FINAL Report

Flora and Fauna Technical Report: Northern Geelong Growth Area

Prepared for Lovely Banks Development Group

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Ecology and Heritage Partners Pty Ltd

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LIST OF ACRONYMS

Acronym	Definition
AVW	Atlas of Victorian Wildlife
CaLP Act	Victorian *Catchment and Land Protection Act 1994*
CMA	Catchment Management Authority
CoGG	City of Greater Geelong
DELWP	Victorian Department of Environment, Land, Water and Planning
DoEE	Commonwealth Department of the Environment and Energy
EE Act	*Environment Effects Act 1978*
EES	Environment Effects Statement
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EVC	Ecological Vegetation Class
FFG Act	*Flora and Fauna Guarantee Act 1988*
FIA	Further Investigation Area
FIS	Flora Information System
FZ	Farming Zone
IDP	Infrastructure Development Plan
NES	National Environmental Significance
NTGVVP	Natural Temperate Grassland of the Victorian Volcanic Plain
NVIM	Native Vegetation Information Management Tool
NVPP	Native Vegetation Precinct Plan
PMST	Protected Matters Search Tool
PSP	Precinct Structure Plan
VBA	Victorian Biodiversity Atlas

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1 INTRODUCTION

1.1 Background

This Flora and Fauna Technical Report presents a summary of ecological values associated within the Northern Geelong Growth Area ('the study area'), which encompasses approximately 2,127 hectares of land situated near the localities of Lovely Banks and Lara (Figure 1a).

The study area covers the 'Northern Further Investigation Area' (FIA) identified in the G21 Regional Growth Plan (G21 Geelong Region Alliance 2013) as being potentially suitable for development aimed at accommodating the medium and longer term growth of Geelong. In late 2015, the City of Greater Geelong (CoGG) committed to developing an Integrated Infrastructure Delivery Plan (IIDP) and Framework Plan for the FIA, subsequently named the Northern Geelong Growth Area. These plans aim to set the scope for a future Precinct Structure Plan (PSP), outline infrastructure requirements and confirm the preferred timing of land release.

The IIDP and Framework Plan will be developed through a Project Plan funded by CoGG and a Lovely Banks Development Group. Phase 1 of the Project Plan involves the preparation of a draft IIDP, which incorporates the findings of a range of technical studies, including this Flora and Fauna Technical Report.

1.2 Scope and Objectives

The overarching objective of this report is to assess the biodiversity value of the study area and inform preparation of the IIDP and Framework Plan. The information presented in this report is based on a detailed desktop review and inspections of accessible land within the study area undertaken in August and September 2016. This report also incorporates key stakeholder inputs and the findings of concurrent technical studies including hydrological.

This report addresses the following required outputs specified by CoGG:

- An overview of the natural environment context within and adjacent to the study area;
- Maps and descriptions of the natural assets within and adjacent to the study area;
- Identification of issues affecting natural assets within the study area that need to be considered in the Framework Plan;
- Identification of opportunities affecting natural assets within in the study area which could drive land use outcomes and be included in the Framework Plan;
- Identification of opportunities to integrate and grow natural assets with planning for open space, drainage and broader land use planning; and,
- Recommendations for further detailed analysis in future stages of growth area planning including Precinct Structure Planning.

1.3 Study Area and Surrounds

The study area covers approximately 2,127 hectares of land bounded by Staceys Road to the north, Geelong-Bacchus Marsh Road to the east, the Geelong Ring Road to the south-east, Anakie Road to the south-west, and private rural land to the west (Figure 1).

According to the Victorian Department of Environment, Land, Water and Planning (DELWP) Native Vegetation Information Management Tool (NVIM) (DELWP 2016a), the study area occurs within the jurisdiction of the Corangamite Catchment Management Authority (CMA) and the CoGG municipality. The study area extends over a single bioregion, the Victorian Volcanic Plain Bioregion.

There are currently multiple land use zones across the study area. The largest percentage is Urban Growth Zone (UGZ), occupying the north eastern and central western sections of the study area. The second largest area is Rural Land Zone (RLZ) in the southern and eastern sections. Other zones include Public Use Zone (PUZ) at the Lovely Banks Basins along Anakie Road and Farming Zone (FZ) occupying the land along the western and north western boundaries.

The study area is characterised primarily by the Lovely Banks escarpment, which cuts from north-east to south-west through the eastern section of the study area. The land is largely open, treeless pasture, primarily used for pastoral and cropping activities in conjunction with rural residential housing. There are several ephemeral drainage lines and farm dams which occur within study area. There are no Ramsar or nationally significant wetlands mapped within the study area (DELWP 2016c). However, overland flows including ephemeral drainage lines discharge into the Port Phillip (Western Shoreline) and Bellarine Peninsula Ramsar wetland of international significance.

The study area is subject to the '*Permitted clearing of native vegetation - Biodiversity assessment guidelines*' (the Guidelines) (DEPI 2013). Under the Guidelines, the site is predominately classified as 'Location Risk A', the lowest risk category. Several larger areas of 'Location Risk B' are mapped in properties located in the north of the study area between Staceys Road and Elcho Road with smaller areas noted along Heales Road and Anakie Road.

2 METHODS

2.1 Desktop Review

Relevant literature, online-resources and databases were reviewed to provide an assessment of flora and fauna values associated with the study area. The following information sources were reviewed:

- The DELWP NVIM Tool (DELWP 2016a) and Biodiversity Interactive Map (DELWP 2016b) for:
    - Modelled data for location risk, remnant vegetation patches, scattered trees and habitat for rare or threatened species; and
    - The extent of historic and current Ecological Vegetation Classes (EVCs).
- EVC benchmarks (DELWP 2016c) for descriptions of EVCs within the Victorian Volcanic Plain Bioregion;
- The Victorian Biodiversity Atlas (VBA) for previously documented flora and fauna records within the project locality (DELWP 2016d);
- The Flora Information System (FIS) (Viridans 2014a) and Atlas of Victorian Wildlife (AVW) (Viridans 2014b) for assistance with the distribution of flora and fauna species;
- The Commonwealth Department of the Environment and Energy (DoEE) Protected Matters Search Tool (PMST) for matters of National Environmental Significance (NES) protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (DoEE 2016);
- Relevant listings under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act), including the latest Threatened and Protected Lists (DELWP 2015a; DELWP 2015b);
- The Planning Maps Online (DELWP 2016e) and Planning Schemes Online (DELWP 2016f) to ascertain current zoning and environmental overlays in the study area;
- Other relevant environmental legislation and policies as required;
- Aerial photography of the study area; and
- Previous ecological or other relevant assessments of the study area, including those listed in Table 1 below.

Table 1. Previous assessments completed within the study area

Assessment	Scope
225 Staceys Road Lovely Banks, Vegetation and Biodiversity Assessment Report (Mark Trengrove Ecological Services, June 2016)	The assessment focussed on a 32 hectare study area encompassing the property at 225 Staceys Road Lovely Banks (Figure 2). A detailed desktop review was undertaken and detailed vegetation surveys (including habitat hectare surveys) were conducted on 27th April 2015.
City of Greater Geelong – Assessment of Biodiversity Assets of Roadsides (Ecology and Heritage Partners Pty Ltd 2016)	Ecology and Heritage Partners Pty Ltd was commissioned by CoGG to conduct an Assessment of Biodiversity Assets on Roadsides within the City of Greater Geelong municipality. The purpose of the assessment was to identify the extent, type and quality of remnant native vegetation present on Council managed roadsides.

Assessment	Scope
Preliminary vegetation and threatened flora and fauna habitat assessment for the Lovely Banks Urban Growth Zone, Lovely Banks, Victoria (Ecology and Heritage Partners Pty Ltd, December 2015)	Preliminary vegetation and fauna habitat assessments were undertaken in July 2015 within areas associated with the Lovely Banks Development Group. This information has been incorporated into this Flora and Fauna Technical Report.
Overview of ecological values of the 'Wider Study Area', Lovely Banks, Victoria (Ecology Partners Pty Ltd 2008)	The overview assessment involved two components, a desktop review of existing ecological data and a field inspection throughout the Lovely Banks area. The study area was located between the existing residential development of Lovely Banks in the south and east, and Elcho Road in the north and Evans Road in the west. A small parcel of land was also inspected to the west of Bacchus-Marsh Road and south of Staceys Road.
eBird Database (2016)	A collection of bird survey results submitted by members of the public, sourced from the following sites adjoining the study area within the Lovely Banks and Lara localities: 1. Bacchus Marsh Rd at Patullos Rd, Lovely Banks (1 sp.); 2. Bacchus Marsh Rd at Elcho Rd, Lara (1 sp.); 3. Elcho Park Recreation Reserve (2 spp.); 4. Bacchus Marsh Rd, b/w Gibbons Rd and Heales Rd, Lara (7 spp.); 5. Bacchus Marsh Rd at Heales Rd, Lara (3 spp. inc. Spotted Harrier); 6. Princes Freeway at Bacchus Marsh Rd, Corio (5 spp.); 7. Princes Freeway at Service Centres, Lovely Banks (11 spp.); 8. Purnell Rd Linear Trail, Corio (13 spp.); 9. Princes Fwy at Anakie Rd, Lovely Banks (4 spp.); 10. Lovely Banks (5 spp.); 11. Corio (7 spp.). One site of high ecological significance for bird species within the local area is the Serendip Sanctuary, located approximately 10 kilometres north-east of the study area which lists 182 individual species.

2.2 Field Assessment

Inspections within the study area associated with this report were undertaken on 20 and 21 July 2015 and 20 September 2016 to obtain information on flora and fauna values present. Surveys were undertaken in accessible parts of the site which included properties owned or controlled by the consortium group and other private properties where permission was granted (Figure 1b).

The inspections focussed on identifying patches of native vegetation, scattered trees, protected ecological communities and potential habitat for significant flora and fauna species at a broad-scale. With consideration to the objectives of the Flora and Fauna Assessment, the site inspections did not seek to map all areas of native vegetation in fine detail or define the condition of native vegetation using the habitat hectare methodology.

2.3 Stakeholder Consultation

Key stakeholders representing CoGG, DEWLP, Corangamite CMA and Barwon Water were consulted during the development of this report to assist with providing planning and specialist advice to guide key future objectives and consideration for the NGGA Flora and Fauna concept design. This technical report incorporates the outcomes of a stakeholder engagement program involving the following consultation events:

- Consultant Team Workshop (27/09/16) - This workshop was attended by consultants from each discipline of study. The meeting allowed for information sharing and aimed to ensure consistency in the project outputs.

- Concept Options Workshop (24/01/2017) - The workshop was attended by key stakeholders and the consultant team (hydrology). The primary aim of the workshop was to provide an overview of the Existing Conditions Report, provide feedback and discussion, facilitate an integrated approach to planning for drainage, open space and biodiversity, and identify the key principles to integrate future planning objectives with extant biodiversity values within the NGGA.
- Council Meeting (07/02/2017) - A meeting with representatives of the CoGG planning and environmental teams was arranged to review outcomes of the workshop, provide progress updates and discuss submitted draft outputs, including the Existing Conditions Report and Concept Plan.

No external consultation with community groups or non-government agencies was undertaken during the technical background stages for the NGGA project as further considerations and input will be undertaken during the detailed precinct planning stages.

2.4 Assessment Qualifications and Limitations

Data and information held within the ecological databases and mapping programs assessed as part of the desktop review (e.g. VBA, PMST, Biodiversity Interactive Maps etc.) are unlikely to represent all flora and fauna observations within, and surrounding, the study area. It is therefore important to acknowledge that a lack of documented records does not necessarily indicate that a species or community is absent.

Ecological values identified on site were recorded using a hand-held GPS or tablet with an accuracy of +/-5 metres. This level of accuracy is considered adequate to provide a sufficient assessment of the ecological values present within the study area; however this data should not be used for detailed surveying purposes.

As noted in Section 2.2, the site inspections aimed to collect sufficient information to inform preparation of concurrent technical studies, the IIDP and Framework Plan. The inspections did not entail detailed vegetation mapping, habitat hectare surveys or targeted surveys for significant species. It is understood that this detailed scope would be completed as part of the Precinct Structure Planning process, which does not form part of the current scope of works.

It should also ne noted that approximately 53% of the study area was assessed in the field (Figure 1b).

3 EXISTING ENVIRONMENT

3.1 Vegetation

Modelling undertaken by DELWP provides an indication of the likely extent and type of native vegetation (remnant patches) present within the study area prior to European settlement (pre-1750s) and in 2005. The modelling suggests that a small proportion of native vegetation has been retained within the study area (DELWP 2016c), with small fragmented patches predicted to occur across the site based on preliminary investigations (Figure 2).

Vegetation mapping completed as part of this assessment and previous studies (Table 1) largely confirm the modelled paucity of native vegetation within the study area. Broad-scale vegetation mapping completed across approximately 730 hectares of the study area as part of the current project identified grassland within the study area consistent with the Plains Grassland EVC. This is broadly consistent with extant DELWP mapping (DELWP 2016b).

Plains Grassland is a treeless vegetation community, mostly less than one metre tall, dominated by largely graminoid and herb lifeforms. It occupies fertile cracking basalt soils, prone to seasonal waterlogging (DELWP 2016b). Plains Grassland was recorded within the Victorian Volcanic Plain bioregion and has a bioregional conservation significance of Endangered. Three broad categories of Plains Grassland EVC have been identified as part of the preliminary investigation within the study area based on the cover of native vegetation present, these are detailed below:

- PG1: Plains Grassland EVC – Defined as an area of vegetation where at least 25% of the total perennial understorey plant cover is native (DEPI 2013). Areas mapped as PG1 were typically associated with less disturbed areas (i.e. embedded rock cover).
- PG2: Plains Grassland EVC (NTGVVP) – *Natural Temperate Grassland of the Victorian Volcanic Plain* (NTGVVP): Defined as an area of vegetation where the dominant native species represent at least 50% of the native species and the perennial tussock cover (SEWPaC 2011). Dominated means that a minimum of 50% of the ground layer cover comprises native grasses and/or other herbs (SEWPaC 2011).
- PG3: Fragmented patches of Plains Grassland EVC – This follows the same definition of PG1 areas within the study area although a more detailed mapping exercise is required to refine remnant patches within these properties.
- Scattered Trees – Defined as a native canopy tree which does not form part of a remnant patch (DEPI 2013).

Broad-scale vegetation mapping completed across the study area as part of the current assessment recorded the following (Plates 1–8; Figure 2):

- 45 hectares of vegetation classification PG1;
- 24 hectares of vegetation classification PG2;
- 339 hectares of vegetation classification PG3; and,
- 3 Scattered Trees south of Staceys Road within private property (*Eucalyptus sp.*).

Plate 1. Plains Grassland – PG1 (Ecology and Heritage Partners Pty Ltd July 2015)

Plate 2. Plains Grassland – PG1 (Ecology and Heritage Partners Pty Ltd September 2016)

Plate 3. Plains Grassland (NTGVVP) – PG2 (Ecology and Heritage Partners Pty Ltd September 2016)

Plate 4. Plains Grassland (NTGVVP) – PG2 (Ecology and Heritage Partners Pty Ltd September 2016)

Plate 5. Plains Grassland – PG3 (Ecology and Heritage Partners Pty Ltd September 2016)

Plate 6. Plains Grassland – PG3 (Ecology and Heritage Partners Pty Ltd July 2015)

Plate 7. Scattered Trees – Staceys Road (Ecology and Heritage Partners Pty Ltd September 2016).

Plate 8. Scattered Trees – Staceys Road (Ecology and Heritage Partners Pty Ltd September 2016).

Remaining areas of the site were recorded as being either developed or supporting non-remnant vegetation (i.e. planted indigenous and non-indigenous species, grassland/ pasture dominated by introduced species or crops) (Plates 9–10). It is noted that the native vegetation extents listed above were recorded as part of a broad-scale survey and that detailed vegetation surveys would be expected to refine these figures.

Plate 9. Modified Pasture Grass (Ecology and Heritage Partners Pty Ltd September 2016).

Plate 10. Modified Pasture Grass (Ecology and Heritage Partners Pty Ltd September 2016).

Several Weeds of National Significance (WoNS) were also recorded within road reserves and throughout the study area including Chilean Needle-grass *Nassella neesiana*, Serrated Tussock *Nassella trichotoma*, Sweet Briar Rose *Rosa rubiginosa* and African Boxthorn *Lycium ferocissimum*.

3.2 Council Roadside Biosites

No Council Biosites with the exception of roadside reserves have been recorded within the study area. However, a series of field assessments were undertaken by Ecology and Heritage Partners Pty Ltd between October 2014 and February 2015 to obtain information on terrestrial flora (and fauna) values within a selection of Council owned road reserves and a habitat hectare assessment was undertaken concurrently with the field assessments. Plains Grassland was the dominant vegetation community located within Council roadsides with a total of 32 sites identified within the NGGA study area (Ecology and Heritage Partners Pty Ltd 2016, Figure 2).

