MANZEENE AVENUE, LARA

FLORA, FAUNA AND HABITAT HECTARE ASSESSSMENT

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Revision	Date	Author/s	Reviewer	Revisions
1.0	10/02/2012	Teisha Sloane and Rachel Omodei	Inga Kulik	Initial Draft
1.1	17/05/2012	Rachel Omodei	Inga Kulik	Amendments to address areas of vegetation previously unassessable
1.2	31/07/2012	Inga Kulik	-	Minor editorial amendments
1.3	04/02/2013	Rachel Omodei	Inga Kulik	Amendments to incorporate findings of Golden Sun Moth targeted surveys

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1. EXECUTIVE SUMMARY

Manzeene Avenue Development Trust engaged BL&A to conduct a Flora, Fauna and Habitat Hectare Assessment for a 60 hectare area of land consisting of properties on and around Manzeene Avenue, Lara. These properties are proposed for residential subdivision.

The study area consisted of disturbed and degraded patches of indigenous vegetation, combined with planted trees and gardens. Remnant patches of indigenous vegetation were small and scattered and contained low indigenous species diversity. A habitat hectare assessment recorded:

- 3.2 habitat hectares (10.46 hectares) of high conservation significance *Low-rainfall* Plains Grassland (EVC 132_63); and
- 1.94 habitat hectares (7.23 hectares) of high conservation significance *Low-rainfall* Plains Grassland (EVC 132_63).

No rare or threatened flora or fauna species were recorded on site.

The following recommendations are provided to aid in meeting the principles of the Framework:

- Following the principles of the Framework, indigenous vegetation removal should be avoided where possible. This is unlikely due to the scattered location of remnant patches and therefore the development plan should minimise indigenous vegetation removal.
- Removal of indigenous vegetation of Very High conservation significance should be preferred for retention over those of lower conservation significance.
- Removal of any vegetation that cannot be avoided must be offset as per the Framework.
- Where possible, existing planted trees, in particular old ones, should be retained and incorporated into the development plan. Whilst not indigenous, these trees are a valuable resource for native birds in the area.

The following implications would pertain to the current development proposal:

- A planning permit under Clause 52.17 of all Victorian Planning Schemes would be required for the removal of any indigenous vegetation from the study site, including scattered plants.
- The study area is not subject to any overlays in the Greater Geelong Planning Scheme.
- A referral to DSE would be required if the proposed development of the study area involved the removal of more than 0.5 hectares of *Low-rainfall* Plains Grassland (EVC 132_63) recorded on site.
- A Referral under the EPBC Act would be required for the removal of Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP).
- The removal of the FFG Act listed Western (Basalt) Plains Grassland Community will be considered by the responsible authority during the application process.

- A Referral to the State Minister under the EE Act is dependent on the development plan.
- Three EBPC Act listed migratory bird species are also likely to occur occasionally. Impacts on listed migratory bird species would be unlikely, as they are highly mobile and would occur in the study area only occasionally. Regional population impacts on these species are therefore not considered to be significant.
- Noise disturbance during construction activities is likely to have a short-term impact on fauna species which may result in temporary habitat displacement. However, considering the extent of available habitat in the surrounding area it is unlikely that the proposed development would result in a significant impact on these species.
- One threatened fauna species, Spotted Harrier, was considered likely to occur due to the presence of suitable habitat. This species is not considered susceptible to significant impacts from the proposed development as it would occur only in very small numbers and is unlikely to be significantly affected by the current proposal due to its high mobility to move away from disturbance.

2. INTRODUCTION

Manzeene Avenue Development Trust engaged BL&A to conduct a Flora, Fauna and Habitat Hectare Assessment for a 60 hectare area of land consisting of properties on and around Manzeene Avenue, Lara. These properties are proposed for residential subdivision.

This investigation was commissioned to provide information on the extent and condition of native vegetation and fauna habitat in the study area. This report outlines any implications under various national, state and local legislation and policy, including Victoria's Native Vegetation Management Framework (DNRE 2002), referred to herein as the 'Framework'.

Specifically, the scope of the investigation included:

- A review of existing information on flora and fauna of the area (e.g. DSE Flora Information System and Atlas of Victorian Wildlife; EPBC Act Protected Matters Search Tool);
- A site survey involving:
    - Characterisation and mapping of remnant native vegetation on the site;
    - Assessment of native vegetation in accordance with Victoria's Native Vegetation Management Framework (including habitat hectare assessment and/or scattered tree assessment);
    - Assessment of the nature and quality of native fauna habitat;
    - Assessment of the likelihood of occurrence of threatened flora and fauna in the area; and
    - Compilation of flora and fauna species lists for the site.
- Preparation of a map of the site showing the results of the assessment.

This report is divided into the following sections:

Section 3 describes the sources of information, including the methods used for the field survey.

Section 4 provides an overview of the characteristics of the study area.

Section 5 presents the investigation results, describing the flora and fauna of the study area.

Section 6 discusses the implications of the findings under relevant Commonwealth, State and local legislation and policies.

Section 7 provides recommendations to inform the design process and assist the development of a minimum impact proposal.

This investigation was undertaken by a team from BL&A, comprising Rachel Omodei (Botanist), Teisha Sloane (Zoologist) and Inga Kulik (Senior Ecologist & Project Manager).

3. SOURCES OF INFORMATION

3.1. Existing information

Existing information used for this investigation is described below. Note that 'study area' refers to properties located along Manzeene Avenue, Lara, as well as adjoining properties along Kees Road and Patullos Road (Figure 1).

Existing information has been obtained from a wider area, termed the 'search region' defined for this assessment as an area with radius ten kilometres from the approximate centre point of the study area of coordinates: latitude 38˚ 00' 52" S and longitude 144˚ 22' 53" E. This provided an indication of threatened species and communities that have the potential to occur in the study area.

3.1.1. Flora

A list of the flora species recorded in the search region was obtained from the Viridans Flora Information System (FIS), a database administered by the Department of Sustainability and Environment (DSE) (Viridans Biological Databases 2011a). This database search listed all plant species, including rare and threatened plants found in the search region. The Victorian Biodiversity Atlas Flora records were also reviewed. Plant taxonomy used throughout this report follows the FIS standards.

The likelihood of suitable habitat in the study area for nationally threatened flora species was ascertained through a search of the online *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool (DSEWPC 2011) using the same search region.

3.1.2. Ecological Vegetation Classes

Pre-1750 (pre-European settlement) vegetation mapping was reviewed to determine the type of native vegetation likely to occur in the study area. Information on Ecological Vegetation Classes was obtained from published EVC benchmarks. These sources included:

- Relevant EVC benchmarks for the Victorian Volcanic Plain bioregion[1] (DSE 2011a); and
- Biodiversity Interactive Maps (DSE 2011b).

The likelihood of EPBC Act threatened ecological communities in the study area was ascertained through a search of the online *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool (DSEWPC 2011) using the search region outlined above.

3.1.3. Fauna

A list of the fauna species recorded in the search region was obtained from the Atlas of Victorian Wildlife (AVW), a database administered by DSE (Viridans

[1] A bioregion is defined as "a geographic region that captures the patterns of ecological characteristics in the landscape, providing a natural framework for recognising and responding to biodiversity values". In general bioregions reflect underlying environmental features of the landscape (DNRE 1997).

Biological Databases 2011b). The Victorian Biodiversity Atlas Fauna records were also reviewed. Fauna taxonomy used throughout this report follows the AVW nomenclature.

The presence or likelihood of occurrence in the study area of nationally threatened fauna species was obtained through the EPBC Act Protected Matters Search Tool (DSEWPC 2011).

3.2. Field methodology

The field assessment was conducted on the 20th January 2012. During this assessment, the study area was inspected initially by vehicle and areas supporting remnant native vegetation and/or fauna habitat were surveyed in more detail on foot.

A second field assessment was conducted on the 16th May 2012 to assess areas that were previously not able to be assessed due to extreme grazing and/or mowing. This assessment involved surveying the areas in detail on foot.

Sites in the study area found to support native vegetation and/or habitat for rare or threatened flora and/or fauna were mapped. Mapping was undertaken through a combination of aerial photograph interpretation and ground-truthing using a hand held GPS (accurate to approximately five metres).

3.2.1. Flora

Incidental records of flora species were made based on intuitive sampling methods within all vegetation types and landforms. Specimens requiring identification using laboratory techniques were collected.

3.2.2. Native vegetation

Native vegetation in Victoria has been defined as belonging to three categories (DNRE 2002):

- Remnant patch
- Scattered trees
- Degraded treeless vegetation

A description of these is provided below with the prescribed DSE methods to assess them.

Remnant patch

Remnant patches of native vegetation comprise indigenous plant species considered part of a clearly definable EVC and are defined by the DSE as:

- An area of native vegetation, with or without trees, where at least 25% of the understorey cover is indigenous (excluding bare ground), and/or
- "A group (i.e. three or more) of trees where the tree canopy cover is at least 20%" (DSE 2007a).

Remnant patch vegetation is assessed using the habitat scoring or habitat hectare method (Parkes *et al*. 2003; DSE 2004) whereby components of native vegetation (e.g. tree canopy, understorey and ground cover) are assessed against

a DSE-issued EVC benchmark (see appendices) that described the notional pre-European condition of that EVC. The score effectively measures the percentage resemblance of the vegetation to its original condition.

The habitat hectare score assists in defining the value of remnant native vegetation for assessing its conservation significance and for calculating offsets if removal of native vegetation is approved.

Scattered trees

DSE (2007a) define scattered trees as indigenous canopy trees with a diameter at breast height (1.3 metres) (DBH) greater than ten centimetres "within an area where at least 75% of the total understorey plant cover is introduced vegetation and the overall canopy cover for a group (i.e. three or more) of trees is less than 20%".

Scattered trees are counted and their DBH measured. The size class of scattered trees is based on the large tree DBH in the relevant benchmark for the EVC to which it once belonged.

Degraded treeless vegetation

Degraded treeless vegetation comprises all other vegetation (DSE 2007a), either:

- "Minor treeless vegetation" which is vegetation that does not have more than 25% understorey cover that is native or does not contain any canopy trees, or
- "Modified treeless vegetation" which is vegetation that has more than 25% understorey cover that is native, but is now dominated by species that are unlikely to have originally dominated the site. This may include such situations as former grasslands that have had a history of cropping, and now have an extremely modified cover consisting of a few opportunistic, primary colonising native grass species generally amongst exotic species, with little other indigenous diversity.

Minor treeless vegetation requires no further assessment or offsets.

The determination of a patch supporting modified treeless vegetation must be confirmed by DSE. In the case where modified treeless vegetation supports habitat for a rare or threatened species, this will be treated as a remnant patch. A habitat hectare assessment will be required and the conservation significance will be based on the determination of best 50% or remaining 50% habitat. Offsets will be required for the removal of this type of vegetation.

Modified treeless vegetation which does not support habitat for a rare or threatened species requires no further assessment or offsets.

3.2.3. Fauna

The following techniques were used to detect fauna species inhabiting the study area:

- Incidental searches for mammal scats, tracks and signs (e.g. diggings, signs of feeding and nests/burrows).
- Turning over logs and other ground debris for reptiles, frogs and mammals.
- Bird observation during the day.

- General searches for reptiles and frogs; including identification of frog calls in seasonally wet areas.
- General searches for bat habitat including waterbodies and potential roosting sites such as caves, dead trees with hollows and underneath bark of trees.

Fauna habitat types were characterised in the study area and are described in Section 5.2.1. The quality of fauna habitat was assessed based on the criteria detailed below. These are based on habitat components which include including old-growth trees, fallen timber, leaf litter and surface rocks. Three quality categories were used, as described below:

High: The majority of fauna habitat components are present and habitat linkages to other remnant ecosystems in the landscape are intact.

Moderate: The majority of fauna habitat components are present but habitat linkages to other remnant ecosystems in the landscape are absent; or

The majority of habitat components are absent but habitat linkages to other remnant ecosystems in the landscape are intact.

Low: The majority of fauna habitat components are absent and habitat linkages to other remnant ecosystems in the landscape are absent.

3.3. Limitations of field assessment

Where feasible, all efforts are made to schedule flora and fauna field surveys in optimal weather conditions and times of year. Nevertheless, field surveys usually fail to record all species present for various reasons, including the seasonal absence of some species and short survey duration. Rare or cryptic species are often missed in short surveys.

Detailed flora surveying was carried out in summer, when many annual and spring-emergent plant species may have been absent or in the senescent stage of their life-cycle and lacking essential identification characteristics. During the initial assessment some areas of the study area had been slashed or grazed to heights that made species identification and percentage cover estimation difficult. Consequently, these areas were not assessed during the initial investigation. Land owners of these areas were encouraged to reduce or eliminate mowing and grazing to allow vegetation to regrow and enable vegetation identification. A re-assessment was undertaken approximately four months later and the vegetation was able to be assessed. The timing of the survey and condition of vegetation was otherwise considered suitable to ascertain the extent and quality of native vegetation.

The fauna assessment was undertaken during warm and partly cloudy conditions. These conditions were considered suitable for detecting most species groups likely to occur in the study area. The survey was undertaken when most fauna species were present.

As the primary purpose of the investigation was to assess the extent and quality of native vegetation and fauna habitats in the study area and any potential impacts, the review of existing information, combined with the field survey were sufficient to complete this aspect of the assessment.

Wherever appropriate, a precautionary approach has been adopted in the discussion of implications. That is, where insufficient evidence is available on the occurrence or likelihood of occurrence of a species, it is assumed that it could be in an area of suitable habitat. The implications under legislation and policy are considered accordingly.

