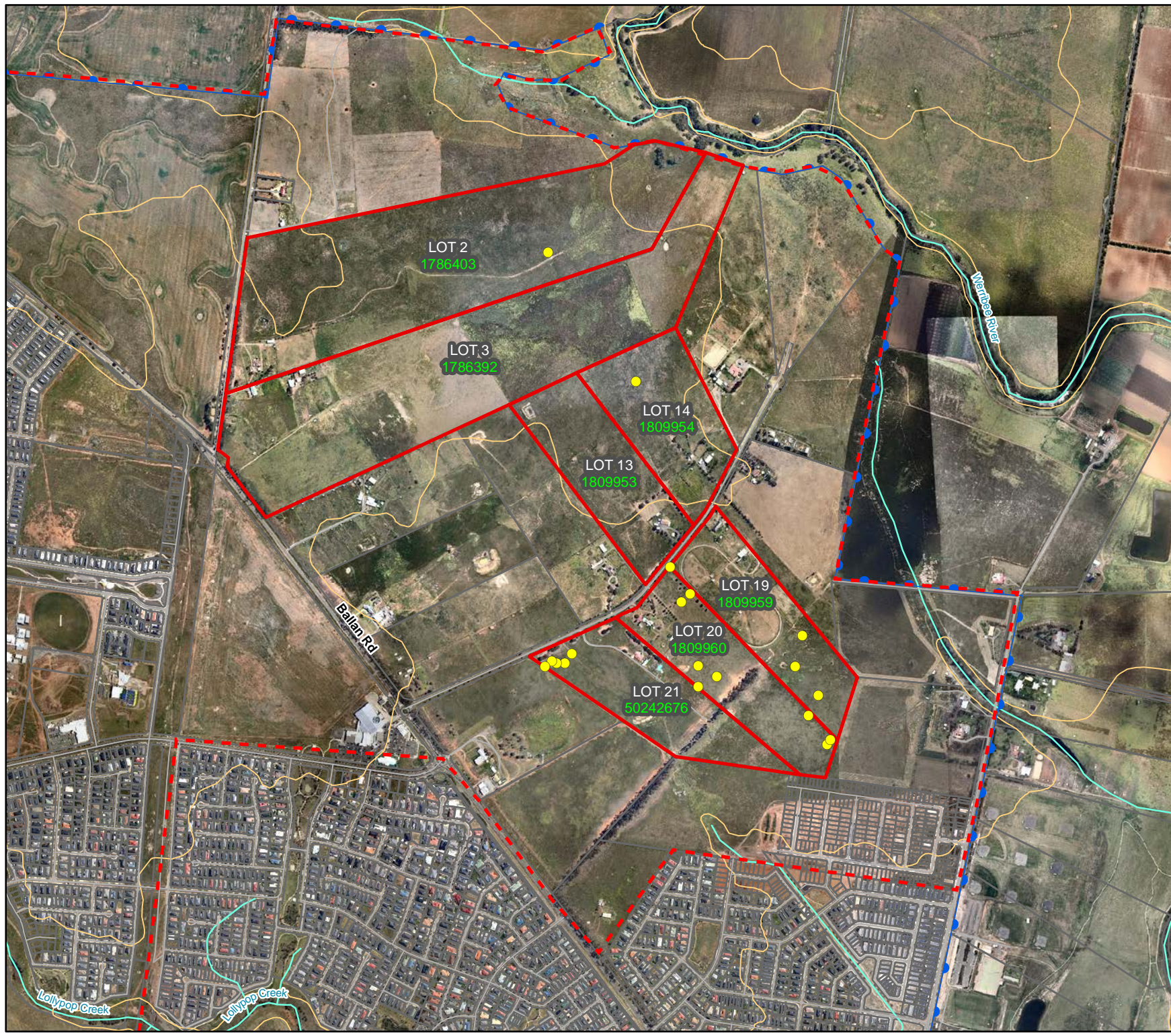


Figure 4
Significant Fauna Records
PSP 40 Ballan Road

GDA 1994; MGA Zone 55

0 0.375 0.75 1.5
Kilometers

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- ### Legend
- Ecology Partners Study Areas
 - PSP 40 - Ballan Road
 - Urban Growth Boundary
 - Slender Bindweed

LOT2 = Lot Number
1786403 = Parcel PFI

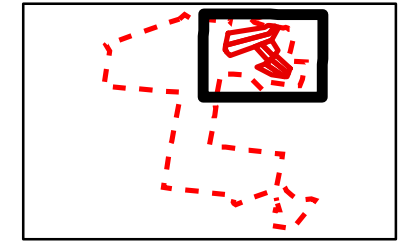
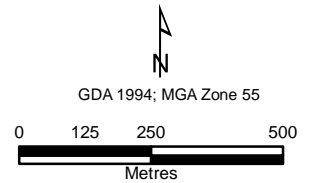
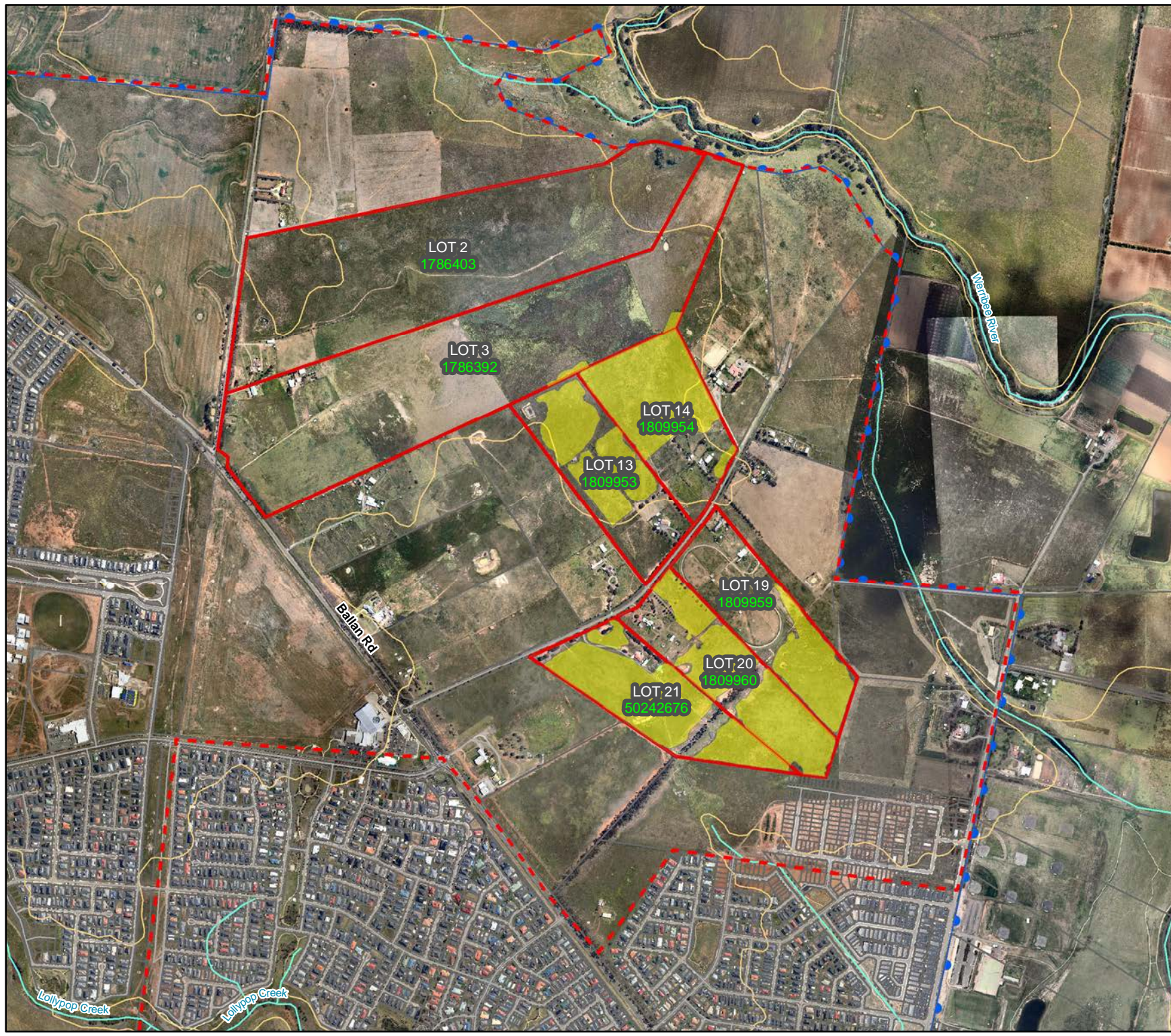


Figure 5
 Targeted Survey Results
 PSP 40 Ballan Road







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Legend

-  Ecology Partners Study
-  PSP 40 - Ballan Road
-  Urban Growth Boundary
-  Potential Habitat for Striped Legless Lizard, Plains Wanderer and Golden Sun Moth

LOT2 = Lot Number
1786403 = Parcel PFI

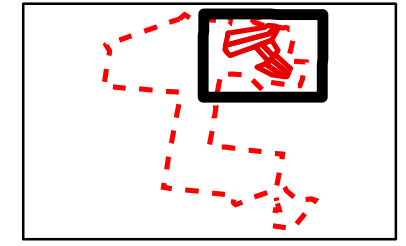
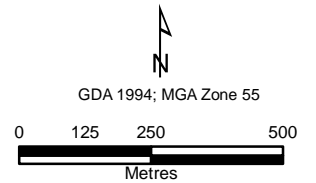


Figure 6
 Potnetial Fauna Habitat
 PSP 40 Ballan Road



GDA 1994; MGA Zone 55
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APPENDICES

Appendix 1 – Significance Assessment

Criteria used by Ecology Partners Pty Ltd to define conservation significance, vegetation condition and habitat quality is provided below.

A1.1. Rare or Threatened Categories for Listed Victorian Taxa

Table A1.1. Rare or Threatened categories for listed Victorian taxa.

Rare or Threatened Categories
CONSERVATION STATUS IN AUSTRALIA (Based on the EPBC Act 1999, Briggs and Leigh 1996)
EX - Extinct: Extinct is when there is no reasonable doubt that the last individual of the species has died.
CR - Critically Endangered: A species is critically endangered when it is facing an extremely high risk of extinction in the wild in the immediate future.
EN - Endangered: A species is endangered when it is not critically endangered but is facing a very high risk of extinction in the wild in the near future.
VU - Vulnerable: A species is vulnerable when it is not critically endangered or endangered but is facing a high risk of extinction in the wild in the medium-term future.
R* - Rare: A species is rare but overall is not currently considered critically endangered, endangered or vulnerable.
K* - Poorly Known: A species is suspected, but not definitely known, to belong to any of the categories extinct, critically endangered, endangered, vulnerable or rare.
CONSERVATION STATUS IN VICTORIA (Based on DSE 2005, DSE 2007b, DSE 2009)
x - Presumed Extinct in Victoria: not recorded from Victoria during the past 50 years despite field searches specifically for the plant, or, alternatively, intensive field searches (since 1950) at all previously known sites have failed to record the plant.
e - Endangered in Victoria: at risk of disappearing from the wild state if present land use and other causal factors continue to operate.
v - Vulnerable in Victoria: not presently endangered but likely to become so soon due to continued depletion; occurring mainly on sites likely to experience changes in land-use which would threaten the survival of the plant in the wild; or, taxa whose total population is so small that the likelihood of recovery from disturbance, including localised natural events such as drought, fire or landslip, is doubtful.
r - Rare in Victoria: rare but not considered otherwise threatened - there are relatively few known populations or the taxon is restricted to a relatively small area.
k - Poorly Known in Victoria: poorly known and suspected, but not definitely known, to belong to one of the above categories (x, e, v or r) within Victoria. At present, accurate distribution information is inadequate.