Plains Grassland patches within road reserves are generally low in diversity and comprised few common native species including Kneed Spear-grass *Austrostipa bigeniculata*, Common Wallaby-grass *Rytidosperma caespitosum*, Windmill-grass *Chloris truncata* Berry Saltbush *Atriplex semibaccata*, Black Roly-poly *Sclerolaena muricata* and Short-leaf Bluebush *Maireana brevifolia* (Ecology and Heritage Partners Pty Ltd 2016). The typical Habitat Score (ranging from 0-100) for Plains Grassland located within road reserves ranged between a score of 25 – 52 across 32 sites (mean = 32). Weed species associated with roadside Plains Grassland patches include Cocksfoot *Dactylis glomerata*, African Box-thorn *Lycium ferocissimum*, Chilean Needle-grass *Nassella neesiana*, Serrated Tussock *Nassella trichotoma*, Wild Oat *Avena fatua*, Galenia *Galenia pubescens*, Ribwort *Plantago lanceolata*, Ox-tongue *Helminthotheca echioides* and Buck's-horn Plantain *Plantago coronopus.*

Weed cover is moderate to high in the remainder of roadside reserves which do not contain remnant patches of Plains Grassland. Dominant and high threat weeds include Cocksfoot, Wild Oat, Galenia, Soft Brome *Bromus hordeaceus*, Ribwort, Yorkshire Fog Grass *Holcus lanatus*, Toowoomba Canary Grass *Phalaris aquatica*, Rye Grass *Lolium* spp., Onion-grass *Romulea rosea*, Narrow-leaf Clover *Trifolium angustifolium* var. *angustifolium*, Cape Weed *Arctotheca calendula* and Wild Sage *Salvia verbenaca*. A full list of flora species recorded within each Council roadside Biosite is provided in Appendix A with their locations shown on Figure 2 below.

3.3 Waterbodies

There are no significant waterways (i.e. rivers or creeks) within the study area with the exception of several ephemeral minor tributaries in the east of the study area (Figure 2). A number of farm dams were noted to be dry during preliminary investigations by Ecology and Heritage Partners and are considered to be ephemeral during extended dry periods (2015; Plates 11 and 12). However, recent site inspections have noted that many of these now contain water after recent high rainfall (Plates 13 and 14). The location of farm dams and minor tributaries is shown on Figure 2 below. There is not considered to be any additional ephemeral wetlands present within the study with the exception of those habitats described above.

Plate 11. Modified Pasture Grass (Ecology and Heritage Partners Pty Ltd September 2016).

Plate 12. Modified Pasture Grass (Ecology and Heritage Partners Pty Ltd September 2016).

Plate 13. Modified Pasture Grass (Ecology and Heritage Partners Pty Ltd September 2016).

Plate 14. Modified Pasture Grass (Ecology and Heritage Partners Pty Ltd September 2016).

Ephemeral drainage lines along roadsides and waterbodies within private land provides suitable breeding, foraging and refuge habitat for locally common frogs. Common Froglet *Crinia signifera*, Pobblebonk Frog *Limnodynastes dumerilii*, Striped Marsh Frog *Limnodynastes peronii*, Spotted Marsh Frog *Limnodynastes tasmaniensis* and Southern Brown Tree Frog *Litoria ewingii* were heard calling within these environments during field assessments.

In addition to remnant patches and scattered trees, the study area contains two 'Current Wetland' sites mapped by DELWP (Figure 2). Under the Guidelines (DEPI 2013), these areas are classified as native vegetation and must be accounted for when applying for a permit to remove, destroy or lop native vegetation and calculating offset obligations.

3.4 Flora and Fauna Species

Flora

According to the VBA, 43 flora species have been recorded within the local area (DELWP 2016d) (Figure 3; Appendix A). Of the flora species recorded, 30 (70%) are introduced, with the majority of records sourced from the VBA databases. Eleven additional native flora species have been recorded during previous assessments and more recent field assessments within the study area (Ecology and Heritage Partners Pty Ltd 2016, Mark Trengrove 2016). A full list of all flora species recorded to date within the study area is provided in Appendix A.

Fauna

There has been a high level of terrestrial fauna surveys previously undertaken in the local area (DELWP 2016d); from this data there have been a total of 345 terrestrial species documented, with a high representation of bird species (DELWP 2016d; Appendix B).

The total number of species recorded in the local area provides an indication of the diversity of fauna species known to occupy habitats in the vicinity of the NGGA, despite highly modified and significantly degraded environs.

Of the 345 terrestrial species recorded, there are 31 mammals (23 native, 8 introduced), 253 birds (243 native, 10 introduced), 23 reptiles, seven amphibians, 26 fish, three mussels/crustacean and two invertebrates (DELWP 2016d; Appendix B).

While no formal fauna assessments have been undertaken within the study area, a range of common and introduced bird species have been noted during field assessments. Fifty-six (56) fauna species have been recorded within the study area during field assessments, including: four mammals (one native, three introduced), 45 birds (38 native, seven introduced), two reptiles and five native frogs (A, Taylor pers. obs.).

Given a lack of survey effort within the study area, information on locally common bat and terrestrial mammal species is limited at present. However, incidental records of Eastern Grey Kangaroo *Macropus giganteus* were noted within the study area during on site assessments (A, Taylor pers. obs.). A variety of locally common bats species are also likely to roost or forage within habitats located within the study area including White-striped Freetail Bat *Tadarida australis*, Southern Forest Bat *Vespadelus regulus*, Large Forest Bat *Vespadelus darlingtoni*, Lesser Long-eared Bat *Nyctophilus geoffroyi* and Little Forest Bat *Vespadelus vulturnus*.

Due to the inclusion of Corio Bay in the 10 kilometre database search area, a large proportion of the returned records comprise species which are restricted to coastal and marine environments. Owing to the lack of suitable habitat for these species within the study area, they are not considered further and have been excluded for further assessment. A consolidated list of fauna species recorded within and throughout the local area is provided in Appendix B.

4 SIGNIFICANT AND PROTECTED VALUES

4.1 Flora

The VBA and FIS contain previous records of 10 nationally significant and an additional 35 State significant flora species within 10 kilometres of the study area (DELWP 2016d; Viridians 2014a) (Appendix C; Figure 4). The PMST nominated an additional six nationally significant species which have not been previously recorded but have the potential to occur in the locality (DoEE 2016).

Of the 45 significant flora species recorded within the project locality (10km radius of the site), only one State significant flora species, Leafless Bluebush *Maireana aphylla*, has been recorded on-site, within the vicinity of the north-east boundary of the study area (Figure 4).

The findings of ecological studies previously completed within the study area (Table 1) suggest that few additional records of significant flora species are likely to occur within the study area. However, areas of higher quality grassland (PG 1 and PG2) may provide potential habitat for two nationally listed flora species, Spiny Rice-flower *Pimelea spinescens* subsp. *Spinescens* and Large-headed Fireweed *Senecio macrocarpus,* and further investigations for these species are recommended to determine their presence within the study area.

4.2 Fauna

The VBA and AVW contain previous records of 18 nationally significant, 35 State significant and 16 regionally significant fauna species within 10 kilometres of the study area (DELWP 2016d; Viridians 2014b) (Appendix D; Figure 6). The PMST nominated an additional six nationally significant species which have not been previously recorded but have the potential to occur in the locality (DoEE 2016).

Of the 69 significant fauna species recorded from the VBA within the project locality, none have been formally documented within the study area (Figure 5). However, several nationally significant fauna species have the potential to occur within the study area based on the existing habitats identified during field assessments.

Higher quality areas of Plains Grassland (PG1 and PG2) mapped throughout the study area may provide potentially suitable habitat for the nationally significant Golden Sun Moth *Synemon plana* and Striped Legless Lizard *Delma impar* as both species have been recorded within the project locality (A, Taylor pers. obs.).

While previously dry conditions are likely to have limited the ability for Growling Grass Frog *Litoria raniformis* to disperse and reside within the study area on a permanent basis, recent high levels of rainfall may provide dispersal opportunities into the study area (albeit a low likelihood).

A high number of State significant bird species have been recorded throughout the local area and are likely to use the study area on a temporary basis as dispersal or foraging habitat. One State significant species Hardhead *Aythya australis* was noted within a farm dam during a recent field assessment (A, Taylor pers. obs.). The State significant Spotted Harrier *Circus assimilis* has also been noted within the local area and is likely to forage over the study area on an occasional basis (eBird Database 2016).

Given the proximity of the Serendip Sanctuary, approximately 10 kilometres north-east of the study area, a high proportion of wetland associated species have been recorded within the local area (Appendix D). For example, a total of 182 species (many of which are significant bird species) have been recorded at the Serendip Sanctuary, with species likely to utilise suitable habitats (i.e. farm dams) within the study area on an occasional basis whilst dispersing to preferred foraging or breeding habitats within the local area.

Due to the inclusion of Corio Bay in the 10 kilometre database search area, a large proportion of the records returned comprise species which are restricted to coastal and marine environments. Owing to the lack of suitable habitat for these species within the study area, they are not considered further within Appendix D.

4.3 Ecological Communities

According to the EPBC Act PMST (DoEE 2016), six nationally listed ecological communities are predicted to occur within 10 kilometres of the study area:

- Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP);
- Grassy Eucalypt Woodland of the Victorian Volcanic Plain;
- Natural Damp Grassland of the Victorian Coastal Plains;
- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains;
- Subtropical and Temperate Coastal Saltmarsh; and
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered).

Inspections undertaken in July 2015 and September 2016 as part of this project identified several patches of Plains Grassland which correspond with the NTGVVP ecological community (Figure 2). It is considered likely that additional areas of these communities would be identified through detailed vegetation surveys.

All Plains Grassland present within the study area corresponds with the FFG Act listed ecological community Western (Basalt) Plains Grasslands. Unlike most EPBC Act-listed ecological communities, FFG Act-listed communities have no condition thresholds.

4.4 Significant Sites and Corridors

No sites of Biological Significance (BioSites) have been documented by DELWP within the study area to date (Figure 2). However, Roadside Biosites maintained by CoGG have been discussed in Section 3.2 and are shown on Figure 2 below.

Based on the highly modified nature of the study area, significant bio-links are generally lacking on site with respect to suitable dispersal passages (i.e. riparian corridors associated with waterways). However, areas of remnant Plains Grassland noted within the study area are likely to provide a good platform for open spaces as part of future planning and in accordance with the biodiversity objectives of the Background Report for the G21 Regional Growth Plan (G21 Geelong Region Alliance 2013).

5 SUMMARY OF ECOLOGICAL FINDINGS

The desktop review and field survey identified the following key ecological values within the study area:

- Potential habitat for a range of nationally (Spiny Rice-flower and Large-headed Fireweed) and State (Leafless Bluebush) listed significant flora species;
- Potential habitat for a range of nationally (namely Golden Sun Moth and Striped Legless Lizard based on current site conditions), State and regionally listed significant fauna species (albeit comprising predominantly bird species) which may occasionally reside within the study area whilst dispersing to more suitable breeding or foraging habitats;
- Remnant patches of native vegetation and native scattered trees. Based on the findings of previous ecological studies and recent broad-scale surveys completed as part of this assessment, approximately 408 hectares of remnant patches and three scattered trees have been recorded within 2,127 hectares (19%) of the study area;
- Ecological communities protected under the Commonwealth EPBC Act (NTGVVP) and Victorian FFG Act (Western (Basalt) Plains Grasslands);
- Two DELWP mapped 'Current Wetlands'; and
- Local Fauna and Flora (modified farmland/rural pasture).

6 IMPLICATIONS FOR FUTURE DEVELOPMENT WITHIN THE STUDY AREA

A summary of biodiversity legislation and policy relevant to future development within the study area is provided in Table 2.

Table 2. Summary of legislative implications

Legislation/ Policy	Notes
Environment Protection and Biodiversity Conservation Act 1999	The EPBC Act establishes a Commonwealth process for the assessment of proposed actions likely to have a significant impact on matters of National Environmental Significance (NES), or those that are undertaken on Commonwealth Land. An action, unless otherwise exempt, requires approval from the Commonwealth Minister for the Environment if it is likely to have an impact on any of the following matters of NES: World Heritage properties, National Heritage places, Ramsar wetlands of international significance, nationally listed threatened species and ecological communities, Migratory species protected under international agreements, Commonwealth marine areas, the Great Barrier Reef Marine Park, nuclear actions and water resources (for coal seam gas and large coal mining projects). Key ecological constraints associated with the EPBC Act may include threatened ecological communities and species of flora and fauna (e.g. NTGVVP, Spiny Rice-flower, Large-headed Fireweed, Striped Legless Lizard, Golden Sun Moth and Growling Grass Frog). Any action that is likely to significantly impact upon these values or any other matter of NES would need to be referred to DoEE for assessment and approval. Referrals are assessed over a period of 20 working days, including a ten day public comment period. A referred action will subsequently be classed as one of the following: • *Not a controlled action* – approval is not required if the action is undertaken in accordance with the referral • *Not a controlled Action 'particular manner'* – approval is not required if the action is undertaken in accordance with the manner specified. • *Controlled action* – the action is subject to the assessment and approval process under the EPBC Act. Prior to any future development within the study area, detailed flora and fauna surveys of the precinct are required to confirm the extent of the NTGVVP ecological community and identify the presence of any other ecological communities or species of flora or fauna listed under the EPBC Act.

Legislation/ Policy	Notes
Environment Effects Act 1978	The *Environment Effects Act 1978* (EE Act) provides for an assessment of proposed activities that are capable of having a significant impact on the environment at a State level. The Act allows the Victorian Minister for planning to decide whether an Environment Effects Statement (EES) is required to be completed. The "*Ministerial Guidelines for Assessment of Environmental Effects under the Environment Effects Act 1978*" provides triggers for which an EES is required, such as the removal of 10 or more hectares of native vegetation or potential impacts on remaining habitat or populations of threatened species. Activities undertaken in accordance with an approved PSP, such as the clearing of vegetation identified for removal, are exempt from the provisions of the EE Act. An action that is not prescribed under a PSP that is likely to have a significant impact on State matters, as defined under the relevant guidelines, would need to be referred under the EE Act.
Flora and Fauna Guarantee Act 1988	The FFG Act is the primary legislation dealing with biodiversity conservation and the sustainable use of native flora and fauna in Victoria. The provisions of the FFG Act bind all public agencies, public landowners and land managers. The Act contains lists of threatened flora and fauna species, 'protected flora species' and threatened vegetation communities, as well as action statements to protect the long-term viability of these values. The Act applies to the removal of listed threatened species and communities, as well as protected flora species. Protected flora species include any of the Asteraceae (Daisies) family, all orchids, ferns (excluding Pteridium esculentum) and Acacia species (excluding *Acacia dealbata, Acacia decurrens, Acacia implexa, Acacia melanoxylon* and *Acacia paradoxa*); in addition to any taxa that forms a component of a listed FFG Act vegetation community. A species may be both listed and protected. Proponents are required to apply for an FFG Act permit to 'take' listed and/or protected flora species and listed vegetation communities in areas of public land (i.e. within road reserves). An FFG Act permit is generally not required for removal of listed and/or protected flora species and communities on private land. There are currently no requirements for proponents to apply for a permit under the FFG Act where a proposed activity requires the removal of habitat for a listed terrestrial fauna species. The Act does however regulate the removal, salvage, temporary holding, translocation, taking, trading and keeping of FFG Act-listed fish species, and as such, an FFG Act permit is unlikely to be required given fish species are not likely to be affected by a proposed activity. Key ecological constraints within the study area associated with the FFG Act are likely to include threatened ecological communities and species of flora and fauna. The majority of land within the study area is privately owned and therefore exempt from most provisions under the FFG Act including the requirement to obtain a permit for the removal or disturbance of listed/ protected plants and ecological communities. Any such action on public land affecting these values would require a permit from DELWP. Prior to any future development within the study area, detailed flora and fauna surveys of the precinct are required to confirm the extent of the Western (Basalt) Plains Grasslands ecological community and identify the presence of any other ecological communities or species of flora or fauna listed under the FFG Act.

Legislation/ Policy	Notes
Planning and Environment Act 1987	The *Planning and Environment Act 1987* outlines the legislative framework for planning in Victoria and for the development and administration of planning schemes. Clause 12 of the State Planning Policy Framework requires planning to protect eco systems and biodiversity and conserve areas with environmental and landscape values. All planning schemes contain native vegetation provisions at Clause 52.17 which require a planning permit from the relevant local Council to remove, destroy or lop native vegetation on a site of more than 0.4 hectares, unless an exemption clause under 52.17-6 of the Victorian Planning Schemes applies, or if the proposed clearing is in accordance with a Native Vegetation Precinct Plan (NVPP) (Clause 52.16) that has been incorporated into the Planning Scheme. Assuming the study area is subject to the precinct planning process in the future, the resulting PSP will draw upon the findings of detailed assessments and specify the native vegetation that is to be protected, and that can be removed, destroyed or lopped. The PSP will also set out the works or other necessary actions required to offset the removal, destruction or lopping of native vegetation within the precinct. Provided that the PSP is approved and incorporated into the CoGG Planning Scheme, then a permit under Clause 52.17 will not be required for the removal of native vegetation designated for retention.
Permitted clearing of native vegetation Biodiversity Assessment Guidelines' (the Guidelines)	The Victorian Planning Provisions relating to biodiversity protection and native vegetation management was amended in December 2013 to reflect the new permitted clearing of native vegetation and biodiversity policy encapsulated in the Guidelines (DEPI 2013). The permitted clearing of native vegetation (as specified in a PSP) would be offset in accordance with the Guidelines. The extent and condition of Remnant Patches and Scattered Trees within the precinct would be effectively time-stamped through detailed surveys, with offset obligations specified within the PSP.
Wildlife Act 1975 and Wildlife Regulations 2002	The *Wildlife Act 1975* (and associated Wildlife Regulations 2002) 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. A permit would be required for the removal of habitat and/ or native fauna within the precinct. A separate permit under the Wildlife Act may not be required where the removal of habitat is covered by a permit to remove native vegetation under the *Planning and Environment Act 1987*. A *Wildlife Act* permit would be required to undertake any action that is likely to result in the death of wildlife, or require the translocation of wildlife.