4. SITE DESCRIPTION

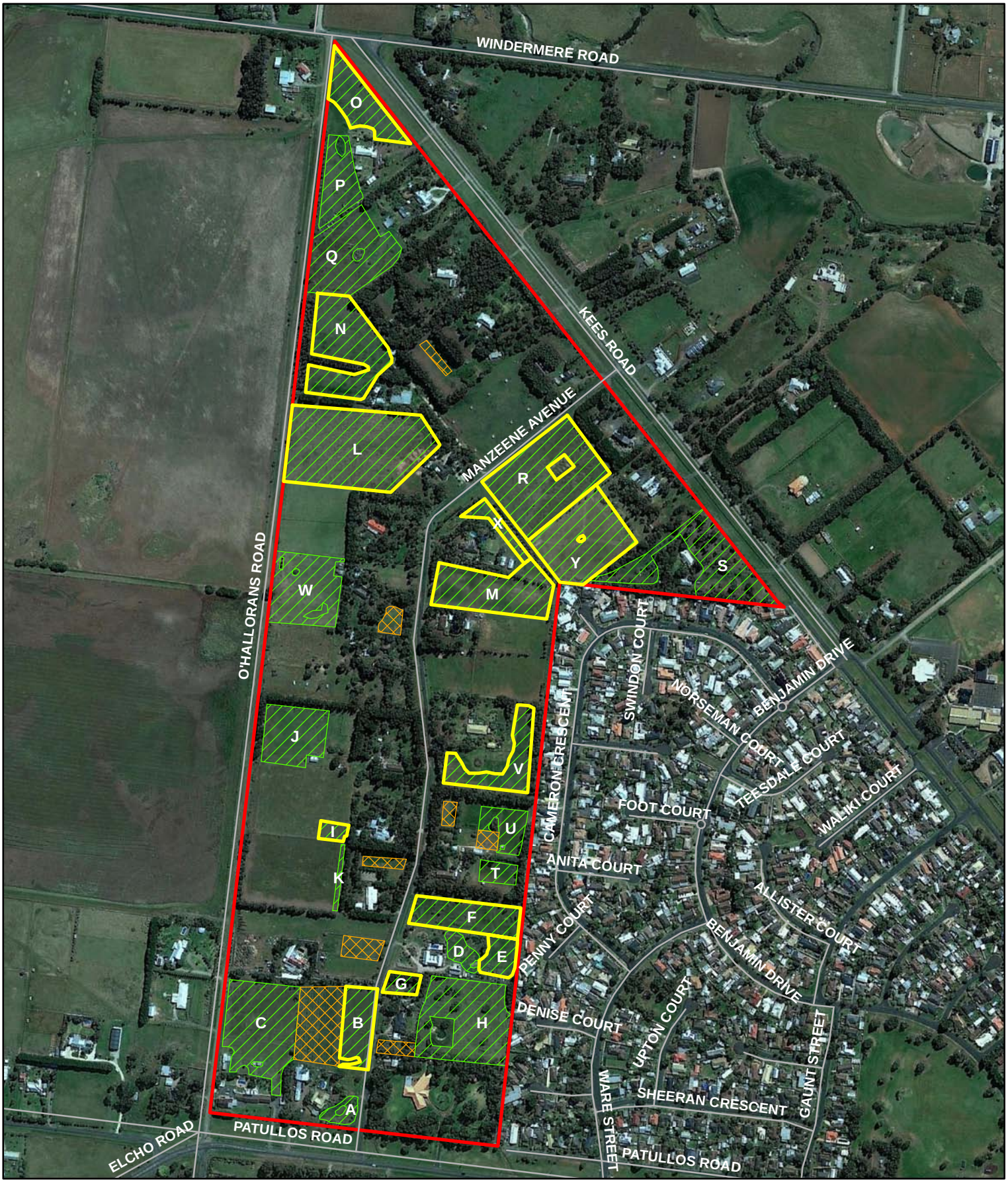
The study area for this investigation (Figure 1) is approximately 60 hectares of public and private land located at Lara, approximately 56 kilometres south-west of Melbourne. It is bordered by Patullos Road to the south, O'Hallorans Road to the west, Kees Road to the south-east and residential housing to the east.

The study area supported cracking basalt soils on a flat landscape. No standing water and few dams were present in the study area. The majority of the study area is used for horse and stock grazing. Much of the study area has been recently slashed.

The study area consisted of disturbed and degraded patches of indigenous vegetation, combined with planted trees and gardens. Remnant patches of indigenous vegetation were small and scattered and contained low indigenous species diversity. Common species were spear grasses, Windmill Grass and wallaby grasses. Other indigenous species such as Berry Saltbush and Bindweed were present. Weeds such as Galenia, Ribwort and Couch were dominant. High indigenous litter cover was present in most of the habitat zones.

The study area is surrounded by both residential and farmland. Connectivity to nearby grassland vegetation forms a network of wider, regional values and provides dispersal routes for species that may move between habitats. Likewise, planted trees within the study area provide a movement corridor for birds. Continuous grassland vegetation exists to the north and west of the study area. Surrounding land predominantly supports rural residential living on all sides except for the residential subdivision to the east.

The study area lies within the Victorian Volcanic Plain bioregion and falls within the Corangamite catchment. It is currently zoned Rural Living Zone (RLZ). No overlays relevant to this investigation cover the study area.



Legend

- Study Area
- Natural Temperate Grassland of Victorian Volcanic Plain (NTGVVP)

Native Vegetation

- *Low-rainfall* Plains Grassland (EVC 132_63)
- Minor Treeless Vegetation

0 100 200 400 Metres

Figure 1: Study Area and Native Vegetation

Project: Manzeene Avenue, Lara

Client: CPG Australia Pty Ltd

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5. ASSESSMENT RESULTS

5.1. Vegetation assessment

5.1.1. Flora species

During the field assessment 36 plant species were recorded. Of these, nine (25%) were indigenous and 27 (75%) were introduced or non-indigenous native in origin (Appendix 1).

FIS records (Viridans Biological Databases 2011a) and the EPBC Protected Matters Search Tool (DSEWPC 2011) indicate that within the search region there are records of, or there occurs potential suitable habitat for, 26 rare or threatened flora species. Of these, 10 species were listed under the federal EPBC Act, 11 on the state *Flora and Fauna Guarantee Act 1988* (FFG Act) and 26 on DSE's Advisory List for Rare and Threatened Flora (DSE 2007b). No rare or threatened flora species were detected during the current field survey.

The likelihood of occurrence in the study area of threatened species listed under the FFG Act or the EPBC Act is addressed in Table 1. Species that may occur in the study area are highlighted. This analysis indicates that no suitable habitat occurs on site for EPBC Act and FFG Act listed flora species.

Moreover, no DSE-listed flora species were considered to potentially occur in the study area.

Table 1: FFG Act and EPBC Act listed flora species and likelihood of occurrence

Common Name	Scientific Name	Conservation Status		Habitat	Likelihood of occurrence
		EPBC	FFG		
Adamson's Blown-grass	*Lachnagrostis adamsonii*	L	E	Mainly found on roadside depressions and flats, associated with drainage lines and small sluggish creeks, particularly where these sites are protected from wind by surrounding rises or by stands of tall grasses such as Toowoomba Canary-grass or sedges and rushes such as Juncus spp. or Gahnia spp. (DSE 2000).	Suitable habitat on site highly disturbed and degraded – **Unlikely to occur.**
Brittle Greenhood	*Pterostylis truncata*	L		Open forest, often in flat open areas with shallow granite outcrops or on sheltered ridges (Jones 1994).	No suitable habitat present – **Unlikely to occur.**
Button Wrinklewort	*Rutidosis leptorhynchoides*	L	E	Basaltic grasslands between Rokewood and Melbourne (Jeanes 1999).	Suitable habitat on site highly disturbed and degraded – **Unlikely to occur.**
Clover Glycine	*Glycine latrobeana*	L	V	Occurs mainly in grasslands and grassy woodlands on basalt soils dominated by Kangaroo Grass or within intermittently flooded streamlines co-dominated by Yellow Gum and Scentbark over mixed grasses and shrubs (in the Grampians/Black Range area (Carter & Sutter 2010; D.Coppolino pers. Obs.).	Suitable habitat on site highly disturbed and degraded – **Unlikely to occur.**

Common Name	Scientific Name	Conservation Status		Habitat	Likelihood of occurrence
		EPBC	FFG		
Curly Sedge	*Carex tasmanica*	L	V	Occurs in seasonally wet, fertile, heavy basalt clay soils, usually around the margins of slightly saline drainage lines or freshwater swamps. The dominant vegetation type varies, but is often grassy/sedgy and generally lacks trees (Carter 2010).	No suitable habitat present – **Unlikely to occur.**
Large-headed Fireweed	*Senecio macrocarpus*	L	V	Occurs in a variety of habitats, including grasslands, sedgelands, shrublands and woodlands, generally on sparsely vegetated sites on sandy loam to heavy clay soils, often in depressions that are waterlogged in winter (Sinclair 2010).	Suitable habitat on site highly disturbed and degraded – **Unlikely to occur.**
Maroon Leek-orchid	*Prasophyllum frenchii*	L	E	Occurs in grassland and grassy woodland habitats, on sandy to black clay loams that are generally damp but well drained, although some sites are seasonally waterlogged. Sites include the seasonally damp transition zone on the margins of shallow freshwater marshlands (Duncan 2010).	Suitable habitat on site highly disturbed and degraded – **Unlikely to occur.**
Metallic Sun-orchid	*Thelymitra epipactoides*	L	E	Primarily in mesic coastal heathlands, grasslands and woodlands, but also in drier inland heathlands, open forests and woodlands (Backhouse & Jeanes 1995 in DSEWPC 2003).	Suitable habitat on site highly disturbed and degraded – **Unlikely to occur.**

Common Name	Scientific Name	Conservation Status		Habitat	Likelihood of occurrence
		EPBC	FFG		
Small Golden Moths	*Diuris basaltica*	L	E	Grows in herb-rich native grasslands dominated by Kangaroo Grass on heavy basalt soils, often with embedded basalt boulders. This vegetation is dominated by a ground layer of tussock-forming perennial grasses, with a wide variety of wildflowers and herbs growing among the tussocks (Backhouse and Lester 2010).	Suitable habitat on site highly disturbed and degraded – **Unlikely to occur.**
Small Milkwort	*Comesperma polygaloides*	L		Found in remnant native grasslands and grassy woodlands on heavy soils (Walsh 1999) on the Western Basalt Plains, dominated by Kangaroo Grass, Silver Tussock and, less commonly, wallaby grasses and spear grasses (DSE 1999).	Suitable habitat on site highly disturbed and degraded – **Unlikely to occur.**
Small Snake-orchid	*Diuris pedunculata* s.s.		E	Prefers moist areas (Rouse 2003) and has been found growing in open areas of dry sclerophyll forests with grassy understories, in riparian forests (including gallery rainforests), swamp forests, in sub-alpine grasslands and herbfields. Not often found in dense forests or heavily shrubby areas (Quinn et al. 1995).	No suitable habitat present – **Unlikely to occur.**
Spiny Rice-flower	*Pimelea spinescens* subsp. *spinescens*	L	C	Grasslands or open shrublands on basalt derived soils (Entwisle 1996). Prefers shallow depressions and drainage lines with moderate soil moisture (D.Coppolino pers. obs.).	Suitable habitat on site highly disturbed and degraded – **Unlikely to occur.**

EPBC Act listing: C = Critically Endangered; **E** = Endangered; **V** = Vulnerable; **L** = Listed as threatened under FFG Act

5.1.2. *Ecological Vegetation Classes*

Pre–European EVC mapping (DSE 2011b) indicates that the study area and surrounds would have supported Plains Grassland (EVC 132_63) and Creekline Grassy Woodland (EVC 68) prior to European settlement based on modelling of factors including rainfall, aspect, soils and remaining vegetation.

Evidence on site, including floristic composition and soil characteristics, suggested that *Low-rainfall* Plains Grassland (EVC 132_63) was present in scattered areas across the study area (Figure 1).

***Low-rainfall* Plains Grassland (EVC 132_63)** has an endangered conservation status in the Victorian Volcanic Plain bioregion. The benchmark for this EVC describes it as "treeless vegetation mostly < 1 metre tall dominated by largely graminoid and herb life forms. (It) occupies cracking basalt soils prone to seasonal waterlogging in areas receiving < 500 millimetres annual rainfall" (Appendix 4).

A total of 25 remnant patches (referred to herein as habitat zones) comprising the abovementioned EVC were identified in the study area (Table 2).

Table 2: Description of habitat zones in the study area

Habitat Zone	EVC	Bioregional Conservation Status	Description
A, H, T & W	*Low-rainfall* Plains Grassland (EVC 132_63)	Endangered	Dominated by indigenous spear and wallaby grasses of moderate cover. The other indigenous species present was Berry Saltbush. Moderate to high indigenous litter cover and little bare ground were present. Weed cover was high and dominated by high threat weeds such as Galenia. Some planted Eucalypts were present.
B, E, F, M & V			Dominated by indigenous spear and wallaby grasses with some Windmill Grass of moderate to high cover. Other indigenous species present included Berry Saltbush, Bindweed and Kidney Weed. Moderate to high indigenous litter cover and little bare ground were present. Weed cover was high and dominated by low threat weeds such as Ribwort and Buck's-horn Plantain.
C, J, Q, X & Y			Dominated by a mixture of spear and wallaby grasses and Windmill Grass, with some Berry Saltbush. No other indigenous species recorded. Moderate indigenous litter cover and some bare ground present. Weed cover was moderate to high and dominated by low threat weeds such as Ribwort and Buck's-horn Plantain.

Habitat Zone	EVC	Bioregional Conservation Status	Description
D, U, P & S	*Low-rainfall* Plains Grassland (EVC 132_63)	Endangered	Dominated by indigenous wallaby grasses with some spear grasses and Windmill Grass. No other indigenous species recorded. Moderate indigenous litter cover and some bare ground present. Weed cover was moderate to high and dominated by high threat weeds such as Couch.
L & O			Dominated by indigenous wallaby grasses with some spear grasses and Windmill Grass. No other indigenous species recorded. High indigenous litter cover and little bare ground. Weed cover was low and dominated by low threat weeds such as Ribwort.
G			Dominated by indigenous spear grasses with some wallaby grasses. No other indigenous species recorded. High indigenous litter cover and little bare ground were present. Weed cover was low and dominated by high threat weeds such as Horehound.
I			Dominated by indigenous spear grass and wallaby grass, with some Bindweed present. Moderate to high indigenous litter cover and little bare ground present. Weed cover was moderate to high and dominated by low threat weeds such as Ribwort.
K			Spear grass and no other indigenous species present. Moderate indigenous litter cover and bare ground present. Weed cover was low to moderate and dominated by low threat weeds such as Ribwort and Buck's-horn Plantain.
N			The most diverse remnant patch. Dominated by indigenous spear and wallaby grasses, with some Kangaroo Grass and Windmill Grass present. Indigenous Bindweed was also present. High indigenous litter cover and little bare ground present. Weed cover was low and dominated by low threat weeds such as Ribwort.
R			Dominated by spear grass with some wallaby grass and Windmill Grass. High indigenous litter cover and little to no bare ground present. Weed cover was low and dominated by low threat weeds such as Ribwort.