A1.2. Defining Ecological Significance

Table A1.2. Defining Ecological Significance.

Criteria for defining Ecological Significance	
NATIONAL SIGNIFICANCE	
Flora	National conservation status is based on the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act) list of taxa considered threatened in Australia (i.e. extinct, critically endangered, endangered, vulnerable).
	Flora listed as rare in Australia in <i>Rare or Threatened Australian Plants</i> (Briggs and Leigh 1996).
Fauna	National conservation status is based on the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act) list of taxa considered threatened in Australia (i.e. extinct, critically endangered, endangered, vulnerable).
	Fauna listed as extinct, critically endangered, endangered, vulnerable or rare under National Action Plans for terrestrial taxon prepared for the Department of Environment and Heritage: threatened marsupials and monotremes (Maxwell <i>et al.</i> 1996), bats (Duncan <i>et al.</i> 1999), rodents (Lee 1995); birds (Garnett and Crowley 2000), reptiles (Cogger <i>et al.</i> 1993), amphibians (Tyler 1997) and Butterflies (Sands and New 2002).
Communities	Vegetation communities considered critically endangered, endangered or vulnerable under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> and considering vegetation condition.
STATE SIGNIFICANCE	
Flora	Threatened taxa listed under the provisions of the <i>Flora and Fauna Guarantee Act 1988</i> .
	Flora listed as extinct, endangered, vulnerable or rare in Victoria in the DSE Flora Information System (most recent Version).
	Flora listed in the State Government's <i>Advisory List of Rare or Threatened Plants in Victoria, 2005</i> (DSE 2005).
	Flora listed as poorly known in Australia in <i>Rare or Threatened Australian Plants</i> (Briggs and Leigh 1996).
Fauna	Threatened taxon listed under Schedule 2 of the <i>Flora and Fauna Guarantee Act 1988</i> .
	Fauna listed as extinct, critically endangered, endangered and vulnerable on the State Government's <i>Advisory List of Threatened Vertebrate Fauna in Victoria - 2007</i> (DSE 2007).
	Listed as Lower Risk (near threatened, conservation dependent or least concern), data deficient, insufficiently known under National Action Plans for terrestrial species prepared for the Department of Environment and Heritage: threatened marsupials and monotremes (Maxwell <i>et al.</i> 1996), bats (Duncan <i>et al.</i> 1999), birds (Garnett and Crowley 2000), reptiles (Cogger <i>et al.</i> 1993), amphibians (Tyler 1997) and butterflies (Sands and New 2002).

Criteria for defining Ecological Significance	
Communities	Ecological communities listed as threatened under the <i>Flora and Fauna Guarantee Act 1988</i> .
	Ecological vegetation class listed as threatened (i.e. endangered, vulnerable) or rare in a Native Vegetation Plan for a particular bioregion (DSE Website) and considering vegetation condition.
REGIONAL SIGNIFICANCE	
Flora	Flora considered rare in any regional native vegetation plan for a particular bioregion.
	Flora considered rare by the author for a particular bioregion.
Fauna	Fauna with a disjunct distribution, or a small number of documented recorded or naturally rare in the bioregion.
	A particular taxon that is has an unusual ecological or biogeographical occurrence or listed as lower risk – near-threatened, data deficient or insufficiently known on the State Government’s Advisory List of <i>Threatened Vertebrate Fauna in Victoria - 2007</i> (DSE 2007).
Communities	Ecological vegetation class listed as depleted or least concern in a Native Vegetation Plan for a particular bioregion (DSE Website) and considering vegetation condition.
	Ecological vegetation class considered rare by the author for a particular bioregion.
LOCAL SIGNIFICANCE	
Local significance is defined as flora, fauna and ecological communities indigenous to a particular area, which are not considered rare or threatened on a national, state or regional level.	

A1.3 Defining Site Significance

The following geographical areas apply to the overall level of significance with respect to the current survey.

- National:** Australia
State: Victoria
Regional: Victorian Volcanic Plain
Local: Within 10 kilometres surrounding the study area

Table A1.3. Defining Site Significance.

Criteria for defining Site Significance
NATIONAL SIGNIFICANCE
<p>A site is of National significance if:</p> <ul style="list-style-type: none"> - It regularly supports, or has a high probability of regularly supporting individuals of a taxon listed as 'Critically Endangered' or 'Endangered' under the EPBC Act and/or under National Action Plans for terrestrial taxon prepared for the SEWPaC. - It regularly supports, or has a high probability of supporting, an 'important population' as defined under the EPBC Act of one or more nationally 'vulnerable' flora and fauna taxon. - It is known to support, or has a high probability of supporting taxon listed as 'Vulnerable' under National Action Plans. - It is known to regularly support a large proportion (i.e. greater than 1%) of a population of a taxon listed as 'Conservation Dependent' under the EPBC Act and/or listed as Rare or Lower Risk (near threatened, conservation dependent or least concern) under National Action Plans. - It contains an area, or part thereof designated as 'critical habitat' under the EPBC Act, or if the site is listed under the Register of National Estate compiled by the Australian Heritage Commission. - It is a site which forms part of, or is connected to a larger area(s) of remnant native vegetation or habitat of national conservation significance such as most National Park, and/or a Ramsar Wetland(s).
STATE SIGNIFICANCE
<p>A site is of State significance if:</p> <ul style="list-style-type: none"> - It occasionally (i.e. every 1 to 5 years) supports, or has suitable habitat to support taxon listed as 'Critically Endangered' or 'Endangered' under the EPBC Act and/or under National Action Plans. - It regularly supports, or has a high probability of regularly supporting (i.e. high habitat quality) taxon listed as 'Vulnerable', 'Near threatened', 'Data Deficient' or 'Insufficiently Known' in Victoria (DSE 2005, 2007b), or species listed as 'Data Deficient' or 'Insufficiently Known' under National Action Plans. - It contains an area, or part thereof designated as 'critical habitat' under the FFG Act. - It supports, or likely to support a high proportion of any Victorian flora and fauna taxa. - It contains high quality, intact vegetation/habitat supporting a high species richness and diversity in a particular bioregion. - It is a site which forms part of, or connected to a larger area(s) of remnant native vegetation or habitat of state conservation significance such as most State Parks and/or Flora and Fauna Reserves.

Criteria for defining Site Significance
REGIONAL SIGNIFICANCE
<p>A site is of Regional significance if:</p> <ul style="list-style-type: none"> - It regularly supports, or has a high probability of regularly supporting regionally significant fauna as defined in Table 1.2. - It contains a large population (i.e. greater than 1% or 5%) of flora considered rare in any regional native vegetation plan for a particular bioregion. - It supports a fauna population with a disjunct distribution, or a particular taxon that has an unusual ecological or biogeographical occurrence. - It is a site which forms part of, or is connected to a larger area(s) of remnant native vegetation or habitat of regional conservation significance such as most Regional Parks and/or Flora and Fauna Reserves.
LOCAL SIGNIFICANCE
<p>Most sites are considered to be of at least local significant for conservation, and in general a site of local significance can be defined as:</p> <ul style="list-style-type: none"> - An area which supports indigenous flora species and/or a remnant EVC, and habitats used by locally significant fauna species. - An area which currently acts, or has the potential to act as a wildlife corridor linking other areas of higher conservation significance and facilitating fauna movement throughout the landscape.

A1.4. Defining Vegetation Condition

Table A1.4. Defining Vegetation Condition.

Criteria for defining Vegetation Condition
<p>Good condition - Vegetation dominated by a diversity of indigenous species, with defined structures (where appropriate), such as canopy layer, shrub layer, and ground cover, with little or few introduced species present.</p>
<p>Moderate condition - Vegetation dominated by a diversity of indigenous species, but is lacking some structures, such as canopy layer, shrub layer or ground cover, and/or there is a greater level of introduced flora species present.</p>
<p>Poor condition - Vegetation dominated by introduced species, but supports low levels of indigenous species present, in the canopy, shrub layer or ground cover.</p>

A1.5. Defining Habitat Quality

Several factors are taken into account when determining the value of habitat. Habitat quality varies on both spatial and temporal scales, with the habitat value varying depending upon a particular fauna species.

Table A1.5. Defining Habitat Quality.

Criteria for defining Habitat Quality
HIGH QUALITY
High degree of intactness (i.e. floristically and structurally diverse), containing several important habitat features such as ground debris (logs, rocks, vegetation), mature hollow-bearing trees, and a dense understorey component.
High species richness and diversity (i.e. represented by a large number of species from a range of fauna groups).
High level of foraging and breeding activity, with the site regularly used by native fauna for refuge and cover.
Habitat that has experienced, or is experiencing low levels of disturbance and/or threatening processes (i.e. weed invasion, introduced animals, soil erosion, salinity).
High contribution to a wildlife corridor, and/or connected to a larger area(s) of high quality habitat.
Provides known, or likely habitat for one or more rare or threatened species listed under the EPBC Act, FFG Act, or species considered rare or threatened according to DSE 2007.
MODERATE QUALITY
Moderate degree of intactness, containing one or more important habitat features such as ground debris (logs, rocks, vegetation), mature hollow-bearing trees, and a dense understorey component.
Moderate species richness and diversity - represented by a moderate number of species from a range of fauna groups.
Moderate levels of foraging and breeding activity, with the site used by native fauna for refuge and cover.
Habitat that has experienced, or is experiencing moderate levels of disturbance and/or threatening processes.
Moderate contribution to a wildlife corridor, or is connected to area(s) of moderate quality habitat.
Provides potential habitat for a small number of threatened species listed under the EPBC Act, FFG Act, or species considered rare or threatened according to DSE 2007b.
LOW QUALITY
Low degree of intactness, containing few important habitat features such as ground debris (logs, rocks, vegetation), mature hollow-bearing trees, and a dense understorey component.
Low species richness and diversity (i.e. represented by a small number of species from a range of fauna groups).
Low levels of foraging and breeding activity, with the site used by native fauna for refuge and cover.
Habitat that has experienced, or is experiencing high levels of disturbance and/or threatening processes.
Unlikely to form part of a wildlife corridor, and is not connected to another area(s) of habitat.
Unlikely to provide habitat for rare or threatened species listed under the EPBC Act, FFG Act, or considered rare or threatened according to DSE 2007b.

Appendix 2.1 – Flora results

Table A2.1. Flora recorded within the study area.