Legislation/ Policy	Notes
Catchment and Land Protection Act 1994	The *Catchment and Land Protection Act 1994* (CaLP Act) contains provisions relating to catchment planning, land management, noxious weeds and pest animals. The 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. A number of weeds listed as noxious under the CaLP Act are likely to occur throughout the study area. Similarly, it is likely that the region is occupied by several pest fauna species listed under the Act. Landowners are responsible for the control of any infestation of noxious weeds and pest fauna species. To meet CaLP Act requirements listed noxious weeds and pests should be appropriately controlled during any development activity to minimise their spread and impact on ecological values within the study area.

7 OUTCOMES OF STAKEHOLDER WORKSHOP

The following items were identified during the stakeholder workshop as key considerations for integrating population growth and biodiversity values within the NGGA:

- Provide a variety of flora and fauna habitats to promote and retain biodiversity.
- Create multi-use spaces for the public (i.e. incorporate natural values with residential and public open space).
- Undertake habitat creation (i.e. waterways, drainage lines and designated revegetation areas).
- Promote active lifestyles and recreation. Provide linear corridors of vegetation along walking/cycling tracks.
- Interpret/educate residents about values of grasslands through signage.
- Undertaken feral pest animal and plant control.
- Retain areas of high conservation value:
    - High quality PG as conservation examples/education (interpreted).
    - Incorporating drainage lines into habitat corridors and open public spaces.
    - Retained remnant trees in urban/park designs and lets them grow.
    - Feature waterways/landscaping combination of a series of smaller connected basins rather than one large isolated basin.
- Integrate trails and reserves with water – channels and wetlands.
- Create linear habitat corridors along waterways/drainage lines/tributaries whilst implementing Water Sensitive Urban Design whilst ensuring no off-site impacts.
- Place large areas of vegetation in nodes throughout development.
- Investigate methods to interconnect spaces through Open Space Links to create more complete habitat.
- Ensure natural assets and public open space is close and accessible to residents.
- Restore and protect significant native vegetation.
- Ensure an appropriate amount of land is set aside for reserves and parks and revegetated appropriately.
- Ensure adequate land to protect enhance, learn about our natural assets.
- Representation of multiple vegetation types (interactions may be different between types).
- Ensure stormwater treatment is designed to provide habitat(s) for significant flora and fauna species.

- Investigate options to achieve high canopy coverage on public and private land (for example 40-50%).
- Connect biodiversity sites with parks/open spaces so they are separated from development.

8 OUTCOMES OF STAKEHOLDER WORKSHOP

The study area provides a significant contribution to the biodiversity value of the Geelong region and as such, the planning of future development to address population growth must be implemented on a precinct-wide scale to facilitate a consistent and informed approach to ensuring the future protection and enhancement of ecological values present.

Detailed desk-based assessments, field surveys and stakeholder consultations have been undertaken to establish a Concept Plan (Figure 5) and set of recommended principles aimed at balancing the needs for future development and biodiversity. The following tables summarised the outcomes of the stakeholder workshop and provide a set off recommended planning and design principles developed to inform the IIDP and Framework Plan.

Table 3. Key assets and visions for biodiversity within the NGGA.

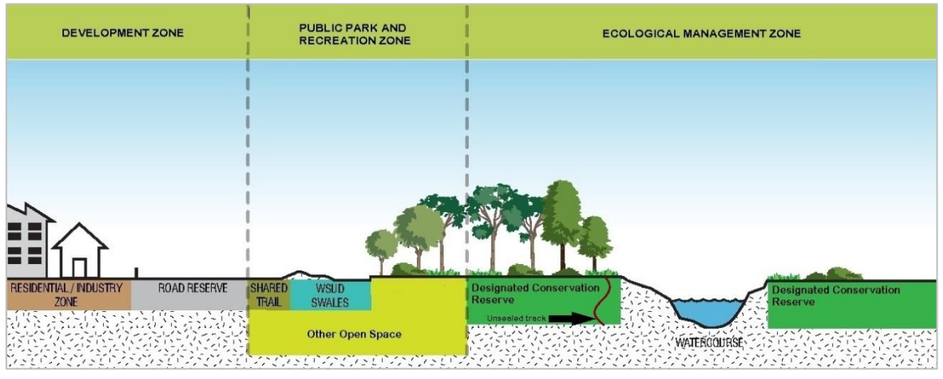
Principle	Description and Importance of Principle	Objective	Key Consideration Outcomes
Integrated and Accessible	Establishment of strong ecological values, and the reestablishment of native flora and fauna to integrate biodiversity, amenity and sustainability. Importance: Health and Wellbeing, Liveability, Safe Communities, climate adaptation, reduces heat island effect.	Existing and new biodiversity is included into the urban landscape, and that everyone has access to nature within their neighbourhood.	The following are considered to be key assets associated with Integrated and Accessible principles within the NGGA: • Protection of remnant native vegetation, ecological communities and rocky areas for native flora and fauna species. • Provide accessibility to areas of ecological significance through Open Space Links, shared pathways and Conservation Areas.

Principle	Description and Importance of Principle	Objective	Key Consideration Outcomes
Connected	Connections (habitat corridors) allow flora and fauna to sufficiently move across a landscape. Importance: Allow movement between isolated populations, increase genetic diversity, provide food and shelter, assist with juvenile dispersal and seasonal migrations. Reserve networks are extremely valuable for conservation and can increase migration between patches up to 50%.	High level connectivity to enable passive movement of all species across the landscape.	The following are considered to be key assets associated with Connectivity principles within the NGGA: • Utilise open space along the Geelong Ring Road. • Utilise existing utility easements (Gas and Transmission lines). • Natural topography within existing drainage lines, monocline and waterways. • Topography should assist with managing lot sizes and Open Space Links. • Investigate opportunities to link pathways / waterways outside the NGGA (i.e. Cowies Creek and Ted Wilson Trail).
Extent	Extent (area, size, shape) where biodiversity exists and the primary purpose is conservation. Importance: Reduce dispersal distances avoid detrimental edge effects.	Sufficient extent, area, size of land to expand biodiversity. Several large reserves, rather than multiple pocket parks.	The following are considered to be key assets associated with Extent principles within the NGGA: • Utilise appropriate safety buffers around explosives factory to enhance remnant native grassland in the north of the NGGA. • Retain areas of remnant vegetation (Plains Grassland). • Enhance the width and extent of existing natural corridors to form permanent Open Space Links and Conservation Areas.

Principle	Description and Importance of Principle	Objective	Key Consideration Outcomes
Quality and Remnant	The quality and condition of habitats - which includes functioning ecosystem processes, remnant rather than planted, representation of diverse habitats and landscapes, condition (weed and pest animals), species diversity including multiple lifeforms and structures. Importance: Good quality remnant vegetation and habitat contains important and irreplaceable ecosystem services - water purification, nutrient recycling, erosion, salinity, habitat for species.	Ecosystem quality is protected, restored and enhanced. Remnant habitats, species and vegetation are protected and enhanced.	The following are considered to be key assets associated with Quality and Remnant principles within the NGGA: • Undertake further detailed vegetation mapping to determine quality and extent of ecological communities within the NGGA. • Secure and retain important ecological communities (NTGVVP and Western [Basalt] Plains Grasslands).
Representation	A variety of natural habitats and landscapes (i.e. wet, dry, woodland, grassland, riverine, escarpment). Importance: A range of habitats maintains and increases species diversity.	Ecosystems representative of the area are present and functioning.	The following are considered to be key assets associated with Representation principles within the NGGA: • Secure, protect and manage a variety of key habitats within the NGGA (i.e. Roadside Biosites, waterways, remnant grasslands, modelled and artificial waterbodies). • Secure a mixture of vegetation communities – not just the reinstatement of grasslands. • Secure and protect remnant, planted and aquatic habitats, where possible.

Principle	Description and Importance of Principle	Objective	Key Consideration Outcomes
Significance	Species and communities considered 'rare or threatened', recognised under Commonwealth and Victorian biodiversity legislation, or considered locally significant. Importance: Species and communities which require priority conservation planning and management to secure their long term survival on the planet.	Significant species and communities are resilient and secure in the long-term.	The following are considered to be key assets associated with Significance principles within the NGGA: • Undertake further detailed vegetation mapping to determine significance of flora and communities within the NGGA. • Undertake targeted flora and fauna surveys for significant species to determine priority areas for future protection and retention through Conservation Areas / Open Space Links.

Table 4. Planning and design principles for future development

Principle	Objective	Existing Conditions	Planning and Design Principles
Integrated and Accessible	Future development integrates biodiversity into the urban landscape and ensures all neighbourhoods have access to nature.	In its current form, the growth area supports large tracts of undeveloped land under private ownership. The land is largely open, treeless pasture, primarily used for pastoral and cropping activities in conjunction with rural and medium density housing. There are several ephemeral drainage lines and farm dams which occur within study area.	• Establish Conservation Areas dedicated to the protection, connection and enhancement of biodiversity features within the NGGA. **Note:** Further site specific investigation of potential conservation reserves is required. • Establish a network of biolinks connecting key conservation areas within the NGGA, this includes areas proposed for hydrology along existing drainage lines, large areas of existing native vegetation (particularly those with higher quality vegetation and ecological communities), and linear Open Space Links, greenways, vegetated roadways, escarpments etc established to connect these key sites (indicative locations are provided within the Concept Plan below). The network should include primary and secondary biolinks through residential and commercial areas. **Note:** further site specific investigation of each potential biolink is required, for example, some potential links may not be suitable or appropriate. • Continuous conservation/riparian reserves along waterways require sufficient corridor width to allow for environmental protection/rehabilitation and recreation/water way drainage functions. Any future pedestrian and vehicular access where permitted within environmentally significant areas must be limited and controlled in accordance with the *Geelong Waterway Corridor Guidelines* for NWGGA. Buffers distances along waterways should be consistent with the *Geelong Water Corridor Guidelines* which prescribes a buffer of 35 metres each side of constructed waterways. The width of buffers should reflect local topography and be determined in a site responsive manner. Buffer widths may decrease from the prescribed figures in instances where a 35 metre buffer is unlikely to provide improved environmental outcomes (eg where steep escarpments adjoin waterways and provide limited opportunity for rehabilitation). • Ensure areas set aside for biodiversity protection are sustainable in the long-term in terms of their size and connectivity to other natural areas. • Design and where possible locate, public land (informal parks, recreation reserves, landscape and amenity areas, heritage sites and land encumbered by service infrastructure [e.g. retention basins]) to promote the integration of biodiversity features. Opportunities to meet this objective include the application of environmentally sensitive design, environmentally conscious revegetation, and the provision of connectivity with designated Conservation Areas. • Focus the design of designated conservation areas on the protection and enhancement of biodiversity values. These areas should exclude hard infrastructure (including stormwater treatment) and public access should be managed to avoid the potential for incompatible land use (e.g. high-speed cycling in areas supporting significant fauna species). Maintenance regimes should also be consistent with the intended purpose of the reserve, with activities such as grass slashing minimised or avoided if possible. • Consider significant view lines between urbanised and natural areas to promote connections with nature and use of these assets. • The diagram below provides an indicative view of how open space reserves can be established within the NGGA. 
Connected	Future development maintains, improves and creates biolinks, allowing the passive movement of fauna species across the landscape.	Proposed biolinks within the study area focus predominantly on existing (minor) waterways/drainage lines and utility easements (Gas and Transmission lines). Biolinks are required to connect conservation areas.	• Establish designated Conservation Areas to ensure the vegetation and landscape character are maintained and enhanced. • Establish a network of biolinks between conservation areas along waterways/drainage lines, open space links, escarpments, infrastructure easements to provide linkages for the movement of fauna. The network concept is included in Figure 5. • The *Geelong Waterway Corridor Guidelines* provide buffer distances for waterways and detail the preferred width of riparian zones along constructed waterways. In response to further detailed planning and more detailed site investigation these will be further refined. The design and management of the designated Conservation Areas and biolinks should be focussed on the protection and enhancement of biodiversity. • Promote passive fauna movement by designating additional Conservation Areas where large areas of remnant vegetation persist (remnant patches and scattered trees), and through the establishment and rehabilitation of appropriate biolinks across the NGGA (indicative locations are illustrated in Figure 5).

Principle	Objective	Existing Conditions	Planning and Design Principles
			• Drainage infrastructure, such as wetlands, should be strategically located to integrate biodiversity features. An opportunity to achieve this outcome is the establishment of appropriately designed wetlands adjacent to drainage lines / waterways buffers/ conservation areas, which may support significant fauna in the future. • Prioritise the retention and enhancement of native vegetation within road reserves during future road upgrade proposals (i.e. Roadside Biosites).
Extent	Future development increases the extent of land managed for biodiversity within the growth area.	Key areas within the study area with the potential to be managed for conservation include areas of remnant vegetation and existing and proposed waterways/drainage lines.	• Ensure that any offset requirements generated by future development activity within the growth area are met through the securement of offsets within the precinct. Offsetting arrangements may facilitate the establishment of dedicated Conservation Areas through active management and subsequent land transfers. Clearing proposals should result in a no net loss outcome for biodiversity. • Offset requirements should be met in the NGGA by securing connected remnant native vegetation or strategically large-scale revegetation (to create primary or secondary biolinks). Offsets should strengthen existing biodiversity values. • Consistent with the City of Greater Geelong Geelong Urban Forestry Strategy, design of the NGGA should aim to achieve a minimum of 25% tree canopy cover. • Ensure the design of roads/traffic infrastructure extended the canopy (extent) of adjacent conservation reserves by using locally indigenous species, and central boulevards/medians and or wider road reserves. • Explore opportunities (using planning controls) to increase the extent of urban biodiversity in the NGGA.
Quality	Future development ensures that the quality of biodiversity assets within the growth area is enhanced.	Native vegetation and habitat within the study area ranges in quality, with features of higher quality concentrated around the rocky areas and uncropped private properties.	• Monitor the protection of land through appropriate conservation covenants when establishing Conservation Areas and biolinks within the NGGA. • Ensure that conservation covenants are automatically applied to any managed offsets transferred to Council ownership. The existing quality of the offset, management requirements and capacity of Council resourced must be considered as part of any transfer proposal. • Apply appropriate planning controls, zones and overlays (PCRZ,ESOs, VPOs) to significant environmental values within the study area, including the waterway corridors, remnant native vegetation (including individual scattered trees) and known populations of significant flora and fauna. Investigate the feasibility of applying new overlays to achieve specific environmental outcomes. • Any future development within the growth area must adopt the principles of WSUD. This should include an integrated approach to stormwater and flood management that meets the objectives for hydraulic capacity, flood management and water cycle management. WSUD features and major stormwater infrastructure should not be directly located in areas of environmental significance (i.e. designated Conservation Areas). • Design of the open space network should consider potential issues associated with climate change, including the requirement to build resilience by increasing connectivity, changes to the abundance and distribution of invasive species and the potential for increased fire events. • Buffer zones around areas of environmental significance are also an important consideration to future Conservation Areas and should be incorporated into future planning of the NGGA. Buffers reduce the impacts of adjoining land use and may potentially enhance existing and future habitat connectivity in addition to maintenance and fire protection access. • Where possible prioritise the siting of infrastructure within areas which have already been disturbed or already have existing infrastructure in place which will preclude further environmental rehabilitation. • Conserve the vegetation and landscape character along drainage lines through revegetation and protection of remnant vegetation within Conservation Areas and biolinks.
Remnant	Future development protects and promotes the enhancement of key remnant features, including vegetation, habitat and species.	Broad-scale vegetation mapping completed across 408 hectares of remnant patches and 3 scattered trees have been recorded within 2,127 hectares (19%) of the study area.	• The hierarchy of environmental management should be applied to all future development within the growth area. In order of priority, environmental impacts should be avoided, minimised and offset. • Utilise existing road networks to limit the crossing of waterways and significant vegetation in road reserves. • Promote passive regeneration in designated Conservation Areas and Open Space Links. Active revegetation within these areas and other open space reserves should be undertaken using appropriate indigenous species. Revegetation should attempt to reproduce the EVC that would have occurred naturally in the area. All revegetation activities in open space reserves and Open Space Links should: o Represent at least 30% of the original communities EVC diversity o Be based on the EVC benchmark planting densities o Ensure all plants are indigenous and of local providence. • Establish design and siting standards for future development within the growth area, including recommended planting lists.
Representative	Future development maintains and promotes biodiversity through the retention and re-	The study area supports a diversity of vegetation communities, habitats and species of flora and fauna.	• Ensure that the siting and design of open space areas considers the diversity of vegetation and habitat types being protected. • Adopt appropriate planting standards for all revegetation activities within Conservation Areas, biolinks and other areas of open space to ensure that all created habitats are representative of the natural environment and that vegetation and habitat diversity is increased. • Where native vegetation is permitted to be removed, ensure it is offset in a manner that makes a contribution to Victoria's biodiversity, that is, an offset

Principle	Objective	Existing Conditions	Planning and Design Principles
	establishment of features representative of the natural landscape.		equivalent to the contribution made by the native vegetation proposed to be removed. Offsets should be located within the NGGA. • Develop appropriate management guidelines to ensure human impacts on biodiversity values are minimised while acknowledging the importance of interaction with the natural environment to health and wellbeing. • Improve community understanding and appreciation of intrinsic biodiversity and natural values.
Significance	Future development retains and facilitates the long-term resilience of key significant species and ecological communities recorded or potentially present within the landscape.	The study area is known to support the nationally significant NTGVVP ecological community and a number of habitats likely to support significant flora and fauna species within the NGGA.	• Undertake further targeted surveys and detailed mapping to determine the presence of significant flora, fauna and ecological communities within the NGGA. An appropriate management response should consider the following for each species or ecological community present: o Ecological requirements; o Extent and condition; o Legislative requirements; o Threats (existing and those predicted to arise through development of the growth area); o Demonstrated approaches to conservation and enhancement; and, o Appropriate management responses to direct the avoidance, minimisation and offsetting of future impacts. • Ensure the protection of Conservation Areas and biolinks identified during the strategic planning stages of the NGGA, especially areas containing the highest quality remnant vegetation and associated threatened flora and fauna species habitat(s). • Protection will ensure Conservation Areas are not impacted by any form of development (including roads and other infrastructure). The retention of Conservation Areas will also aim to retain the existing rural character of these areas in order to preserve natural environments and functions into the future.