The habitat hectare assessment results for these habitat zones are provided in Table 3. More detailed habitat scoring results are presented in Appendix 3.

Table 3: Summary of habitat hectare assessment results

Habitat Zone	EVC	Area (ha)	Habitat Score (out of 100)	Habitat Hectare (Hha)	Conservation Significance
A	*Low-rainfall* Plains Grassland (EVC 132_63)	0.127	20	0.02	High
B*		0.484	28	0.13	High
C		1.266	28	0.35	High
D		0.165	25	0.04	High
E*		0.247	28	0.07	High
F*		0.649	28	0.18	High
G*		0.137	29	0.04	High
H		1.308	20	0.26	High
I*		0.097	28	0.03	High
J		0.693	28	0.19	High
K		0.057	28	0.02	High
L*		2.114	32	0.67	High
M*		1.006	28	0.28	High
N*		1.153	32	0.37	High
O*		0.593	32	0.19	High
P		0.474	25	0.12	High
Q		1.088	28	0.30	High
R*		1.533	37	0.57	High
S		1.187	25	0.30	High
T		0.154	22	0.03	High
U		0.297	20	0.06	High
V*		0.585	32	0.19	High
W		0.904	28	0.25	High
X*		0.174	31	0.05	High
Y*		1.194	35	0.41	High
Totals		**17.686**		**5.14**	

***=** indicates EPBC Act listed community Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP). Note that all habitat zones constitute FFG Act listed community Western (Basalt) Plains Grassland.

The conservation significance of habitat zones is based on the bioregional conservation status of the EVC, habitat score of the vegetation, any significant site attributes and the results of the best / remaining 50% habitat assessment, presented in Appendix 6.

The assessment for best / remaining 50% of habitat has been undertaken for each Victorian listed flora and fauna species that has been recorded or is likely to occur in each habitat zone (DSE 2007a).

5.1.3. Scattered trees

No scattered trees were recorded in the study area.

5.1.4. Degraded treeless vegetation

Eight areas of Minor Treeless Vegetation were present in the study area (Figure 1). These areas contained less than 25 % cover of indigenous species. The 'avoid, minimise and offset' principles do not apply to any patches determined to be minor treeless vegetation.

5.2. Fauna

5.2.1. Habitat assessment

Hobby-farm allotments were assessed for fauna habitat. The study area supports the following habitat types:

Native grassland: This habitat was limited to several patches in the study area (Figure 1). It was highly uniform and not ecologically diverse. These patches comprised wallaby grasses, Spear Grass and Windmill Grass with scattered herbs such as Berry Saltbush and Pink Bindweed. Some weeds have established across most of the properties and include Blanket weed, Ribwort and Onion weed. Throughout the habitat, grasses were interspersed with bare ground, with evidence of soil cracking. Scattered surface and embedded rock was absent from this habitat.

The grassland habitat has some connectivity to other intact native grassland remnants habitats in the region. Continuous grassland vegetation exists to the north and west of the study area. The eastern part of the study area is surrounded by residential buildings.

Overall, the grassland habitat of the study area was considered moderate quality habitat for ground-dwelling fauna, since it retained many original elements such as ground layer diversity and structure. This habitat may provide habitat for threatened grassland fauna species, such as the Golden Sun Moth.

Grazing paddocks: A large part of the study area comprised this habitat type, which mostly included improved pasture dominated by introduced grass species. Other areas had been previously cultivated and cropped. These areas provided few habitat values for native fauna and supported common farmland fauna species. The infiltration of introduced plants, particularly in the ground layer, and lack of habitat components (rocks, logs, native vegetation) combine to make this a low quality habitat for fauna.

Planted trees: Plantings in gardens and along roadsides and fence lines comprised indigenous, non-indigenous native and/or introduced trees. Species include European ornamental plants, Sugar Gum, pines and Paperbarks. Planted trees provided habitat for common bird species. Whilst the mature trees supported only a few small hollows, they provided perching and nesting opportunities for birds foraging in the area. Lorikeets were particularly abundant feeding in planted eucalypts.

Due to the trees being the main source of vegetation in the region for native fauna, they are considered to be moderate quality habitat for native fauna.

Aquatic Habitat: This habitat component consisted of a few small man-made dams scattered across the site. The majority of small dams were accessible to stock. One dam in a backyard was vegetated and provided suitable habitat for local waterbird and frog species. This aquatic habitat has been assessed as being low quality for fauna, as most of the dams were small in size, isolated and lacked fringing and submerged aquatic native vegetation.

5.2.2. *Fauna species*

The review of existing information and current field survey indicated that 197 fauna species may occur within the study area, including 159 birds (11 introduced), 16 mammals (seven introduced), 14 reptile, seven frog species and one invertebrate species. Appendix 2 details fauna species that may occur within the study area and lists species that were recorded during the field survey.

5.2.3. *Listed threatened fauna species*

The review of existing information and current field survey indicate that within the search region 83 rare or threatened fauna species (67 bird, seven mammal, four reptile, two frog and three invertebrate) listed on the EPBC Act, FFG Act and/or the DSE advisory list (DSE 2007c) may occur within the study area. Their likelihood of occurrence within the study area is assessed and presented in Table 4. Species that are likely to occur are highlighted. Oceanic birds (such as albatrosses and petrels) and mammals (i.e. seals and whales) have been eliminated from this list due to the lack of habitat within the study area.

Table 4 indicates whether any of the listed rare or threatened species are also listed as migratory species under the EPBC Act.

Table 4: Threatened fauna identified as occurring or potentially occurring in the study area

Common Name	Scientific Name	Conservation Status			Habitat	Year of Last Record	Number of Records	Likelihood of Occurrence
		EPBC	FFG	DSE				
Birds								
Australasian Bittern	*Botaurus poiciloptilus*	EN	L	EN	Usually inhabits permanent freshwater wetlands with tall dense vegetation, particularly those dominated by sedges, rush, reeds or cutting grass (Marchant and Higgins 1990).	1990	3	Absence of suitable habitat, therefore unlikely to occur.
Australasian Shoveler	*Anas rhynchotis*			VU	Large and deep freshwater wetlands with abundant aquatic flora. Less often, brackish or saline waters including inshore estuarine waters. Sometimes on farm dams (Marchant and Higgins 1990).	1993	43	Absence of suitable habitat, therefore unlikely to occur.
Australian Painted Snipe	*Rostratula australis*	VU, M (CAMBA)	L	CE	Shallow freshwater or brackish swamps, usually inland and often ephemeral, with emergent vegetation such as River Red Gum and Lignum and muddy margins. Uncommon summer visitors to Victoria (Garnett and Crowley 2000).	None	None	Absence of suitable habitat, therefore unlikely to occur.
Azure Kingfisher	*Alcedo azurea*			NT	Mostly well vegetated freshwater wetland margins or along tidal rivers and creeks, especially with still or slowly flowing waters (Higgins 1999).	1981	1	Absence of suitable habitat, therefore unlikely to occur.
Barking Owl	*Ninox connivens connivens*		L	EN	Eucalyptus dominated forests and woodlands, commonly near water-bodies, such as streams and rivers, and requires hollow trees for nesting and trees with dense foliage for roosting. Prefers edge habitats to the interior of forests, with riparian vegetation through farmland supporting the species most regularly. It prefers sites with higher proportion of large trees greater than 60 centimeters in diameter at breast height and containing hollows (Higgins and Davies 1996).	2006	1	Absence of suitable habitat, therefore unlikely to occur.
Black Falcon	*Falco subniger*			VU	Inhabits woodlands, open country and terrestrial wetlands in arid and semi-arid zones. Mainly occurs over open plains and undulating land with large tracts of low vegetation. It is more commonly found in north western Victoria and is only occasionally found in southern Victoria. It is a highly mobile species, moving in response to food availability and seasonal conditions (Marchant and Higgins 1993).	2000	11	Absence of suitable habitat, therefore unlikely to occur.
Black-chinned Honeyeater	*Melithreptus gularis gularis*			NT	Open box-ironbark forests and woodlands. Usually found in Red or Mugga Ironbarks, Grey Box, Yellow Gum and Yellow Box. Especially mature tall trees along gullies, low-lying flats and lower slopes. Characteristic box-ironbark species, widespread but moderately common. The species is gregarious, usually seen in groups of 3–10 birds (Higgins *et al.* 2001; Tzaros 2005).	2008	39	Absence of suitable habitat, therefore unlikely to occur.
Black-eared Cuckoo	*Chalcites osculans*			NT	Open woodlands and open shrublands often those dominated by eucalypts or often in saltbush or bluebush shrublands. In Victoria it usually occurs north of the divide. (Higgins 1999).	2008	11	Absence of suitable habitat, therefore unlikely to occur.
Black-faced Cormorant	*Phalacrocorax fuscescens*			NT	Marine and estuarine species, forages on inshore waters, in shallow waters or over reef. Nests on rocky islands, stacks and reefs, on coastal slopes and shores with rocky platforms (Marchant and Higgins 1990).	2001	1	Absence of suitable habitat, therefore unlikely to occur.
Black-tailed Godwit	*Limosa limosa*			VU	Mainly coastal species, usually in sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats. In Victoria found mainly round Port Phillip Bay (Higgins and Davies 1996).	1978	1	Absence of suitable habitat, therefore unlikely to occur.
Blue-billed Duck	*Oxyura australis*		L	EN	Terrestrial freshwater and brackish wetlands, preferring deep permanent, well vegetated water bodies. Secretive birds, usually feeding in open water or beside tall dense vegetation (Marchant and Higgins 1990).	2000	34	Absence of suitable habitat, therefore unlikely to occur.

Common Name	Scientific Name	Conservation Status			Habitat	Year of Last Record	Number of Records	Likelihood of Occurrence
		EPBC	FFG	DSE				
Brolga	*Grus rubicunda*		L	VU	Wetlands that include permanent open water and deep freshwater marsh and forages in nearby crops and paddocks. There are two sub populations in Victoria; one occurs in the west and the other in the north along the valley of the Murray River and associated floodplains (Marchant and Higgins 1993).	2000	4	Absence of suitable habitat, therefore unlikely to occur.
Brown Quail	*Coturnix ypsilophora australis*			NT	Prefers tall ground vegetation, such as grass, ferns and shrubs over damp or swampy ground. Also occurs in grasslands, cereal crops, stubble, leafy crops, heath, bracken and stands of vegetation fringing freshwater wetlands. In Victoria it is widespread and could be locally common in suitable habitats (Marchant and Higgins 1993).	1990	1	Absence of suitable habitat, therefore unlikely to occur.
Brown Treecreeper	*Climacteris picumnus victoriae*			NT	Woodlands dominated by eucalyptus, especially Stringybarks or other rough-barked eucalypts usually with open grassy understorey, some dead trees and fallen timber (Higgins *et al.* 2001).	2007	14	Absence of suitable habitat, therefore unlikely to occur.
Bush Stone-curlew	*Burhinus grallarius*		L	EN	Plains and riverine grassy woodlands, box-ironbark forests often with dead leaves and fallen dead timber. The species is mainly found in north and west Victoria. This species has declined since European settlement, especially in the south of the state (Marchant and Higgins 1993).	1961	4	Absence of suitable habitat, therefore unlikely to occur.
Cape Barren Goose	*Cereopsis novaehollandiae*			NT	Grasslands and terrestrial wetlands on southern off-shore islands and adjacent mainland. It breeds on off-shore islands and moves to mainland in summer (Marchant and Higgins 1990).	2006	112	Absence of suitable habitat, therefore unlikely to occur.
Caspian Tern	*Hydroprogne caspia*	M (JAMBA, CAMBA)	L	NT	Sheltered coastal embayments, including harbours, lagoons, inlets, estuaries and river deltas, usually with sandy or muddy margins. A small breeding population of Caspian Terns occurs on Mud Islands, which is one of three breeding colonies in Victoria (Higgins and Davies 1996).	2005	11	Absence of suitable habitat, therefore unlikely to occur.
Common Sandpiper	*Actitis hypoleucos*	M (JAMBA, CAMBA, ROKAMBA, Bonn)		VU	Wide range of coastal wetlands with varying levels of salinity but primarily estuaries. Mainly occurs on muddy margins or rocky shores but avoids extensive open mudflats and sometimes inland. In Victoria it is mostly found at Westernport and Port Phillip Bays (Higgins and Davies 1996).	1995	5	Absence of suitable habitat, therefore unlikely to occur.
Diamond Firetail	*Stagonopleura guttata*		L	VU	Commonly found in open forests and woodlands often with sparse grassy understorey also occurs along watercourses and in farmland areas. Widespread but scattered. Populations have declined in Victoria since the 1950's (Higgins *et al.* 2006).	2008	62	Absence of suitable habitat, therefore unlikely to occur.
Eastern Curlew	*Numenius madagascariensis*	M (JAMBA, CAMBA, ROKAMBA, Bonn)		NT	Inhabits sheltered coasts, especially estuaries, embayment, harbours, inlets and coastal lagoons with large intertidal mudflats or sandflats, often with beds of sea grass (Higgins and Davies 1996).	2000	12	Absence of suitable habitat, therefore unlikely to occur.
Eastern Great Egret	*Ardea modesta*	M (JAMBA, CAMBA)	L	VU	Variety of wetlands including estuaries and intertidal mudflats; various permanent and ephemeral freshwater, brackish and saline wetlands; shallows of deep permanent lakes (Marchant and Higgins 1990).	2003	37	Absence of suitable habitat, therefore unlikely to occur.
Elegant Parrot	*Neophema elegans*			VU	Occupy open habitats, both coastal and inland including grassland, mallee shrublands, dry open woodlands and acacia scrubs. In Victoria Scattered records in the west of the state (Higgins 1999).	1993	1	Absence of suitable habitat, therefore unlikely to occur.
Fairy Prion	*Pachyptila turtur*	VU		VU	Marine waters in subtropical and sub-antarctic seas. In Australia breeds on islands in Bass Strait and off Tasmania (Marchant and Higgins 1990).	1981	1	Absence of suitable habitat, therefore unlikely to occur.