Species of regional conservation significance are in **bold** type

(k) Poorly Known taxa within Victoria (DSE)

Native Australia taxa found outside original range since European colonisation

* Declared noxious weed within the Port Phillip Catchment (DPI 2006)

^ Weed of National Significance (<http://www.weeds.org.au>)

Scientific Name	Common Name
INDIGENOUS SPECIES	
<i>Acaena ovina</i>	Australian Sheep's Burr
<i>Amphibromus nervosus</i>	Common Swamp Wallaby-grass
<i>Asperula conferta</i>	Common Woodruff
<i>Atriplex semibaccata</i>	Berry Saltbush
<i>Austrodanthonia caespitosa</i>	Common Wallaby-grass
<i>Austrodanthonia duttoniana</i>	Brown-back Wallaby-grass
<i>Austrodanthonia eriantha</i>	Hill Wallaby-grass
<i>Austrodanthonia fulva</i>	Copper-awned Wallaby-grass
<i>Austrodanthonia racemosa</i>	Slender Wallaby-grass
<i>Austrodanthonia setacea</i>	Bristly Wallaby-grass
<i>Austrostipa bigeniculata</i>	Kneed Spear-grass
<i>Austrostipa curticomata</i>	Short-crown Spear-grass
<i>Austrostipa mollis</i>	Supple Spear-grass
<i>Austrostipa scabra</i> subsp. <i>falcata</i>	Rough Spear-grass
<i>Bothriochloa macra</i>	Red-leg Grass
<i>Carex appressa</i>	Tall Sedge
<i>Chamaesyce drummondii</i>	Flat Spurge
<i>Cheilanthes sieberi</i>	Narrow Rock Fern
<i>Chenopodium pumilo</i>	Clammy Goosefoot
<i>Chloris truncata</i>	Windmill Grass
k <i>Convolvulus angustissimus</i> subsp. <i>omnigracilis</i>	Slender Bindweed
<i>Crassula decumbens</i> var. <i>decumbens</i>	Spreading Crassula
<i>Crassula sieberiana</i> s.l.	Sieber Crassula
<i>Dichondra repens</i>	Kidney-weed
<i>Einadia nutans</i> subsp. <i>nutans</i>	<i>Nodding Saltbush</i>
<i>Elatine gratioloides</i>	<i>Waterwort</i>
<i>Eleocharis acuta</i>	<i>Common Spike-sedge</i>
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	<i>Ruby Saltbush</i>
<i>Eryngium ovinum</i>	Blue Devil
<i>Juncus gregiflorus</i>	Green Rush
<i>Juncus subsecundus</i>	Finger Rush
<i>Kennedia prostrata</i>	Running Postman
<i>Lachnagrostis filiformis</i> sp. 1	Common Blown-grass
<i>Lomandra filiformis</i>	Wattle Mat-rush
<i>Lythrum hyssopifolium</i>	Small Loosestrife
<i>Maireana enchylaenoides</i>	Wingless Bluebush
<i>Marsilea drummondii</i>	Nardoo
<i>Melicytus</i> sp. aff. <i>dentatus</i> (Volcanic Plain variant)	Tangled Shrub-violet
<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass
<i>Oxalis perennans</i>	Grassland Wood-sorrel

Scientific Name	Common Name
<i>Poa labillardierei</i>	Common Tussock-grass
<i>Poa sieberiana</i>	Grey Tussock-grass
<i>Portulaca oleracea</i>	Common Purslane
<i>Pseudognaphalium luteoalbum</i>	Jersey Cudweed
<i>Rumex brownii</i>	Slender Dock
<i>Themeda triandra</i>	Kangaroo Grass
<i>Typha domingensis</i>	Narrow-leaved Cumbungi
<i>Vittadinia cuneata</i>	Fuzzy New-holland Daisy
<i>Walwhalleya proluta</i>	Rigid Panic
Exotic Species	
<i>Agrostis capillaris</i>	Brown-top Bent
<i>Aira spp.</i>	Hair Grass
<i>Anagallis arvensis</i>	Pimpernel
<i>Arctotheca calendula</i>	Cape Weed
<i>Avena barbata</i>	Bearded Oat
<i>Avena spp.</i>	Oat
<i>Berkheya rigida*</i>	African Thistle
<i>Brassica fruticulosa</i>	Twiggy Turnip
<i>Briza maxima</i>	Large Quaking-grass
<i>Bromus hordeaceus</i> subsp. <i>hordeaceus</i>	Soft Brome
<i>Carthamus lanatus*</i>	Saffron Thistle
<i>Chenopodium murale</i>	Sowbane
<i>Cirsium vulgare</i>	Spear Thistle
<i>Conyza bonariensis</i>	Flaxleaf Fleabane
<i>Cynara cardunculus*</i>	Artichoke Thistle
<i>Cynodon dactylon</i> var. <i>dactylon</i>	Couch
<i>Dactylis glomerata</i>	Cocksfoot
<i>Ecballium elaterium</i>	Squirting Cucumber
<i>Echium plantagineum*</i>	Paterson's Curse
<i>Ehrharta erecta</i> var. <i>erecta</i>	Panic Veldt-grass
<i>Ehrharta longiflora</i>	Annual Veldt-grass
<i>Eleusine tristachya</i>	American Crows-foot Grass
<i>Erodium botrys</i>	Big Heron's-bill
<i>Erodium cicutarium</i>	Common Heron's-bill
<i>Galenia pubescens</i> var. <i>pubescens</i>	Galenia
<i>Heliotropium europaeum</i>	Common Heliotrope
<i>Helminthotheca echioides</i>	Ox-tongue
<i>Holcus lanatus</i>	Yorkshire Fog
<i>Hordeum marianum</i>	Sea Barley Grass
<i>Hypochoeris radicata</i>	Flatweed
<i>Lactuca serriola</i>	Prickly Lettuce
<i>Leontodon taraxacoides</i> subsp. <i>taraxacoides</i>	Hairy Hawkbit
<i>Lepidium africanum</i>	Common Peppercross
<i>Lolium perenne</i>	Perennial Rye-grass
<i>Lolium rigidum</i>	Wimmera Rye-grass
<i>Lycium ferocissimum*</i>	African Box-thorn
<i>Malva neglecta</i>	Dwarf Mallow
<i>Malva parviflora</i>	Small-flower Mallow
<i>Marrubium vulgare</i>	Horehound
<i>Mesembryanthemum crystallinum</i>	Common Ice-plant
<i>Modiola caroliniana</i>	Red-flower Mallow
<i>Nassella neesiana</i> *^	Chilean Needle-grass

Scientific Name	Common Name
<i>Nassella trichotoma</i> *^	Serrated Tussock
<i>Oxalis pes-caprae</i>	Soursob
<i>Paspalum dilatatum</i>	Paspalum
<i>Paspalum distichum</i>	Water Couch
<i>Pennisetum clandestinum</i>	Kikuyu
<i>Pentaschistis airoides</i>	False Hair-grass
<i>Phalaris aquatica</i>	Toowoomba Canary-grass
<i>Plantago coronopus</i>	Buck's-horn Plantain
<i>Plantago lanceolata</i>	Ribwort
<i>Polygonum aviculare</i>	Prostrate Knotweed
<i>Raphanus raphanistrum</i>	Wild Radish
<i>Romulea rosea</i>	Onion Grass
<i>Rosa rubiginosa</i>	Sweet Briar
<i>Salvia verbenaca</i>	Wild Sage
<i>Schinus molle</i>	Pepper Tree
<i>Setaria parviflora</i>	Slender Pigeon Grass
<i>Silybum marianum</i>	Variiegated Thistle
<i>Sisymbrium officinale</i>	Hedge Mustard
<i>Solanum linnaeanum</i>	Apple of Sodom
<i>Solanum nigrum</i> sensu Willis (1972)	Black Nightshade
<i>Sonchus asper</i> s.l.	Rough Sow-thistle
<i>Sonchus oleraceus</i>	Common Sow-thistle
<i>Sporobolus africanus</i>	Rat-tail Grass
<i>Trifolium angustifolium</i> var. <i>angustifolium</i>	Narrow-leaf Clover
<i>Trifolium arvense</i>	Hare's-foot Clover
<i>Trifolium dubium</i>	Yellow Suckling Clover
<i>Trifolium repens</i>	White Clover
<i>Trifolium subterraneum</i>	Subterranean Clover
<i>Verbascum thapsus</i> subsp. <i>thapsus</i>	Great Mullein
<i>Vicia sativa</i>	Common Vetch
<i>Vulpia bromoides</i>	Squirrel-tail Fescue
<i>Xanthium spinosum</i> *	Bathurst Burr

Appendix 2.2 – Flora database results

Table A2.2. Significant flora recorded within 10 kilometres of the study area.

Sources used to determine species status:

EPBC	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)
DSE	Advisory List of Threatened Flora in Victoria (DSE 2005)
FFG	Flora and Fauna Guarantee Act 1988 (Victoria)

National status of species is designated by:

X	Extinct
CR	Critically endangered
EN	Endangered
VU	Vulnerable
K	Poorly Known (Briggs and Leigh 1996)
#	Records identified from EPBC Act Protected Matters Search Tool.
*	Native non-indigenous species

State status of species is designated by:

X	Extinct
e	Endangered
v	Vulnerable
r	Rare
k	Poorly Known
L	Listed

Scientific Name	Common Name	Last Documented Record (VBA)	Total number of documented records (VBA)	EPBC	VROTS	FFG	Detected During Current Survey	Likely occurrence within the study area	Reasoning for Likelihood
NATIONAL SIGNIFICANCE									
# <i>Carex tasmanica</i>	Curly Sedge	-	-	VU	v	L	-	Unlikely	No Habitat
<i>Dianella amoena</i>	Matted Flax-lily	2004	1	EN	e	L	-	Unlikely	No Habitat
<i>Diuris basaltica</i>	Small Golden Moths	2000	2	EN	v	L	-	Unlikely	No Habitat
# <i>Pimelea spinescens</i> subsp. <i>spinescens</i>	Spiny Rice-flower	2006	19	CR	e	-	-	Unlikely	No Habitat
# <i>Prasophyllum frenchii</i>	Maroon Leek-orchid	-	-	EN	e	L	-	Unlikely	No Habitat
# <i>Rutidosia leptorhynchoides</i>	Button Wrinklewort	2004	18	EN	e	L	-	Unlikely	No Habitat
# <i>Senecio macrocarpus</i>	Large-headed Fireweed	2006	17	VU	e	L	-	Unlikely	No Habitat
STATE SIGNIFICANCE									
<i>Allocasuarina luehmannii</i>	Buloke	1999	8	-	-	L	-	Unlikely	No Habitat
<i>Alternanthera</i> sp. 1 (Plains)	Plains Joyweed	2004	3	-	k	-	-	Low Likelihood	No Habitat
<i>Amphibromus pithogastrus</i>	Plump Swamp Wallaby-grass	2004	2	-	e	L	-	Unlikely	No Habitat
<i>Amyema linophylla</i> subsp.	Buloke Mistletoe	1999	2	-	v	-	-	Unlikely	No Habitat

Scientific Name	Common Name	Last Documented Record (VBA)	Total number of documented records (VBA)	EPBC	VROTS	FFG	Detected During Current Survey	Likely occurrence within the study area	Reasoning for Likelihood
<i>orientale</i>									
<i>Austrostipa exilis</i>	Heath Spear-grass	1992	1	-	r	-	-	Unlikely	No Habitat
<i>Comesperma polygaloides</i>	Small Milkwort	2000	4	-	v	L	-	Unlikely	No Habitat
<i>Convolvulus angustissimus</i> subsp. <i>omnigracilis</i>	Slender Bindweed	1900	2	-	k	-	Yes	Present	Recorded on all Lots
<i>Cullen parvum</i>	Small Scurf-pea	1994	3	-	e	L	-	Unlikely	No Habitat
<i>Cullen tenax</i>	Tough Scurf-pea	2006	1	-	e	L	-	Unlikely	No Habitat
<i>Desmodium varians</i>	Slender Tick-trefoil	1986	1	-	k	-	-	Unlikely	No Habitat
<i>Dianella</i> sp. aff. <i>longifolia</i> (Benambra)	Arching Flax-lily	2006	2	-	v	-	-	Unlikely	No Habitat
<i>Eleocharis macbarronii</i>	Grey Spike-sedge	2006	3	-	k	-	-	Unlikely	No Habitat
<i>Eragrostis trachycarpa</i>	Rough-grain Love-grass	1984	3	-	r	-	-	Unlikely	No Habitat
<i>Eucalyptus leucoxydon</i> subsp. <i>connata</i>	Melbourne Yellow-gum	2004	1	-	v	-	-	Unlikely	No Habitat
<i>Geranium solanderi</i> var. <i>solanderi</i> s.s.	Austral Crane's-bill	2005	1	-	v	-	-	Unlikely	No Habitat
<i>Helichrysum</i> aff. <i>rutidolepis</i> (Lowland Swamps)	Pale Swamp Everlasting	1999	1	-	v	-	-	Unlikely	No Habitat
<i>Lachnagrostis perennis</i> spp. agg.	Perennial Blown-grass	2007	5	-	k	-	-	Unlikely	No Habitat
<i>Nicotiana suaveolens</i>	Austral Tobacco	1999	2	-	r	-	-	Unlikely	No Habitat
<i>Podolepis</i> sp. 1	Basalt Podolepis	2006	13	-	e	-	-	Unlikely	No Habitat
<i>Rhagodia parabolica</i>	Fragrant Saltbush	1999	2	-	r	-	-	Low Likelihood	Poor condition habitat present
<i>Sclerolaena muricata</i> var. <i>muricata</i>	Black Roly-poly	2007	1	-	k	-	-	Unlikely	No Habitat
<i>Triopogon loliiformis</i>	Rye Beetle-grass	1993	2	-	r	-	-	Low Likelihood	Poor condition habitat present

Source: DSE (2010); SEWPaC Protected Matters Search Tool (<http://www.environment.gov.au/erin/ert/epbc/index.htm>)

Appendix 3.1 – Fauna results

Table A3.1. Fauna recorded during the present survey (1, 4, 5 and 8 April 2011), and previously recorded within 10 kilometres of the study area.