9 CONCLUSION

The NGGA has been identified as one of two Further Investigation Areas (FIAs) in the G21 Regional Growth Plan (RGP) and is considered to be potentially suitable for future urban growth in the municipality. In assessing the feasibility of this scenario, CoGG have committed to the development of an IIDP and Framework Plan, which will be informed by the findings of this Flora and Fauna Technical Report.

This Flora and Fauna Technical Report has been developed through the collation of data from detailed desk-based assessments, broad-scale field surveys on 53% of the study area and stakeholder consultation. This information has been used to provide an overview of the biodiversity values and key assets within the NGGA to guide suitable planning and conservation objectives as part of the future development precinct. The findings of the assessment confirmed that the study area supports a diversity of significant natural assets (Section 3), which are subject to the natural and anthropogenic pressures common of developed and fringing landscapes (Section 6). Given the potential for future development within the study area to intensify existing pressures and threaten the overall viability of retained values, a precinct-wide approach is required to ensure all known values are accounted for and that management responses are consistent and implemented on a landscape-scale.

Knowledge gathered from this assessment has been used to develop an indicative Flora and Fauna Concept Plan (Figure 5). That is, the Flora and Fauna Concept Plan outlines high level opportunities and constraints only from a biodiversity perspective. It has been prepared in isolation and does not consider the significant range of matters such as traffic, cultural heritage, social infrastructure and stormwater management, which will ultimately influence the outcome for the overall NGGA. The plan provides an interpretation of the following set of principles aimed at balancing the needs of population growth and protection of key biodiversity assets:

- Integrated and Accessible - Future development integrates biodiversity into the urban landscape and ensures all neighbourhoods have access to nature.
- Connected - Future development maintains, improves and creates Open Space Links, allowing the passive movement of fauna species across the landscape.
- Extent - Future development increases the extent of land managed for biodiversity within the growth area.
- Quality - Future development ensures that the quality of biodiversity assets within the growth area is enhanced.
- Remnant - Future development protects and promotes the enhancement of key remnant features, including vegetation, habitat and species.
- Representative - Future development maintains and promotes biodiversity through the retention and re-establishment of features representative of the natural landscape.

- Significance - Future development retains and facilitates the long-term resilience of key significant species and ecological communities recorded or potentially present within the landscape.

Key ecological assets and principles identified during stakeholder engagement are provided in Tables 4 and 5. It is recommended that the IIDP and Framework Plan be prepared with reference to the principles for future development and that these are built upon/expanded as the precinct planning progresses and further detail regarding the ecological values present within the growth area is obtained.

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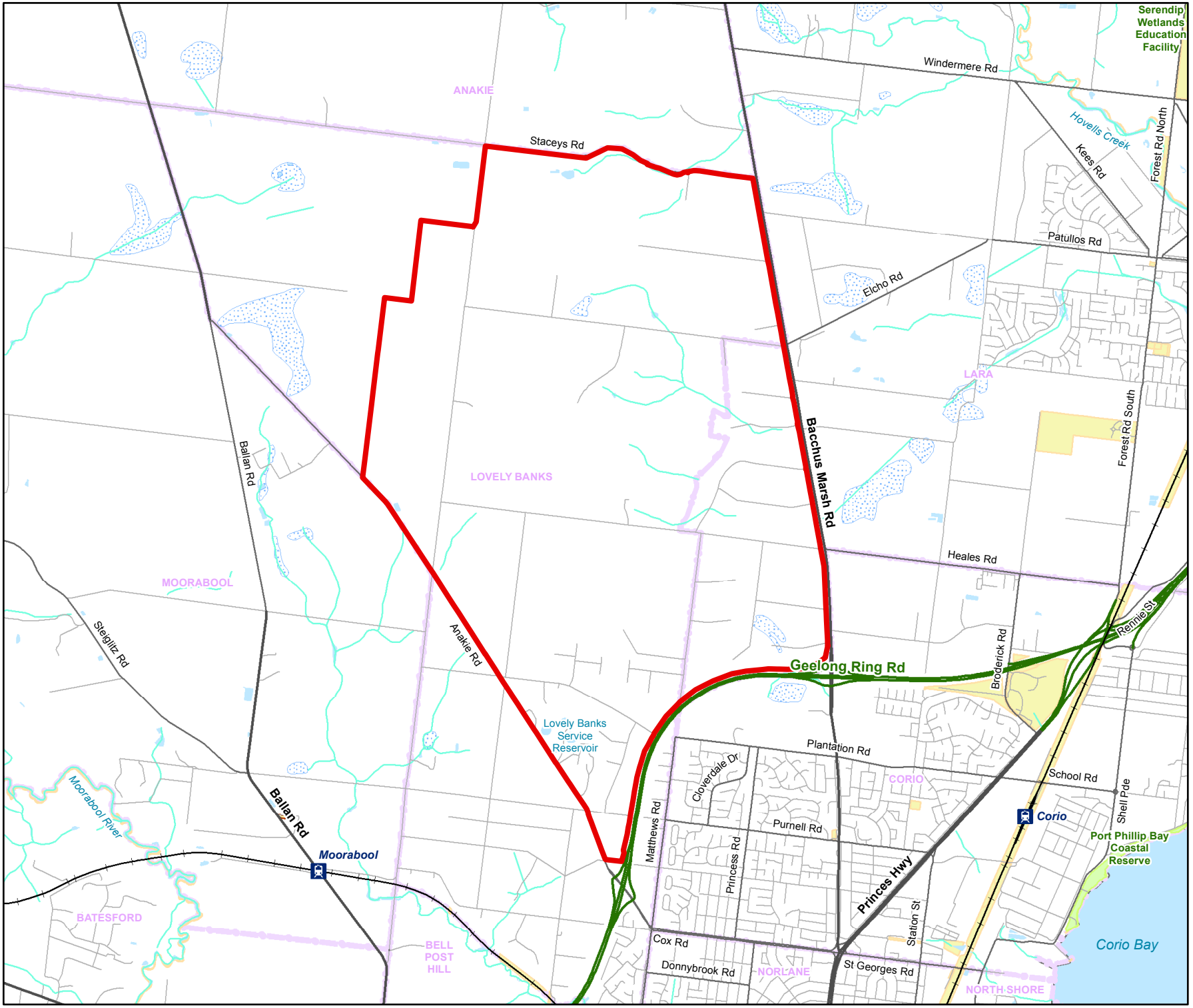
FIGURES



Legend

- Study Area
- Railway
- Freeway
- Major Road
- Collector Road
- Minor Road
- Minor Watercourse
- Permanent Waterbody
- Land Subject to Inundation
- Parks and Reserves
- Commonwealth Land
- Crown Land
- Localities

Figure 1b

Location of the study area

Northern Geelong Growth Area - Flora and Fauna Assessment

N

0 500 1,000

Metres

ecology & heritage partners

8357_Fig01_StudyArea 27/09/2017 cbrowning

Staceys Rd
Elcho Rd
Bacchus Marsh Rd
Heales Rd
Anakie Rd
Geelong Ring Rd
Plantation Rd
Matthews Rd
Cloverdale Dr
Princess Rd
Purnell Rd
Cowies Creek
Ballan Rd
nearmap

Figure 1b

Accessed Properties

Northern Geelong Growth Area - Flora and Fauna Assessment

Legend

- Study Area
- Properties not accessed during field surveys

N

0 400 800

Metres

ecology & heritage partners

8357_Fig01b_Access 27/09/2017 cbrowning

Figure 2

Ecological features - Overview

Northern Geelong Growth Area - Flora and Fauna Assessment

ecology & heritage partners

Legend

- Study Area
- Scattered Tree
- Current Wetlands
- Waterbodies
- PG1: Plains Grassland EVC
- PG2: Plains Grassland EVC (NTGVVP)
- PG3: Fragmented patches of Plains Grassland EVC
- Biosites / Roadside Vegetation
- Embedded rock

Likelihood of Occurrence – Significant Fauna Habitats

Golden Sun Moth

- High
- Moderate
- Low

Striped Legless Lizard

- Moderate
- Low

N

0 400 800

Metres

Trengove 2016
- 11sp.

Leafless Bluebush (1992)

VBA Site 1
- 1sp.

VBA Site 2
- 1sp.

VBA Site 3
- 1sp.

VBA Site 4
- 1sp.

VBA Site 5
- 3sp.

VBA Site 6
- 1sp.

VBA Site 7
- 1sp.

VBA Site 8
- 1sp.

VBA Site 9
- 2sp.

VBA Site 10
- 2sp.

VBA Site 11
- 1sp.

VBA Site 12
- 1sp.

VBA Site 13
- 19sp.

VBA Site 14
- 3sp.

VBA Site 15
- 1sp.

VBA Site 16
- 1sp.

1sp.

VBA Site 17
- 1sp.

VBA Site 18
- 2sp.

VBA Site 19
- 1sp.

VBA Site 20
- 1sp.

VBA Site 21
- 2sp.

Adamson's Blown-grass (2002)

nearmap

Figure 3

Flora species within the study area and surrounds

Northern Geelong Growth Area - Flora and Fauna Assessment

Legend

- Study Area
- Significant Flora Records
- VBA Records
- Trengrove 2016 Records

N

0 250 500

Metres

8357_Fig03_Flora_A1 24/11/2016 cbrowning

ecology & heritage partners

VBA Site 1
- 9sp.

VBA Site 2
- 2sp.

VBA Site 3
- 1sp.

Golden Sun Moth (2009)

Black Falcon (2000)

eBird Site 1
- 1sp.

VBA Site 4
- 1sp.

Striped Legless Lizard (1992)

eBird Site 2
- 1sp.

eBird Site 3
- 2sp.

EHP 2016 (entire study area)
- 56sp.

eBird Site 4
- 7sp.

eBird Site 5
- 3sp.

Spotted Harrier

eBird Site 6
- 5sp.

VBA Site 5
- 1sp.

Spotted Harrier (2001)

eBird Site 7
- 11sp.

eBird Site 8
- 13sp.

VBA Site 8
- 1sp.

VBA Site 6
- 1sp.

Yellow Sedge-skipper (1988)

eBird Site 11
- 7sp.

Little Egret
Spotted Harrier

VBA Site 7
- 8sp.

VBA Site 9
- 7sp.

eBird Site 10
- 5sp.

Black Kite

eBird Site 9
- 4sp.

Figure 4

Fauna species within the study area and surrounds

Northern Geelong Growth Area - Flora and Fauna Assessment

Legend

- Study Area
- Significant Fauna Records
- eBird Database Records
- Ecology and Heritage Partners 2016 Records
- VBA Records

N

0 250 500

Metres

8357_Fig04_Fauna_A1 24/11/2016 cbrowning

ecology & heritage partners

Note: The following concept plan has not been directly influenced by any coinciding investigations (i.e. Cultural Heritage, Hydrology, Soil testing etc..) and is therefore subject to discussion and review. The location and width of all Biolinks are also indicative only and will be discussed with relevant stakeholder as part of the Precinct Planning Process.

Staceys Rd
Elcho Rd
Bacchus Marsh Rd
Heales Rd
Anakie Rd
Geelong Ring Rd
Plantation Rd
Matthews Rd
Cloverdale Dr
Princess Rd
Purnell Rd
Cowies Creek
Ballan Rd
nearmap

Figure 1
NGGA Workshop Concept Design
Northern Geelong Growth Area - Flora and Fauna Assessment

ecology & heritage partners

Legend

- Study Area
- BioLinks [Natural and Created]
- BioLinks [Services water/power/gas]
- BioLinks [Outside NGGA]
- Conservation Areas
- Plains Grassland
- Plains Grassland (NTGVVP)
- Potential Plains Grassland Areas

N

0 400 800

Metres

APPENDICES

APPENDIX A - FLORA SPECIES RECORDED WITHIN THE STUDY AREA

Table A1. Flora species previously recorded within the study area

Scientific Name	Common Name	Conservation Status[1]	Data Source[2, 3, 4]
INDIGENOUS SPECIES			
Acaena echinata	Sheep's Burr	-	EHP 2016
Atriplex semibaccata	Berry Saltbush		EHP 2016
Austrostipa bigeniculata	Kneed Spear-grass	-	EHP 2016, Mark Trengrove 2016
Chloris truncata	Windmill Grass	-	VBA (Site 13), EHP 2016
Eucalyptus sp.	Eucalyptus (scattered tree)	-	EHP 2016
Juncus subsecundus	Juncus	-	EHP 2016
Maireana brevifolia	Short-leaf Bluebush	-	EHP 2016
Oxalis perennans	Grassland Sorrel	-	Mark Trengrove 2016
Rumex brownii	Slender Dock	-	VBA (Site 15), Mark Trengrove 2016
Rytidosperma caespitosum	Common Wallaby-grass	-	EHP 2016, Mark Trengrove 2016
Rytidosperma racemosum	Slender Wallaby-grass	-	Mark Trengrove 2016
Sclerolaena muricata var. *muricata*	Black Roly-poly	k	EHP 2016
Themeda triandra	Kangaroo Grass	-	EHP 2016
INTRODUCED SPECIES			
Allium vineale	Crow Garlic	-	VBA (Sites 14, 18, 20, 21)
Arctotheca calendula	Cape weed	-	VBA (Sites 9, 10, 13)
Arctotheca calendula	Wild Sage	-	EHP 2016
Avena spp.	Wild Oats	-	EHP 2016, Mark Trengrove 2016
Bromus catharticus	Prairie Grass	-	VBA (Site 13)
Bromus hordeaceus subsp. *hordeaceus*	Soft Brome	-	VBA (Site 13)

Scientific Name	Common Name	Conservation Status[1]	Data Source[2, 3, 4]
Cirsium vulgare	Spear Thistle	-	VBA (Site 13)
Dactylis glomerata	Cocksfoot	-	VBA (Site 13), EHP 2016
Echium plantagineum	Paterson's Curse	-	VBA (Site 5)
Erodium spp.	Heron's Bill	-	VBA (Site 13)
Fumaria spp.	Fumitory	-	VBA (Site 13)
Galenia pubescens var. *pubescens*	Galenia	-	VBA (Sites 13,), EHP 2016
Helminthotheca echioides,	*Ox-tongue*	-	EHP 2016
Holcus lanatus	Yorkshire Fog	-	VBA (Sites 13,)
Hypochaeris radicata	Flatweed	-	VBA (Sites 13,)
Lycium ferocissimum	African Box-thorn	-	EHP 2016
Lolium spp.	Rye Grass	-	EHP 2016, Mark Trengrove 2016
Melva spp.	Mallow	-	EHP 2016
Nassella neesiana	Chilean Needle-grass	-	VBA (Sites 5, 14, 21) , EHP 2016, Mark Trengrove 2016
Nassella trichotoma	Serrated Tussock	-	VBA (Sites 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19), EHP 2016
Oxalis pes-caprae	Soursob	-	VBA (Site 13)
Phalaris aquatica	Toowoomba Canary Grass	-	EHP 2016
Plantago lanceolata	Ribwort	-	VBA (Site 13), EHP 2016, Mark Trengrove 2016
Plantago coronopus	Buck's-horn Plantain	-	EHP 2016
Polygonum aviculare s.l.	Prostrate Knotweed	-	VBA (Site 13)
Romulea rosea	Onion-grass	-	EHP 2016, Mark Trengrove 2016
Rumex crispus	Curled Dock	-	VBA (Site 13)
Trifolium spp.	Clover	-	VBA (Site 13), Mark Trengrove 2016
Vicia sativa	Common Vetch	-	VBA (Site 13)
Vulpia spp.	Fescue	-	VBA (Site 13)

Notes:

1) **Source: DEPI 2014 – Advisory List of Rare or Threatened Plants in Victoria**. Note: 'k' - Listed as Poorly Known in Victoria: poorly known and suspected, but not definitely known, to belong to one of the remaining categories (x, e, v or r) within Victoria. At present, accurate distribution information is inadequate (DEPI 2014).
2) **Source: VBA - DELWP 2016d. Victorian Biodiversity Atlas**. Sourced from GIS layers: "VBA_FLORA25", "VBA_FLORA100", "VBA_FAUNA25", "VBA_FAUNA100", January 2016. Victorian Department of Environment, Land, Water and Planning, Melbourne, Victoria.
3) **Source: Ecology and Heritage Partners Pty Ltd 2016**. City of Greater Geelong – Assessment of Biodiversity Assets of Roadsides.
4) **Source: Mark Trengrove Ecological Services 2016**. 225 Staceys Road Lovely Banks, Vegetation and Biodiversity Assessment Report. Report prepared for NatJon Constructions Pty Ltd.