Common Name	Scientific Name	Conservation Status			Habitat	Year of Last Record	Number of Records	Likelihood of Occurrence
		EPBC	FFG	DSE				
Fairy Tern	*Sternula nereis nereis*	VU	L	EN	Sheltered coasts, on mainland and inshore and offshore islands. Occurs in embayments, such as harbours, inlets, bays, estuaries and lagoons and on ocean beaches. Also on coastal lakes and salt ponds. In Victoria the species is most common between Westernport and Port Phillip Bays, West to Aireys Inlet (Higgins and Davies 1996).	2005	17	Absence of suitable habitat, therefore unlikely to occur.
Freckled Duck	*Stictonetta naevosa*		L	EN	Terrestrial wetlands, it prefers fresh, densely vegetated waters, particularly floodwater swamps and creeks vegetated with lignum or cane grass. During dry seasons or droughts it moves away from ephemeral breeding swamps and occupy large permanent waters (Marchant and Higgins 1990).	1992	4	Absence of suitable habitat, therefore unlikely to occur.
Glossy Ibis	*Plegadis falcinellus*	M (CAMBA, Bonn)		NT	Prefer freshwater inland wetlands, in particular, permanent or ephemeral water bodies and swamps with abundant vegetation (Marchant and Higgins 1990).	1991	1	Absence of suitable habitat, therefore unlikely to occur.
Great Knot	*Calitris tenuirostris*	M (JAMBA, CAMBA, ROKAMBA, Bonn)	L	EN	Inhabit sheltered coastal habitats with large intertidal mudflats or sandflats. Including inlets, bays, harbours, estuaries and lagoons, sometimes on ocean beaches. In Victoria mostly found round Port Phillip Bay, especially Mud Island and East Corner Inlet (Higgins and Davies 1996).	1978	1	Absence of suitable habitat, therefore unlikely to occur.
Grey Goshawk	*Accipiter novaehollandiae novaehollandiae*		L	VU	Inhabit rainforests, open forests, swamp forests, woodlands and plantations. Most abundant where forest or woodland provide cover for hunting from perches, some movement to open farmland and urban areas outside breeding season. In Victoria most common in Otway ranges (Marchant and Higgins 1993).	2007	4	Absence of suitable habitat, therefore unlikely to occur.
Grey Plover	*Pluvialis squatarola*	M (JAMBA, CAMBA, ROKAMBA, Bonn)		NT	Coastal, but occasionally inland. Mainly on marine shores, inlets, estuaries and lagoons where there are nearby large tidal mudflats for feeding and sandy beaches for roosting. In Victoria few records east of Gippsland Lakes (Marchant and Higgins 1993).	1978	1	Absence of suitable habitat, therefore unlikely to occur.
Grey-crowned Babbler	*Pomatostomus temporalis temporalis*		L	EN	Inhabits dry woodlands and forests with a shrub layer and a groundcover of leaf litter and fallen timber. In Victoria it is found in woodlands and forests with box-ironbark eucalypt associations and River Red Gums, including narrow remnants along roadsides and streams. Formerly widespread over much of Victoria, but populations has declined and range has contracted markedly, mostly from the south and west since the 1970's (Higgins and Peter 2002; Tzaros 2005).	1960	3	Absence of suitable habitat, therefore unlikely to occur.
Grey-tailed Tattler	*Heteroscelus brevipes*	M (JAMBA, CAMBA, ROKAMBA, Bonn)	L	CE	Usually found on sheltered coasts with reefs and rock platforms or with mudflats exposed at low tide and forage on wet mudflats and among rocks, and often roost on rocks. The species is rarely recorded from Corner inlet, Port Phillip Bay or Western Port (Higgins and Davies 1996).	2005	3	Absence of suitable habitat, therefore unlikely to occur.
Hardhead	*Aythya australis*			VU	Inhabits large, deep waters where vegetation is abundant, particularly deep swamps and lakes, pools and creeks. It also occurs on freshwater meadows, seasonal swamps with abundant aquatic flora, reed swamps, wooded lakes and swamps, rice fields, and sewage ponds (Marchant and Higgins 1990).	2000	106	Absence of suitable habitat, therefore unlikely to occur.

Common Name	Scientific Name	Conservation Status			Habitat	Year of Last Record	Number of Records	Likelihood of Occurrence
		EPBC	FFG	DSE				
Hooded Robin	*Melanodryas cucullata cucullata*		L	NT	Mostly in lightly timbered woodlands dominated by acacias or eucalypts, often with pockets of saplings or taller shrubs, an open shrubby understorey, sparse grasses and patches of bare ground and leaf-litter with scattered fallen timber. The population has declined throughout its range, especially since the early 1980's. This species typically occurs north of the great divide in shrubland or woodland dominated by acacias (Higgins and Peter 2002; Tzaros 2005).	1999	16	Absence of suitable habitat, therefore unlikely to occur.
Intermediate Egret	*Ardea intermedia*		L	CE	Mainly in inland freshwater wetlands, occasionally visit coastal wetlands and forages amongst aquatic vegetation in shallow water and requires trees for roosting and nesting. Often occurs in wetlands that contain vegetation, including *Typha.* They are generally scarce in Victoria only few breeding records from Gunbower Island and Murray River, few pairs nested near Barmah during deep spring floods (Marchant and Higgins 1990).	1995	5	Absence of suitable habitat, therefore unlikely to occur.
Latham's Snipe	*Gallinago hardwickii*	M (JAMBA, CAMBA, ROKAMBA, Bonn)		NT	Occurs in wide variety of permanent and ephemeral wetlands, it prefers open freshwater wetlands with soft substrates and with dense cover nearby, such as the edges of rivers and creeks, bogs, swamps and waterholes. The species is wide spread in southeast Australia and most of its population occurs in Victoria except in the northwest of the state (Naarding 1983; Higgins and Davies 1996).	1992	8	Absence of suitable habitat, therefore unlikely to occur.
Lesser Sand Plover	*Charadrius mongolus*	M (JAMBA, CAMBA, ROKAMBA, Bonn)		VU	Inhabits beaches of sheltered bays, harbours, and estuaries with large intertidal sandflats or mudflats. Regularly seen in Corner Inlet, Westernport and Port Phillip Bay (Marchant and Higgins 1993).	1988	2	Absence of suitable habitat, therefore unlikely to occur.
Lewin's Rail	*Lewinia pectoralis pectoralis*		L	VU	Occurs in a variety of densely vegetated wetland habitats, fresh or saline and usually with areas of standing water. It requires shallow water areas to forage in. Occur mainly in southern parts of Victoria (Marchant and Higgins 1993).	1990	3	Absence of suitable habitat, therefore unlikely to occur.
Little Bittern	*Ixobrychus minutus dubius*		L	EN	Inhabits terrestrial wetlands, in dense emergent vegetation in freshwater swamps, lakes and watercourses (Marchant and Higgins 1990).	1970	1	Absence of suitable habitat, therefore unlikely to occur.
Little Egret	*Egretta garzetta nigripes*		L	EN	It occurs in a range of coastal and terrestrial wetlands, including freshwater wetlands with vegetation such as *Typha* and requires trees for roosting and nesting (Marchant and Higgins 1990).	2008	74	Absence of suitable habitat, therefore unlikely to occur.
Little Tern	*Sternula albifrons*	M (JAMBA, CAMBA, ROKAMBA, Bonn)	L	VU	Sheltered coastal environments, including lagoons, estuaries, river mouths, deltas, lakes, bays, harbours and inlets. Especially those with exposed sandbanks or sand spits. In Victoria it occurs mainly on the east coast between Mallacoota and Corner Inlet. It is rare elsewhere (Higgins and Davies 1996).	1992	7	Absence of suitable habitat, therefore unlikely to occur.
Long-toed Stint	*Calidris subminuta*	M (JAMBA, CAMBA, ROKAMBA, Bonn)		NT	Inhabits a variety of terrestrial wetlands it prefers shallow freshwater or brackish wetlands with areas of muddy shorelines and growth of various vegetation (Higgins and Davies 1996).	1978	1	Absence of suitable habitat, therefore unlikely to occur.
Magpie Goose (reintroduced)	*Anseranas semipalmata*		L	VU	Terrestrial and aquatic habitats, but activities cantered on wetlands, mainly those on floodplains of rivers. Introduced to near Geelong in 1964 (Marchant and Higgins 1990).	2006	114	Absence of suitable habitat, therefore unlikely to occur.
Major Mitchell's Cockatoo	*Cacatua leadbeateri leadbeateri*		L	VU	Dry woodlands, particularly mallee. Mostly restricted to north west corner of Victoria (Higgins 1999).	1961	3	Absence of suitable habitat, therefore unlikely to occur.

Common Name	Scientific Name	Conservation Status			Habitat	Year of Last Record	Number of Records	Likelihood of Occurrence
		EPBC	FFG	DSE				
Malleefowl	*Leipoa ocellata*	VU	L	EN	Mainly in semi-arid zones in heath and mallee-heath, rarely arid zones. Associated with mallee, particularly floristically rich tall dense mallee of higher rainfall areas (Marchant and Higgins 1993).	None	None	Absence of suitable habitat, therefore unlikely to occur.
Masked Owl	*Tyto novaehollandiae novaehollandiae*		L	EN	Open woodlands and forests that provide dense and tall tree cover, and adjoining open habitats such as cleared farmlands (Higgins 1999).	1985	5	Absence of suitable habitat, therefore unlikely to occur.
Musk Duck	*Biziura lobata*			VU	This species inhabits terrestrial wetlands, estuarine habitats and sheltered inland waters. Almost entirely aquatic, preferring deep water of large swamps, lakes and estuaries, where conditions are stable and aquatic flora abundant (Marchant and Higgins 1990).	2005	57	Absence of suitable habitat, therefore unlikely to occur.
Nankeen Night Heron	*Nycticorax caledonicus hillii*			NT	Inhabits littoral and estuarine habitats and terrestrial wetlands. Mainly nocturnal foraging over soft or firm substrates in still or slow-moving shallow water, on exposed shores, banks and flats of wetlands, or swampy vegetation. Often occurs where sheltered by tall emergent or ground vegetation and near trees used for roosting (Marchant and Higgins 1990).	1998	29	Absence of suitable habitat, therefore unlikely to occur.
Orange-bellied Parrot	*Neophema chrysogaster*	CE	L	CE	Inhabits natural saltmarshes dominated by Beaded Glasswort and Shrubby Glasswort as well as associated grassy or weedy pastures. The Orange-bellied Parrot occurs regularly in low numbers in the Port Phillip region at three particular sites: The Spit State Nature Reserve near Point Wilson, Lake Connewarre on the Barwon River, and Swan Island/Swan Bay (Commonwealth of Australia 2005).	1993	3	Absence of suitable habitat, therefore unlikely to occur.
Pacific Golden Plover	*Pluvialis fulva*	M (JAMBA, ROKAMBA)		NT	Inhabits sandy, muddy or rocky shores, usually coastal, rarely far inland. Often on beaches and mudflats, sandflats and occasionally rock shelves (Marchant and Higgins 1993).	1991	3	Absence of suitable habitat, therefore unlikely to occur.
Pacific Gull	*Larus pacificus pacificus*			NT	Inhabits sandy or less often rocky shores, prefer areas protected from ocean swells, such as bays, inlets, estuaries and lagoons. Often on offshore islands, sometimes occur up to 10 kilometres inland. In Victoria its distribution is widespread along southern shores, except between Warrnambool and central Otway and breeds on the islands of Bass Strait (Higgins and Davies 1996).	2005	37	Absence of suitable habitat, therefore unlikely to occur.
Painted Honeyeater	*Grantiella picta*		L	VU	Strongly associated with its main food plant mistletoe, particularly around the margins of dry open box and ironbark forests and woodlands. Occurs at few localities. Uncommon breeding migrant from further north, arriving in October and leaving in February (Higgins *et al.* 2001; Tzaros 2005).	2006	5	Absence of suitable habitat, therefore unlikely to occur.
Pectoral Sandpiper	*Calidris melanotus*	M (JAMBA, ROKAMBA, Bonn)		NT	Inhabit shallow fresh to saline wetlands, usually coastal to near-coastal, but occasionally farther inland. Wetlands often have open fringing mudflats and low emergent or fringing vegetation. In Victoria most records from Port Phillip bay and valley of Murray River (Higgins and Davies 1996).	1978	1	Absence of suitable habitat, therefore unlikely to occur.
Pied Cormorant	*Phalacrocorax varius*			NT	Occurs in marine and coastal habitats. They require trees in which to nest, such as dead eucalypts or melaleucas and also occurs in the Murray-Darling Basin and other large lakes. The breeding population in Port Phillip Bay is the largest and most regular breeding colony in Victoria and one of the largest in Australia (Marchant and Higgins 1990).	2005	44	Absence of suitable habitat, therefore unlikely to occur.