H	Heard	Mi	Migratory
S	Seen	Ma	Marine
I	Incidental (feathers, bones, scats etc)	*	Introduced species
A	Anabat ultrasonic call detection		
T	Trapped / handheld		
C	Communication		

Common name	Scientific name	Last documented record	Total # of documented records	Present survey
MAMMALS				
Short-beaked Echidna	<i>Tachyglossus aculeatus</i>	1973	1	
Fat-tailed Dunnart	<i>Sminthopsis crassicaudata</i>	2003	24	
Eastern Barred Bandicoot	<i>Perameles gunnii</i>	1982	7	
Common Brushtail Possum	<i>Trichosurus vulpecula</i>	2007	34	I
Common Ringtail Possum	<i>Pseudocheirus peregrinus</i>	2008	8	I
Sugar Glider	<i>Petaurus breviceps</i>	1986	1	
Koala	<i>Phascolarctos cinereus</i>	2005	1	
Black Wallaby	<i>Wallabia bicolor</i>	2008	3	
Eastern Grey Kangaroo	<i>Macropus giganteus</i>	2004	3	
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	1997	4	
White-striped Freetail Bat	<i>Tadarida australis</i>	2006	15	A
Lesser Long-eared Bat	<i>Nyctophilus geoffroyi</i>	2001	14	
Gould's Wattled Bat	<i>Chalinolobus gouldii</i>	2001	6	A
Chocolate Wattled Bat	<i>Chalinolobus morio</i>			A
Southern Forest Bat	<i>Vespadelus regulus</i>	2001	3	
Little Forest Bat	<i>Vespadelus vulturnus</i>	2001	25	A
Large Forest Bat	<i>Vespadelus darlingtoni</i>	2001	1	A
Mormopterus spp.	<i>Mormopterus sp2 or sp4</i>			A

Common name	Scientific name	Last documented record	Total # of documented records	Present survey
Black Rat*	<i>Rattus rattus</i>	2001	4	
Brown Rat*	<i>Rattus norvegicus</i>	2001	5	
House Mouse*	<i>Mus musculus</i>	2004	52	I
Water Rat	<i>Hydromys chrysogaster</i>	2007	9	
European Rabbit*	<i>Oryctolagus cuniculus</i>	2007	96	S
European Hare*	<i>Lepus europeaus</i>	2006	35	S
Red Fox*	<i>Vulpes vulpes</i>	2006	74	S
Cat*	<i>Felis catus</i>	2005	6	S
Platypus	<i>Ornithorhynchus anatinus</i>	2006	37	
Eastern water rat	<i>Hydromys chryogaster</i>	2006	2	
Southern Brown Bandicoot	<i>Isodon obesulus obesulus</i>	1881	1	
Little Penguin	<i>Eudyptula minor</i>	1978	2	
Australian Fur Seal	<i>Arctocephalus pusillus</i>	1987	1	
BIRDS				
Fluttering Shearwater	<i>Puffinus gavia</i>	2006	1	
Short-tailed Shearwater	<i>Ardenna tenuirostris</i>	2007	3	
Australasian Gannet	<i>Morus serrator</i>	2007	1	
Arctic Jaeger	<i>Stercorarius parasiticus</i>	2008	4	
Common Tern	<i>Sterna hirundo</i>	2008	5	
Emu	<i>Dromaius novaehollandiae</i>	2004	1	
Stubble Quail	<i>Coturnix pectoralis</i>	2008	38	S
Brown Quail	<i>Coturnix ypsilophora australis</i>	2008	17	
Painted Button-quail	<i>Turnix varia</i>	2008	3	
Little Button-quail	<i>Turnix velox</i>	1990	1	
Red-chested Button-quail	<i>Turnix pyrrhorthorax</i>	2008	4	
Plains-wanderer	<i>Pedionomus torquatus</i>	2008	25	
Peaceful Dove	<i>Geopelia striata</i>	2008	2	
Common Bronzewing	<i>Phaps chalcoptera</i>	1990	2	

Common name	Scientific name	Last documented record	Total # of documented records	Present survey
Crested Pigeon	<i>Ocyphaps lophotes</i>	2008	7	S
Lewin's Rail	<i>Lewinia pectoralis pectoralis</i>	2008	9	
Buff-banded Rail	<i>Gallirallus philippensis</i>	2008	18	
Australian Spotted Crake	<i>Porzana fluminea</i>	2008	17	
Baillon's Crake	<i>Porzana pusilla palustris</i>	2006	4	
Spotless Crake	<i>Porzana tabuensis</i>	2008	7	
Black-tailed Native-hen	<i>Gallinula ventralis</i>	2008	5	
Dusky Moorhen	<i>Gallinula tenebrosa</i>	2008	55	S
Purple Swamphen	<i>Porphyrio porphyrio</i>	2006	24	
Eurasian Coot	<i>Fulica atra</i>	2007	50	S
Great Crested Grebe	<i>Podiceps cristatus</i>	2008	8	
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	2008	34	
Hoary-headed Grebe	<i>Poliiocephalus poliocephalus</i>	2007	58	
Great Cormorant	<i>Phalacrocorax carbo</i>	2008	22	
Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>	2008	19	
Black-faced Cormorant	<i>Phalacrocorax fuscescens</i>	2008	3	
Pied Cormorant	<i>Phalacrocorax varius</i>	2007	14	
Little Pied Cormorant	<i>Microcarbo melanoleucos</i>	2008	59	S
Darter	<i>Anhinga novaehollandiae</i>	2008	4	
Broad-billed Sandpiper	<i>Limicola falcinellus</i>	2007	3	
Latham's Snipe	<i>Gallinago hardwickii</i>	2006	17	
Australian Painted Snipe	<i>Rostratula benghalensis australis</i>	1985	3	
Australian Pratincole	<i>Stiltia isabella</i>	1992	1	
Brolga	<i>Grus rubicunda</i>	2008	24	
Glossy Ibis	<i>Plegadis falcinellus</i>	2008	20	
Australian White Ibis	<i>Threskiornis molucca</i>	2007	64	S
Straw-necked Ibis	<i>Threskiornis spinicollis</i>	2007	86	S
Royal Spoonbill	<i>Platalea regia</i>	2008	17	

Common name	Scientific name	Last documented record	Total # of documented records	Present survey
Yellow-billed Spoonbill	<i>Platalea flavipes</i>	2008	35	
Little Egret	<i>Egretta garzetta nigripes</i>	2007	6	
Intermediate Egret	<i>Ardea intermedia</i>	1990	2	
Eastern Great Egret	<i>Ardea modesta</i>	2008	21	
White-faced Heron	<i>Egretta novaehollandiae</i>	2008	102	S
White-necked Heron	<i>Ardea pacifica</i>	2008	41	
Nankeen Night Heron	<i>Nycticorax caledonicus hillii</i>	2007	11	
Little Bittern	<i>Ixobrychus minutus dubius</i>	2006	2	
Australasian Bittern	<i>Botaurus poiciloptilus</i>	2008	23	
Cape Barren Goose	<i>Cereopsis novaehollandiae</i>	2008	13	
Magpie Goose	<i>Anseranas semipalmata</i>	2008	7	
Australian Wood Duck	<i>Chenonetta jubata</i>	2007	28	S
Black Swan	<i>Cygnus atratus</i>	2008	61	
Australian Shelduck	<i>Tadorna tadornoides</i>	2008	43	S
Pacific Black Duck	<i>Anas superciliosa</i>	2007	127	S
Chestnut Teal	<i>Anas castanea</i>	2007	79	
Grey Teal	<i>Anas gracilis</i>	2007	63	
Australasian Shoveler	<i>Anas rhynchotis</i>	2007	33	
Pink-eared Duck	<i>Malacorhynchus membranaceus</i>	2007	22	
Freckled Duck	<i>Stictonetta naevosa</i>	2008	4	
Hardhead	<i>Aythya australis</i>	2008	34	
Blue-billed Duck	<i>Oxyura australis</i>	2008	33	
Musk Duck	<i>Biziura lobata</i>	2008	43	
Spotted Harrier	<i>Circus assimilis</i>	2008	10	
Swamp Harrier	<i>Circus approximans</i>	2007	31	
Grey Goshawk	<i>Accipiter novaehollandiae novaehollandiae</i>	2008	8	
Brown Goshawk	<i>Accipiter fasciatus</i>	2008	35	

Common name	Scientific name	Last documented record	Total # of documented records	Present survey
Collared Sparrowhawk	<i>Accipiter cirrhocephalus</i>	1976	3	
Wedge-tailed Eagle	<i>Aquila audax</i>	2008	10	
Little Eagle	<i>Hieraaetus morphnoides</i>	2008	30	S
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	2008	8	
Whistling Kite	<i>Haliastur sphenurus</i>	2008	39	S
Black Kite	<i>Milvus migrans</i>	2008	15	
Black-breasted Buzzard	<i>Hamirostra melanosternon</i>	1998	1	
Black-shouldered Kite	<i>Elanus axillaris</i>	2007	56	S
Letter-winged Kite	<i>Elanus scriptus</i>	1978	4	
Australian Hobby	<i>Falco longipennis</i>	2008	14	
Peregrine Falcon	<i>Falco peregrinus</i>	2008	13	
Black Falcon	<i>Falco subniger</i>	2008	21	
Brown Falcon	<i>Falco berigora</i>	2007	80	S
Nankeen Kestrel	<i>Falco cenchroides</i>	2007	75	S
Southern Boobook	<i>Ninox novaeseelandiae</i>	2008	8	C
Barking Owl	<i>Ninox connivens connivens</i>	1986	1	
Pacific Barn Owl	<i>Tyto javanica</i>	2003	16	
Masked Owl	<i>Tyto novaehollandiae novaehollandiae</i>	1884	1	
Eastern Grass Owl	<i>Tyto longimembris</i>	2007	3	
Rainbow Lorikeet	<i>Trichoglossus haematodus</i>	2008	9	S
Musk Lorikeet	<i>Glossopsitta concinna</i>	2007	8	S
Purple-crowned Lorikeet	<i>Glossopsitta porphyrocephala</i>	2007	20	S
Little Lorikeet	<i>Glossopsitta pusilla</i>	2007	4	
Yellow-tailed Black-Cockatoo	<i>Calyptorhynchus funereus</i>	2007	2	
Sulphur-crested Cockatoo	<i>Cacatua galerita</i>	2007	26	S
Little Corella	<i>Cacatua sanguinea</i>	2008	5	
Long-billed Corella	<i>Cacatua tenuirostris</i>	1993	5	S
Galah	<i>Eolophus roseicapilla</i>	2007	58	S