APPENDIX B - FAUNA SPECIES RECORDED WITHIN THE PROJECT LOCALITY

Table B1. Fauna species recorded within the study area.

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	Hollow Use	Mi/ Ma	Source
MAMMALS						
Native Species						
Agile Antechinus	*Antechinus agilis*	1973	3	Partial	-	VBA within 10 kilometres
Black Wallaby	*Wallabia bicolor*	2011	13	-	-	VBA within 10 kilometres
Chocolate Wattled Bat	*Chalinolobus morio*	1990	2	Total	-	VBA within 10 kilometres
Common Brushtail Possum	*Trichosurus vulpecula*	1998	20	Total	-	VBA within 10 kilometres
Common Dunnart	*Sminthopsis murina murina*	1964	1	-	-	VBA within 10 kilometres
Common Ringtail Possum	*Pseudocheirus peregrinus*	1980	2	Partial	-	VBA within 10 kilometres
Eastern Barred Bandicoot	*Perameles gunnii*	1980	36	-	-	VBA within 10 kilometres
Eastern Freetail Bat	*Mormopterus sp. 2*	1989	1	-	-	VBA within 10 kilometres
Eastern Grey Kangaroo	*Macropus giganteus*	2007	21	-	-	EHP 2016
Fat-tailed Dunnart	*Sminthopsis crassicaudata*	1973	2	-	-	VBA within 10 kilometres
Gould's Wattled Bat	*Chalinolobus gouldii*	1990	4	Total	-	VBA within 10 kilometres

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	Hollow Use	Mi/ Ma	Source
Grey-headed Flying-fox	*Pteropus poliocephalus*	2004	7	-	-	VBA within 10 kilometres
Koala	*Phascolarctos cinereus*	2015	42	-	-	VBA (Site 8)
Large Forest Bat	*Vespadelus darlingtoni*	1989	2	Total	-	VBA within 10 kilometres
Lesser Long-eared Bat	*Nyctophilus geoffroyi*	1989	5	Total	-	VBA within 10 kilometres
Little Forest Bat	*Vespadelus vulturnus*	1989	2	Total	-	VBA within 10 kilometres
Platypus	*Ornithorhynchus anatinus*	2002	4	-	-	VBA within 10 kilometres
Short-beaked Echidna	*Tachyglossus aculeatus*	2006	10	-	-	VBA within 10 kilometres
Southern Forest Bat	*Vespadelus regulus*	1989	2	Total	-	VBA within 10 kilometres
Sugar Glider	*Petaurus breviceps*	1990	8	Total	-	VBA within 10 kilometres
Swamp Antechinus	*Antechinus minimus maritimus*	100	1	-	-	VBA within 10 kilometres
Water Rat	*Hydromys chrysogaster*	2000	5	-	-	VBA within 10 kilometres
White-striped Freetail Bat	*Tadarida australis*	1989	8	Total	-	VBA within 10 kilometres
Introduced Species						
Black Rat*	*Rattus rattus*	1988	12	-	-	VBA within 10 kilometres
Brown Rat*	*Rattus norvegicus*	1975	2	-	-	VBA within 10 kilometres

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	Hollow Use	Mi/ Ma	Source
Cat*	*Felis catus*	1990	9	-	-	VBA within 10 kilometres
European Hare*	*Lepus europeaus*	2006	16	-	-	EHP 2016
European Rabbit*	*Oryctolagus cuniculus*	2006	25	-	-	EHP 2016
Goat (feral)*	*Capra hircus*	2006	2	-	-	VBA within 10 kilometres
House Mouse*	*Mus musculus*	1990	16	-	-	VBA within 10 kilometres
Red Fox*	*Vulpes vulpes*	2007	21	-	-	EHP 2016
BIRDS						
Native Species						
Australasian Bittern	*Botaurus poiciloptilus*	1990	4	-	-	VBA within 10 kilometres
Australasian Grebe	*Tachybaptus novaehollandiae*	2013	181	-	-	VBA within 10 kilometres
Australasian Pipit	*Anthus novaeseelandiae*	2014	148	-	Ma	EHP 2016
Australasian Shoveler	*Anas rhynchotis*	1993	48	-	-	VBA within 10 kilometres
Australian Hobby	*Falco longipennis*	2010	111	-	-	VBA within 10 kilometres
Australian King-Parrot	*Alisterus scapularis*	1990	3	Total	-	VBA within 10 kilometres
Australian Magpie	*Cracticus tibicen*					VBA (Sites 1,9), eBird (Sites 1,3,4,7,8,10)

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	Hollow Use	Mi/ Ma	Source
Australian Owlet-nightjar	*Aegotheles cristatus*	2008	50	Total	-	VBA within 10 kilometres
Australian Painted Snipe	*Rostratula australis*	100	1	-	Mi/Ma	VBA within 10 kilometres
Australian Pelican	*Pelecanus conspicillatus*	2014	268	-	Ma	VBA within 10 kilometres
Australian Raven	*Corvus coronoides*	2010	96	-	-	EHP 2016
Australian Shelduck	*Tadorna tadornoides*	2013	210	Total	-	EHP 2016
Australian Spotted Crake	*Porzana fluminea*	2013	31	-	-	VBA within 10 kilometres
Australian White Ibis	*Threskiornis molucca*	2014	431	-	Ma	EHP 2016, eBird (Site 4)
Australian Wood Duck	*Chenonetta jubata*	2013	217	Total	-	EHP 2016
Azure Kingfisher	*Alcedo azurea*	1981	2	-	-	VBA within 10 kilometres
Baillon's Crake	*Porzana pusilla palustris*	2010	5	-	Ma	VBA within 10 kilometres
Banded Lapwing	*Vanellus tricolor*	2007	23	-	-	EHP 2016
Banded Stilt	*Cladorhynchus leucocephalus*	2013	61	-	-	VBA within 10 kilometres
Barking Owl	*Ninox connivens connivens*	2006	2	Total	-	VBA within 10 kilometres
Bar-tailed Godwit	*Limosa lapponica*	1992	9	-	Mi/Ma	VBA within 10 kilometres
Bassian Thrush	*Zoothera lunulata*	2003	6	-	-	VBA within 10 kilometres

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	Hollow Use	Mi/ Ma	Source
Black Falcon	*Falco subniger*	2012	13	-	-	VBA (Site 2)
Black Kite	*Milvus migrans*	2010	26	-	-	EHP 2016, eBird (Site 10)
Black Swan	*Cygnus atratus*	2013	357	-	-	VBA within 10 kilometres
Black-eared Cuckoo	*Chrysococcyx osculans*	2008	14	-	Ma	VBA within 10 kilometres
Black-faced Cormorant	*Phalacrocorax fuscescens*	2001	2	-	Ma	VBA within 10 kilometres
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*	1981	263	-	Ma	VBA within 10 kilometres
Black-fronted Dotterel	*Elseyornis melanops*	2011	179	-	-	VBA within 10 kilometres
Black-shouldered Kite	*Elanus axillaris*	2013	153	-	-	EHP 2016, VBA (Site 1), eBird (Sites 6,8)
Black-winged Stilt	*Himantopus himantopus*	2013	124	-	Ma	VBA within 10 kilometres
Blue-billed Duck	*Oxyura australis*	2000	29	-	-	VBA within 10 kilometres
Blue-winged Parrot	*Neophema chrysostoma*	2007	10	Partial	-	VBA within 10 kilometres
Brolga	*Grus rubicunda*	2012	8	-	-	VBA within 10 kilometres
Brown Falcon	*Falco berigora*	2013	234	-	-	VBA (Site 9), eBird (Sites 8,9)
Brown Goshawk	*Accipiter fasciatus*	2013	182	-	Ma	VBA within 10 kilometres
Brown Quail	*Coturnix ypsilophora australis*	1990	2	-	-	VBA within 10 kilometres

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	Hollow Use	Mi/ Ma	Source
Brown Songlark	*Cincloramphus cruralis*	2004	10	-	-	VBA within 10 kilometres
Brown Thornbill	*Acanthiza pusilla*	2013	218	-	-	VBA within 10 kilometres
Brown Treecreeper	*Climacteris picumnus victoriae*	2007	28	Total	-	VBA within 10 kilometres
Brown-headed Honeyeater	*Melithreptus brevirostris*	2010	132	-	-	VBA within 10 kilometres
Brush Bronzewing	*Phaps elegans*	2010	19	-	-	VBA within 10 kilometres
Brush Cuckoo	*Cacomantis variolosus*	1990	1	-	-	VBA within 10 kilometres
Budgerigar	*Melopsittacus undulatus*	1990	4	Partial	-	VBA within 10 kilometres
Buff-banded Rail	*Gallirallus philippensis*	2014	8	-	-	VBA within 10 kilometres
Buff-breasted Sandpiper	*Tryngites subruficollis*	1986	1	-	Mi/Ma	VBA within 10 kilometres
Buff-rumped Thornbill	*Acanthiza reguloides*	2010	70	-	-	eBird (Site 8)
Bush Stone-curlew	*Burhinus grallarius*	1961	3	-	-	VBA within 10 kilometres
Cape Barren Goose	*Cereopsis novaehollandiae*	2010	119	-	Ma	VBA within 10 kilometres
Caspian Tern	*Hydroprogne caspia*	2013	35	-	Mi/Ma	VBA within 10 kilometres
Cattle Egret	*Ardea ibis*	2010	48	-	Mi/Ma	eBird (Sites 6,11)
Chestnut Teal	*Anas castanea*	2014	374	Total	-	VBA within 10 kilometres

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	Hollow Use	Mi/ Ma	Source
Chestnut-rumped Heathwren	*Calamanthus pyrrhopygius*	1969	4	-	-	VBA within 10 kilometres
Clamorous Reed Warbler	*Acrocephalus stentoreus*	2009	83	-	Mi/Ma	eBird (Site 7)
Cockatiel	*Nymphicus hollandicus*	1999	8	Total	-	VBA within 10 kilometres
Collared Sparrowhawk	*Accipiter cirrhocephalus*	2010	44	-	-	VBA within 10 kilometres
Common Bronzewing	*Phaps chalcoptera*	2010	192	-	-	VBA within 10 kilometres
Common Cicadabird	*Coracina tenuirostris*	2005	4	-	Ma	VBA within 10 kilometres
Common Tern	*Sterna hirundo*	1988	3	-	Mi/Ma	VBA within 10 kilometres
Corellas and Cockatoos	*fam. Cacatuidae gen. Cacatua*	2007	9	-	-	VBA within 10 kilometres
Cox's Sandpiper	*Calidris melanotus X ferruginea*	1986	1	-	-	VBA within 10 kilometres
Crescent Honeyeater	*Phylidonyris pyrrhoptera*	2000	7	-	-	VBA within 10 kilometres
Crested Pigeon	*Ocyphaps lophotes*	2013	80	-	-	EHP 2016, VBA (Site 2), eBird (Sites 7,11)
Crested Shrike-tit	*Falcunculus frontatus*	2010	169	-	-	VBA within 10 kilometres
Crested Tern	*Thalasseus bergii*	2014	104	-	-	EHP 2016
Crimson Rosella	*Platycercus elegans*	2013	258	Total	-	VBA within 10 kilometres
Curlew Sandpiper	*Calidris ferruginea*	2008	49	-	Mi/Ma	VBA within 10 kilometres

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	Hollow Use	Mi/ Ma	Source
Darter	*Anhinga novaehollandiae*	2013	30	-	-	VBA within 10 kilometres
Diamond Dove	*Geopelia cuneata*	1977	1	-	-	VBA within 10 kilometres
Diamond Firetail	*Stagonopleura guttata*	2007	83	-	-	VBA within 10 kilometres
Dollarbird	*Eurystomus orientalis*	2007	6	Total	Ma	VBA within 10 kilometres
Domestic Goose	*Anser anser*	1997	1	-	-	VBA within 10 kilometres
Double-banded Plover	*Charadrius bicinctus*	2009	16	-	Mi/Ma	EHP 2016
Dusky Moorhen	*Gallinula tenebrosa*	2013	303	-	-	VBA within 10 kilometres
Dusky Woodswallow	*Artamus cyanopterus*	2010	164	Partial	-	VBA within 10 kilometres
Eastern Great Egret	*Ardea modesta*	2014	129	-	Mi/Ma	VBA within 10 kilometres
Eastern Rosella	*Platycercus eximius*	2010	321	Total	-	VBA within 10 kilometres
Eastern Spinebill	*Acanthorhynchus tenuirostris*	2013	146	-	-	VBA within 10 kilometres
Eastern Yellow Robin	*Eopsaltria australis*	2010	193	-	-	VBA (Site 9)
Elegant Parrot	*Neophema elegans*	1993	1	Total	-	VBA within 10 kilometres
Emu	*Dromaius novaehollandiae*	2000	63	-	-	VBA within 10 kilometres
Eurasian Coot	*Fulica atra*	2013	253	-	-	VBA within 10 kilometres

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	Hollow Use	Mi/ Ma	Source
European Goldfinch	*Carduelis carduelis*	2014	515	-	-	EHP 2016, VBA (Site 1)
Fairy Martin	*Petrochelidon ariel*	2010	54	Partial	-	VBA within 10 kilometres
Fairy Tern	*Sternula nereis nereis*	2005	52	-	Ma	VBA within 10 kilometres
Fan-tailed Cuckoo	*Cacomantis flabelliformis*	2010	114	-	-	VBA within 10 kilometres
Flame Robin	*Petroica phoenicea*	2013	123	-	-	VBA within 10 kilometres
Fork-tailed Swift	*Apus pacificus*	2006	11	-	Mi/Ma	VBA within 10 kilometres
Freckled Duck	*Stictonetta naevosa*	1992	5	-	-	VBA within 10 kilometres
Fuscous Honeyeater	*Lichenostomus fuscus*	1984	5	-	-	VBA within 10 kilometres
Galah	*Eolophus roseicapilla*					eBird (Sites 2,3)
Gang-gang Cockatoo	*Callocephalon fimbriatum*	2010	142	-	-	VBA within 10 kilometres
Gilbert's Whistler	*Pachycephala inornata*	1998	4	-	-	VBA within 10 kilometres
Glossy Ibis	*Plegadis falcinellus*	1991	2	-	Mi/Ma	VBA within 10 kilometres
Golden Whistler	*Pachycephala pectoralis*	2008	175	-	-	VBA within 10 kilometres
Golden-headed Cisticola	*Cisticola exilis*	2013	73	-	-	VBA within 10 kilometres
Great Cormorant	*Phalacrocorax carbo*	2013	136	-	-	VBA within 10 kilometres