Common Name	Scientific Name	Conservation Status			Habitat	Year of Last Record	Number of Records	Likelihood of Occurrence
		EPBC	FFG	DSE				
Red Knot	*Calitris canutus*	M (JAMBA, CAMBA, ROKAMBA, Bonn Conventio n (A2H)		NT	Inhabits intertidal mudflats, sandflats, and sandy beaches of sheltered coasts, in estuaries, bays, inlets, and lagoons (Higgins and Davies 1996).	2005	5	Absence of suitable habitat, therefore unlikely to occur.
Red-backed Kingfisher	*Todiramphus pyrropygia pyrropygia*			NT	Inhabits open, lightly wooded habitats in arid and semi-arid zones near a variety of wetlands. Usually in dry open forests and woodlands dominated by eucalypts. In Victoria widespread in North along the Murray River (Higgins 1999).	2008	2	Absence of suitable habitat, therefore unlikely to occur.
Regent Honeyeater	*Anthochaera phrygia*	EN, M (JAMBA)	L	CE	Mainly occurs in dry scrleophyll forests and box-ironbark woodlands with copious flowering eucalypts and/or mistletoes, usually near rivers and creeks on inland slopes of the Great Dividing Range. It can also occur in small remnant patches or isolated clumps of mature flowering trees in farmland, coastal or urban areas. Occur in northern and central Victorian box-ironbark forests. It is now considered extinct in western Victoria (Higgins *et al*. 2001).	1989	2	Absence of suitable habitat, therefore unlikely to occur.
Royal Spoonbill	*Platalea regia*			VU	This species occurs in terrestrial wetlands, sheltered marine habitats and wet grasslands. Foraging limited to shallow waters, often among aquatic or emergent vegetation or submerged logs that shelter prey and favour coastal habitats (Marchant and Higgins 1990).	2005	85	Absence of suitable habitat, therefore unlikely to occur.
Sanderling	*Calidris alba*	M (JAMBA, CAMBA, ROKAMBA, Bonn)		NT	Inhabits open sandy beaches exposed to sea-swells, also on exposed sandbars and spits. In Victoria it is regularly in large numbers round Corner Inlet–Shallow Inlets–Wilson's Promontory (Higgins and Davies 1996).	1996	1	Absence of suitable habitat, therefore unlikely to occur.
Sooty Oystercatcher	*Haematopus fuliginosus*			NT	Strictly marine coastal, usually within 50 metres from shore. Prefer rocky intertidal shorelines and sandy beaches. In Victoria it is widespread but patchily distributed along the coast. Most records are between Corner Inlet and Port Phillip Bay (Marchant and Higgins 1993).	1978	1	Absence of suitable habitat, therefore unlikely to occur.
Speckled Warbler	*Chthonicola sagittata*		L	VU	Inhabits dry eucalypt forests and woodlands, especially those with box-ironbark eucalypt associations. It is also found in River Red Gum woodlands. The species is uncommon, populations have declined since the 1980s (Higgins and Peter 2002; Tzaros 2005).	2005	14	Absence of suitable habitat, therefore unlikely to occur.
Spotted Harrier	*Circus assimilus*			NT	It prefers open woodlands that do not obstruct low flight and natural and exotic grasslands in arid and semi arid areas. It is more common in Victoria along the Murray River and occurs sporadically in southern Victoria (Higgins and Davies 1996).	2008	11	Grassland habitat present in the study area therefore **likely to occur**
Swift Parrot	*Lathamus discolor*	EN	L	EN	This species prefers a narrow range of eucalypts in Victoria, including White Box, Red Ironbark and Yellow Gum as well as River Red Gum when this species supports abundant 'lerp'. It breeds in Tasmania and migrates to the mainland of Australia for the autumn, winter and early spring months. It lives mostly north of the Great Dividing Range, passing through two areas of Victoria on migration: the Port Phillip district and Gippsland (Emison *et al.* 1987; Higgins 1999; Kennedy and Tzaros 2005).	2008	45	Absence of suitable habitat, therefore unlikely to occur.

Common Name	Scientific Name	Conservation Status			Habitat	Year of Last Record	Number of Records	Likelihood of Occurrence
		EPBC	FFG	DSE				
Terek Sandpiper	*Xenus cinereus*	M (JAMBA, CAMBA, ROCKAMBA, Bonn)	L	EN	Inhabits saline intertidal mudflatsin sheltered estuaries, harbours and lagoons. Forages on islets, mudbanks, sandbanks or spits (Higgins and Davies 1996).	1978	2	Absence of suitable habitat, therefore unlikely to occur.
Whimbrel	*Numenius phaeopus*	M (JAMBA, CAMBA, ROKAMBA, Bonn)		VU	Inhabit intertidal mudflats of sheltered coasts, harbours, lagoons, estuaries and river deltas. Prefer mudflats with mangrove, but also occur on open, unvegetated mudflats. In Victoria, small numbers occurs around Gippsland lakes, most of the population occurs at Corner Inlet, Westernport and Port Phillip Bays (Higgins and Davies 1996).	1978	1	Absence of suitable habitat, therefore unlikely to occur.
Whiskered Tern	*Chlidonias hybridus javanicus*			NT	Inhabit shallow terrestrial freshwater wetlands, either permanent or ephemeral, including lakes, swamps, river pools, reservoirs and sewage farms. In Victoria few records in Gippsland and north east, but widespread elsewhere in west of state (Higgins and Davies 1996).	2003	12	Absence of suitable habitat, therefore unlikely to occur.
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	M (CAMBA)	L	VU	Occurs in maritime habitats, terrestrial large wetlands and coastal lands of tropical and temperate Australia and offshore islands. Its range extends far inland only over large rivers and wetlands (Marchant and Higgins 1993).	2007	7	Absence of suitable habitat, therefore unlikely to occur.
White-winged Black Tern	*Chlidonias leucopterus*			NT	Coastal seas and exposed rocky coasts, and sandy beaches of sheltered coasts. Especially those with banks, spits or flats of sand or shingle. In Victoria it is regularly recorded in Port Phillip Bay at Altona, Werribee and Lake Connewarre and in the Western District at Lake Murdeduke and Lake Terangpom (Higgins and Davies 1996).	1978	2	Absence of suitable habitat, therefore unlikely to occur.
Mammals								
Brush-tailed Rock Wallaby	*Petrogale penicillata*	VU	L	CE	Rock faces with large tumbled boulders, ledges and caves (Menkhorst 1995).	None	None	Absence of suitable habitat, therefore unlikely to occur.
Eastern Barred Bandicoot	*Perameles gunnii*	EN	L	CE	Originally volcanic plain native grasslands, nowadays farmland, parkland and suburban gardens (Menkhorst 1995).	1980	22	Absence of suitable habitat, therefore unlikely to occur.
Fat-tailed Dunnart	*Sminthopsis crassicaudata*			NT	Native grasslands associated with rocky areas, rough pastures and the edges of stubble paddocks (Menkhorst 1995).	1990	4	Absence of suitable habitat, therefore unlikely to occur.
Grey-headed Flying-fox	*Pteropus poliocephalus*	VU	L	VU	Roosts in riverine habitat in Melbourne and forages widely in flowering eucalypts and fruit trees (Menkhorst 1995).	2004	1	Absence of suitable habitat, therefore unlikely to occur.
Long -nosed Potoroo	*Potorous tridactylus tridactylus*	VU	L	EN	In Victoria coastal heathy woodland; In Tasmania moist forest with dense shrub layer; in the north edge of rainforest (Menkhorst 1995).	None	None	Absence of suitable habitat, therefore unlikely to occur.
New Holland Mouse	*Pseudomys novaehollandiae*	VU	L	VU	Coastal heath and scrub, heathy woodland, open forest and vegetated sand-dunes (Menkhorst 1995).	None	None	Absence of suitable habitat, therefore unlikely to occur.
Spot-tailed Quoll	*Dasyurus maculatus maculatus*	EN	L	EN	Rainforest, wet and dry forest, coastal heath and scrub and River Red-gum woodlands along inland rivers (Menkhorst 1995).	None	None	Absence of suitable habitat, therefore unlikely to occur.
Reptiles								
Grassland Earless Dragon	*Tympanocryptis pinguicolla*	EN	L	CE	The species is confined to native tussock grassland on basalt plains north and west of Melbourne, has not been confirmed in Victoria since the 1960's (Robertson and Cooper 2000).	None	None	Absence of suitable habitat, therefore unlikely to occur.

Common Name	Scientific Name	Conservation Status			Habitat	Year of Last Record	Number of Records	Likelihood of Occurrence
		EPBC	FFG	DSE				
Leathery Turtle	*Dermochelys coriacea*	EN, M	L	CE	Pelagic waters, foraging in open and coastal waters, nests on tropical beaches (Wilson and Swan 2003).	None	None	Absence of suitable habitat, therefore unlikely to occur.
Loggerhead Turtle	*Caretta caretta*	EN, M			Tropical and warm temperate waters worldwide, including those of the coast of the Great Barrier Reef. Occasionally occurs south to cooler waters (Wilson and Swan 2003).	None	None	Absence of suitable habitat, therefore unlikely to occur.
Striped Legless Lizard	*Delma impar*	VU	L	EN	Tussock grasslands on the volcanic plains often associated with scattered rocks and cracked soils (Cogger 2000).	1992	1	Absence of suitable habitat, therefore unlikely to occur.
Frogs								
Brown Toadlet	*Pseudophryne bibronii*		L	EN	Wet and dry forest, grassy areas besides small creeks, alpine grasslands and mossy bogs (Cogger 2000).	1986	122	Absence of suitable habitat, therefore unlikely to occur.
Growling Grass Frog	*Litoria raniformis*	VU	L	EN	Permanent, still or slow flowing water with fringing and emergent vegetation in streams, swamps, lagoons and artificial wetlands such as farm dams and abandoned quarries (Clemann and Gillespie 2004).	1990	8	Absence of suitable habitat, therefore unlikely to occur.
Invertebrates								
Golden Sun Moth	*Synemon plana*	CE	L	CE	Areas that are, or have been native grasslands or grassy woodlands. It is known to inhabit degraded grasslands with introduced grasses being dominant, with a preference for the native wallaby grass being present (DEWHA 2009).	None	None	Grassland habitat present in the study area however not recorded during targeted surveys.
Large Ant Blue	*Acrodipsas brisbanensis*		L	EN	Poorly known and patchy; inhabits native vegetation (often in or near hills) in association with Coconut Ant *Papyrius nitidus* (Jelinek and White 2003). These species are known as 'Hill-toppers', a behaviour whereby males tend to congregate on the summit of specific peaks, allowing unfertilised females to readily locate them (DSE 2003).	1760	2	Absence of suitable habitat, therefore unlikely to occur.
Yellow Skipper Butterfly	*Hesperilla flavescens flavescens*		L	VU	Reliant on the Chaffy Saw-sedge, *Gahnia filum,* in the laval form as a food plant. Adult forms can feed on plants in salt marshes.	1988	2	Absence of suitable habitat, therefore unlikely to occur.

CE = Critically Endangered; **EN** = Endangered; **VU** = Vulnerable; **NT** = Lower risk, near threatened; **DD** = data deficient; **L** = Listed as threatened under FFG Act; **M** = Listed migratory species; **(JAMBA)** = Japan-Australia Migratory Bird Agreement; **(CAMBA)** = China-Australia Migratory Bird Agreement; **(ROKAMBA)** = Republic of Korea- Australia Migratory Bird Agreement; **(Bonn)** = Bonn Convention

Birds

Based on the assessment in Table 4, one listed threatened bird species was considered likely to occur in the study area. The vulnerability of this species to potential impacts from the proposed development is discussed below.

- **Spotted Harrier**

  (DSE: near threatened)

This species is likely to occur at low densities and their stronghold is the Murray-Darling Basin. There are eight historical records in the region, the latest recorded in 2008 from the You Yangs Regional Park. If present, this species would occur in very small numbers and is therefore unlikely to be significantly affected by the current proposal due to its high mobility to move away from disturbance.

Migratory Birds

The EPBC Act Protected Matters Search Tool identified 52 listed migratory species within the search region. These species included birds (including albatrosses and petrels) and mammals (seals, dolphins, whales and sharks). The proposed works would not impact on any oceanic species due to the lack of suitable habitat.

Three terrestrial migratory bird species were considered likely to occur in the study area based on the availability of suitable habitat.

- **White-throated Needletail**
- **Satin Flycatcher**
- **Fork-tailed Swift**

Fork-tailed Swift, White-throated Needletail and Satin Flycatcher are occasional summer visitors to the region and may occasionally pass through the study area.

Impacts on these species would be unlikely to occur, as they are highly mobile and would move away from the sources of disturbance during construction activities. The operational phase of the development would not impact the regional or wider population of these species significantly as they are likely to occur in the study area occasionally.

Mammals

Based on the assessment in Table 4, no listed mammal species were considered likely to occur in the study area.

Common mammal species that may occur in the study area include possums, kangaroos and micro-bats.

Reptiles

Based on the assessment in Table 4, no threatened reptile species were considered likely to occur in the study area.

However, small patches of native grassland habitat would support a small population of local common skink and snake species. Targeted Striped Legless Lizard surveys have been previously undertaken across some properties in the study area. No Striped Legless Lizard was found (BL&A unpubl. data).

Frogs

Based on the assessment in Table 4, no listed frog species were considered likely to occur in the study area. Aquatic habitat in the study area may support common frog species.

Invertebrates

Based on the assessment in Table 4, one listed threatened invertebrate species was considered to potentially occur in the study area. The vulnerability of this species to potential impacts from the proposed development is discussed below.

- Golden Sun Moth

  (EPBC Act: critically endangered, FFG Act: listed, DSE: endangered)

The Golden Sun Moth potentially occurs in grassland habitats within the study area. Its range has contracted due to agricultural, urban and industrial development (O'Dwyer *et al.* 2000). This species has been recorded in the Lara region in recent years (BL&A unpubl. data).

BL&A undertook targeted surveys for this species in the summer of 2012/2013 (BL&A 2013) and no Golden Sun Moths were recorded. Therefore, this species is not considered to occur in the study area (see BL&A Report 11212 (2.1).

Legend

- Study Area
- Potential Golden Sun Moth Habitat

0 100 200 400 Metres

Figure 2: Potential Golden Sun Moth Habitat

Project: Manzeene Avenue, Lara

Client: CPG Australia Pty Ltd

Project No.: 11212	Date: 17/05/2012	Created By: R. Omodei / M. Ghasemi

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6. IMPACTS AND REGULATORY IMPLICATIONS

6.1. Proposed development

The study area is proposed for a residential subdivision. No development plan currently exists for the study area. Due to the scattered nature of the remnant vegetation patches, it is unlikely that removal of all indigenous vegetation could be avoided.

6.2. Planning controls

6.2.1. State provisions

Destruction, lopping or removal of native vegetation on allotments of 0.4 hectares or more requires a planning permit under Clause 52.17 of all Victorian Planning Schemes. This includes the removal of dead trees with a DBH of 40 centimetres or greater, native degraded treeless vegetation and/or any individual scattered native plants.

A planning permit would be required for the removal of any indigenous vegetation from the study site, including scattered plants.

Before issuing a planning permit, Responsible Authorities are obligated to refer to Clause 12.01 (Conservation of Biodiversity) in the Planning Scheme. This refers to Victoria's Native Vegetation Management Framework – a Framework for Action, discussed in the following section.

6.2.2. Local provisions

The study area is not subject to any overlays in the Greater Geelong Planning Scheme.