Common name	Scientific name	Last documented record	Total # of documented records	Present survey
Cockatiel	<i>Nymphicus hollandicus</i>	1977	1	
Australian King-Parrot	<i>Alisterus scapularis</i>	1983	2	
Crimson Rosella	<i>Platycercus elegans</i>	2004	6	
Eastern Rosella	<i>Platycercus eximius</i>	2006	21	S
Red-rumped Parrot	<i>Psephotus haematonotus</i>	2007	47	S
Orange-bellied Parrot	<i>Neophema chrysogaster</i>	2008	17	
Blue-winged Parrot	<i>Neophema chrysostoma</i>	2008	10	
Swift Parrot	<i>Lathamus discolor</i>	1995	2	
Tawny Frogmouth	<i>Podargus strigoides</i>	1990	2	
Laughing Kookaburra	<i>Dacelo novaeguineae</i>	2004	14	S
Sacred Kingfisher	<i>Todiramphus sanctus</i>	2008	13	
Rainbow Bee-eater	<i>Merops ornatus</i>	1988	2	
White-throated Needletail	<i>Hirundapus caudacutus</i>	1990	5	
Pallid Cuckoo	<i>Cuculus pallidus</i>	2008	7	
Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>	2008	7	S
Brush Cuckoo	<i>Cacomantis variolosus</i>	1929	1	
Horsfield's Bronze-Cuckoo	<i>Chrysococcyx basalis</i>	2008	21	H
Shining Bronze-Cuckoo	<i>Chrysococcyx lucidus</i>	2008	5	
Domestic Goose*	<i>Anser anser</i>	2006	1	
Northern Shoveler	<i>Anas clypeata</i>	2005	1	
Red-necked Phalarope	<i>Phalaropus lobatus</i>	2006	9	
Northern Mallard*	<i>Anas platyrhynchos</i>	2004	6	
Rock Dove*	<i>Columba livia</i>	2007	41	S
Cattle Egret	<i>Ardea ibis</i>	2008	33	
Spotted Turtle-Dove*	<i>Streptopelia chinensis</i>	2007	53	S
Australian Pelican	<i>Pelecanus conspicillatus</i>	2007	17	
White-winged Black Tern	<i>Chlidonias leucopterus</i>	2008	17	
Whiskered Tern	<i>Chlidonias hybridus javanicus</i>	2008	21	

Common name	Scientific name	Last documented record	Total # of documented records	Present survey
Gull-billed Tern	<i>Gelochelidon nilotica macrotarsa</i>	2008	6	
Caspian Tern	<i>Hydroprogne caspia</i>	2008	4	
Crested Tern	<i>Thalaseus bergii</i>	2008	8	
Little Tern	<i>Sternula albifrons sinensis</i>	2008	3	
Fairy Tern	<i>Sternula nereis nereis</i>	2008	10	
Silver Gull	<i>Chroicocephalus novaehollandiae</i>	2007	47	
Ruddy Turnstone	<i>Arenaria interpres</i>	2008	7	
Pied Oystercatcher	<i>Haematopus longirostris</i>	2008	10	
Sooty Oystercatcher	<i>Haematopus fuliginosus</i>	2008	4	
Red-kneed Dotterel	<i>Erythronyx cinctus</i>	2007	17	
Masked Lapwing	<i>Vanellus miles</i>	2007	84	S
Banded Lapwing	<i>Vanellus tricolor</i>	2008	36	
Grey Plover	<i>Pluvialis squatarola</i>	2008	3	
Pacific Golden Plover	<i>Pluvialis fulva</i>	2008	8	
Lesser Sand Plover	<i>Charadrius mongolus</i>	1978	2	
Double-banded Plover	<i>Charadrius bicinctus</i>	2008	16	
Greater Sand Plover	<i>Charadrius leschenaultii</i>	1978	2	
Red-capped Plover	<i>Charadrius ruficapillus</i>	2007	11	
Black-fronted Dotterel	<i>Elseyornis melanops</i>	2008	41	S
Black-winged Stilt	<i>Himantopus himantopus</i>	2008	23	
Banded Stilt	<i>Cladorhynchus leucocephalus</i>	2008	7	
Red-necked Avocet	<i>Recurvirostra novaehollandiae</i>	2006	9	
Eastern Curlew	<i>Numenius madagascariensis</i>	2008	7	
Little Curlew	<i>Numenius minutus</i>	2008	15	
Black-tailed Godwit	<i>Limosa limosa</i>	2008	4	
Bar-tailed Godwit	<i>Limosa lapponica</i>	2008	7	
Wood Sandpiper	<i>Tringa glareola</i>	2008	17	
Common Sandpiper	<i>Actitis hypoleucos</i>	2007	3	

Common name	Scientific name	Last documented record	Total # of documented records	Present survey
Common Greenshank	<i>Tringa nebularia</i>	2008	15	
Marsh Sandpiper	<i>Tringa stagnatilis</i>	2008	9	
Terek Sandpiper	<i>Xenus cinereus</i>	2008	8	
Curlew Sandpiper	<i>Calidris ferruginea</i>	2008	22	
Red-necked Stint	<i>Calidris ruficollis</i>	2008	20	
Sharp-tailed Sandpiper	<i>Calidris acuminata</i>	2008	27	
Red Knot	<i>Calidris canutus</i>	2007	7	
Great Knot	<i>Calidris tenuirostris</i>	2007	7	
Small wader	<i>Fam. Scolopacidae (Small wader)</i>	2007	1	
Little Stint	<i>Calidris minuta</i>	2008	4	
Ruff	<i>Philomachus pugnax</i>	2008	12	
Long-toed Stint	<i>Calidris subminuta</i>	2008	12	
Pectoral Sandpiper	<i>Calidris melanotos</i>	2008	17	
Pacific Gull	<i>Larus pacificus pacificus</i>	1988	8	
Welcome Swallow	<i>Hirundo neoxena</i>	2007	120	S
Tree Martin	<i>Hirundo nigricans</i>	2006	23	S
Fairy Martin	<i>Hirundo ariel</i>	2008	18	
Grey Fantail	<i>Rhipidura albiscarpa</i>	2008	31	S
Rufous Fantail	<i>Rhipidura rufifrons</i>	2007	2	
Willie Wagtail	<i>Rhipidura leucophrys</i>	2008	160	S
Restless Flycatcher	<i>Myiagra inquieta</i>	2008	11	
Jacky Winter	<i>Microeca fascinans</i>	2004	6	
Scarlet Robin	<i>Petroica boodang</i>	1999	6	
Red-capped Robin	<i>Petroica goodenovii</i>	2006	3	
Flame Robin	<i>Petroica phoenicea</i>	2006	35	S
Pink Robin	<i>Petroica rodinogaster</i>	2008	3	
Hooded Robin	<i>Melanodryas cucullata cucullata</i>	1931	1	
Golden Whistler	<i>Pachycephala pectoralis</i>	2008	14	

Common name	Scientific name	Last documented record	Total # of documented records	Present survey
Rufous Whistler	<i>Pachycephala rufiventris</i>	2008	7	
Grey Shrike-thrush	<i>Colluricincla harmonica</i>	1999	3	
Magpie-lark	<i>Grallina cyanoleuca</i>	2008	142	S
Crested Shrike-tit	<i>Falcunculus frontatus</i>	2008	9	
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	2007	35	S
White-bellied Cuckoo-shrike	<i>Coracina papuensis</i>	2006	1	
White-winged Triller	<i>Lalage sueurii</i>	2008	5	
White-browed Babbler	<i>Pomatostomus superciliosus</i>	1930	1	
White-fronted Chat	<i>Epthianura albifrons</i>	2007	64	S
Weebill	<i>Smicromnis brevirostris</i>	2004	1	
Southern Whiteface	<i>Aphelocephala leucopsis</i>	1987	2	
Striated Thornbill	<i>Acanthiza lineata</i>	1978	2	
Yellow Thornbill	<i>Acanthiza nana</i>	2004	13	
Brown Thornbill	<i>Acanthiza pusilla</i>	2007	16	S
Buff-rumped Thornbill	<i>Acanthiza reguloides</i>	2004	3	
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>	2007	73	S
White-browed Scrubwren	<i>Sericornis frontalis</i>	2007	18	S
Speckled Warbler	<i>Chthonicola sagittata</i>	2004	2	
Brown Songlark	<i>Cincloramphus cruralis</i>	2008	18	
Rufous Songlark	<i>Cincloramphus mathewsi</i>	2008	1	
Little Grassbird	<i>Megalurus gramineus</i>	2007	25	
Clamorous Reed Warbler	<i>Acrocephalus stentoreus</i>	2007	16	
Golden-headed Cisticola	<i>Cisticola exilis</i>	2007	55	
Superb Fairy-wren	<i>Malurus cyaneus</i>	2007	98	S
White-browed Woodswallow	<i>Artamus superciliosus</i>	2007	4	
Dusky Woodswallow	<i>Artamus cyanopterus</i>	2008	12	
Varied Sittella	<i>Daphoenositta chrysoptera</i>	2004	7	
Mistletoebird	<i>Dicaeum hirundinaceum</i>	2008	11	

Common name	Scientific name	Last documented record	Total # of documented records	Present survey
Spotted Pardalote	<i>Pardalotus punctatus</i>	2007	9	
Silvereye	<i>Zosterops lateralis</i>	2007	27	S
White-naped Honeyeater	<i>Melithreptus lunatus</i>	1999	3	
Brown-headed Honeyeater	<i>Melithreptus brevirostris</i>	2004	5	-
Eastern Spinebill	<i>Acanthorhynchus tenuirostris</i>	2007	3	S
Singing Honeyeater	<i>Lichenostomus virescens</i>	2008	4	-
Yellow-faced Honeyeater	<i>Lichenostomus chrysops</i>	2008	4	-
White-eared Honeyeater	<i>Lichenostomus leucotis</i>	2004	1	-
White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>	2008	103	S
New Holland Honeyeater	<i>Phylidonyris novaehollandiae</i>	2008	18	S
Noisy Miner	<i>Manorina melanocephala</i>	2001	10	S
Red Wattlebird	<i>Anthochaera carunculata</i>	2008	60	S
Spiny-cheeked Honeyeater	<i>Acanthagenys rufogularis</i>	2008	2	-
Australasian Pipit	<i>Anthus novaeseelandiae</i>	2006	93	S
Horsfield's Bushlark	<i>Mirafrja javanica</i>	2008	28	-
Diamond Firetail	<i>Stagonopleura guttata</i>	2007	6	-
Zebra Finch	<i>Taeniopygia guttata</i>	2008	21	S
Red-browed Finch	<i>Neochmia temporalis</i>	2007	24	S
Olive-backed Oriole	<i>Oriolus sagittatus</i>	2008	3	-
White-winged Chough	<i>Corcorax melanorhamphos</i>	1977	4	-
Grey Currawong	<i>Strepera versicolor</i>	1931	1	-
Australian Magpie	<i>Gymnorhina tibicen</i>	2008	159	S
Yellow Wagtail	<i>Motacilla flava</i>	2005	1	-
Australian Raven	<i>Corvus coronoides</i>	2005	27	-
Little Raven	<i>Corvus mellori</i>	2007	151	S
Striated Pardalote	<i>Pardalotus striatus</i>	2004	15	-
Common Blackbird*	<i>Turdus merula</i>	2007	65	S
Song Thrush*	<i>Turdus philomelos</i>	2007	5	-