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	Hollow Use	Mi/ Ma	Source
Great Crested Grebe	*Podiceps cristatus*	2014	43	-	-	VBA within 10 kilometres
Grey Butcherbird	*Cracticus torquatus*	2013	121	-	-	EHP 2016
Grey Currawong	*Strepera versicolor*	2009	57	-	-	VBA within 10 kilometres
Grey Goshawk	*Accipiter novaehollandiae*	2007	23	-	-	VBA within 10 kilometres
Grey Plover	*Pluvialis squatarola*	1979	3	-	Mi/Ma	VBA within 10 kilometres
Grey Shrike-thrush	*Colluricincla harmonica*	2010	303	Partial	-	EHP 2016
Grey Teal	*Anas gracilis*	2014	296	Total	-	VBA within 10 kilometres
Grey-crowned Babbler	*Pomatostomus temporalis temporalis*	1960	2	-	-	VBA within 10 kilometres
Grey-tailed Tattler	*Tringa brevipes*	2005	9	-	Mi/Ma	VBA within 10 kilometres
Hardhead	*Aythya australis*	2013	140	-	-	EHP 2016
Hoary-headed Grebe	*Poliocephalus poliocephalus*	2013	206	-	-	VBA within 10 kilometres
Hooded Robin	*Melanodryas cucullata cucullata*	1999	17	-	-	VBA within 10 kilometres
Horsfield's Bronze-Cuckoo	*Chrysococcyx basalis*	2013	118	-	Ma	VBA within 10 kilometres
Horsfield's Bushlark	*Mirafra javanica*	2011	15	-	-	VBA within 10 kilometres
Intermediate Egret	*Ardea intermedia*	2001	9	-	Ma	VBA within 10 kilometres

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	Hollow Use	Mi/ Ma	Source
Jacky Winter	*Microeca fascinans*	2010	152	-	-	VBA within 10 kilometres
Latham's Snipe	*Gallinago hardwickii*	2014	33	-	Mi/Ma	VBA within 10 kilometres
Laughing Kookaburra	*Dacelo novaeguineae*	2010	247	Total	-	VBA within 10 kilometres
Leaden Flycatcher	*Myiagra rubecula*	1978	3	-	-	VBA within 10 kilometres
Letter-winged Kite	*Elanus scriptus*	1977	3	-	-	VBA within 10 kilometres
Lewin's Rail	*Lewinia pectoralis pectoralis*	2006	6	-	Mi	VBA within 10 kilometres
Little Bittern	*Ixobrychus minutus dubius*	1970	1	-	-	VBA within 10 kilometres
Little Black Cormorant	*Phalacrocorax sulcirostris*	2013	224	-	-	VBA within 10 kilometres
Little Button-quail	*Turnix velox*	1977	2	-	-	VBA within 10 kilometres
Little Corella	*Cacatua sanguinea*	2009	15	Total	-	VBA within 10 kilometres
Little Eagle	*Hieraaetus morphnoides*	2010	122	-	-	VBA within 10 kilometres
Little Egret	*Egretta garzetta nigripes*	2013	113	-	Ma	VBA (Site 7), eBird (Site 11)
Little Grassbird	*Megalurus gramineus*	2014	117	-	-	VBA within 10 kilometres
Little Lorikeet	*Glossopsitta pusilla*	2010	65	-	-	VBA within 10 kilometres
Little Pied Cormorant	*Microcarbo melanoleucos*	2014	345	-	-	VBA within 10 kilometres

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	Hollow Use	Mi/ Ma	Source
Little Raven	*Corvus mellori*	2013	721	-	Ma	EHP 2016, eBird (Sites 4,6,7,8,10)
Little Tern	*Sternula albifrons sinensis*	1999	17	-	Mi/Ma	VBA within 10 kilometres
Little Wattlebird	*Anthochaera chrysoptera*	2005	8	-	-	VBA within 10 kilometres
Long-billed Corella	*Cacatua tenuirostris*	2010	57	Total	-	VBA within 10 kilometres
Magpie Goose	*Anseranas semipalmata*	2006	116	-	Ma	VBA within 10 kilometres
Magpie-lark	*Grallina cyanoleuca*	2013	774	-	-	EHP 2016, eBird (Sites 4,7)
Major Mitchell's Cockatoo	*Lophocroa leadbeateri*	2005	5	Total	-	VBA within 10 kilometres
Masked Lapwing	*Vanellus miles*	2014	574	-	-	EHP 2016, VBA (Site 1)
Masked Owl	*Tyto novaehollandiae*	1984	2	Total	-	VBA within 10 kilometres
Masked Woodswallow	*Artamus personatus*	2006	8	-	-	VBA within 10 kilometres
Mistletoebird	*Dicaeum hirundinaceum*	1999	94	-	-	VBA within 10 kilometres
Musk Duck	*Biziura lobata*	2006	69	-	Ma	VBA within 10 kilometres
Musk Lorikeet	*Glossopsitta concinna*	2010	103	-	-	VBA within 10 kilometres
Nankeen Kestrel	*Falco cenchroides*	2013	147	Partial	Ma	EHP 2016, VBA (Site 1), eBird (Sites 6,9,10)

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	Hollow Use	Mi/ Ma	Source
Nankeen Night Heron	*Nycticorax caledonicus hillii*	2010	81	-	Ma	VBA within 10 kilometres
New Holland Honeyeater	*Phylidonyris novaehollandiae*	2014	682	-	-	EHP 2016. eBird (Sites 6,8)
Noisy Miner	*Manorina melanocephala*	2010	44	-	-	EHP 2016
Olive Whistler	*Pachycephala olivacea*	1984	2	-	-	VBA within 10 kilometres
Olive-backed Oriole	*Oriolus sagittatus*	2010	56	-	-	VBA within 10 kilometres
Orange-bellied Parrot	*Neophema chrysogaster*	1993	4	-	Mi/Ma	VBA within 10 kilometres
Pacific Barn Owl	*Tyto javanica*	2011	25	Partial	-	eBird (Site 11)
Pacific Black Duck	*Anas superciliosa*	2014	424	-	-	EHP 2016
Pacific Golden Plover	*Pluvialis fulva*	1999	17	-	Mi/Ma	VBA within 10 kilometres
Painted Button-quail	*Turnix varia*	2010	52	-	-	VBA within 10 kilometres
Painted Honeyeater	*Grantiella picta*	2006	6	-	-	VBA within 10 kilometres
Peaceful Dove	*Geopelia striata*	2010	13	-	-	VBA within 10 kilometres
Peregrine Falcon	*Falco peregrinus*	2013	62	Partial	-	VBA within 10 kilometres
Pied Cormorant	*Phalacrocorax varius*	2014	127	-	-	VBA within 10 kilometres
Pied Currawong	*Strepera graculina*	2010	233	-	-	VBA within 10 kilometres

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	Hollow Use	Mi/ Ma	Source
Pink Robin	*Petroica rodinogaster*	2008	39	-	-	VBA within 10 kilometres
Pink-eared Duck	*Malacorhynchus membranaceus*	2004	39	Partial	-	VBA within 10 kilometres
Plains-wanderer	*Pedionomus torquatus*	100	1	-	-	VBA within 10 kilometres
Plumed Whistling-Duck	*Dendrocygna eytoni*	2007	3	-	-	VBA within 10 kilometres
Powerful Owl	*Ninox strenua*	1987	5	Total	-	VBA within 10 kilometres
Purple Swamphen	*Porphyrio porphyrio*	2014	287	-	-	VBA within 10 kilometres
Purple-crowned Lorikeet	*Glossopsitta porphyrocephala*	2010	304	Total	-	VBA within 10 kilometres
Rainbow Bee-eater	*Merops ornatus*	2010	73	-	Mi/Ma	VBA within 10 kilometres
Rainbow Lorikeet	*Trichoglossus haematodus*	2013	286	Total	-	EHP 2016
Red Knot	*Calidris canutus*	2005	7	-	Mi/Ma	VBA within 10 kilometres
Red Wattlebird	*Anthochaera carunculata*	2013	788	-	-	EHP 2016. eBird (Site 8)
Red-backed Kingfisher	*Todiramphus pyrropygia pyrropygia*	2008	2	Partial	-	VBA within 10 kilometres
Red-browed Finch	*Neochmia temporalis*	2010	189	-	-	VBA within 10 kilometres
Red-capped Plover	*Charadrius ruficapillus*	2013	83	-	Ma	VBA within 10 kilometres
Red-capped Robin	*Petroica goodenovii*	2007	14	-	-	VBA within 10 kilometres

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	Hollow Use	Mi/ Ma	Source
Red-kneed Dotterel	*Erythrogonys cinctus*	2013	42	-	-	VBA within 10 kilometres
Red-rumped Parrot	*Psephotus haematonotus*	2011	264	-	-	EHP 2016
Regent Honeyeater	*Anthochaera phrygia*	1993	4	-	Mi	VBA within 10 kilometres
Restless Flycatcher	*Myiagra inquieta*	2010	156	-	-	VBA within 10 kilometres
Rose Robin	*Petroica rosea*	2008	14	-	-	VBA within 10 kilometres
Royal Spoonbill	*Platalea regia*	2013	137	-	-	VBA within 10 kilometres
Rufous Fantail	*Rhipidura rufifrons*	2006	19	-	Mi/Ma	eBird (Site 11)
Rufous Songlark	*Cincloramphus mathewsi*	1989	12	-	-	VBA within 10 kilometres
Rufous Whistler	*Pachycephala rufiventris*	2010	130	-	-	VBA within 10 kilometres
Sacred Kingfisher	*Todiramphus sanctus*	2009	51	Partial	Ma	VBA within 10 kilometres
Satin Flycatcher	*Myiagra cyanoleuca*	1995	7	-	Mi/Ma	VBA within 10 kilometres
Scaly-breasted Lorikeet	*Trichoglossus chlorolepidotus*	2007	3	Total	-	VBA within 10 kilometres
Scarlet Robin	*Petroica boodang*	2010	137	-	-	VBA within 10 kilometres
Shining Bronze-Cuckoo	*Chrysococcyx lucidus*	2007	75	-	Ma	VBA within 10 kilometres
Silver Gull	*Chroicocephalus novaehollandiae*	2014	449	-	Ma	eBird (Site 7)

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	Hollow Use	Mi/ Ma	Source
Silvereye	*Zosterops lateralis*	2014	381	-	Ma	VBA within 10 kilometres
Singing Honeyeater	*Lichenostomus virescens*	2000	4	-	-	VBA within 10 kilometres
Southern Boobook	*Ninox novaeseelandiae*	2008	32	Total	Ma	VBA (Site 1)
Southern Whiteface	*Aphelocephala leucopsis*	2007	21	-	-	VBA within 10 kilometres
Speckled Warbler	*Chthonicola sagittatus*	2006	19	-	-	VBA within 10 kilometres
Spiny-cheeked Honeyeater	*Acanthagenys rufogularis*	2013	142	-	-	VBA (Site 9)
Spotless Crake	*Porzana tabuensis*	2010	4	-	Ma	VBA within 10 kilometres
Spotted Harrier	*Circus assimilis*	2013	15	-	-	EHP 2016, VBA (Site 5), eBird (Sites 5,11)
Spotted Quail-thrush	*Cinclosoma punctatum*	1976	2	-	-	VBA within 10 kilometres
Square-tailed Kite	*Lophoictinia isura*	2008	1	-	-	VBA within 10 kilometres
Straw-necked Ibis	*Threskiornis spinicollis*	2000	395	-	Ma	EHP 2016, eBird (Sites 5,7.8)
Striated Fieldwren	*Calamanthus fuliginosus*	2014	50	-	-	VBA within 10 kilometres
Striated Pardalote	*Pardalotus striatus*	2010	181	Partial	-	EHP 2016
Striated Thornbill	*Acanthiza lineata*	2010	80	-	-	VBA within 10 kilometres
Stubble Quail	*Coturnix pectoralis*	2011	19	-	Ma	VBA within 10 kilometres

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	Hollow Use	Mi/ Ma	Source
Sulphur-crested Cockatoo	*Cacatua galerita*	2010	501	Total	-	EHP 2016
Superb Fairy-wren	*Malurus cyaneus*	2014	537	-	-	EHP 2016, VBA (Site 9), eBird (Site 8)
Swamp Harrier	*Circus approximans*	2014	129	-	Ma	eBird (Site 11)
Swift Parrot	*Lathamus discolor*	2008	49	Total	Ma	VBA within 10 kilometres
Tawny Frogmouth	*Podargus strigoides*	2010	68	-	-	VBA within 10 kilometres
Tree Martin	*Petrochelidon nigricans*	2010	63	Total	Ma	VBA within 10 kilometres
Varied Sittella	*Daphoenositta chrysoptera*	2008	60	-	-	VBA within 10 kilometres
Wedge-tailed Eagle	*Aquila audax*	2010	114	-	-	EHP 2016
Weebill	*Smicrornis brevirostris*	2010	82	-	-	VBA within 10 kilometres
Welcome Swallow	*Hirundo neoxena*					eBird (Site 7)
Western Gerygone	*Gerygone fusca*	2008	7	-	-	VBA within 10 kilometres
Whimbrel	*Numenius phaeopus*	1978	2	-	Mi/Ma	VBA within 10 kilometres
Whiskered Tern	*Chlidonias hybridus javanicus*	2014	43	-	Ma	VBA within 10 kilometres
Whistling Kite	*Haliastur sphenurus*	2013	301	-	Ma	EHP 2016
White-backed Swallow	*Cheramoeca leucosternus*	2010	10	-	-	VBA within 10 kilometres

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	Hollow Use	Mi/ Ma	Source
White-bellied Cuckoo-shrike	*Coracina papuensis*	1999	5	-	Ma	VBA within 10 kilometres
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	2007	7	-	Mi/Ma	VBA within 10 kilometres
White-browed Babbler	*Pomatostomus superciliosus*	2008	3	-	-	VBA within 10 kilometres
White-browed Scrubwren	*Sericornis frontalis*	2014	131	-	-	VBA within 10 kilometres
White-browed Woodswallow	*Artamus superciliosus*	2010	31	-	-	VBA within 10 kilometres
White-eared Honeyeater	*Lichenostomus leucotis*	2001	22	-	-	VBA within 10 kilometres
White-faced Heron	*Egretta novaehollandiae*	2014	426	-	-	EHP 2016, eBird (Site 9)
White-fronted Chat	*Epthianura albifrons*	2014	203	-	-	VBA within 10 kilometres
White-fronted Honeyeater	*Phylidonyris albifrons*	1950	1	-	-	VBA within 10 kilometres
White-naped Honeyeater	*Melithreptus lunatus*	2010	133	-	-	VBA within 10 kilometres
White-necked Heron	*Ardea pacifica*	2006	98	-	-	VBA within 10 kilometres
White-plumed Honeyeater	*Lichenostomus penicillatus*	2014	539	-	-	EHP 2016, VBA (Site 9)
White-throated Gerygone	*Gerygone olivacea*	2007	6	-	-	VBA within 10 kilometres
White-throated Needletail	*Hirundapus caudacutus*	2007	20	-	Mi/Ma	VBA within 10 kilometres
White-throated Nightjar	*Eurostopodus mystacalis*	1978	1	-	-	VBA within 10 kilometres

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	Hollow Use	Mi/ Ma	Source
White-throated Treecreeper	*Cormobates leucophaeus*	2010	145	Total	-	VBA within 10 kilometres
White-winged Chough	*Corcorax melanorhamphos*	2010	170	-	-	VBA within 10 kilometres
White-winged Triller	*Lalage sueurii*	2009	49	-	-	VBA within 10 kilometres
Willie Wagtail	*Rhipidura leucophrys*	2014	790	-	-	EHP 2016, VBA (Site 9), eBird (Site 8)
Yellow Thornbill	*Acanthiza nana*	2010	143	-	-	VBA within 10 kilometres
Yellow-billed Spoonbill	*Platalea flavipes*	2010	145	-	-	VBA within 10 kilometres
Yellow-faced Honeyeater	*Lichenostomus chrysops*	2010	201	-	-	VBA within 10 kilometres
Yellow-plumed Honeyeater	*Lichenostomus ornatus*	2007	1	-	-	EHP 2016
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*	2014	363	-	-	EHP 2016, VBA (Site 1)
Yellow-tailed Black-Cockatoo	*Calyptorhynchus funereus*	2010	97	Total	-	VBA within 10 kilometres
Yellow-tufted Honeyeater	*Lichenostomus melanops*	1995	16	-	-	VBA within 10 kilometres
Zebra Finch	*Taeniopygia guttata*	2008	13	-	-	VBA within 10 kilometres
Introduced Species						
Common Blackbird*	*Turdus merula*	2013	605	-	-	EHP 2016
Common Myna*	*Acridotheres tristis*	2013	408	-	-	EHP 2016, eBird (Sites 4,7,8)

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	Hollow Use	Mi/ Ma	Source
Common Starling*	*Sturnus vulgaris*	2014	692	Partial	-	EHP 2016, eBird (Sites 4,5,9,10)
Eurasian Tree Sparrow*	*Passer montanus*	2010	42	-	-	VBA within 10 kilometres
European Skylark*	*Alauda arvensis*	2013	157	-	-	EHP 2016, VBA (Site 1)
House Sparrow*	*Passer domesticus*	2014	662	-	-	EHP 2016, VBA (Site 1), eBird (Sites 4,7,8)
Northern Mallard*	*Anas platyrhynchos*	2009	29	-	-	VBA within 10 kilometres
Rock Dove*	*Columba livia*	2014	164	-	-	EHP 2016, eBird (Site 7)
Song Thrush*	*Turdus philomelos*	2009	124	-	-	VBA within 10 kilometres
Spotted Turtle-Dove*	*Streptopelia chinensis*	2014	467	-	-	EHP 2016. eBird (Site 8)
REPTILES						
Black Rock Skink	*Egernia saxatilis intermedia*	2008	5	Partial	-	VBA within 10 kilometres
Bougainville's Skink	*Lerista bougainvillii*	1979	5	-	-	VBA within 10 kilometres
Common Blue-tongued Lizard	*Tiliqua scincoides*	2007	8	-	-	VBA within 10 kilometres
Cunningham's Skink	*Egernia cunninghami*	1996	3	-	-	VBA within 10 kilometres
Eastern Brown Snake	*Pseudonaja textilis*	2006	7	-	-	VBA within 10 kilometres
Eastern Three-lined Skink	*Acritoscincus duperreyi*	2008	10	-	-	VBA within 10 kilometres