6.3. Native Vegetation Management Framework

6.3.1. How the Framework operates

Any proposal to remove native vegetation from the study area must demonstrate that the three-step approach of 'Net Gain' outlined in the Framework has been applied. This approach is hierarchical and includes the following steps:

- Step 1: As a priority, ***avoid*** adverse impacts on native vegetation, particularly through clearance;

If the removal of native vegetation cannot be avoided:

- Step 2: ***Minimise*** impacts through appropriate consideration in the planning process and expert input to project design or management; and
- Step 3: Identify appropriate ***offset*** options.

A combination of project design and offsetting should aim to achieve a net gain in the area and quality of native vegetation across Victoria.

Responses to planning permit applications to remove native vegetation vary depending on the conservation significance of the vegetation proposed for removal. Conservation significance determines both the likelihood of approval and, importantly, the scale of the required offset. This is summarised in Table 5.

Table 5: Likely response to applications for removal of intact native vegetation

Framework conservation significance	Likely response to application for clearing	Likely offset requirements
VERY HIGH	Clearing not permitted unless exceptional circumstances apply. Offset Management Plan to be submitted with application.	Substantial Net Gain At least 2 X calculated loss in habitat hectares plus a large tree protection and replacement offset if any large trees are removed
HIGH	Clearing generally not permitted	Net Gain At least 1.5 X calculated loss in habitat hectares plus a large tree protection and replacement offset if any large trees are removed

Offset targets are directly related to the habitat hectare value of the removed vegetation. They can comprise indigenous vegetation retained for conservation purposes within the study area, or vegetation elsewhere, secured on a case-by-case basis by the proponent or through the DSE Bush Broker scheme.

Clause 66.02 of the planning scheme determines the role of the DSE in the assessment of indigenous vegetation removal planning permit applications. If an application is referred to the DSE then the Responsible Authority must follow that department's recommendation in relation to that permit application. The criteria presented in Table 6 indicate when the DSE becomes a referral authority.

Table 6: Application referral criteria

Applications will be referred to the Department of Sustainability and Environment under the following circumstances:
Remnant Patch Vegetation (may include trees) ▪ To remove or destroy native vegetation which is in an Ecological Vegetation Class that has a Bioregional Conservation Status of Endangered, Vulnerable or Rare if the area to be cleared is more than 0.5 hectare. ▪ To remove or destroy native vegetation which is in an Ecological Vegetation Class that has a Bioregional Conservation Status of Depleted or Least Concern if the area to be cleared is more than 1 hectare.

A referral to DSE would be required if the proposed development of the study area involved the removal of:

- More than 0.5 hectares of *Low-rainfall* Plains Grassland (EVC 132_63) recorded on site.

6.3.2. Design recommendations

The following recommendations are provided to aid in meeting the principles of the Framework:

- Following the principles of the Framework, indigenous vegetation removal should be avoided where possible. It is unlikely that all native vegetation removal can be avoided due to the scattered location of remnant patches and

therefore the development plan should minimise indigenous vegetation removal.

- Removal of indigenous vegetation of Very High conservation significance should be avoided over those of lower conservation significance.
- Removal of any vegetation that cannot be avoided must be offset as per the Framework.
- Where possible, existing planted trees, in particular old ones, should be retained and incorporated into the development plan. Whilst not indigenous, these trees are a valuable resource for native birds in the area.

6.4. EPBC Act

The *Environment Protection and Biodiversity Conservation Act 1999* contains a list of threatened species and ecological communities that are considered to be of national conservation significance. Any impacts on these species considered significant requires the approval of the Australian Minister for the Environment. If there is a possibility of a significant impact on nationally threatened species or communities or listed migratory species, a Referral under the EPBC Act should be considered. The Minister will decide after 20 business days whether the project will be a 'controlled action' under the EPBC Act, in which case it cannot be undertaken without the approval of the Minister. This approval depends on a further assessment and approval process.

6.4.1. Threatened ecological communities

One EPBC Act listed ecological community, Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP), was recorded in 13 of the 25 habitat zones (9.97 hectares). No other EPBC Act listed ecological communities were considered likely to occur.

6.4.2. Threatened flora species

No EPBC Act listed flora species were recorded or considered likely to occur.

6.4.3. Threatened fauna species

No EPBC Act listed fauna species were recorded or considered likely to occur

6.4.4. Key Threatening Processes under the EPBC Act

The following Key Threatening Processes are considered relevant for the project:

- Land clearance
- Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants
- Loss of terrestrial climatic habitat caused by anthropogenic emissions of greenhouse gases
- Predation by feral cats

Mitigation measures in Section 7.2 identify specific actions required to manage these key threatening processes.

6.4.5. *Implications*

A Referral under the EPBC Act would be required for the removal of Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP).

6.5. FFG Act

The Victorian *Flora and Fauna Guarantee Act 1988* lists threatened flora and fauna species to provide for their protection and management. The FFG Act has limited direct application to private land. However, Clause 12.01 (Conservation of Biodiversity) of the Planning Scheme makes reference to this Act. The local planning authority is likely to consider impacts on FFG Act-listed species and communities when deciding on planning permit applications.

6.5.1. *Threatened ecological communities*

One FFG Act listed ecological community, Western (Basalt) Plains Grassland Community, was recorded on site. All habitat zones recorded constituted this community. No other FFG Act listed ecological communities were considered likely to occur.

6.5.2. *Threatened/protected flora species*

No FFG Act listed flora species were recorded or considered likely to occur.

No flora values listed as protected under the FFG Act and were recorded on public land within the study area.

6.5.3. *Threatened fauna species*

No FFG Act listed fauna species were recorded or considered likely to occur.

6.5.4. *Key Threatening Processes under the FFG Act*

The following Key Threatening Processes are considered relevant for the project:

- Habitat fragmentation as a threatening process for fauna in Victoria.
- Invasion of native vegetation by "environmental weeds".
- Predation of native wildlife by the cat, *Felis catus*.

Mitigation measures in Section 7.2 identify specific actions required to manage these key threatening processes.

6.5.5. *Implications*

The removal of the FFG Act listed Western (Basalt) Plains Grassland Community will be considered by the responsible authority during the application process.

6.6. EE Act

The "Ministerial Guidelines for Assessment of Environmental Effects under the *Environment Effects Act 1978"* (DSE 2006), identifies the following criteria related to flora and fauna which assist in determining whether a Referral to the State Minister for Planning is required:

- Potential clearing of ten hectares or more of native vegetation from an area with endangered EVC, or vegetation that is or is likely to be, of very high

conservation significance according to Victoria's Native Vegetation Management Framework, except where authorised under an approved Forest Management Plan or Fire Protection Plan;
- Potential long-term loss of a significant proportion (1 to 5% depending upon conservation status of species concerned) of known remaining habitat or population of a threatened species in Victoria;
- Potential long-term change to a wetland's ecological character, where that wetland is Ramsar listed, or listed in 'A Directory of Important Wetlands in Australia';
- Potential major effects upon the biodiversity of aquatic ecosystems over the long term;
- Potential significant effects on matters listed under the *Flora and Fauna Guarantee Act 1988*.

One or a combination of these criteria may trigger a requirement for a Referral to the Victorian Minister for Planning who will determine if an EES is required. The proponent is currently liaising with the DPCD on this matter.

6.7. DSE advisory lists

Rare and threatened species advisory lists administered by the Department of Sustainability and Environment include flora and fauna species known to be rare or threatened throughout the state. Although the advisory list has no statutory status, the Responsible Authority will consider impacts on any species on the list when assessing a planning application.

No flora species from the DSE *Advisory List of Rare and Threatened Plants in Victoria* (DSE 2007b) were recorded in the study area and none are considered likely to occur.

No fauna species listed on the DSE *Advisory List of Threatened Vertebrate Fauna in Victoria* (DSE 2007c) were recorded in the study area and none are considered likely to occur.

6.8. DSE Biosites

Biosites support biological assets comprising ecological attributes including threatened flora and / or fauna, habitat to support these and rare / or threatened vegetation communities. Whist these sites are not protected by formal legislation, the Responsible Authority will consider impacts to these when assessing a planning application.

No biosites are located in the study area boundary.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1. Conclusions

The following implications would pertain to the current development proposal:

- A planning permit under Clause 52.17 of all Victorian Planning Schemes would be required for the removal of any indigenous vegetation from the study site, including scattered plants.
- The study area is not subject to any overlays in the Greater Geelong Planning Scheme.
- A referral to DSE would be required if the proposed development of the study area involved the removal of more than 0.5 hectares of *Low-rainfall* Plains Grassland (EVC 132_63) recorded on site.
- A Referral under the EPBC Act would be required for the removal of Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP).
- The removal of the FFG Act listed Western (Basalt) Plains Grassland Community will be considered by the responsible authority during the application process.
- A Referral to the State Minister under the EE Act is dependent on the development plan.
- Three EBPC listed migratory bird species are likely to occur occasionally. Impacts on listed migratory bird species would be unlikely as they are highly mobile and would only occur in the study area occasionally. Regional population impacts on these species are therefore not considered to be significant.
- Noise disturbance during construction activities is likely to have a short-term impact on fauna species which may result in temporary habitat displacement. However, considering the extent of available habitat in the surrounding area it is unlikely that the proposed development would result in a significant impact on these species. The other threatened species that might occur in the study area is the Spotted Harrier, which would occur only in very small numbers and is unlikely to be significantly affected by the current proposal due to its high mobility to move away from disturbance.
- One threatened fauna species, Spotted Harrier, was considered likely to occur due to the presence of suitable habitat. This species is not considered susceptible to significant impacts from the proposed development and therefore no further investigation is required.

7.2. Mitigation Recommendations

Consideration should be given to including the mitigation measures described below in a construction and operational environmental management plan for the project:

Pre-construction:

- Avoid disturbing the intact native vegetation and scattered trees where feasible.
- Avoid removal of large, hollow-bearing trees where feasible.
- In accordance with the *Catchment and Land Protection Act 1994*, the noxious weed species listed below, which were recorded in the study area, must be controlled using precision methods that minimise off-target kills (e.g. spot spraying). This method of control will be implemented throughout the project.
  - Onion Weed;
  - Serrated Tussock; and
  - Spear Thistle.
- The proposed development should be designed in a way that does not alter the site's hydrology in areas that support native vegetation or act as tributaries to significant drainage lines.
- Construction contractors should be inducted into an environmental management program for construction works.
- All environmental controls should be checked for compliance on a regular basis.

Construction phase:

- Environmentally sensitive areas should be securely fenced at two metres from the perimeter and appropriately signed. All machinery and earthworks are to be excluded from these areas.
- Any tree pruning should be undertaken by an experienced arborist to prevent disease or unnecessary damage to the tree or disturbance to understorey vegetation during tree trimming.
- Any stockpiling will occur outside of environmentally sensitive areas.
- All machinery should enter and exit works sites along defined routes that do not impact on native vegetation or cause soil disturbance and weed spread.
- All machinery brought on site should be weed and pathogen free. This is important for environmental and agricultural protection. Soil borne pathogens such as Cinnamon Fungus and livestock diseases can be easily transported by machinery.
- All machinery wash down, lay down and personnel rest areas should be defined (fenced) and located in disturbed areas.
- Best practice erosion control should be installed where an erosion hazard is identified, erosion control activities should include:
  - The use of sediment fences down slope of exposed soil and stockpiles.
  - Bunding of stockpiles.
  - Minimisation of the area of disturbed soil at any one time.

Post-construction phase:

- Weed control, by an experienced bush regenerator, is to be carried out along disturbed areas after construction to control any weed outbreaks in bushland or wetland areas.
- The use of local indigenous plant species, of local genetic provenance, should be considered in the landscaping of any development on the site. Locally indigenous species generally have low water-use requirements, high survival rates and provide habitat to local fauna species. The site provides a reservoir for grass seed collection within remnant patches.

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Appendix 1: Flora species recorded in the study area and threatened species known (or with the potential) to occur in the search region

Origin	Common Name	Scientific Name	Family Name	Conservation Status			Recorded
				FFG	EPBC	DSE	
	Adamson's Blown-grass	*Lachnagrostis adamsonii*	Poaceae	L	E	v	
	Austral Tobacco	*Nicotiana suaveolens*	Solanaceae			r	
*	Barley Grass	*Hordeum spp.*	Poaceae				X
	Berry Saltbush	*Atriplex semibaccata*	Chenopodiaceae				X
*	Big Heron's-bill	*Erodium botrys*	Geraniaceae				X
	Bindweed	*Convolvulus spp.*	Convolvulaceae				X
*	Black Nightshade	*Solanum nigrum s.s.*	Solanaceae				X
	Brittle Greenhood	*Pterostylis truncata*	Orchidaceae	L		e	
	Brown-back Wallaby-grass	*Rytidosperma duttonianum*	Poaceae				X
*	Buck's-horn Plantain	*Plantago coronopus*	Veronicaceae				X
	Button Wrinklewort	*Rutidosis leptorhynchoides*	Asteraceae	L	E	e	
*	Cat's Ear	*Hypochaeris spp.*	Asteraceae				X
*	Chilean Needle-grass	*Nassella neesiana*	Poaceae				X
*	Clover	*Trifolium spp.*	Fabaceae				X
	Clover Glycine	*Glycine latrobeana*	Fabaceae	L	V	v	
	Coast Saltwort	*Salsola tragus* subsp. *pontica*	Chenopodiaceae			r	
*	Cocksfoot	*Dactylis glomerata*	Poaceae				X
*	Couch	*Cynodon dactylon* var. *dactylon*	Poaceae				X
	Curly Sedge	*Carex tasmanica*	Cyperaceae	L	V	v	
*	Drain Flat-sedge	*Cyperus eragrostis*	Cyperaceae				X
	Drooping Mistletoe	*Amyema pendula* subsp. *longifolia*	Loranthaceae			r	