Common name	Scientific name	Last documented record	Total # of documented records	Present survey
European Skylark*	<i>Alauda arvensis</i>	2006	107	S
Eurasian Tree Sparrow*	<i>Passer montanus</i>	2001	8	-
House Sparrow*	<i>Passer domesticus</i>	2007	125	S
European Goldfinch*	<i>Carduelis carduelis</i>	2007	113	S
European Greenfinch*	<i>Carduelis chloris</i>	2006	31	-
Common Myna*	<i>Acridotheres tristis</i>	2007	81	S
Common Starling*	<i>Sturnus vulgaris</i>	2008	139	S
Brown Treecreeper (south-eastern ssp.)	<i>Climacteris picumnus victoriae</i>	2008	7	
REPTILES				
Marbled Gecko	<i>Christinus marmoratus</i>	1987	1	-
Striped Legless Lizard	<i>Delma impar</i>	2008	9	-
Large Striped Skink	<i>Ctenotus robustus</i>	1990	17	-
Cunningham's Skink	<i>Egernia cunninghami</i>	1990	13	-
Garden Skink	<i>Lampropholis guichenoti</i>	1990	16	S
Metallic Skink	<i>Niveoscincus metallicus</i>	1987	2	-
Bougainville's Skink	<i>Lerista bougainvillii</i>	1990	7	-
Common Blue-tongued Lizard	<i>Tiliqua scincoides</i>	2004	34	S
Stumpy-tailed Lizard	<i>Tiliqua rugosa</i>	1987	1	-
Tiger Snake	<i>Notechis scutatus</i>	2004	36	-
Eastern Three-lined Skink	<i>Bassiana duperreyi</i>	1993	7	S
Eastern Brown Snake	<i>Pseudonaja textilis</i>	2004	15	-
Little Whip Snake	<i>Suta flagellum</i>	1990	17	-
Grassland Earless Dragon	<i>Tympanocryptis pinguicolla</i>	1960	1	-
Lowland Copperhead	<i>Austrelaps superbis</i>	1990	1	-
unidentified skink	<i>Fam. Scincidae</i>	1993	8	-
Tussock Skink	<i>Pseudemoiapagenstecheri</i>	2004	1	-
Long neck tortoise	<i>Chelodina longicollis</i>	2006	3	-
Murray Short-necked Turtle	<i>Emydura macquarii</i>	2006	1	-

Common name	Scientific name	Last documented record	Total # of documented records	Present survey
Black Rock Skink	<i>Egernia saxatilis intermedia</i>	1977	1	-
Southern Water Skink	<i>Eulamprus tympanum tympanum</i>	1990	2	-
AMPHIBIANS				
Southern Bullfrog (ssp. unknown)	<i>Limnodynastes dumerilii</i>	2009	23	S
Striped Marsh Frog	<i>Limnodynastes peronii</i>	2004	5	S
Spotted Marsh Frog (race unknown)	<i>Limnodynastes tasmaniensis</i>	2009	44	S
Common Spadefoot Toad	<i>Neobatrachus sudelli</i>	1993	17	-
Brown Toadlet	<i>Pseudophryne bibronii</i>	1990	1	-
Common Froglet	<i>Crinia signifera</i>	2009	73	H
Southern Brown Tree Frog	<i>Litoria ewingii</i>	1967	1	-
Growling Grass Frog	<i>Litoria raniformis</i>	2003	22	-
FISH				
Pouched Lamprey	<i>Geotria australis</i>	1995	5	-
Short-headed Lamprey	<i>Mordacia mordax</i>	1995	6	-
Short-finned Eel	<i>Anguilla australis</i>	2006	29	-
Sandy Sprat	<i>Hyperlophus vittatus</i>	1995	2	-
Pilchard	<i>Sardinops neopilchardus</i>	1995	1	-
Blue Sprat	<i>Spratelloides robustus</i>	1995	1	-
Australian Anchovy	<i>Engraulis australis</i>	1995	1	-
Brown Trout*	<i>Salmo trutta</i>	1981	2	-
Australian Smelt	<i>Retropinna semoni</i>	2006	9	-
Spotted Galaxias	<i>Galaxias truttaceus</i>	2006	1	-
Common Galaxias	<i>Galaxias maculatus</i>	2006	22	-
Goldfish*	<i>Carassius auratus</i>	2006	10	-
Carp*	<i>Cyprinus carpio</i>	2006	6	-
Roach*	<i>Rutilus rutilus</i>	1995	6	-
Tench*	<i>Tinca tinca</i>	2006	3	-

Common name	Scientific name	Last documented record	Total # of documented records	Present survey
Oriental Weatherloach*	<i>Misgurnus anguillicaudatus</i>	1990	7	-
Gambusia*	<i>Gambusia holbrooki</i>	2006	18	-
Smallmouthed Hardyhead	<i>Atherinosoma microstoma</i>	2006	5	-
Pikehead Hardyhead	<i>Kestratherina esox</i>	1995	1	-
Silver Fish	<i>Leptatherina presbyteroides</i>	1995	2	-
Southern Pigmy Perch	<i>Nannoperca australis</i>	1990	1	-
Redfin*	<i>Perca fluviatilis</i>	2006	14	-
Silver Trevally	<i>Pseudocaranx dentex</i>	1995	1	-
Eastern Australian Salmon	<i>Arripis trutta</i>	1995	1	-
Black Bream	<i>Acanthopagrus butcheri</i>	2006	3	-
Luderick	<i>Girella tricuspidata</i>	1995	1	-
River Blackfish	<i>Gadopsis marmoratus</i>	1995	4	-
Yellow-eye Mullet	<i>Aldrichetta forsteri</i>	1995	3	-
Tupong	<i>Pseudaphritis urvillii</i>	2006	12	-
Tamar River Goby	<i>Afurcagobius tamarensis</i>	1995	3	-
Bridled Goby	<i>Arenigobius bifrenatus</i>	1995	1	-
Long-finned Goby	<i>Favonigobius lateralis</i>	1995	1	-
Glass Goby	<i>Gobiopterus semivestitus</i>	2006	3	-
Blue-spotted Goby	<i>Pseudogobius olorum</i>	1995	2	-
Flat-headed Gudgeon	<i>Philypnodon grandiceps</i>	2006	29	-
MUSSELS & CRUSTACEANS				
Common Freshwater Shrimp	<i>Paratya australiensis</i>	2006	22	-
Yabby	<i>Cherax destructor</i>	1989	2	-
Southern Victorian Spiny Crayfish	<i>Euastacus yarraensis</i>	2006	1	-
Freshwater Crabs	Ord. Decapoda Fam. Hymenosomatidae	2006	1	-
INVERTEBRATES				
Golden Sun Moth	<i>Synemon plana</i>	2008	49	-

Common name	Scientific name	Last documented record	Total # of documented records	Present survey
Imperial Jezebel	<i>Delias harpalyce</i>	-	-	S
Chequered Swallowtail	<i>Papilio demoleus sthenelus</i>	-	-	S
Australian Painted Lady	<i>Vanessa kershawi</i>	-	-	S
Yellow Admiral	<i>Vanessa itea</i>	-	-	S
Meadow Argus	<i>Junonia villida calybe</i>	-	-	S
Common Brown	<i>Heteronympha merope merope</i>	-	-	S
Blotched Dusky-blue	<i>Candalides acasta</i>	-	-	S
Cabbage White	<i>Pieris rapae rapae</i>	-	-	S

Source used to determine number of records and year: Victorian Biodiversity Atlas (DSE 2010)

Appendix 3.2 – Significant fauna species

Table A3.2. Significant fauna within 10 kilometres of the study area.

EPBC	<i>Environment Protection and biodiversity Conservation Act 1999 (EPBCAct)</i>
FFG	<i>Flora and Fauna Guarantee Act 1988 (FFG Act)</i>
DSE	Advisory List of Threatened Vertebrate Fauna in Victoria (DSE 2007); Advisory List of Threatened Invertebrate Fauna in Victoria (DSE 2009)
NAP	National Action Plan (Maxwell <i>et al.</i> 1996; Duncan <i>et al.</i> 1999; Garnet and Crowley 2000; Cogger <i>et al.</i> 1993; Tyler 1997; Sands and New 2002)

EX	Extinct	Reasoning for Likelihood
RX	Regionally extinct	1 Recent Nearby Records and Suitable Habitat
CR	Critically endangered	2 Suitable Habitat
EN	Endangered	3 Fly Over / Visitor
VU	Vulnerable	4 No Suitable Habitat
RA	Rare	
NT	Near threatened	
CD	Conservation dependent	
LR	Lower risk (least concern)	
DD	Data deficient (insufficiently or poorly known)	
L	Listed as threatened under FFG Act	
I	Invalid or ineligible for listing under the FFG Act	
#	Listed on the Protected Matters Search Tool	

Common name	Scientific name	Total # of records	Last documented record	EPB C	FF G	DS E	NAP	Detected During Current Survey	Likely occurrence within the study area	Reasoning for Likelihood
NATIONAL										
Golden Sun Moth	<i>Synemon plana</i>	49	2008	CR	L	CR	-	-	Likely	1
Eastern Barred Bandicoot	<i>Perameles gunnii</i>	7	1982	EN	L	CR	CR	-	Unlikely	4
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	4	1997	VU	L	VU	VU	-	Possible	3
Southern Brown Bandicoot	<i>Isodon obesulus obesulus</i>	1	1881	EN	L	NT	NT	-	Unlikely	4
Plains-wanderer	<i>Pedionomus torquatus</i>	25	2008	VU	L	CR	EN	-	Likely	1
Australian Painted Snipe	<i>Rostratula benghalensis australis</i>	3	1985	VU	L	CR	VU	-	Unlikely	4
Australasian Bittern	<i>Botaurus poiciloptilus</i>	23	2008	EN	L	EN	VU	-	Unlikely	4
Orange-bellied Parrot	<i>Neophema chrysogaster</i>	17	2008	CR	L	CR	CR	-	Unlikely	4
Swift Parrot	<i>Lathamus discolor</i>	2	1995	EN	L	EN	EN	-	Possible	3

Common name	Scientific name	Total # of records	Last documented record	EPB C	FF G	DS E	NAP	Detected During Current Survey	Likely occurrence within the study area	Reasoning for Likelihood
Striped Legless Lizard	<i>Delma impar</i>	9	2008	VU	L	EN	VU	-	Likely	1
Grassland Earless Dragon	<i>Tympanocryptis pinguicolla</i>	1	1960	EN	L	CR	VU	-	Unlikely	4
Growling Grass Frog	<i>Litoria raniformis</i>	22	2003	VU	L	EN	VU	-	Possible	3
#New Holland Mouse	<i>Pseudomys novaehollandia</i>	-	-	VU	L	VU	VU	-	Unlikely	4
#Dwarf Galaxias	<i>Galaxiella pusilla</i>	-	-	VU	L	VU	VU	-	Unlikely	4
#Spot-tailed Quoll	<i>Dasyurus maculatus maculatus</i>	-	-	EN	L	EN	VU	-	Unlikely	4
#Australian Grayling	<i>Prototroctes maraena</i>	-	-	VU	L	VU	VU	-	Unlikely	4
STATE										
Red-chested Button-quail	<i>Turnix pyrrhotorax</i>	4	2008	-	L	VU	-	-	Likely	1
Lewin's Rail	<i>Lewinia pectoralis pectoralis</i>	9	2008	-	L	VU	NT	-	Unlikely	4
Baillon's Crake	<i>Porzana pusilla palustris</i>	4	2006	-	L	VU	-	-	Unlikely	4
Brolga	<i>Grus rubicunda</i>	24	2008	-	L	VU	-	-	Unlikely	4
Royal Spoonbill	<i>Platalea regia</i>	17	2008	-	-	VU	-	-	Likely	2
Little Egret	<i>Egretta garzetta nigripes</i>	6	2007	-	L	EN	-	-	Unlikely	4
Intermediate Egret	<i>Ardea intermedia</i>	2	1990	-	L	CR	-	-	Unlikely	4
Eastern Great Egret	<i>Ardea modesta</i>	21	2008	-	L	VU	-	-	Likely	2
Little Bittern	<i>Ixobrychus minutus dubius</i>	2	2006	-	L	EN	-	-	Unlikely	4
Magpie Goose	<i>Anseranas semipalmata</i>	7	2008	-	L	NT	-	-	Unlikely	4
Australasian Shoveler	<i>Anas rhynchos</i>	33	2007	-	-	VU	-	-	Unlikely	4
Freckled Duck	<i>Stictonetta naevosa</i>	4	2008	-	L	EN	-	-	Unlikely	4
Hardhead	<i>Aythya australis</i>	34	2008	-	-	VU	-	-	Unlikely	4
Blue-billed Duck	<i>Oxyura australis</i>	33	2008	-	L	EN	-	-	Unlikely	4
Musk Duck	<i>Biziura lobata</i>	43	2008	-	-	VU	-	-	Unlikely	4
Grey Goshawk	<i>Accipiter novaehollandiae novaehollandiae</i>	8	2008	-	L	VU	-	-	Possible	3
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	8	2008	-	L	VU	-	-	Unlikely	4
Black Falcon	<i>Falco subniger</i>	21	2008	-	-	VU	-	-	Possible	3
Barking Owl	<i>Ninox connivens connivens</i>	1	1986	-	L	EN	NT	-	Unlikely	4