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	Hollow Use	Mi/ Ma	Source
Garden Skink	*Lampropholis guichenoti*	2008	7	-	-	EHP 2016
Grassland Earless Dragon	*Tympanocryptis pinguicolla*	100	1	-	-	VBA within 10 kilometres
Green Turtle	*Chelonia mydas*	100	1	-	Mi/Ma	VBA within 10 kilometres
Large Striped Skink	*Ctenotus robustus*	1981	13	-	-	VBA within 10 kilometres
Leathery Turtle	*Dermochelys coriacea*	100	1	-	Mi/Ma	VBA within 10 kilometres
Little Whip Snake	*Parasuta flagellum*	1988	11	-	-	VBA within 10 kilometres
Loggerhead Turtle	*Caretta caretta*	100	1	-	Mi/Ma	VBA within 10 kilometres
Marbled Gecko	*Christinus marmoratus*	2007	2	Partial	-	VBA within 10 kilometres
Metallic Skink	*Niveoscincus metallicus*	1990	1	-	-	VBA within 10 kilometres
Red-bellied Black Snake	*Pseudechis porphyriacus*	1989	1	-	-	VBA within 10 kilometres
Skinks	*infp. Scincomorpha fam. Scincidae*	1967	1	-	-	VBA within 10 kilometres
Southern Water Skink	*Eulamprus tympanum tympanum*	1995	1	-	-	VBA within 10 kilometres
Striped Legless Lizard	*Delma impar*	1992	1	-	-	VBA (Site 4)
Tiger Snake	*Notechis scutatus*	2007	23	-	-	EHP 2016
Tree Dragon	*Amphibolurus muricatus*	2008	10	Partial	-	VBA within 10 kilometres

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	Hollow Use	Mi/ Ma	Source
White-lipped Snake	*Drysdalia coronoides*	1988	1	-	-	VBA within 10 kilometres
White's Skink	*Liopholis whitii GROUP*	1990	3	-	-	VBA within 10 kilometres
AMPHIBIANS						
Brown Toadlet	*Pseudophryne bibronii*	1977	23	-	-	VBA within 10 kilometres
Common Froglet	*Crinia signifera*	2011	65	-	-	EHP 2016
Growling Grass Frog	*Litoria raniformis*	2010	9	-	-	EHP 2016
Pobblebonk Frog	*Limnodynastes dumerilii dumerilii*	1965	1	-	-	EHP 2016
Southern Brown Tree Frog	*Litoria ewingii*	1965	1	-	-	EHP 2016
Spotted Marsh Frog	*Limnodynastes tasmaniensis*	2010	10	-	-	EHP 2016
Whistling Tree Frog	*Litoria verreauxii verreauxii*	1989	3	-	-	VBA within 10 kilometres
FISH						
Native Species						
Australian Grayling	*Prototroctes maraena*	1998	41	-	-	VBA within 10 kilometres
Australian Smelt	*Retropinna semoni*	1999	10	-	-	VBA within 10 kilometres
Blue-spotted Goby	*Pseudogobius olorum*	1992	1	-	-	VBA within 10 kilometres

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	Hollow Use	Mi/ Ma	Source
Bridled Goby	*Arenigobius bifrenatus*	1996	1	-	-	VBA within 10 kilometres
Common Galaxias	*Galaxias maculatus*	2005	34	-	-	VBA within 10 kilometres
Dwarf Galaxias	*Galaxiella pusilla*	100	1	-	-	VBA within 10 kilometres
Flat-headed Gudgeon	*Philypnodon grandiceps*	2008	27	-	-	VBA within 10 kilometres
Macquarie Perch	*Macquaria australasica*	1981	6	-	-	VBA within 10 kilometres
Murray Cod	*Maccullochella peelii*	1873	1	-	-	VBA within 10 kilometres
River Blackfish	*Gadopsis marmoratus*	2005	7	-	-	VBA within 10 kilometres
Short-finned Eel	*Anguilla australis*	2008	44	-	-	VBA within 10 kilometres
Short-headed Lamprey	*Mordacia mordax*	1998	1	-	-	VBA within 10 kilometres
Smallmouthed Hardyhead	*Atherinosoma microstoma*	1996	3	-	-	VBA within 10 kilometres
Southern Pygmy Perch	*Nannoperca australis*	2008	10	-	-	VBA within 10 kilometres
Spotted Galaxias	*Galaxias truttaceus*	2004	12	-	-	VBA within 10 kilometres
Tamar River Goby	*Afurcagobius tamarensis*	1996	1	-	-	VBA within 10 kilometres
Tupong	*Pseudaphritis urvillii*	2005	18	-	-	VBA within 10 kilometres
Yarra Pygmy Perch	*Nannoperca obscura*	100	1	-	-	VBA within 10 kilometres

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	Hollow Use	Mi/ Ma	Source
Introduced Species						
Brown Trout*	*Salmo trutta*	1999	17	-	-	VBA within 10 kilometres
Carp*	*Cyprinus carpio*	2005	10	-	-	VBA within 10 kilometres
Gambusia*	*Gambusia holbrooki*	2011	8	-	-	VBA within 10 kilometres
Goldfish*	*Carassius auratus*	1999	7	-	-	VBA within 10 kilometres
Goldfish/Carp Hybrid*	*Cyprinidae Carassius x Cyprinus*	2004	1	-	-	VBA within 10 kilometres
Redfin*	*Perca fluviatilis*	2005	14	-	-	VBA within 10 kilometres
Roach*	*Rutilus rutilus*	2005	3	-	-	VBA within 10 kilometres
Tench*	*Tinca tinca*	2005	1	-	-	VBA within 10 kilometres
MUSSELS & CRUSTACEANS						
Common Freshwater Shrimp	*Paratya australiensis*	2008	6	-	-	VBA within 10 kilometres
Southern Victorian Spiny Crayfish	*Euastacus yarraensis*	1998	2	-	-	
Yabby	*fam. Parastacidae gen. Cherax*	2011	1	-	-	VBA within 10 kilometres
INVERTEBRATES						

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	Hollow Use	Mi/ Ma	Source
Golden Sun Moth	*Synemon plana*	2009	1	-	-	VBA (Site 3)
Yellow Sedge-skipper	*Hesperilla flavescens flavescens*	1988	1	-	-	VBA (Site 3)

Notes:

1) Listed as:
EN - Endangered under the EPBC Act
Threatened (L) under the FFG Act
Endangered (e), Vulnerable (v) or Near Threatened (nt) on the Victorian Advisory List (DEPI 2014)

2) Data sources (Section 2.1 and Table 1):

VBA Sites: Refer Figure 4

eBird Sites: Refer Figure 4:

Site 1: Bacchus Marsh Rd at Patullos Rd, Lovely Banks
Site 2: Bacchus Marsh Rd at Elcho Rd, Lara
Site 3: Elcho Park Recreation Reserve
Site 4: Bacchus Marsh Rd, b/w Gibbons Rd and Heales Rd, Lara
Site 5: Bacchus Marsh Rd at Heales Rd, Lara
Site 6: Princes Freeway at Bacchus Marsh Rd, Corio
Site 7: Princes Freeway at Service Centres, Lovely Banks
Site 8: Purnell Rd Linear Trail, Corio
Site 9: Princes Freeway at Anakie Rd, Lovely Banks
Site 10: Lovely Banks
Site 11: Corio.

APPENDIX C – SIGNIFICANT FLORA SPECIES RECORDED WITHIN THE PROJECT LOCALITY

Table C1 Significant flora species recorded within 10 kilometres of the study area.

Scientific name	Common name	Last record[1]	Total # records	EPBC[2]	FFG[3]	Vic[4]	Likelihood of Occurrence
NATIONAL SIGNIFICANCE							
Caladenia pumila #	Dwarf Spider-orchid	-	-	CR	L	e	5
Dianella amoena	Matted Flax-lily	12	2014	EN	L	e	5
Diuris basaltica	Small Golden Moths	1	1998	EN	L	e	5
Euphrasia collina subsp. *muelleri*	Purple Eyebright	2	1853	EN	L	e	5
Glycine latrobeana #	Clover Glycine	-	-	VU	L	v	5
Lachnagrostis adamsonii	Adamson's Blown-grass	8	2002	EN	L	v	5
Leucochrysum albicans subsp. *tricolor*	White Sunray	1	1853	EN	L	e	5
Pimelea spinescens subsp. *spinescens*	Spiny Rice-flower	182	2014	CR	L	e	3
Prasophyllum frenchii #	Maroon Leek-orchid	-	-	EN	L	e	5
Prasophyllum spicatum	Dense Leek-orchid	1	1925	VU		e	5
Prasophyllum suaveolens	Fragrant Leek-orchid	1	1924	EN	L	e	5
Pterostylis cucullata #	Leafy Greenhood	-	-	VU	L	v	5
Rutidosis leptorhynchoides	Button Wrinklewort	16	2010	EN	L	e	5
Senecio macrocarpus	Large-headed Fireweed	34	2011	VU	L	e	3
Thelymitra epipactoides #	Metallic Sun-orchid	-	-	EN	L	e	5
Xerochrysum palustre #	Swamp Everlasting	-	-	VU	L	v	5
STATE SIGNIFICANCE							
Acacia boormanii	Snowy River Wattle	1	2002	-	-	r	5
Acacia cupularis	Cup Wattle	1	1983	-	-	r	5
Allocasuarina luehmannii	Buloke	3	2007	-	L	e	5
Amyema pendula subsp. *longifolia*	Drooping Mistletoe	1	2002	-	-	r	5

Atriplex paludosa subsp. *paludosa*	Marsh Saltbush	6	1994	-	-	r	5
Avicennia marina subsp. *australasica*	Grey Mangrove	3	2003	-	-	r	5
Brachyscome cuneifolia	Wedge-leaf Daisy	1	2002	-	-	k	5
Callitriche palustris var. *palustris*	Swamp Water-starwort	1	1986	-	-	k	5
Cardamine tenuifolia	Slender Bitter-cress	1	1986	-	-	P	5
Comesperma polygaloides	Small Milkwort	13	2011	-	L	v	4
Convolvulus angustissimus subsp. *omnigracilis*	Slender Bindweed	2	2012	-	-	k	2
Cullen parvum	Small Scurf-pea	2	1924	-	L	e	5
Desmodium varians	Slender Tick-trefoil	1	1871	-	-	k	4
Dianella sp. aff. *longifolia (*Benambra)	Arching Flax-lily	5	2011	-	-	v	4
Diuris palustris	Swamp Diuris	5	1971	-	L	v	5
Eucalyptus leucoxylon subsp. *connata*	Melbourne Yellow-gum	2	2009	-	-	v	5
Grevillea chrysophaea	Golden Grevillea	1	1770	-	-	r	5
Grevillea rosmarinifolia	Rosemary Grevillea	1	1770	-	-	P	5
Grevillea steiglitziana	Brisbane Range Grevillea	1	1770	-	-	r	5
Heterozostera tasmanica	Tasman Grass-wrack	1	2005	-	-	r	5
Lachnagrostis robusta	Salt Blown-grass	2	1997	-	-	r	4
Lepidosperma canescens	Hoary Rapier-sedge	1	2007	-	-	r	5
Leptorhynchos elongatus	Lanky Buttons	1	1770	-	-	e	5
Maireana aphylla	Leafless Bluebush	3	1992	-	-	k	1
Nicotiana maritima	Coast Tobacco	1	1986	-	-	e	5
Nicotiana suaveolens	Austral Tobacco	11	2012	-	-	r	4
Olearia pannosa subsp. *cardiophylla*	Velvet Daisy-bush	1	1977	-	L	v	5
Pleurosorus subglandulosus	Glandular Blanket-fern	1	1770	-	-	k	5
Pomaderris halmaturina subsp. *continentis*	Glenelg Pomaderris	1	1883	-	-	r	5
Prostanthera nivea var. *nivea*	Snowy Mint-bush	11	2012	-	-	r	5
Pterostylis truncata	Brittle Greenhood	206	2014	-	L	e	5
Rhagodia parabolica	Fragrant Saltbush	16	2014	-	-	r	4
Ruppia tuberosa	Tuberous Tassel	1	2000	-	-	k	5

Rytidosperma monticola	Small-flower Wallaby-grass	1	2008	-	-	r	5
Rytidosperma richardsonii	Straw Wallaby-grass	1	1961	-	-	v	3
Salsola tragus subsp. *pontica*	Coast Saltwort	3	2005	-	-	r	5
Swainsona behriana	Southern Swainson-pea	2	1926	-	-	r	5
Thelymitra circumsepta	Naked Sun-orchid	1	1770	-	-	v	5
Triodia bunicola	Southern Porcupine Grass	1	1770	-	-	k	5
Tripogon loliiformis	Rye Beetle-grass	3	1998	-	-	r	3

Notes:

1) **#** - Species only nominated by the EPBC Act PMST (not previously recorded within 10 kilometres of the study area)

2) Listed as Critically Endangered (CR), Endangered (E) or Vulnerable (V) under the EPBC Act

3) Listed (L) under the FFG Act

4) Listed as Endangered (e), Vulnerable (v), Rare (r) or Status Poorly Known (k) on the Victoria Advisory List (DEPI 2014)

5) Likelihood of occurrence ratings: **1 Known Occurrence** - Recorded within the project locality recently (i.e. within ten years), **2 High Likelihood** - Previous records of the species in the local vicinity; and/or, the study area contains areas of high quality habitat, **3 Moderate Likelihood** - Limited previous records of the species in the local vicinity; and/or, the study area contains poor or limited habitat, **4 Low Likelihood** - Poor or limited habitat for the species however other evidence (such as a lack of records or environmental factors) indicates there is a very low likelihood of presence, **5 Unlikely** - No suitable habitat and/or outside the species range.

APPENDIX D – SIGNIFICANT FAUNA SPECIES RECORDED WITHIN THE PROJECT LOCALITY

Table D1 Significant fauna species recorded within 10 kilometres of the study area.