Origin	Common Name	Scientific Name	Family Name	Conservation Status			Recorded
				FFG	EPBC	DSE	
#Pl	Eucalypt	*Eucalyptus* spp.	Myrtaceae				X
#	Fragrant Saltbush	*Rhagodia parabolica*	Chenopodiaceae			r	
*	Galenia	*Galenia pubescens* var. *pubescens*	Aizoaceae				X
#Pl	Giant Honey-myrtle	*Melaleuca armillaris* subsp. *armillaris*	Myrtaceae				X
	Grey Mangrove	*Avicennia marina* subsp. *australasica*	Verbenaceae			r	
*	Horehound	*Marrubium vulgare*	Lamiaceae				X
	Kangaroo Grass	*Themeda triandra*	Poaceae				X
	Large-headed Fireweed	*Senecio macrocarpus*	Asteraceae	L	V	e	
	Maroon Leek-orchid	*Prasophyllum frenchii*	Orchidaceae	L	E	e	
	Marsh Saltbush	*Atriplex paludosa* subsp. *paludosa*	Chenopodiaceae			r	
	Melbourne Yellow-gum	*Eucalyptus leucoxylon* subsp. *connata*	Myrtaceae			v	
	Metallic Sun-orchid	*Thelymitra epipactoides*	Orchidaceae	L	E	e	
*	Oat	*Avena spp.*	Poaceae				X
*	Onion Grass	*Romulea rosea*	Iridaceae				X
*	Onion Weed	*Asphodelus fistulosus*	Asphodelaceae				X
*	Ox-tongue	*Helminthotheca echioides*	Asteraceae				X
*	Prairie Grass	*Bromus catharticus*	Poaceae				X
*	Ribwort	*Plantago lanceolata*	Veronicaceae				X
	Rye Beetle-grass	*Tripogon loliiformis*	Poaceae			r	
*	Rye Grass	*Lolium* spp.	Poaceae				X
*	Serrated Tussock	*Nassella trichotoma*	Poaceae				X
	Slender Wallaby-grass	*Rytidosperma racemosum* var. *racemosum*	Poaceae				X
	Small Golden Moths	*Diuris basaltica*	Orchidaceae	L	E	v	

Origin	Common Name	Scientific Name	Family Name	Conservation Status			Recorded
				FFG	EPBC	DSE	
	Small Milkwort	*Comesperma polygaloides*	Polygalaceae	L		v	
	Small Snake-orchid	*Diuris pedunculata* s.s.	Orchidaceae		E	e	
	Smooth Grevillea	*Grevillea rosmarinifolia* subsp. *glabella*	Proteaceae			r	
#	Snowy Mint-bush	*Prostanthera nivea* var. *nivea*	Lamiaceae			r	
#	Snowy River Wattle	*Acacia boormanii*	Mimosaceae			r	
	Spear Grass	*Austrostipa spp.*	Poaceae				X
*	Spear Thistle	*Cirsium vulgare*	Asteraceae				X
	Spiny Rice-flower	*Pimelea spinescens* subsp. *spinescens*	Thymelaeaceae	L	C	e	
	Stalked Brooklime	*Gratiola pedunculata*	Veronicaceae			k	
*	Sugar Gum	*Eucalyptus cladocalyx*	Myrtaceae				X
	Tasman Grass-wrack	*Heterozostera tasmanica*	Zosteraceae			r	
*	Toowoomba Canary-grass	*Phalaris aquatica*	Poaceae				X
*	Twiggy Turnip	*Brassica fruticulosa*	Brassicaceae				X
	Wallaby-grass	*Rytidosperma* spp.	Poaceae				X
	Wedge-leaf Daisy	*Brachyscome cuneifolia*	Asteraceae			k	
*	Wild Sage	*Salvia verbenaca*	Lamiaceae				X
	Windmill Grass	*Chloris truncata*	Poaceae				X
	Wood Sorrel	*Oxalis* spp.	Oxalidaceae				X

***** = introduced species; **#** = native species occurring outside of natural range; **Pl** = planted; **L** = listed as threatened; **EPBC** = status under EPBC Act; **DSE** = status under DSE's Advisory List; **C** = critically endangered; **E, e** = endangered; **V, v** = vulnerable; **R, r** = rare; **k** = insufficiently known

Appendix 2: Vertebrate terrestrial fauna species that occur or are likely to occur in the study area

Common Name	Scientific Name	Conservation Status			Recorded
		EPBC	FFG	DSE	
Birds					
Emu	*Dromaius novaehollandiae*				
Stubble Quail	*Coturnix pectoralis*				
Peaceful Dove	*Geopelia striata*				
Common Bronzewing	*Phaps chalcoptera*				
Brush Bronzewing	*Phaps elegans*				
Crested Pigeon	*Ocyphaps lophotes*				X
Black-tailed Native-hen	*Gallinula ventralis*				
Dusky Moorhen	*Gallinula tenebrosa*				
Purple Swamphen	*Porphyrio porphyrio*				
Eurasian Coot	*Fulica atra*				
Great Crested Grebe	*Podiceps cristatus*				
Australasian Grebe	*Tachybaptus novaehollandiae*				
Hoary-headed Grebe	*Poliocephalus poliocephalus*				
Little Black Cormorant	*Phalacrocorax sulcirostris*				
Little Pied Cormorant	*Microcarbo melanoleucos*				X
Darter	*Anhinga novaehollandiae*				
Australian Pelican	*Pelecanus conspicillatus*				
Silver Gull	*Chroicocephalus novaehollandiae*				
Masked Lapwing	*Vanellus miles*				X
Banded Lapwing	*Vanellus tricolor*				
Australian White Ibis	*Threskiornis molucca*				

Common Name	Scientific Name	Conservation Status			Recorded
		EPBC	FFG	DSE	
Straw-necked Ibis	*Threskiornis spinicollis*				
Yellow-billed Spoonbill	*Platalea flavipes*				
White-faced Heron	*Egretta novaehollandiae*				
White-necked Heron	*Ardea pacifica*				
Australian Wood Duck	*Chenonetta jubata*				
Black Swan	*Cygnus atratus*				
Australian Shelduck	*Tadorna tadornoides*				
Pacific Black Duck	*Anas superciliosa*				
Chestnut Teal	*Anas castanea*				
Grey Teal	*Anas gracilis*				
Spotted Harrier	*Circus assimilis*			NT	
Swamp Harrier	*Circus approximans*				
Brown Goshawk	*Accipiter fasciatus*				
Collared Sparrowhawk	*Accipiter cirrhocephalus*				
Wedge-tailed Eagle	*Aquila audax*				
Little Eagle	*Hieraaetus morphnoides*				
Whistling Kite	*Haliastur sphenurus*				
Black Kite	*Milvus migrans*				
Black-shouldered Kite	*Elanus axillaris*				
Australian Hobby	*Falco longipennis*				
Peregrine Falcon	*Falco peregrinus*				
Brown Falcon	*Falco berigora*				
Nankeen Kestrel	*Falco cenchroides*				

Common Name	Scientific Name	Conservation Status			Recorded
		EPBC	FFG	DSE	
Southern Boobook	*Ninox novaeseelandiae*				
Pacific Barn Owl	*Tyto javanica*				
Rainbow Lorikeet	*Trichoglossus haematodus*				X
Scaly-breasted Lorikeet	*Trichoglossus chlorolepidotus*				
Musk Lorikeet	*Glossopsitta concinna*				X
Purple-crowned Lorikeet	*Glossopsitta porphyrocephala*				X
Little Lorikeet	*Glossopsitta pusilla*				
Yellow-tailed Black-Cockatoo	*Calyptorhynchus funereus*				
Sulphur-crested Cockatoo	*Cacatua galerita*				
Little Corella	*Cacatua sanguinea*				
Long-billed Corella	*Cacatua tenuirostris*				
Galah	*Eolophus roseicapilla*				
Cockatiel	*Nymphicus hollandicus*				
Crimson Rosella	*Platycercus elegans elegans*				
Eastern Rosella	*Platycercus eximius*				
Red-rumped Parrot	*Psephotus haematonotus*				
Budgerigar	*Melopsittacus undulatus*				
Tawny Frogmouth	*Podargus strigoides*				
Australian Owlet-nightjar	*Aegotheles cristatus*				
Dollarbird	*Eurystomus orientalis*				
Laughing Kookaburra	*Dacelo novaeguineae*				
White-throated Nightjar	*Eurostopodus mystacalis*				
White-throated Needletail	*Hirundapus caudacutus*				

Common Name	Scientific Name	Conservation Status			Recorded
		EPBC	FFG	DSE	
Fork-tailed Swift	*Apus pacificus*				
Pallid Cuckoo	*Cuculus pallidus*				
Fan-tailed Cuckoo	*Cacomantis flabelliformis*				
Brush Cuckoo	*Cacomantis variolosus*				
Horsfield's Bronze-Cuckoo	*Chrysococcyx basalis*				
Shining Bronze-Cuckoo	*Chrysococcyx lucidus*				
Welcome Swallow	*Hirundo neoxena*				X
White-backed Swallow	*Cheramoeca leucosternus*				
Tree Martin	*Hirundo nigricans*				
Fairy Martin	*Hirundo ariel*				
Grey Fantail	*Rhipidura albiscarpa*				
Willie Wagtail	*Rhipidura leucophrys*				X
Leaden Flycatcher	*Myiagra rubecula*				
Satin Flycatcher	*Myiagra cyanoleuca*				
Restless Flycatcher	*Myiagra inquieta*				
Black-faced Monarch	*Monarcha melanopsis*				
Eastern Yellow Robin	*Eopsaltria australis*				
Golden Whistler	*Pachycephala pectoralis*				
Grey Shrike-thrush	*Colluricincla harmonica*				
Magpie-lark	*Grallina cyanoleuca*				
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*				
White-bellied Cuckoo-shrike	*Coracina papuensis*				
Common Cicadabird	*Coracina tenuirostris*				

Common Name	Scientific Name	Conservation Status			Recorded
		EPBC	FFG	DSE	
White-winged Triller	*Lalage sueurii*				
White-browed Babbler	*Pomatostomus superciliosus*				
White-fronted Chat	*Epthianura albifrons*				
White-throated Gerygone	*Gerygone olivacea*				
Weebill	*Smicrornis brevirostris*				
Striated Thornbill	*Acanthiza lineata*				
Yellow Thornbill	*Acanthiza nana*				X
Brown Thornbill	*Acanthiza pusilla*				
Buff-rumped Thornbill	*Acanthiza reguloides*				
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*				
White-browed Scrubwren	*Sericornis frontalis*				
Striated Fieldwren	*Calamanthus fuliginosus*				
Brown Songlark	*Cincloramphus cruralis*				
Rufous Songlark	*Cincloramphus mathewsi*				
Little Grassbird	*Megalurus gramineus*				
Clamorous Reed Warbler	*Acrocephalus stentoreus*				
Golden-headed Cisticola	*Cisticola exilis*				
Superb Fairy-wren	*Malurus cyaneus*				
Masked Woodswallow	*Artamus personatus*				
White-browed Woodswallow	*Artamus superciliosus*				
Dusky Woodswallow	*Artamus cyanopterus*				
Varied Sittella	*Daphoenositta chrysoptera*				
White-throated Treecreeper	*Cormobates leucophaeus*				

Common Name	Scientific Name	Conservation Status			Recorded
		EPBC	FFG	DSE	
Mistletoebird	*Dicaeum hirundinaceum*				
Spotted Pardalote	*Pardalotus punctatus*				
Silvereye	*Zosterops lateralis*				
White-naped Honeyeater	*Melithreptus lunatus*				
Brown-headed Honeyeater	*Melithreptus brevirostris*				
Black Honeyeater	*Sugamel niger*				
Eastern Spinebill	*Acanthorhynchus tenuirostris*				
White-fronted Honeyeater	*Phylidonyris albifrons*				
Singing Honeyeater	*Lichenostomus virescens*				
Fuscous Honeyeater	*Lichenostomus fuscus*				
Yellow-faced Honeyeater	*Lichenostomus chrysops*				
White-eared Honeyeater	*Lichenostomus leucotis*				
Yellow-tufted Honeyeater	*Lichenostomus melanops*				
Yellow-plumed Honeyeater	*Lichenostomus ornatus*				
White-plumed Honeyeater	*Lichenostomus penicillatus*				
Crescent Honeyeater	*Phylidonyris pyrrhoptera*				
New Holland Honeyeater	*Phylidonyris novaehollandiae*				X
Noisy Miner	*Manorina melanocephala*				
Little Wattlebird	*Anthochaera chrysoptera*				
Red Wattlebird	*Anthochaera carunculata*				X
Spiny-cheeked Honeyeater	*Acanthagenys rufogularis*				
Australasian Pipit	*Anthus novaeseelandiae*				
Horsfield's Bushlark	*Mirafra javanica*				

Common Name	Scientific Name	Conservation Status			Recorded
		EPBC	FFG	DSE	
Zebra Finch	*Taeniopygia guttata*				
Red-browed Finch	*Neochmia temporalis*				
Olive-backed Oriole	*Oriolus sagittatus*				
White-winged Chough	*Corcorax melanorhamphos*				
Pied Currawong	*Strepera graculina*				
Grey Currawong	*Strepera versicolor*				
Grey Butcherbird	*Cracticus torquatus*				
Australian Magpie	*Gymnorhina tibicen*				X
Bassian Thrush	*Zoothera lunulata*				
Australian Raven	*Corvus coronoides*				
Little Raven	*Corvus mellori*				X
Rock Dove	*Columba livia*			*	
Striated Pardalote	*Pardalotus striatus*				
Spotted Turtle-Dove	*Streptopelia chinensis*			*	X
Common Blackbird	*Turdus merula*			*	X
Song Thrush	*Turdus philomelos*			*	
European Skylark	*Alauda arvensis*			*	X
Eurasian Tree Sparrow	*Passer montanus*			*	
House Sparrow	*Passer domesticus*			*	X
European Goldfinch	*Carduelis carduelis*			*	
European Greenfinch	*Carduelis chloris*			*	X
Common Myna	*Acridotheres tristis*			*	X
Common Starling	*Sturnus vulgaris*			*	

Common Name	Scientific Name	Conservation Status			Recorded
		EPBC	FFG	DSE	
Mammals					
Short-beaked Echidna	*Tachyglossus aculeatus*				
Common Brushtail Possum	*Trichosurus vulpecula*				
Sugar Glider	*Petaurus breviceps*				
Black Wallaby	*Wallabia bicolor*				
Eastern Grey Kangaroo	*Macropus giganteus*				
White-striped Freetail Bat	*Tadarida australis*				
Gould's Wattled Bat	*Chalinolobus gouldii*				
Chocolate Wattled Bat	*Chalinolobus morio*				
Black Rat	*Rattus rattus*			*	
Brown Rat	*Rattus norvegicus*			*	
House Mouse	*Mus musculus*			*	
Water Rat	*Hydromys chrysogaster*				
European Rabbit	*Oryctolagus cuniculus*			*	X
European Hare	*Lepus europeaus*			*	
Red Fox	*Vulpes vulpes*			*	
Cat	*Felis catus*			*	
Reptiles					
Marbled Gecko	*Christinus marmoratus*				
Tree Dragon	*Amphibolurus muricatus*				
Large Striped Skink	*Ctenotus robustus*				
Garden Skink	*Lampropholis guichenoti*				
Metallic Skink	*Niveoscincus metallicus*				