Common name	Scientific name	Total # of records	Last documented record	EPB C	FF G	DS E	NAP	Detected During Current Survey	Likely occurrence within the study area	Reasoning for Likelihood
Masked Owl	<i>Tyto novaehollandiae novaehollandiae</i>	1	1884	-	L	EN	NT	-	Unlikely	4
Hooded Robin	<i>Melanodryas cucullata cucullata</i>	1	1931	-	L	NT	NT	-	Unlikely	4
Speckled Warbler	<i>Chthonicola sagittata</i>	2	2004	-	L	VU	NT	-	Unlikely	4
Diamond Firetail	<i>Stagonopleura guttata</i>	6	2007	-	L	VU	NT	-	Unlikely	4
Gull-billed Tern	<i>Gelochelidon nilotica macrotarsa</i>	6	2008	-	L	EN	-	-	Unlikely	4
Caspian Tern	<i>Hydroprogne caspia</i>	4	2008	-	L	NT	-	-	Unlikely	4
Little Tern	<i>Sternula albifrons sinensis</i>	3	2008	-	L	VU	-	-	Unlikely	4
Fairy Tern	<i>Sternula nereis nereis</i>	10	2008	-	L	EN	-	-	Unlikely	4
Lesser Sand Plover	<i>Charadrius mongolus</i>	2	1978	-	-	VU	-	-	Unlikely	4
Greater Sand Plover	<i>Charadrius leschenaultii</i>	2	1978	-	-	VU	-	-	Unlikely	4
Black-tailed Godwit	<i>Limosa limosa</i>	4	2008	-	-	VU	-	-	Unlikely	4
Wood Sandpiper	<i>Tringa glareola</i>	17	2008	-	-	VU	-	-	Unlikely	4
Common Sandpiper	<i>Actitis hypoleucos</i>	3	2007	-	-	VU	-	-	Unlikely	4
Terek Sandpiper	<i>Xenus cinereus</i>	8	2008	-	L	EN	-	-	Unlikely	4
Great Knot	<i>Calidris tenuirostris</i>	7	2007	-	L	EN	-	-	Unlikely	4
Brown Treecreeper (south-eastern ssp.)	<i>Climacteris picumnus victoriae</i>	7	2008	-	-	NT	NT	-	Unlikely	4
Brown Toadlet	<i>Pseudophryne bibronii</i>	1	1990	-	L	EN	-	-	Unlikely	4
REGIONAL										
Fat-tailed Dunnart	<i>Sminthopsis crassicaudata</i>	24	2003	-		NT	-	-	Likely	1
Brown Quail	<i>Coturnix ypsilophora australis</i>	17	2008	-		NT	-	-	Possible	2
Little Button-quail	<i>Turnix velox</i>	1	1990	-		NT	-	-	Unlikely	4
Black-faced Cormorant	<i>Phalacrocorax fuscescens</i>	3	2008	-		NT	-	-	Unlikely	4
Pied Cormorant	<i>Phalacrocorax varius</i>	14	2007	-		NT	-	-	Unlikely	4
Latham's Snipe	<i>Gallinago hardwickii</i>	17	2006	-		NT	-	-	Possible	3
Australian Pratincole	<i>Stiltia isabella</i>	1	1992	-		NT	-	-	Unlikely	4
Glossy Ibis	<i>Plegadis falcinellus</i>	20	2008	-		NT	-	-	Unlikely	4
Nankeen Night Heron	<i>Nycticorax caledonicus hillii</i>	11	2007	-		NT	-	-	Possible	3

Common name	Scientific name	Total # of records	Last documented record	EPB C	FF G	DS E	NAP	Detected During Current Survey	Likely occurrence within the study area	Reasoning for Likelihood
Cape Barren Goose	<i>Cereopsis novaehollandiae</i>	13	2008	-		NT	-	-	Possible	3
Spotted Harrier	<i>Circus assimilis</i>	10	2008	-		NT	-	-	Possible	3
White-winged Black Tern	<i>Chlidonias leucopterus</i>	17	2008	-		NT	-	-	Unlikely	4
Whiskered Tern	<i>Chlidonias hybridus javanicus</i>	21	2008	-		NT	-	-	Possible	3
Sooty Oystercatcher	<i>Haematopus fuliginosus</i>	4	2008	-		NT	-	-	Unlikely	4
Grey Plover	<i>Pluvialis squatarola</i>	3	2008	-		NT	-	-	Unlikely	4
Pacific Golden Plover	<i>Pluvialis fulva</i>	8	2008	-		NT	-	-	Unlikely	4
Eastern Curlew	<i>Numenius madagascariensis</i>	7	2008	-		NT	-	-	Unlikely	4
Red Knot	<i>Calidris canutus</i>	7	2007	-		NT	-	-	Unlikely	4
Long-toed Stint	<i>Calidris subminuta</i>	12	2008	-		NT	-	-	Unlikely	4
Pectoral Sandpiper	<i>Calidris melanotos</i>	17	2008	-		NT	-	-	Unlikely	4
Pacific Gull	<i>Larus pacificus pacificus</i>	8	1988	-		NT	-	-	Possible	3
River Blackfish	<i>Gadopsis marmoratus</i>	4	1995	-		DD	-	-	Unlikely	4

Data source: Victorian Biodiversity Atlas (DSE 2010); Protected Matters Search Tool (SEWPaC 2011).

Appendix 3.3 – Results of Anabat bat detection

Table A3.3. Bat species recorded by Anabat bat detectors within the PSP 40 area.

Species	Date					Total
	05/04/11	06/04/11	07/04/11	08/04/11	09/04/11	
Number of files	330	232	279	222	182	1245
Identified to species level	147	48	59	105	102	461
Calls positively identified	44.55%	20.69%	21.15%	47.30%	56.04%	37.94%
White-striped Freetail Bat <i>Tadarida australis</i>	11	10	28	54	76	179
Gould's Wattled Bat <i>Chalinolobus gouldi</i>	61	35	23	25	9	153
Chocolate Wattled Bat <i>Chalinolobus morio</i>	48	0	6	19	5	78
Large Forest Bat <i>Vespadelus darlingtoni</i>	14	0	0	3	1	18
Little Forest Bat <i>Vespadelus vulturnus</i>	13	3	2	7	11	36
Identified to call complex	58	68	40	24	6	196
Percentage	17.58%	29.31%	14.34%	10.81%	3.30%	15.07%
Mormopterus spp <i>Mormopterus sp2 & sp4</i>	1	1	1	1	1	5
Goulds Watted Bat / Broadnosed Bat / Mormopterus sp <i>Chalinolobus gouldi / Scotorepens sp / Falsistrellus sp</i>	4	0	0	0	0	4
Goulds Watted Bat / Mormopterus sp <i>Chalinolobus gouldi / Mormopterus sp2 & sp4</i>	45	46	34	17	2	144
Little Forest Bat / Chocoalate Wattled Bat <i>Vespadelus vulturnus / Chalinolobus morio</i>	0	14	0	6	0	3
Forest Bat sp <i>Vespadelus darlingtoni/ V. regulus/ V. vulturnus</i>	8	7	5	0	3	23
Unidentified (poor quality)	125	116	180	93	74	588
Percentage of calls	38%	50%	65%	42%	41%	47%

Appendix 3.4 – Sample time versus frequency graphs for microbats identified within the study area