Common Name	Scientific Name	Last record [1]	Total # records	EPBC[2]	FFG[3]	Vic[4]	Likelihood of Occurrence
NATIONAL SIGNIFICANCE							
Swamp Antechinus	*Antechinus minimus maritimus*	#	1	VU	L	nt	4
Eastern Barred Bandicoot	*Perameles gunnii*	1980	36	EN	L	x	4
Grey-headed Flying-fox	*Pteropus poliocephalus*	2004	7	VU	L	vu	2
Australasian Bittern	*Botaurus poiciloptilus*	1990	4	EN	L	en	4
Plains-wanderer	*Pedionomus torquatus*	#	1	CR	L	cr	4
Australian Painted Snipe	*Rostratula australis*	#	1	VU	L	cr	4
Swift Parrot	*Lathamus discolor*	2008	49	CR	L	en	3
Regent Honeyeater	*Anthochaera phrygia*	1993	4	CR	L	cr	4
Painted Honeyeater	*Grantiella picta*	2006	6	VU	L	vu	4
Striped Legless Lizard	*Delma impar*	1992	1	VU	L	en	2
Grassland Earless Dragon	*Tympanocryptis pinguicolla*	#	1	EN	L	cr	4
Growling Grass Frog	*Litoria raniformis*	2010	9	VU	L	en	3

Common Name	Scientific Name	Last record [1]	Total # records	EPBC[2]	FFG[3]	Vic[4]	Likelihood of Occurrence
Dwarf Galaxias	*Galaxiella pusilla*	#	1	VU	L	en	4
Australian Grayling	*Prototroctes maraena*	1998	41	VU	L	vu	4
Murray Cod	*Maccullochella peelii*	1873	1	VU	L	vu	4
Macquarie Perch	*Macquaria australasica*	1981	6	EN	L	en	4
Yarra Pygmy Perch	*Nannoperca obscura*	#	1	VU	L	vu	4
Golden Sun Moth	*Synemon plana*	2009	1	CR	L	cr	1
STATE SIGNIFICANCE							
Common Dunnart	*Sminthopsis murina murina*	1964	1	-	-	vu	1
Magpie Goose	*Anseranas semipalmata*	2006	116	-	L	Nt	4
Musk Duck	*Biziura lobata*	2006	69	-	-	vu	3
Freckled Duck	*Stictonetta naevosa*	1992	5	-	L	en	3
Australasian Shoveler	*Anas rhynchotis*	1993	48	-	-	vu	3
Hardhead	*Aythya australis*	2013	140	-	-	vu	1
Blue-billed Duck	*Oxyura australis*	2000	29	-	L	en	3
Diamond Dove	*Geopelia cuneata*	1977	1	-	L	nt	4
White-throated Needletail	*Hirundapus caudacutus*	2007	20	-	-	vu	4

Common Name	Scientific Name	Last record [1]	Total # records	EPBC[2]	FFG[3]	Vic[4]	Likelihood of Occurrence
Little Bittern	*Ixobrychus minutus dubius*	1970	1	-	L	en	3
Eastern Great Egret	*Ardea modesta*	2014	129	-	L	vu	3
Intermediate Egret	*Ardea intermedia*	2001	9	-	L	en	3
Little Egret	*Egretta garzetta nigripes*	2013	113	-	L	en	3
Square-tailed Kite	*Lophoictinia isura*	2008	1	-	L	vu	2
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	2007	7	-	L	vu	3
Grey Goshawk	*Accipiter novaehollandiae novaehollandiae*	2007	23	-	L	vu	2
Black Falcon	*Falco subniger*	2012	13	-	-	vu	2
Brolga	*Grus rubicunda*	2012	8	-	L	vu	4
Lewin's Rail	*Lewinia pectoralis pectoralis*	2006	6	-	L	vu	3
Baillon's Crake	*Porzana pusilla palustris*	2010	5	-	L	vu	3
Major Mitchell's Cockatoo	*Lophocroa leadbeateri*	2005	5	-	L	vu	3
Bush Stone-curlew	*Burhinus grallarius*	1961	3	-	L	en	4
Little Tern	*Sternula albifrons sinensis*	1999	17	-	L	vu	4
Elegant Parrot	*Neophema elegans*	1993	1	-	-	vu	4
Powerful Owl	*Ninox strenua*	1987	5	-	L	vu	4

Common Name	Scientific Name	Last record [1]	Total # records	EPBC[2]	FFG[3]	Vic[4]	Likelihood of Occurrence
Barking Owl	*Ninox connivens connivens*	2006	2	-	L	en	4
Masked Owl	*Tyto novaehollandiae novaehollandiae*	1984	2	-	L	en	4
Brown Treecreeper	*Climacteris picumnus victoriae*	2007	28	-	-	nt	4
Chestnut-rumped Heathwren	*Calamanthus pyrrhopygius*	1969	4	-	L	vu	4
Speckled Warbler	*Chthonicola sagittatus*	2006	19	-	L	vu	4
Grey-crowned Babbler	*Pomatostomus temporalis temporalis*	1960	2	-	L	en	4
Hooded Robin	*Melanodryas cucullata cucullata*	1999	17	-	L	nt	3
Diamond Firetail	*Stagonopleura guttata*	2007	83	-	L	nt	3
Brown Toadlet	*Pseudophryne bibronii*	1977	23	-	L	En	4
Yellow Sedge-skipper	*Hesperilla flavescens flavescens*	1988	1	-	L	vu	4
REGIONAL SIGNIFICANCE							
Fat-tailed Dunnart	*Sminthopsis crassicaudata*	1973	2	-	-	nt	1
Common Diving-Petrel	*Pelecanoides urinatrix*	1978	2	-	-	nt	4
Pied Cormorant	*Phalacrocorax varius*	2014	127	-	-	nt	3
Black-faced Cormorant	*Phalacrocorax fuscescens*	2001	2	-	-	nt	4
Nankeen Night Heron	*Nycticorax caledonicus hillii*	2010	81	-	-	nt	4

Common Name	Scientific Name	Last record [1]	Total # records	EPBC[2]	FFG[3]	Vic[4]	Likelihood of Occurrence
Glossy Ibis	*Plegadis falcinellus*	1991	2	-	-	nt	3
Royal Spoonbill	*Platalea regia*	2013	137	-	-	nt	3
Spotted Harrier	*Circus assimilis*	2013	15	-	-	nt	1
Latham's Snipe	*Gallinago hardwickii*	2014	33	-	-	nt	4
Little Button-quail	*Turnix velox*	1977	2	-	-	nt	4
Whiskered Tern	*Chlidonias hybridus javanicus*	2014	43	-	-	nt	4
Pacific Gull	*Larus pacificus pacificus*	2014	143	-	-	nt	4
Black-eared Cuckoo	*Chrysococcyx osculans*	2008	14	-	-	nt	4
Azure Kingfisher	*Alcedo azurea*	1981	2	-	-	nt	4
Red-backed Kingfisher	*Todiramphus pyrropygia pyrropygia*	2008	2	-	-	nt	4
Spotted Quail-thrush	*Cinclosoma punctatum*	1976	2	-	-	nt	4

Notes:

1) # - Species only nominated by the EPBC Act PMST (not previously recorded within 10 kilometres of the study area)

2) Listed as Critically Endangered (CR), Endangered (E) or Vulnerable (V)) under the EPBC Act

3) Listed (L) under the FFG Act

4) Listed as Extinct (ex), Critically Endangered (cr), Endangered (e), Vulnerable (v) or Near Threatened (nt) on the Victoria Advisory List (DSE 2009;2013).

5) Likelihood of occurrence ratings:

1	**High Likelihood**	Known resident in the Study area based on site observations, database records, or expert advice; and/or, Recent records (i.e. within five years) of the species in the local area (VBA 2011); and/or, The Study area contains the species' preferred habitat.	2	**Moderate Likelihood**	The species is likely to visit the Study area regularly (i.e. at least seasonally); and/or, Previous records of the species in the local area (DSE 2011b); and/or, The Study area contains some characteristics of the species' preferred habitat.
3	**Low Likelihood**	The species is likely to visit the Study area occasionally or opportunistically whilst en route to more suitable sites; and/or, There are only limited or historical records of the species in the local area (i.e. more than 20 years old); and/or, The Study area contains few or no characteristics of the species' preferred habitat.	4	**Unlikely**	No previous records of the species in the local area; and/or, The species may fly over the Study area when moving between areas of more suitable habitat; and/or, Out of the species' range; and/or, No suitable habitat present.

APPENDIX E - COUNCIL MAPPED BIOSITES

Table E1 Council Mapped BioSites

CoGG Site No	ID Number (Figure 2)	EVC No	EVC Name	Road Name	Land Tenure	Data Source	Area (ha)	Total Habitat Hectares	Species Recorded[1]
1002225	89	132_63	Low-rainfall Plains Grassland	Evans Road	Roadside	EHP	0.265	0.07	Wild Oat *Avena fatua*, Common Wallaby-grass *Rytidosperma caespitosum*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*
1002226	90	132_63	Low-rainfall Plains Grassland	Evans Road	Roadside	EHP	0.262	0.07	Wild Oat *Avena fatua*, Common Wallaby-grass *Rytidosperma caespitosum*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*
1002227	91	132_63	Low-rainfall Plains Grassland	Evans Road	Roadside	EHP	0.243	0.05	Wild Oat *Avena fatua*, Common Wallaby-grass *Rytidosperma caespitosum*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*
1002228	92	132_63	Low-rainfall Plains Grassland	Braemar Court	Roadside	EHP	0.052	0.01	Wild Oat *Avena fatua*, Common Wallaby-grass *Rytidosperma caespitosum*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*
1002229	93	132_63	Low-rainfall Plains Grassland	Braemar Court	Roadside	EHP	0.065	0.01	Ribwort *Plantago lanceolata,* Common Wallaby-grass *Rytidosperma caespitosum*, Kneed Spear-grass *Austrostipa bigeniculata*
1002230	94	132_63	Low-rainfall Plains Grassland	Viewhill Road	Roadside	EHP	0.009	<0.01	Windmill Grass *Chloris truncata*, Cocksfoot *Dactylis glomerata*, Common Wallaby-grass *Rytidosperma caespitosum*, African Box-thorn *Lycium ferocissimum*, Ribwort *Plantago lanceolata*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*
1002231	95	132_63	Low-rainfall Plains Grassland	Blueview Place	Roadside	EHP	0.017	<0.01	Wild Oat *Avena fatua*, Common Wallaby-grass *Rytidosperma caespitosum*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*
1002232	96	132_63	Low-rainfall Plains Grassland	Blueview Place	Roadside	EHP	0.019	<0.01	Wild Oat *Avena fatua*, Common Wallaby-grass *Rytidosperma caespitosum*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*

CoGG Site No	ID Number (Figure 2)	EVC No	EVC Name	Road Name	Land Tenure	Data Source	Area (ha)	Total Habitat Hectares	Species Recorded[1]
1002234	98	132_63	Low-rainfall Plains Grassland	Viewbank Rise	Roadside	EHP	0.037	<0.01	Windmill Grass *Chloris truncata*, Common Wallaby-grass *Rytidosperma caespitosum*, Galenia *Galenia pubescens* var. *pubescens*, Ox-tongue *Helminthotheca echioides*, Buck's-horn Plantain *Plantago coronopus*, Ribwort *Plantago lanceolata*, Kneed Spear-grass *Austrostipa bigeniculata*
1002235	99	132_63	Low-rainfall Plains Grassland	Viewbank Rise	Roadside	EHP	0.034	0.01	Wild Oat *Avena fatua*, Common Wallaby-grass *Rytidosperma caespitosum*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*
1002236	100	132_63	Low-rainfall Plains Grassland	Viewbank Rise	Roadside	EHP	0.024	0.01	Wild Oat *Avena fatua*, Common Wallaby-grass *Rytidosperma caespitosum*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*
1002237	101	132_63	Low-rainfall Plains Grassland	Viewbank Rise	Roadside	EHP	0.018	<0.01	Wild Oat *Avena fatua*, Common Wallaby-grass *Rytidosperma caespitosum*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*
1002238	102	132_63	Low-rainfall Plains Grassland	Viewbay Court	Roadside	EHP	0.025	0.01	Wild Oat *Avena fatua*, Common Wallaby-grass *Rytidosperma caespitosum*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*
1002239	103	132_63	Low-rainfall Plains Grassland	Resibee Street	Roadside	EHP	0.052	0.01	Wild Oat *Avena fatua*, Common Wallaby-grass *Rytidosperma caespitosum*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*
1002240	104	132_63	Low-rainfall Plains Grassland	Resibee Street	Roadside	EHP	0.015	<0.01	Wild Oat *Avena fatua*, Common Wallaby-grass *Rytidosperma caespitosum*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*
1002241	105	132_63	Low-rainfall Plains Grassland	Heales Road	Roadside	EHP	0.186	0.08	Berry Saltbush *Atriplex semibaccata*, Common Wallaby-grass *Rytidosperma caespitosum*, Galenia *Galenia pubescens var. pubescens*, African Box-thorn *Lycium ferocissimum*, Short-leaf Bluebush *Maireana brevifolia*, Serrated Tussock *Nassella trichotoma*, Black Roly-poly *Sclerolaena muricata*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*

CoGG Site No	ID Number (Figure 2)	EVC No	EVC Name	Road Name	Land Tenure	Data Source	Area (ha)	Total Habitat Hectares	Species Recorded[1]
1002242	106	132_63	Low-rainfall Plains Grassland	Houston Road	Roadside	EHP	0.577	0.17	Berry Saltbush *Atriplex semibaccata*, Windmill Grass *Chloris truncata*, Common Wallaby-grass *Rytidosperma caespitosum*, Serrated Tussock *Nassella trichotoma*, Ribwort *Plantago lanceolata*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*
1002243	107	132_63	Low-rainfall Plains Grassland	Houston Road	Roadside	EHP	0.415	0.11	Berry Saltbush *Atriplex semibaccata*, Windmill Grass *Chloris truncata*, Common Wallaby-grass *Rytidosperma caespitosum*, Serrated Tussock *Nassella trichotoma*, Ribwort *Plantago lanceolata*, Black Roly-poly *Sclerolaena muricata*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*
1002244	108	132_63	Low-rainfall Plains Grassland	Houston Road	Roadside	EHP	0.478	0.12	Berry Saltbush *Atriplex semibaccata*, Windmill Grass *Chloris truncata*, Common Wallaby-grass *Rytidosperma caespitosum*, Serrated Tussock *Nassella trichotoma*, Ribwort *Plantago lanceolata*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*
1002245	109	132_63	Low-rainfall Plains Grassland	Houston Road	Roadside	EHP	0.287	0.07	Windmill Grass *Chloris truncata*, Common Wallaby-grass *Rytidosperma caespitosum*, Serrated Tussock *Nassella trichotoma*, Ribwort *Plantago lanceolata*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*
1002246	110	132_63	Low-rainfall Plains Grassland	Houston Road	Roadside	EHP	0.070	0.02	Berry Saltbush *Atriplex semibaccata*, Windmill Grass *Chloris truncata*, Common Wallaby-grass *Rytidosperma caespitosum*, Serrated Tussock *Nassella trichotoma*, Ribwort *Plantago lanceolata*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*
1002247	111	132_63	Low-rainfall Plains Grassland	Houston Road	Roadside	EHP	0.079	0.02	Berry Saltbush *Atriplex semibaccata*, Windmill Grass *Chloris truncata*, Common Wallaby-grass *Rytidosperma caespitosum*, Serrated Tussock *Nassella trichotoma*, Ribwort *Plantago lanceolata*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*

CoGG Site No	ID Number (Figure 2)	EVC No	EVC Name	Road Name	Land Tenure	Data Source	Area (ha)	Total Habitat Hectares	Species Recorded[1]
1002248	112	132_63	Low-rainfall Plains Grassland	Apollo Drive	Roadside	EHP	0.021	0.01	Berry Saltbush *Atriplex semibaccata*, Windmill Grass *Chloris truncata*, Common Wallaby-grass *Rytidosperma caespitosum*, Serrated Tussock *Nassella trichotoma*, Ribwort *Plantago lanceolata*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*
1002249	113	132_63	Low-rainfall Plains Grassland	Apollo Drive	Roadside	EHP	0.161	0.05	Berry Saltbush *Atriplex semibaccata*, Windmill Grass *Chloris truncata*, Common Wallaby-grass *Rytidosperma caespitosum*, Serrated Tussock *Nassella trichotoma*, Ribwort *Plantago lanceolata*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*
1002250	114	132_63	Low-rainfall Plains Grassland	Tillys Road	Roadside	EHP	0.044	0.01	Berry Saltbush *Atriplex semibaccata*, Windmill Grass *Chloris truncata*, Common Wallaby-grass *Rytidosperma caespitosum*, Serrated Tussock *Nassella trichotoma*, Ribwort *Plantago lanceolata*, Black Roly-poly *Sclerolaena muricata*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*
1002251	115	132_63	Low-rainfall Plains Grassland	Tillys Road	Roadside	EHP	0.036	0.01	Berry Saltbush *Atriplex semibaccata*, Windmill Grass *Chloris truncata*, Common Wallaby-grass *Rytidosperma caespitosum*, Serrated Tussock *Nassella trichotoma*, Ribwort *Plantago lanceolata*, Black Roly-poly *Sclerolaena muricata*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*
1002252	116	132_63	Low-rainfall Plains Grassland	Tillys Road	Roadside	EHP	0.025	0.01	Berry Saltbush *Atriplex semibaccata*, Windmill Grass *Chloris truncata*, Common Wallaby-grass *Rytidosperma caespitosum*, Ribwort *Plantago lanceolata*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*
1002253	117	132_63	Low-rainfall Plains Grassland	Frys Road	Roadside	EHP	0.026	0.01	Berry Saltbush *Atriplex semibaccata*, Windmill Grass *Chloris truncata*, Common Wallaby-grass *Rytidosperma caespitosum*, Ribwort *Plantago lanceolata*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*

CoGG Site No	ID Number (Figure 2)	EVC No	EVC Name	Road Name	Land Tenure	Data Source	Area (ha)	Total Habitat Hectares	Species Recorded[1]
1002254	118	132_63	Low-rainfall Plains Grassland	Karlton Close	Roadside	EHP	0.023	<0.01	Berry Saltbush *Atriplex semibaccata*, Windmill Grass *Chloris truncata*, Common Wallaby-grass *Rytidosperma caespitosum*, Ribwort *Plantago lanceolata*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*
1002255	119	132_63	Low-rainfall Plains Grassland	McNeil Court	Roadside	EHP	0.022	<0.01	Berry Saltbush *Atriplex semibaccata*, Windmill Grass *Chloris truncata*, Common Wallaby-grass *Rytidosperma caespitosum*, Ribwort *Plantago lanceolata*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*
1002256	120	132_63	Low-rainfall Plains Grassland	McNeil Court	Roadside	EHP	0.214	0.05	Berry Saltbush *Atriplex semibaccata*, Windmill Grass *Chloris truncata*, Common Wallaby-grass *Rytidosperma caespitosum*, Ribwort *Plantago lanceolata*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*
1002257	121	132_63	Low-rainfall Plains Grassland	Eva Place	Roadside	EHP	0.106	0.03	Berry Saltbush *Atriplex semibaccata*, Windmill Grass *Chloris truncata*, Common Wallaby-grass *Rytidosperma caespitosum*, Ribwort *Plantago lanceolata*, Kneed Spear-grass *Austrostipa bigeniculata*, Chilean Needle-grass *Nassella neesiana*