Common Name	Scientific Name	Conservation Status			Recorded
		EPBC	FFG	DSE	
Bougainville's Skink	*Lerista bougainvillii*				
Common Blue-tongued Lizard	*Tiliqua scincoides*				
White-lipped Snake	*Drysdalia coronoides*				
Tiger Snake	*Notechis scutatus*				
Red-bellied Black Snake	*Pseudechis porphyriacus*				
Eastern Brown Snake	*Pseudonaja textilis*				
Little Whip Snake	*Suta flagellum*				
Lowland Copperhead	*Austrelaps superbus*				
Tussock Skink	*Pseudemoia pagenstecheri*				
Amphibians					
Southern Bullfrog	*Limnodynastes dumerilii*				
Striped Marsh Frog	*Limnodynastes peronii*				
Spotted Marsh Frog	*Limnodynastes tasmaniensis*				
Common Spadefoot Toad	*Neobatrachus sudelli*				
Common Froglet	*Crinia signifera*				
Southern Brown Tree Frog	*Litoria ewingii*				
Whistling Tree Frog	*Litoria verreauxii verreauxii*				
Invertebrates					
Golden Sun Moth	*Synemon plana*	CE	L	CE	

DSE – Status from DSE Advisory List; **EPBC** – Status under EPBC Act; **FFG** – Status under FFG Act; **CE** – Critically endangered; **EN** – Endangered; **VU**– Vulnerable; **NT** – Lower risk near threatened; **DD** = data deficient; **L** – Listed under FFG Act; ***** = introduced species; **X** = recorded

Appendix 3: Detailed habitat hectare assessment results

Habitat Zone			A	B	C	D	E
EVC Name (Initials)			PlGr	PlGr	PlGr	PlGr	PlGr
EVC Number			132_63	132_64	132_65	132_66	132_67
Total area of Habitat Zone (ha)			0.127	0.484	1.266	0.165	0.247
Site Condition	Large Old Trees	/10	N/A	N/A	N/A	N/A	N/A
	Canopy Cover	/5	N/A	N/A	N/A	N/A	N/A
	Lack of Weeds	/15	0	6	6	4	6
	Understorey	/25	5	5	5	5	5
	Recruitment	/10	5	5	5	5	5
	Organic Matter	/5	3	3	3	3	3
	Logs	/5	N/A	N/A	N/A	N/A	N/A
	Total site condition score		13	19	19	17	19
	Possible site condition score		55	55	55	55	55
	*Adjusted site condition score**		*18*	*26*	*26*	*23*	*26*
Landscape Context	Patch Size	/10	1	1	1	1	1
	Neighbourhood	/10	0	0	0	0	0
	Distance to Core	/5	1	1	1	1	1
	Landscape context subtotal		*2*	*2*	*2*	*2*	*2*
Total Habitat Score		**/100**	**20**	**28**	**28**	**25**	**28**
Habitat score out of 1			0.20	0.28	0.28	0.25	0.28
Habitat Hectares in Habitat Zone#			**0.02**	**0.13**	**0.35**	**0.04**	**0.07**
Bioregion			VVP	VVP	VVP	VVP	VVP
EVC Conservation Status			E	E	E	E	E
Conservation Significance	Conservation Status x Habitat Score		High	High	High	High	High
	Threatened Species Rating		Low	Low	Low	Low	Low
	Other Site Attribute Rating		Low	Low	Low	Low	Low
	Overall Conservation Significance (highest)		**High**	**High**	**High**	**High**	**High**
No. Large Old Trees^ in Habitat Zone			N/A	N/A	N/A	N/A	N/A

* = Modified approach to habitat scoring - refer to Table 14 of DSE's Vegetation Quality Assessment Manual (DSE, 2004); # = Habitat hectares (habitat score/100 X area [ha]).

Habitat Zone			F	G	H	I	J
EVC Name (Initials)			PlGr	PlGr	PlGr	PlGr	PlGr
EVC Number			132_68	132_69	132_70	132_71	132_72
Total area of Habitat Zone (ha)			0.649	0.137	1.308	0.097	0.693
Site Condition	Large Old Trees	/10	N/A	N/A	N/A	N/A	N/A
	Canopy Cover	/5	N/A	N/A	N/A	N/A	N/A
	Lack of Weeds	/15	6	7	0	6	6
	Understorey	/25	5	5	5	5	5
	Recruitment	/10	5	5	5	5	5
	Organic Matter	/5	3	3	3	3	3
	Logs	/5	N/A	N/A	N/A	N/A	N/A
	Total site condition score		19	20	13	19	19
	Possible site condition score		55	55	55	55	55
	*Adjusted site condition score**		*26*	*27*	*18*	*26*	*26*
Landscape Context	Patch Size	/10	1	1	1	1	1
	Neighbourhood	/10	0	0	0	0	0
	Distance to Core	/5	1	1	1	1	1
	Landscape context subtotal		*2*	*2*	*2*	*2*	*2*
Total Habitat Score		**/100**	**28**	**29**	**20**	**28**	**28**
Habitat score out of 1			0.28	0.29	0.20	0.28	0.28
Habitat Hectares in Habitat Zone#			**0.18**	**0.04**	**0.26**	**0.03**	**0.19**
Bioregion			VVP	VVP	VVP	VVP	VVP
EVC Conservation Status			E	E	E	E	E
Conservation Significance	Conservation Status x Habitat Score		High	High	High	High	High
	Threatened Species Rating		Low	Low	Low	Low	Low
	Other Site Attribute Rating		Low	Low	Low	Low	Low
	Overall Conservation Significance (highest)		**High**	**High**	**High**	**High**	**High**
No. Large Old Trees^ in Habitat Zone			N/A	N/A	N/A	N/A	N/A

* = Modified approach to habitat scoring - refer to Table 14 of DSE's Vegetation Quality Assessment Manual (DSE, 2004); # = Habitat hectares (habitat score/100 X area [ha]).

Habitat Zone			K	L	M	N	O
EVC Name (Initials)			PlGr	PlGr	PlGr	PlGr	PlGr
EVC Number			132_73	132_74	132_75	132_76	132_77
Total area of Habitat Zone (ha)			0.057	2.114	1.006	1.153	0.593
Site Condition	Large Old Trees	/10	N/A	N/A	N/A	N/A	N/A
	Canopy Cover	/5	N/A	N/A	N/A	N/A	N/A
	Lack of Weeds	/15	6	9	6	9	9
	Understorey	/25	5	5	5	5	5
	Recruitment	/10	5	5	5	5	5
	Organic Matter	/5	3	3	3	3	3
	Logs	/5	N/A	N/A	N/A	N/A	N/A
	Total site condition score		19	22	19	22	22
	Possible site condition score		55	55	55	55	55
	*Adjusted site condition score**		*26*	*30*	*26*	*30*	*30*
Landscape Context	Patch Size	/10	1	1	1	1	1
	Neighbourhood	/10	0	0	0	0	0
	Distance to Core	/5	1	1	1	1	1
	Landscape context subtotal		*2*	*2*	*2*	*2*	*2*
Total Habitat Score		**/100**	**28**	**32**	**28**	**32**	**32**
Habitat score out of 1			0.28	0.32	0.28	0.32	0.32
Habitat Hectares in Habitat Zone#			**0.02**	**0.67**	**0.28**	**0.37**	**0.19**
Bioregion			VVP	VVP	VVP	VVP	VVP
EVC Conservation Status			E	E	E	E	E
Conservation Significance	Conservation Status x Habitat Score		High	High	High	High	High
	Threatened Species Rating		Low	Low	Low	Low	Low
	Other Site Attribute Rating		Low	Low	Low	Low	Low
	Overall Conservation Significance (highest)		**High**	**High**	**High**	**High**	**High**
No. Large Old Trees^ in Habitat Zone			N/A	N/A	N/A	N/A	N/A

* = Modified approach to habitat scoring - refer to Table 14 of DSE's Vegetation Quality Assessment Manual (DSE, 2004); # = Habitat hectares (habitat score/100 X area [ha]).

Habitat Zone			P	Q	R	S	T
EVC Name (Initials)			PlGr	PlGr	PlGr	PlGr	PlGr
EVC Number			132_78	132_79	132_80	132_81	132_63
Total area of Habitat Zone (ha)			0.474	1.088	1.533	1.187	0.154
Site Condition	Large Old Trees	/10	N/A	N/A	N/A	N/A	N/A
	Canopy Cover	/5	N/A	N/A	N/A	N/A	N/A
	Lack of Weeds	/15	4	6	0	13	4
	Understorey	/25	5	5	5	5	5
	Recruitment	/10	5	5	5	5	5
	Organic Matter	/5	3	3	5	3	3
	Logs	/5	N/A	N/A	N/A	N/A	N/A
	Total site condition score		17	19	26	15	17
	Possible site condition score		55	55	55	55	55
	*Adjusted site condition score**		*23*	*26*	*35*	*20*	*23*
Landscape Context	Patch Size	/10	1	1	1	1	1
	Neighbourhood	/10	0	0	0	0	0
	Distance to Core	/5	1	1	1	1	1
	Landscape context subtotal		*2*	*2*	*2*	*2*	*2*
Total Habitat Score		**/100**	**25**	**28**	**37**	**22**	**25**
Habitat score out of 1			0.25	0.28	0.37	0.25	0.22
Habitat Hectares in Habitat Zone#			**0.12**	**0.30**	**0.57**	**0.30**	**0.03**
Bioregion			VVP	VVP	VVP	VVP	VVP
EVC Conservation Status			E	E	E	E	E
Conservation Significance	Conservation Status x Habitat Score		High	High	High	High	High
	Threatened Species Rating		Low	Low	Low	Low	Low
	Other Site Attribute Rating		Low	Low	Low	Low	Low
	Overall Conservation Significance (highest)		**High**	**High**	**High**	**High**	**High**
No. Large Old Trees^ in Habitat Zone			N/A	N/A	N/A	N/A	N/A

* = Modified approach to habitat scoring - refer to Table 14 of DSE's Vegetation Quality Assessment Manual (DSE, 2004); # = Habitat hectares (habitat score/100 X area [ha]).

Habitat Zone			U	V	W	X	Y
EVC Name (Initials)			PlGr	PlGr	PlGr	PlGr	PlGr
EVC Number			132_63	132_63	132_63	132_63	132_63
Total area of Habitat Zone (ha)			0.297	0.585	0.904	0.174	1.194
Site Condition	Large Old Trees	/10	N/A	N/A	N/A	N/A	N/A
	Canopy Cover	/5	N/A	N/A	N/A	N/A	N/A
	Lack of Weeds	/15	0	9	4	6	9
	Understorey	/25	5	5	5	5	5
	Recruitment	/10	5	5	5	5	5
	Organic Matter	/5	3	3	5	5	5
	Logs	/5	N/A	N/A	N/A	N/A	N/A
	Total site condition score		13	22	19	21	24
	Possible site condition score		55	55	55	55	55
	*Adjusted site condition score**		*18*	*30*	*26*	*29*	*33*
Landscape Context	Patch Size	/10	1	1	1	1	1
	Neighbourhood	/10	0	0	0	0	0
	Distance to Core	/5	1	1	1	1	1
	Landscape context subtotal		*2*	*2*	*2*	*2*	*2*
Total Habitat Score		**/100**	**20**	**32**	**28**	**31**	**35**
Habitat score out of 1			0.20	0.32	0.28	0.31	0.35
Habitat Hectares in Habitat Zone#			**0.06**	**0.19**	**0.25**	**0.05**	**0.41**
Bioregion			VVP	VVP	VVP	VVP	VVP
EVC Conservation Status			E	E	E	E	E
Conservation Significance	Conservation Status x Habitat Score		High	High	High	High	High
	Threatened Species Rating		Low	Low	Low	Low	Low
	Other Site Attribute Rating		Low	Low	Low	Low	Low
	Overall Conservation Significance (highest)		**High**	**High**	**High**	**High**	**High**
No. Large Old Trees^ in Habitat Zone			N/A	N/A	N/A	N/A	N/A

* = Modified approach to habitat scoring - refer to Table 14 of DSE's Vegetation Quality Assessment Manual (DSE, 2004); # = Habitat hectares (habitat score/100 X area [ha]).

Appendix 4: EVC Benchmarks

- EVC 132_63 – Victorian Volcanic Plain bioregion

Department of Sustainability and Environment

EVC/Bioregion Benchmark for Vegetation Quality Assessment

Victorian Volcanic Plain bioregion

EVC 132_63: *Low-rainfall* Plains Grassland

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

Life forms:

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

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

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

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

Organic Litter:
10% cover

Victoria The Place To Be

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

Weediness:

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

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Appendix 5: Best / Remaining 50% habitat assessment for rare and threatened species

Species and DSE Conservation Status	Habitat Zones	Assessment Process	Outcome	Conservation significance	Justification
Golden Sun Moth	B, C, D, E, F, J, L, N, O, P, Q, R, T, V, W & X	A. The species has not been recorded on site. → D	Best 50% of habitat	Very High	Golden Sun Moth occurs in native grasslands. The condition of the habitat is considered to represent above-average condition due to the presence of key grassland species such as Wallaby grasses. The species has also been recorded in the wider region and therefore was considered likely to occur in the study area. Targeted surveys were undertaken in the summer of 2012/2013 and the species was not recorded and is therefore not considered likely to occur.
		D. The habitat on site meets one or more of the habitat requirements of the species and the species is likely to use the site in the medium term. →F			
(critically endangered)		F. The site does represent above-average condition and landscape context for the relevant EVC and habitat type in the region. → Yes			
		Best 50% habitat			

Notes: For habitat zones refer to Figure 2; Assessment process refers to Table 2 in the Guide for Assessment of referred planning permit applications (DSE 2007a)