Table A3.4.1. Sample Gould’s Wattled Bat *Chalinolobus gouldi* call

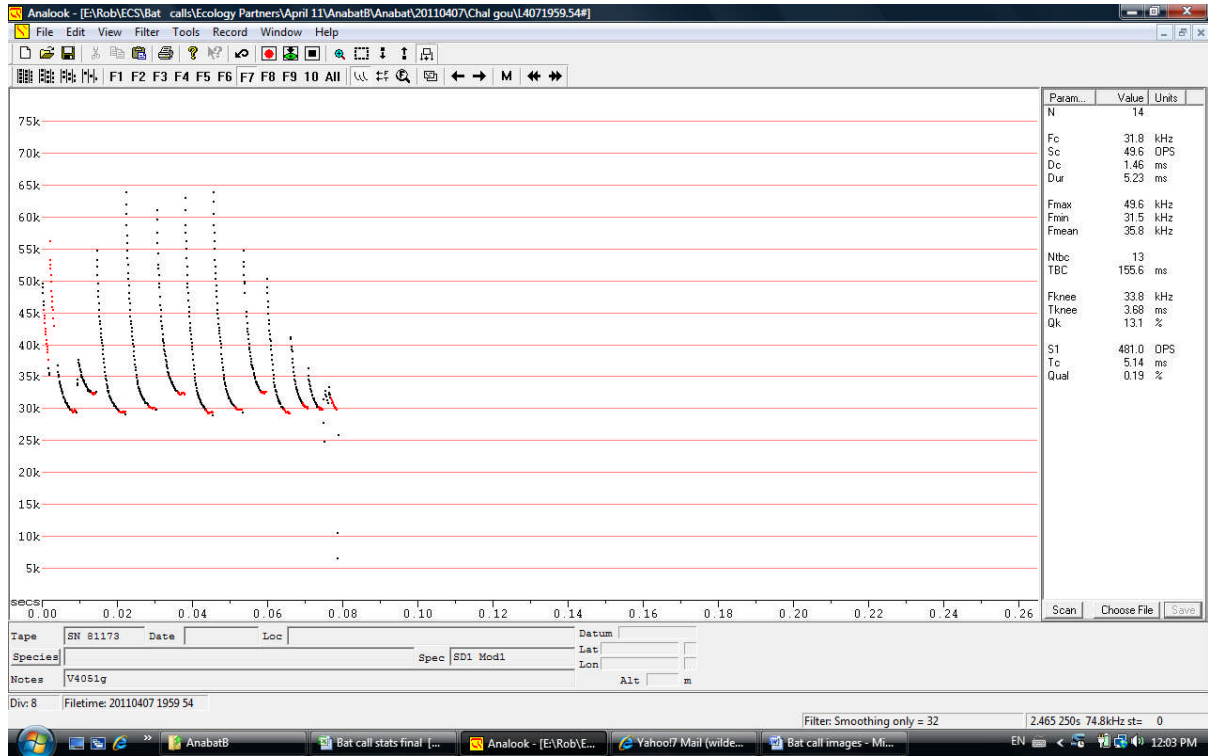


Table A3.4.2. Sample Large Forest Bat *Vespadelus darlingtoni* call

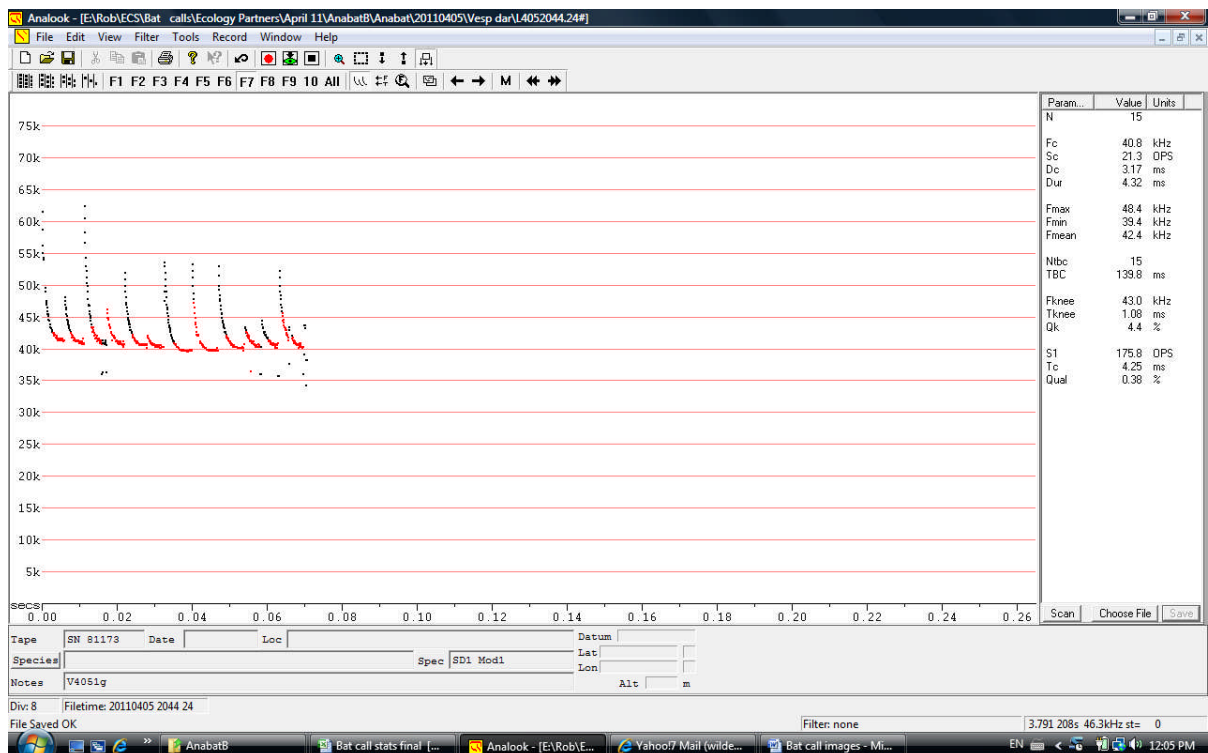


Table A3.4.3. Sample White-striped Freetail Bat *Tadarida australis* call

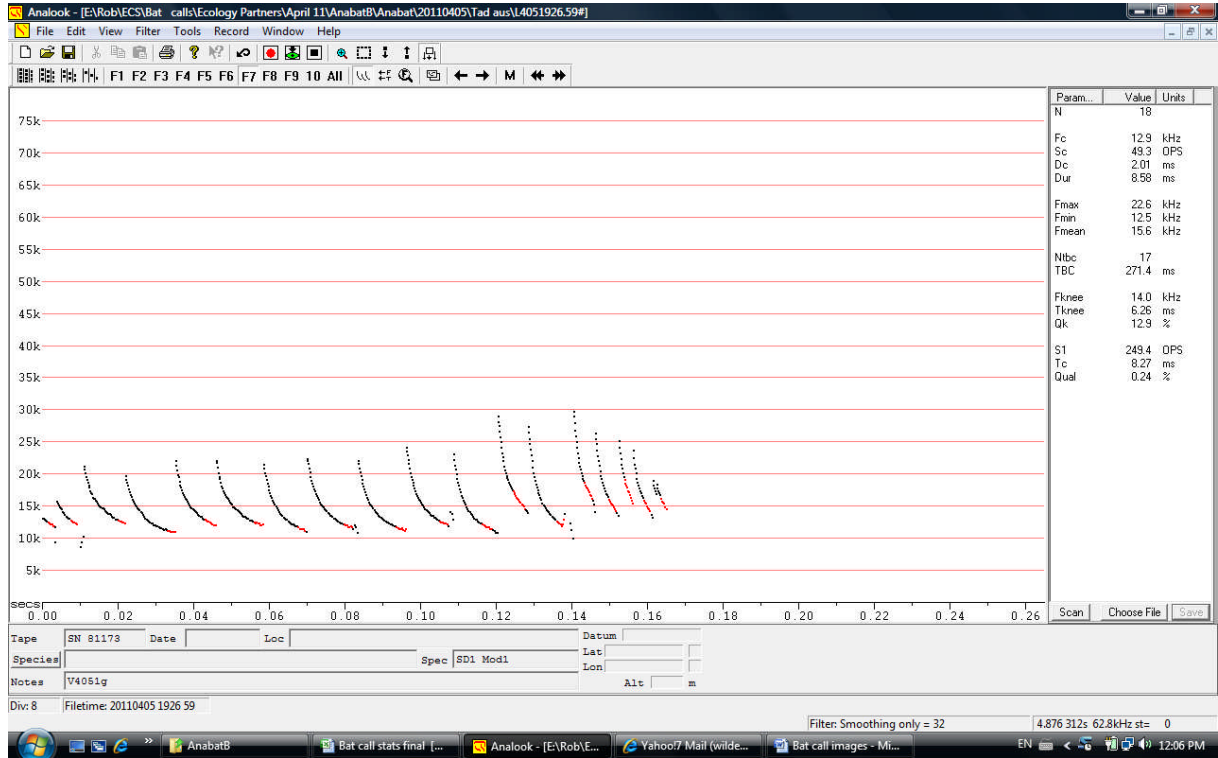


Table A3.4.4. Sample Little Forest Bat *Vespadelus vulturnus* call

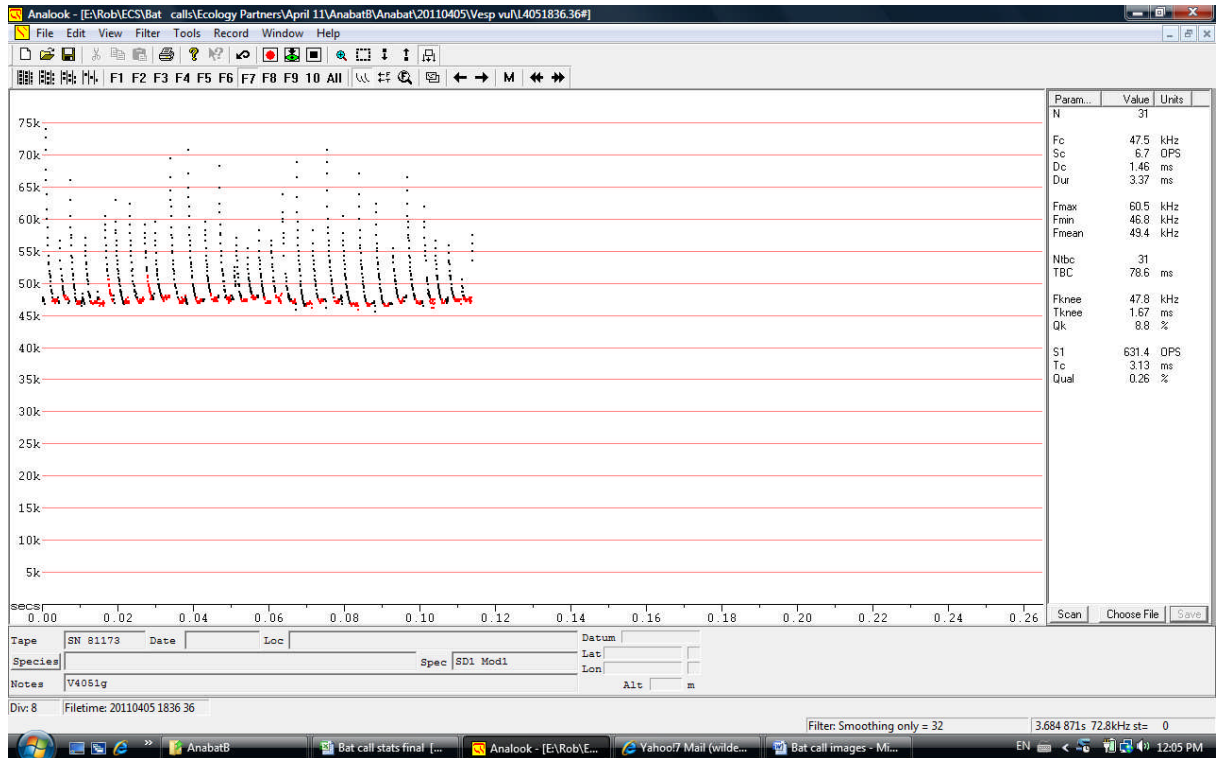
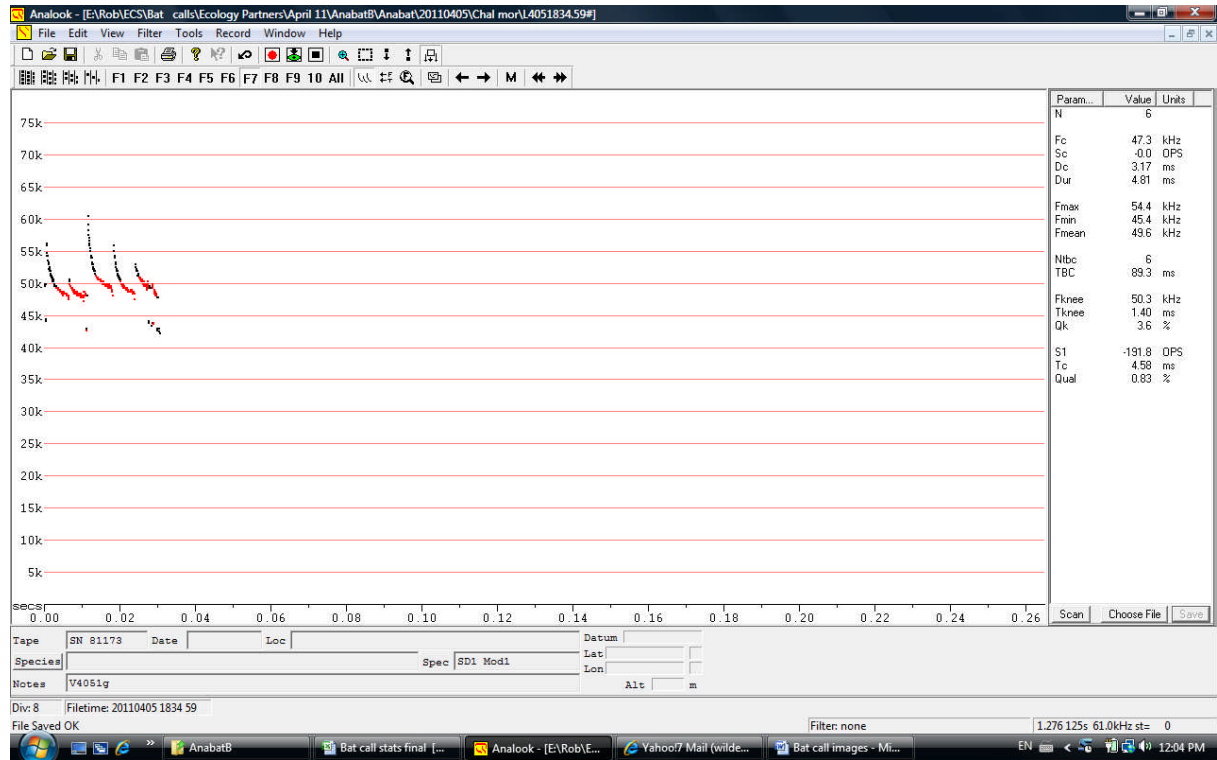


Table A3.4.5. Sample Chocolate Wattled Bat *Chalinolobus morio* call



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